APPENDIX D: NOISE AND VIBRATION ANALYSIS

Glen Helen Specific Plan Amendment

NOISE AND VIBRATION ANALYSIS

COUNTY OF SAN BERNARDINO

PREPARED BY:

Bill Lawson, PE, INCE
blawson@urbanxroads.com
(949) 584-3148

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LIST OF ABBREVIATED TERMS

(1)	Reference
ANSI	American National Standards Institute
Calveno	California Vehicle Noise
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
DEIR	Draft Environmental Impact Report
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GHSP	Glen Helen Specific Plan
INCE	Institute of Noise Control Engineering
L_{eq}	Equivalent continuous (average) sound level
L_{max}	Maximum level measured over the time interval
mph	Miles per hour
PPV	Peak Particle Velocity
Project	Glen Helen Specific Plan Amendment
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 Glen Helen Specific Plan Amendment development ("Project"). The Project site is located south of the Interstate 215 (I-215) and Interstate 15 interchange in the County of San Bernardino. The proposed Project would rezone three out of the six Subareas located within the Glen Helen Specific Plan (GHSP) including: North Glen Helen, Devore, and Sycamore Flats. This noise study has been prepared to satisfy applicable County of San Bernardino 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	*Potentially Significant*	*Less Than Significant*
Operational Noise	9	*Less Than Significant*	-
Construction Noise	10	*Less Than Significant*	-
Nighttime Concrete Pour Noise		*Less Than Significant*	-
Construction Vibration		*Less Than Significant*	-

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1 INTRODUCTION

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

1.1 SITE LOCATION

The proposed Project is located at located south of the Interstate 215 (I-215) and Interstate 15 interchange in the County of San Bernardino.

1.2 PROJECT DESCRIPTION

The Project consists of three out of the six Subareas located within the Glen Helen Specific Plan (GHSP) including: North Glen Helen, Devore, and Sycamore Flats. The proposed amendment would rezone 79 acres of Destination Recreation (DR), 31.8 acres of Commercial/Trailer Services (C/TS) to Corridor Industrial (CI); and 48.7 acres of Single-Family Residential (SFR-SF) would be modified to have a Corridor Industrial (CI) Overlay. Of this area, 79 acres would be used for truck trailer storage/parking for existing nearby facilities. The GHSP Land Use Map is shown on Exhibit 1-A.

- Within the North Glen Helen (Subarea A), the proposed amendment would rezone 79 acres of Destination Recreation (DR) to Corridor Industrial (CI) to be used for truck trailer parking. (2,912 new actual trips compared to the adopted GHSP)
- Within the Devore (Subarea B), the proposed amendment would rezone 19.2 acres of Commercial/Traveler Services (C/TS) to 19.2 acres designated for Corridor Industrial (CI). (-10,972 new actual trips compared to the adopted GHSP)
- Within the Sycamore Flats (Subarea C), the proposed amendment would rezone 12.6 acres of Commercial/Traveler Services (C/TS) to Corridor Industrial (CI) and 48.7 acres designated for Single-Family Residential (SFR-SF) would be modified to include a Corridor Industrial (CI) Overlay. (-6,795 actual new trips compared to the adopted GHSP)

This noise study focuses on the three subareas within the GHSP shown on Exhibit 1-B that the proposed Specific Plan Amendment aims to address – North Glen Helen, Devore, and Sycamore Flats subareas. Any future project that requires discretionary approval is required to complete a project specific environmental analysis consistent with the California Environmental Quality Act (CEQA) and California Environmental Quality Act (CEAQ) Guidelines.

EXHIBIT 1-A: GLEN HELEN SPECIFIC PLAN LAND USE MAP

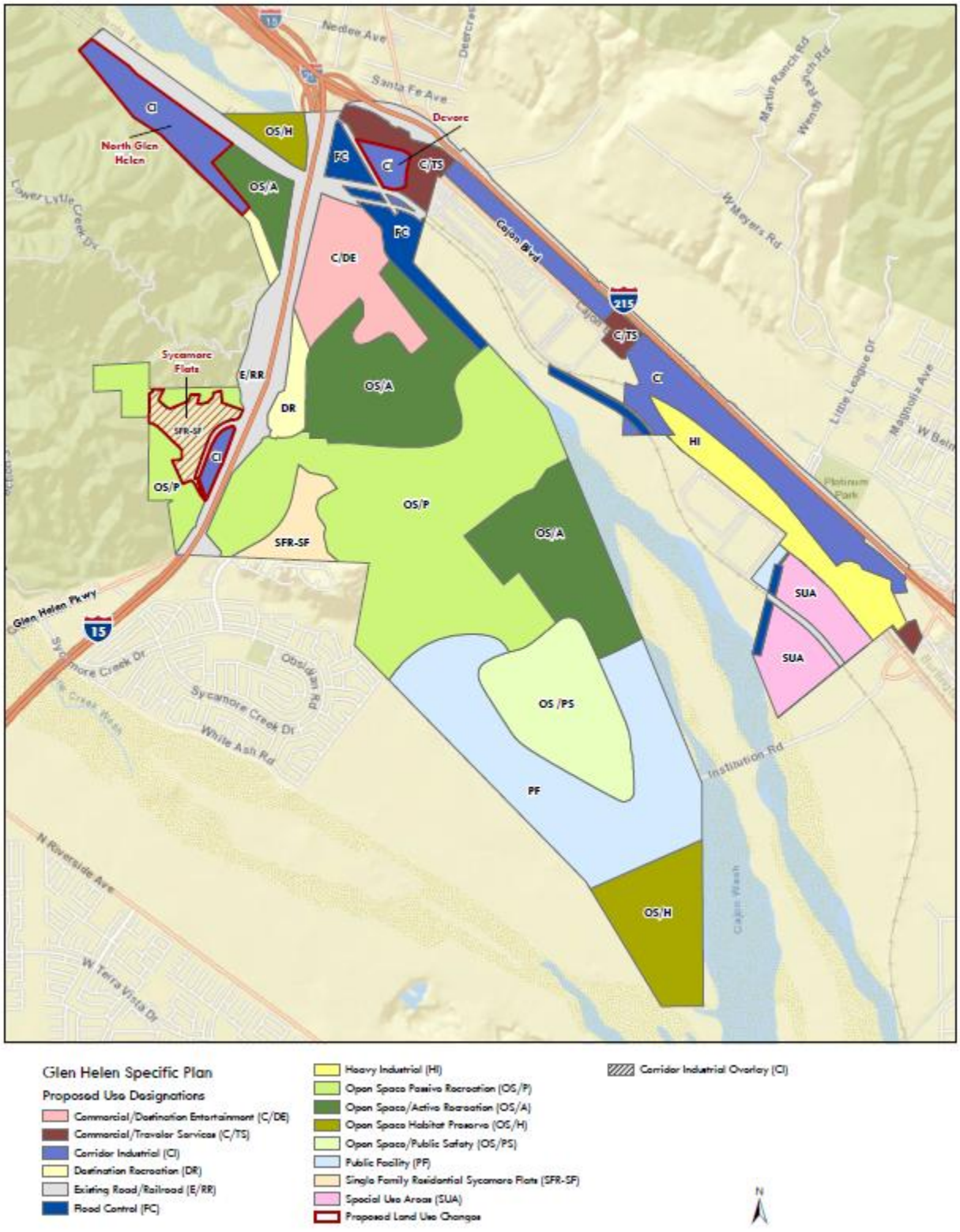
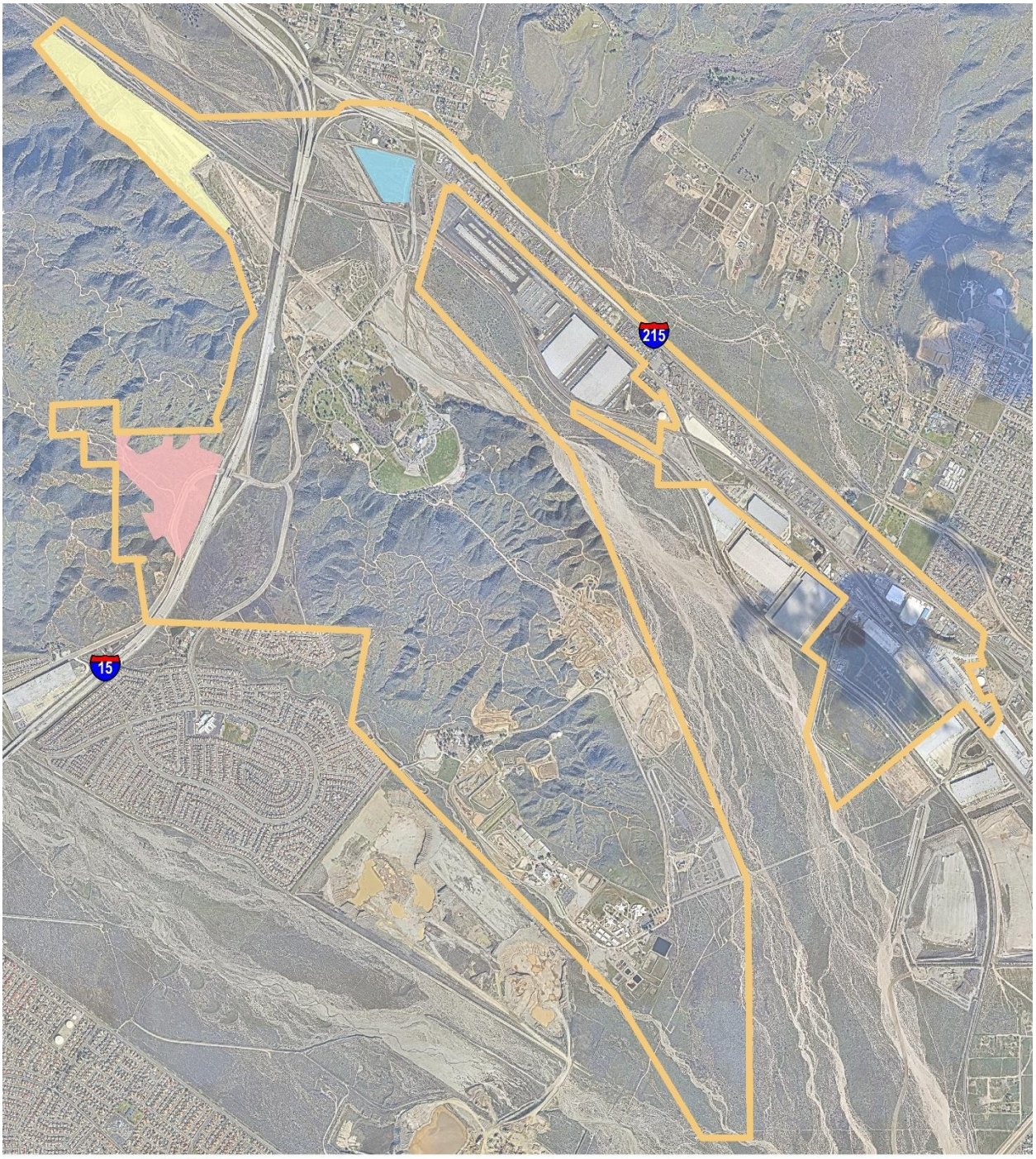


EXHIBIT 1-B: PROJECT STUDY AREA



1.3 GLEN HELEN SPECIFIC PLAN DEIR

On November 2000, the County of San Bernardino adopted the Glen Helen Specific Plan Draft Environmental Impact Report (DEIR). (2) Section 4.5.1 summarizes the technical noise analysis included in Appendix E of the DEIR. The DEIR outlines the following potential environmental noise impacts and mitigation measures to reduce or avoid impacts.

1.3.1 OFF-SITE TRAFFIC NOISE (MOBILE NOISE SOURCES)

The DEIR determined that several of the proposed land uses would be subject to elevated levels of vehicle noise above those levels deemed acceptable in the County's General Plan and, as such, are potentially subject to significant impact. Noise levels associated with project-related traffic could result in increases in excess of the 5 dBA criterion value. The following implementation measures were identified to reduce the potential project related to traffic noise level increase impacts to *less than significant*.

4.5-6: **Mobile Noise Sources**. Increase setbacks may be required for those proposed land use zones outlined in GHSP Table 4.5-9 as being subjected to potentially significant noise from roadway sources, as well as the distances specified in the analysis for the railroad operations.

4.5-7: **Sound Proofing Existing Residences**. Commercial projects that increase traffic on Glen Helen Parkway may be required to contribute toward sound-proofing existing residences on Glen Helen Parkway or Glen Helen Road. Such sound-proofing may include, but shall not be limited to:

- Sound-rated windows
- Sound-rated solid core doors
- Additional weather stripping

Any commercial or industrial projects proposed adjacent to an existing residence shall incorporate site plan features including walls, landscaping, and appropriate building orientation siting as needed to attenuate noise. One or more of the above listed soundproofing improvements to the existing residences) may also be required.

1.3.2 OPERATIONAL NOISE

For the operational noise impacts from the Project, the DEIR found that implementation of the Specific Plan could result in the siting of incompatible land use in proximity, such as stationary noise sources may infringe upon a noise sensitive land use. In addition, noises associated with industrial land uses have the potential to exceed the County stationary source requirements. The following implementation measures were identified to reduce the potential project related to long-term operational noise level impacts to less than significant.

4.5-4: **Location of Industrial Facilities**. No industrial facilities shall be constructed within 500 feet of any commercial land uses or within 2,800 feet of any residential land use designation without the preparation of a dedicated noise analysis.

4.5-5: **Noise Study**. Prior to development, a developer shall contract for a site specific noise study for the parcel. Prior to the issuance of development permits and the approval of

land use applications noted acoustic analysis is to be received and approved by the County Environmental Health Services Department.

1.3.3 CONSTRUCTION NOISE

For the short-term construction related noise impacts from the Project, the DEIR found that construction traffic could result in short-term increases in the ambient noise on local roadways. Noise generated at the site during site preparation, grading and construction could result in short-term noise increases. The following implementation measures were identified to reduce the potential project related to long-term operational noise level impacts to less than significant.

4.5-1: **Construction Hours**. County Performance Standards Section 87.0905(e) exempts, "Temporary construction, repair, or demolition activities between 7:00 a.m. and 7:00 p.m. except Sundays and Federal holidays." Construction, which will be subject to distance requirements outlined in Table 4.5-7 of this document, shall be subject to these limitations.

4.5-2: **Delivery Vehicles**. Haul truck deliveries shall be subject to the same hours specified for construction equipment (see above). Additionally, any construction projects where heavy trucks would exceed 100 daily trips shall be required to have a noise mitigation plan. To the extent feasible, the plan shall denote haul routes that do not pass sensitive land uses or residential dwellings.

4.5-3: **Noise Mitigation Plan**. Prior to the issuance of any grading permits, the County shall condition subdivision approval of any project adjacent to any developed/occupied noise sensitive land uses by requiring the developer to submit a construction related noise mitigation plan for the County's review and approval.

The on-site Project-related noise sources from buildout of the proposed Corridor Industrial (CI) are expected to include: loading dock activity, roof-top air conditioning units, parking lot vehicle activities, trash enclosure activity, and truck movements. This noise analysis is intended to describe the noise level impacts associated with the expected typical operational activities from buildout of the proposed land uses.

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2 FUNDAMENTALS

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

EXHIBIT 2-A: TYPICAL NOISE LEVELS

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

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

2.1 RANGE OF NOISE

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. (3) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA

at approximately 1,000 feet, which can cause serious discomfort. (4) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.2 NOISE DESCRIPTORS

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

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

2.3 SOUND PROPAGATION

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

2.3.1 GEOMETRIC SPREADING

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

2.3.2 GROUND ABSORPTION

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

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

2.3.3 ATMOSPHERIC EFFECTS

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

2.3.4 SHIELDING

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Shielding by trees and other such vegetation typically only has an “out of sight, out of mind” effect. That is, the perception of noise impact tends to decrease when vegetation blocks the line-of-sight to nearby residents. However, for vegetation to provide a substantial, or even noticeable, noise reduction, the vegetation area must be at least 15 feet in height, 100 feet wide and dense enough to completely obstruct the line-of-sight between the source and the receiver. This size of vegetation may provide up to 5 dBA of noise reduction. The Federal Highway Administration (FHWA) does not consider the planting of vegetation to be a noise abatement measure. (6)

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

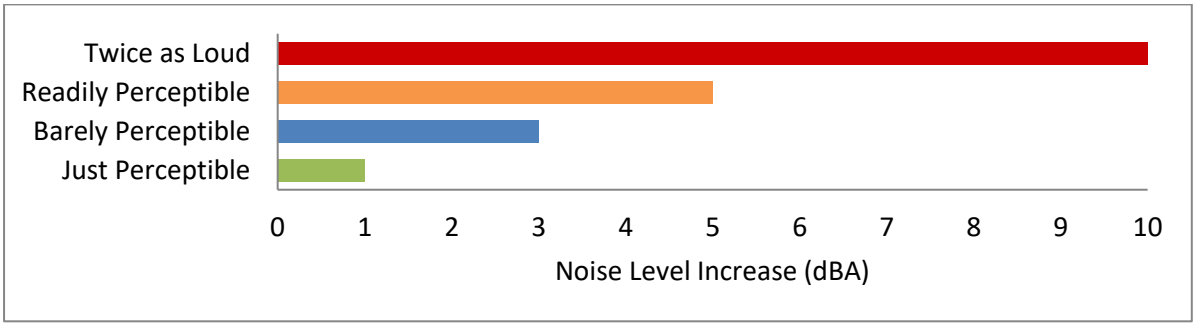
Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development,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

2.7 COMMUNITY RESPONSE TO NOISE

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. (8 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. (9) According to research originally published in the Noise Effects Handbook (8), 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-B. A change of 3 dBA is considered barely perceptible, and changes of 5 dBA are considered readily perceptible. (5)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



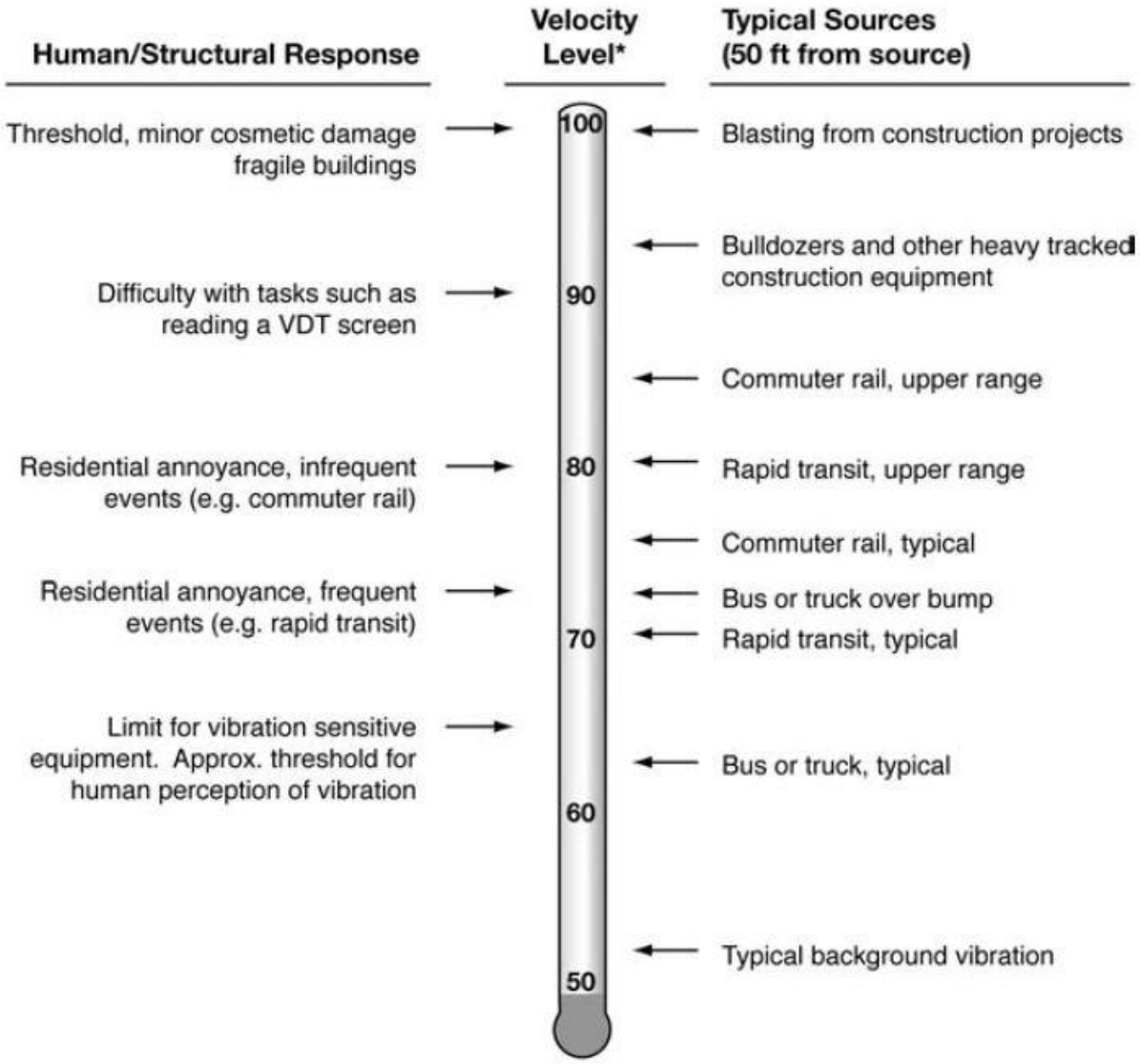
2.8 VIBRATION

Per the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* (9) , 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 (9). 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 (9). 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 (9). 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 (9). 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 (10). 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. (9) Decibel notation (VdB) serves to reduce the range of numbers used to describe vibration levels and is used in this report to describe vibration levels. As stated in the FTA guidance manual, the background vibration-velocity level in residential areas is generally 50 VdB. Ground-borne vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground-borne vibration is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Exhibit 2-C illustrates common vibration sources and the human and structural response to ground-borne vibration.

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



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

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

3 REGULATORY SETTING

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

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

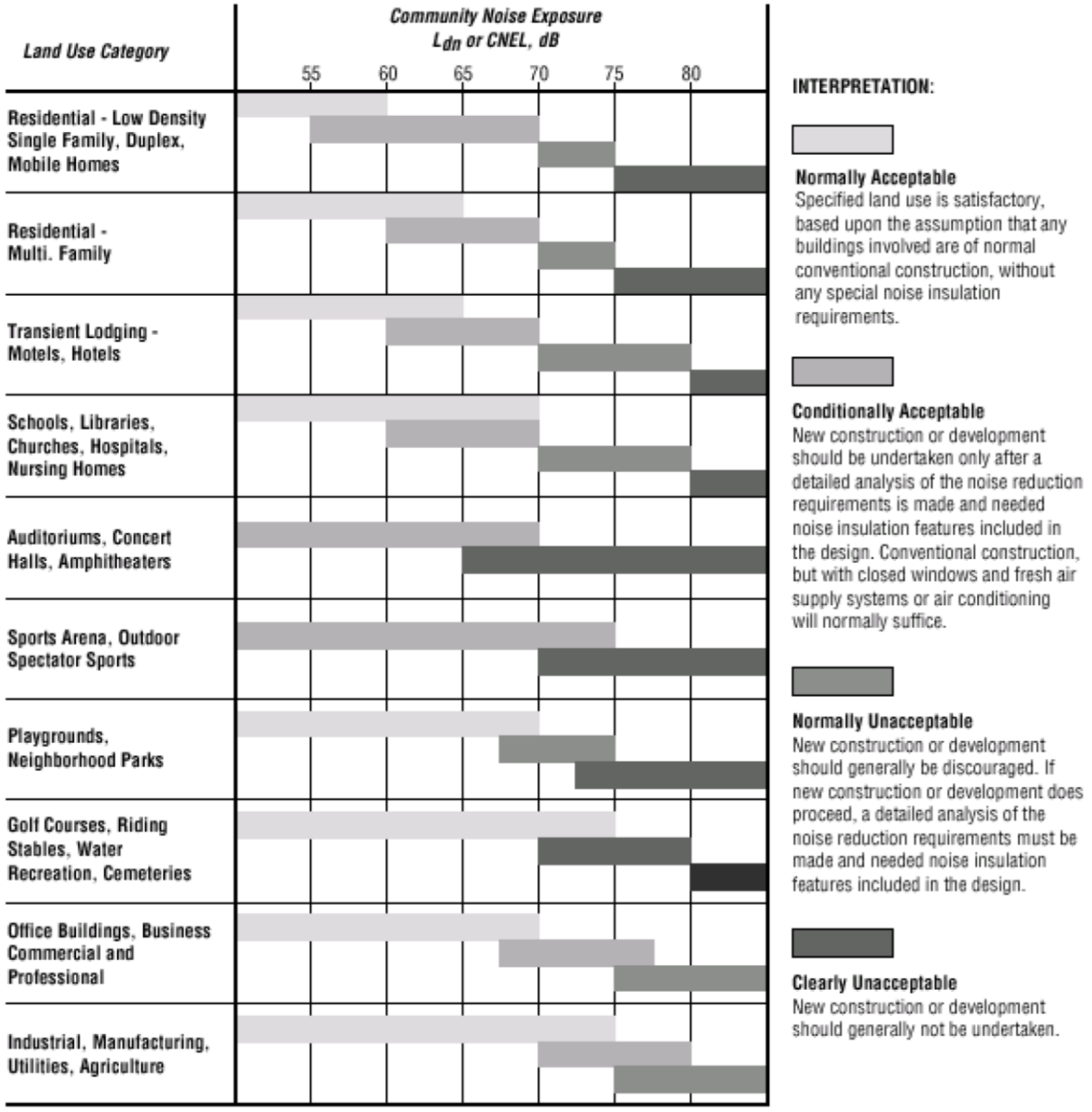
The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared per guidelines adopted by the Governor's Office of Planning and Research (OPR). (11) OPR identifies suggested land use noise compatibility levels as part of its General Plan Guidelines as shown on Exhibit 3-A. These suggested guidelines provide planners with a tool to gauge the compatibility of land uses relative to existing and future noise levels. The guidelines identify normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable noise levels for various land uses.

The land use compatibility guidelines are intended to be an advisory resource when considering changes in land use and policies, such as zoning modifications. In addition, the State through the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts.

3.2 COUNTY OF SAN BERNARDINO COUNTYWIDE PLAN HAZARDS ELEMENT

The County of San Bernardino is committed to protecting life, property, and commerce from impacts associated with natural hazards, human-generated hazards, and increased risk due to climate change. The County also works to ensure that residents in unincorporated disadvantaged communities have a reduced risk of exposure to pollution and have equitable access to public facilities and services. Effectively reducing these risks requires the County and its partners to evaluate public safety threats, proactively plan and protect against potential hazards, and establish systems that will make the county and its people safer and more self- reliant. (12) To address noise sources found in the County of San Bernardino, the following policies have been identified in the Countywide Plan Hazards Element:

EXHIBIT 3-A: LAND USE NOISE COMPATIBILITY CRITERIA



Source: OPR General Plan Guidelines, Appendix D: Noise Element Guidelines, Figure 2.

- County of San BernardinoCounty of San BernardinoCounty of San Bernardino**Policy HZ-2.6**: Coordination with transportation authorities. We collaborate with airport owners, FAA, Caltrans, SBCTA, SCAG, neighboring jurisdictions, and other transportation providers in the preparation and maintenance of, and updates to transportation-related plans and projects to minimize noise impacts and provide appropriate mitigation measures.
- **Policy HZ-2.7**: Truck delivery areas. We encourage truck delivery areas to be located away from residential properties and require associated noise impacts to be mitigated.

- **Policy HZ-2.8**: Proximity to noise generating uses. We limit or restrict new noise sensitive land uses in proximity to existing conforming noise generating uses and planned industrial areas.
- **Policy HZ-2.9**: Control sound at the source. We prioritize noise mitigation measures that control sound at the source before buffers, sound walls, and other perimeter measures.
- **Policy HZ-2.10:** Agricultural operations. We require new development adjacent to existing conforming agricultural operations to provide adequate buffers to reduce the exposure of new development to operational noise, odor, and the storage or application of pesticides or other hazardous materials.
- **Policy HZ-3.19**: Community education. We make educational materials available to the public in unincorporated environmental justice focus areas so that they clearly understand the potential for adverse pollution, noise, odor, vibration, and lighting and glare, and the effects of toxic materials to promote civil engagement. We require that such educational materials be developed in accordance with Plain Language Guidelines.

3.3 COUNTY OF SAN BERNARDINO DEVELOPMENT CODE

While the County of San Bernardino Countywide Plan Hazards Element provides guidelines and criteria to assess transportation noise on sensitive land uses, the County Code, Title 8 Development Code contains the noise level limits for mobile, stationary, and construction-related noise sources. (13)

3.3.1 TRANSPORTATION NOISE STANDARDS

Section 83.01.080[d], Table 83-3, contains the County of San Bernardino's mobile noise source-related standards, shown on Exhibit 3-B. Exterior transportation (mobile) noise level standards for residential land uses in the Project study area are shown to be 60 dBA CNEL, while non-noise-sensitive land uses, such as office uses, require exterior noise levels of 65 dBA CNEL per the County's Table 83-3 mobile noise source standards.

3.3.2 OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location such as the Glen Helen Specific Plan Amendment Project, stationary-source (operational) noise such as the expected loading dock activity, roof-top air conditioning units, parking lot vehicle activities, trash enclosure activity, and truck movements are typically evaluated against standards established under a jurisdiction's Municipal Code. The County of San Bernardino County Code, Title 8 Development Code, Section 83.01.080[c] establish the noise level standards for stationary noise sources. Since the Project's land use will potentially impact adjacent noise-sensitive uses in the Project study area, this noise study relies on the more conservative residential noise level standards to describe potential operational noise impacts.

For residential properties, the exterior noise level shall not exceed 55 dBA Leq during the daytime hours (7:00 a.m. to 10:00 p.m.) and 45 dBA Leq during the nighttime hours (10:00 p.m. to 7:00 a.m.) for both the whole hour, and for not more than 30 minutes in any hour. The exterior noise level (11) standards shall apply for a cumulative period of 30 minutes in any hour, as well as the

standard plus 5 dBA cannot be exceeded for a cumulative period of more than 15 minutes in any hour, or the standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour, or the standard plus 15 dBA for a cumulative period of more than 1 minute in any hour, or the standard plus 20 dBA for any period of time.

EXHIBIT 3-B: COUNTY OF SAN BERNARDINO MOBILE NOISE LEVEL STANDARDS

Noise Standards for Adjacent Mobile Noise Sources			
Land Use		*Ldn (or CNEL) dB(A)*	
Categories	*Uses*	*Interior (1)*	*Exterior (2)*
Residential	Single and multi-family, duplex, mobile homes	45	60(3)
Commercial	Hotel, motel, transient housing	45	60(3)
	Commercial retail, bank, restaurant	50	N/A
	Office building, research and development, professional offices	45	65
	Amphitheater, concert hall, auditorium, movie theater	45	N/A
Institutional/Public	Hospital, nursing home, school classroom, religious institution, library	45	65
Open Space	Park	N/A	65

Notes:

(1) The indoor environment shall exclude bathrooms, kitchens, toilets, closets and corridors.

(2) The outdoor environment shall be limited to:

- Hospital/office building patios
- Hotel and motel recreation areas
- Mobile home parks
- Multi-family private patios or balconies
- Park picnic areas
- Private yard of single-family dwellings
- School playgrounds

(3) An exterior noise level of up to 65 dB(A) (or CNEL) shall be allowed provided exterior noise levels have been substantially mitigated through a reasonable application of the best available noise reduction technology, and interior noise exposure does not exceed 45 dB(A) (or CNEL) with windows and doors closed. Requiring that windows and doors remain closed to achieve an acceptable interior noise level shall necessitate the use of air conditioning or mechanical ventilation.

CNEL = (Community Noise Equivalent Level). The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night from 10:00 p.m. to 7:00 a.m.

Source: County of San Bernardino County Code, Title 8 Development Code, Table 83-3 and GHSP Noise Study Table 4.5-5.

Further, Section 83.01.080[e] indicates that if the existing ambient noise level already exceeds any of the exterior noise level limit categories, then the standard shall be adjusted to reflect the ambient conditions. The County of San Bernardino operational noise level standards are shown on Table 3-1 and included in Appendix 3.1.

TABLE 3-1: OPERATIONAL NOISE LEVEL STANDARDS

Time Period	Exterior Noise Level Standards (dBA)[1]					
	L_{eq} (Average)	L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
Daytime (7:00 a.m. to 10:00 p.m.)	55	55	60	65	70	75
Nighttime (10:00 p.m. to 7:00 a.m.)	45	45	50	55	60	65

[1] County of San Bernardino Development Code, Title 8, Section 83.01.080 (Appendix 3.1). 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.

The 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 operational activities, the L_{50} or average L_{eq} noise level metrics best describe the loading dock activity, roof-top air conditioning units, parking lot vehicle activities, trash enclosure activity, and truck movements. In addition, the L_{eq} noise level metric accounts for noise fluctuations over time by averaging the louder and quieter events and giving more weight to the louder events. In addition, due to the mathematical relationship between the median (L_{50}) and the mean (L_{eq}), the L_{eq} will always be larger than or equal to the L_{50}. The more variable the noise becomes, the larger the L_{eq} becomes in comparison to the L_{50}. Therefore, this noise study conservatively relies on the average L_{eq} sound level limits to describe the Project operational noise levels.

3.4 CONSTRUCTION NOISE STANDARDS

Section 83.01.080[g][3] of the County of San Bernardino Development Code, provided in Appendix 3.1, indicates that construction activity is considered exempt from the noise level standards between the hours of 7:00 a.m. to 7:00 p.m. except on Sundays and Federal holidays. (13) However, neither the County of San Bernardino Countywide Plan or Development Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers, which would allow for a quantified determination of what CEQA constitutes a *substantial temporary or periodic noise increase*. Therefore, a numerical construction threshold based on Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* is used for analysis of daytime construction impacts, as discussed below.

According to the FTA, local noise ordinances are typically not very useful in evaluating construction noise. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Project construction noise criteria should account for the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use. Due to the lack of standardized construction noise thresholds, the FTA provides guidelines that can be considered reasonable criteria for construction noise assessment. The FTA considers a daytime exterior construction noise level of 80 dBA L_{eq} as a reasonable threshold for noise sensitive residential land use. (9 p. 179)

3.5 CONSTRUCTION VIBRATION STANDARDS

The County of San Bernardino Development Code, Section 83.01.090[a] states that vibration shall be no *greater than or equal to two-tenths inches per second measured at or beyond the lot line*. (13) Therefore, to determine if the vibration levels due to the operation and construction of the Project, the peak particle velocity (PPV) vibration level standard of 0.2 inches per second is used.

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4 SIGNIFICANCE CRITERIA

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

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

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

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

4.1 NOISE LEVEL INCREASES (THRESHOLD A)

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Guidelines described above at the closest sensitive receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing baseline ambient noise levels, and the location of noise-sensitive receivers to determine if a noise increase represents a significant adverse environmental impact. This approach recognizes *that there is no single noise increase that renders a noise impact significant.* (14) This is primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted—the so-called *ambient* environment. In general, the more a new noise level exceeds the previously existing ambient noise level, the less acceptable the new noise level will typically be judged.

4.1.1 NOISE-SENSITIVE AND NON-NOISE SENSITIVE RECEIVERS

The Federal Interagency Committee on Noise (FICON) (15) developed guidance to be used for the assessment of project-generated increases in noise levels that consider the ambient noise level. The FICON recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics, such as the average-daily noise level (CNEL) and equivalent continuous noise level (L_{eq}).

As previously stated, the approach used in this noise study recognizes *that there is no single noise increase that renders a noise impact significant*, based on a 2008 California Court of Appeal ruling on Gray v. County of Madera. (14)

While the off-site Project-related traffic level increases are generally limited to noise sensitive residential uses that are likely to perceive this change over time, this off-site traffic noise analysis also evaluates the potential noise impacts for non-noise sensitive land uses. To determine if Project-related traffic noise level increases are significant at both off-site noise-sensitive and non-

noise-sensitive land uses, a *readily perceptible* 5 dBA increase criteria is used. This is consistent with the 5 dBA increase threshold identified in the DEIR.

4.2 VIBRATION (THRESHOLD B)

As described in Section 3.5, the vibration impacts originating from the construction of the Glen Helen Specific Plan Amendment, vibration-generating activities are appropriately evaluated using the County of San Bernardino threshold to assess potential temporary construction-related impacts at nearby receiver locations. The County of San Bernardino Municipal Code identifies an vibration level threshold of 0.2 in/sec PPV.

4.3 CEQA GUIDELINES NOT FURTHER ANALYZED (THRESHOLD C)

CEQA Noise Threshold C applies when there are nearby public and private airports and/or air strips and focuses on land use compatibility of the Project to nearby airports and airstrips. The Project site is not located within two miles of an airport or airstrip. The closest airport is the San Bernardino International Airport located over 10 miles southeast of the Project site. As such, the Project site would not be exposed to excessive noise levels from airport operations, and therefore, impacts are considered *less than significant,* and no further noise analysis is conducted in relation to Appendix G to the CEQA Guidelines, Noise Threshold 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 Project. 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	Land Use	Condition(s)	Significance Criteria	
			Daytime	Nighttime
Off-Site Traffic Noise Increase	n/a	≥ 5 dBA CNEL Project increase		
Operational	Residential	Exterior Noise Level Limit[3]	55 dBA L_{eq}	45 dBA L_{eq}
	Noise-Sensitive[1]	if ambient is < 60 dBA L_{eq}	≥ 5 dBA L_{eq} Project increase	
		if ambient is 60 - 65 dBA L_{eq}	≥ 3 dBA L_{eq} Project increase	
		if ambient is > 65 dBA L_{eq}	≥ 1.5 dBA L_{eq} Project increase	
Construction	Noise-Sensitive	Permitted between 7:00 a.m. to 7:00 p.m.; except Sundays and Federal holidays.[4]		
		Noise Level Threshold[5]	80 dBA L_{eq}	(see Table 3-1)[3]
		Vibration Level Threshold[6]	0.2 PPV (in/sec)	n/a

[1] Limited to existing noise sensitive residential land use FICON, 1992.
[2] Glen Helen Specific Plan Draft Environmental Impact Report (DEIR) Appendix E Noise Study.
[3] County of San Bernardino Development Code, Title 8, Section 83.01.080 (Appendix 3.1)
[4] Section 83.01.080[g][3] of the County of San Bernardino County Code.
[5] Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual.
[6] Section 83.01.090[a] of the County of San Bernardino County Code.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m. "n/a" = construction activities are not planned during the nighttime hours; "PPV" = peak particle velocity.

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5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, 24-hour noise level measurements were taken at seven locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, long-term noise level measurements were collected by Urban Crossroads, Inc. on Thursday, February 29, 2024 and Friday, October 18, 2024. 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. (17)

5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing 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*. (3) Further, FTA guidance states, t*hat it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community*. (9)

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. (9) In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Receivers represent a location of noise sensitive areas and are used to estimate the future noise level impacts. Collecting 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 energy average hourly sound levels (L_{eq}) to describe the existing *ambient* conditions. The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. Table 5-1 identifies the hourly daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) noise levels at each noise level measurement location.

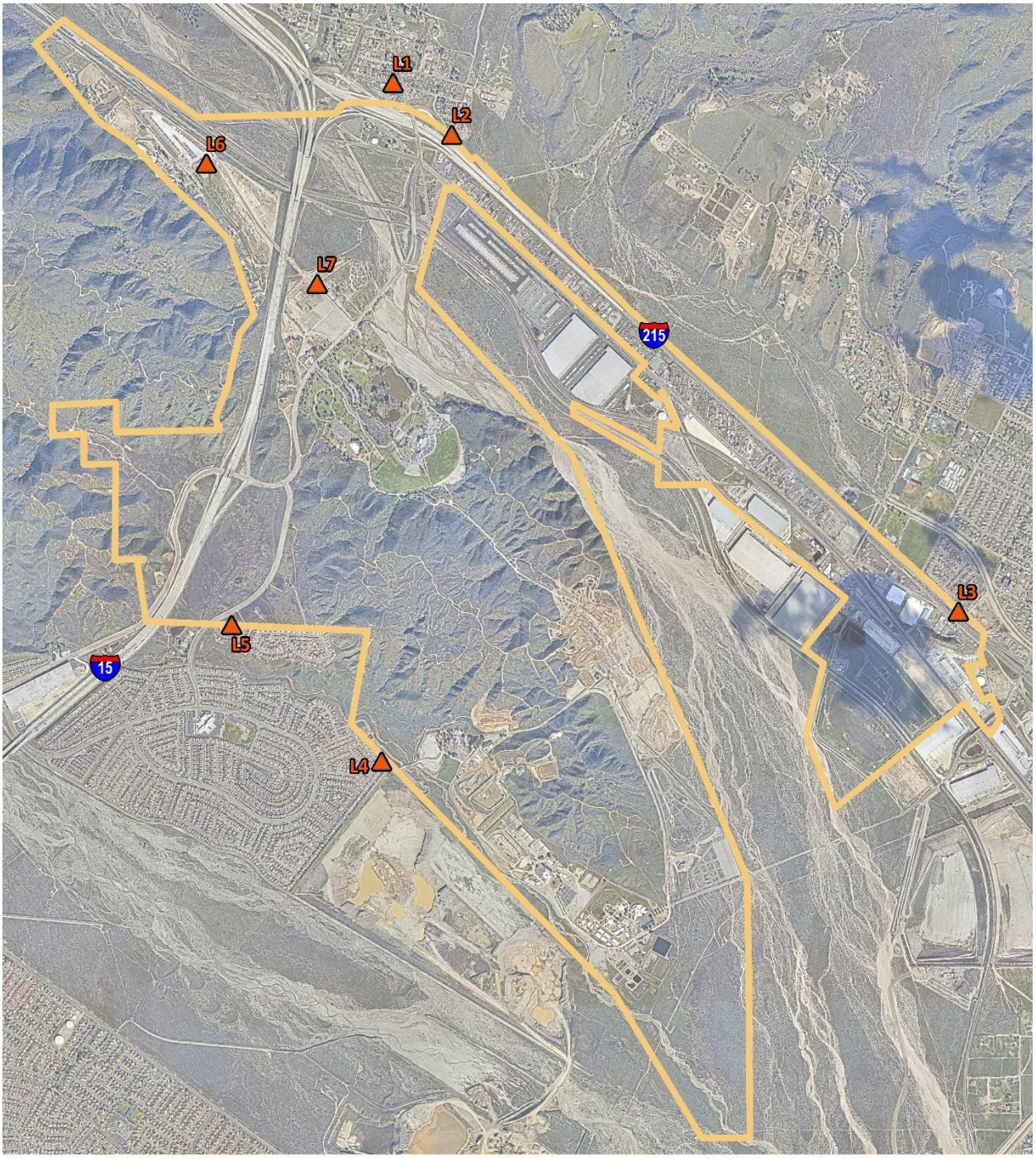
TABLE 5-1: AMBIENT NOISE LEVEL MEASUREMENTS

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]		CNEL
		Daytime	Nighttime	
L1	Located north of the GHSP near the residence at 1650 Devore Rd.	59.5	55.8	63.6
L2	Located north of the GHSP near the residence at 18552 Parker St.	72.2	69.4	76.8
L3	Located east of the GHSP near the residence at 3817 W. Bodega Wy.	79.0	77.4	84.4
L4	Located south of the GHSP near the residence at 18325 Lapis Ln.	52.7	46.6	55.4
L5	Located south of the GHSP near the residence at 3301 Osage Ct.	57.0	54.2	61.9
L6	Located within the GHSP near the Freedom Acres Resort Adult Community at 1924 Glen Helen Road.	53.7	62.6	69.4
L7	Located within the GHSP near the Glen Helen Regional Park Campground	63.6	56.5	65.4

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

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

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS



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6 TRAFFIC NOISE METHODS AND PROCEDURES

The following section outlines the methods and procedures used to estimate and analyze the future transportation related noise environment. Consistent with Section 83.01.080[d], Table 83-3 County of San Bernardino Development Code (13), all transportation related noise levels are presented in terms of the 24-hour CNEL's.

Traffic generated by the operation of the proposed Project will influence the traffic noise levels in surrounding off-site areas and at the Project site. According to the *Glen Helen Specific Plan Amendment Traffic Impact Analysis* (TIA) prepared by EPD Solutions, Inc. (18) the Project is anticipated to generate fewer trips as compared to the uses evaluated for the same areas within the DEIR. Based on a comparison to the currently approved GHSP, the development of the proposed Project is anticipated to result in a net reduction in trips for the overall Project including the Devore and the Sycamore Flats Subareas. While the overall Project represents a net reduction in trips from the approved DEIR, and the overall off-site traffic noise levels generated by the Project are considered *less than significant,* the TIA shows that the North Glen Helen (Subarea A) will generate an additional 3,305 trips per day (actual vehicles) that includes 2,327 truck trips. Therefore, the following analysis evaluates the off-site traffic noise level impacts associated with North Glen Helen (Subarea A).

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) The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). In California the national REMELs are substituted with the California Vehicle Noise (Calveno) Emission Levels. (20) 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. (21)

6.1.1 OFF-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

Table 6-1 presents the roadway parameters used to assess the Project's off-site transportation noise impacts. Table 6-1 identifies the five off-site study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the County of San Bernardino General Plan Circulation Element, and the vehicle speeds. The ADT

volumes used in this study area presented on Table 6-2 are based on the *Glen Helen Specific Plan Amendment Traffic Impact Analysis* (TIA) prepared by EPD Solutions, Inc. (18)

- Existing
- Existing plus Project
- General Plan Buildout Conditions
- General Plan Buildout plus Project Conditions

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.

TABLE 6-1: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	Classification[1]	Distance from Centerline to Receiving Land Use (Feet)[3]	Vehicle Speed (mph)
1	Glen Helen Pkwy.	n/o Cajon Blvd.	Major	52'	45
2	Glen Helen Pkwy.	s/o Cajon Blvd.	Major	52'	45
3	Glen Helen Pkwy.	s/o Glen Helen Rd.	Major	52'	45
4	Glen Helen Pkwy.	w/o Clearwater Pkwy.	Major	52'	45
5	Glen Helen Rd.	w/o Glen Helen Pkwy.	Major	104'	45

[1] Glen Helen Specific Plan Amendment Traffic Impact Analysis, EPD Solutions, Inc.
[2] Limited to existing noise sensitive residential land use based on a review of existing aerial imagery.
[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[1]			
			Existing		General Plan Buildout (2040)	
			Without Project	With Project	Without Project	With Project
1	Glen Helen Pkwy.	n/o Cajon Blvd.	5,810	8,341	14,470	17,001
2	Glen Helen Pkwy.	s/o Cajon Blvd.	3,130	5,661	11,830	14,361
3	Glen Helen Pkwy.	s/o Glen Helen Rd.	4,060	4,834	14,300	15,074
4	Glen Helen Pkwy.	w/o Clearwater Pkwy.	8,140	8,914	9,870	10,644
5	Glen Helen Rd.	w/o Glen Helen Pkwy.	n/a	3,555	n/a	3,705

[1] Glen Helen Specific Plan Amendment Traffic Impact Analysis, EPD Solutions, Inc.
[2] "n/a" = Due to the low existing traffic volumes, 24-Hour CNEL noise measurements are used to describe the without Project conditions.

To quantify the off-site noise levels, the 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. Table 6-3 provides the time of day (daytime, evening, and nighttime) vehicle splits. The 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 DEIR Noise Study. Using the Project truck trips in combination with the Project trip distribution, Urban Crossroads, Inc. calculated the number of additional Project truck trips and vehicle mix percentages for each of the study area roadway segments. Table 6-4 shows the traffic flow by vehicle type (vehicle mix) used for all without Project traffic scenarios, and Tables 6-5 to 6-7 show the vehicle mixes used for the with Project traffic scenarios.

TABLE 6-3: TIME OF DAY VEHICLE SPLITS

Vehicle Type	Time of Day Splits[1]			Total of Time of Day Splits
	Daytime	Evening	Nighttime	
Autos	77.50%	12.90%	9.60%	100.00%
Medium Trucks	84.80%	4.90%	10.30%	100.00%
Heavy Trucks	86.50%	2.70%	10.80%	100.00%

[1] Glen Helen Specific Plan Draft Environmental Impact Report (DEIR) Appendix E Noise Study.
"Daytime" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

TABLE 6-4: WITHOUT PROJECT VEHICLE MIX

Classification	Total % Traffic Flow[1]			Total
	Autos	Medium Trucks	Heavy Trucks	
All Segments	97.42%	1.84%	0.74%	100.00%

[1] Glen Helen Specific Plan Draft Environmental Impact Report (DEIR) Appendix E Noise Study.

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 6-5: EXISTING WITH PROJECT VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Glen Helen Pkwy.	n/o Cajon Blvd.	77.00%	7.01%	15.99%	100.00%
2	Glen Helen Pkwy.	s/o Cajon Blvd.	67.34%	9.45%	23.21%	100.00%
3	Glen Helen Pkwy.	s/o Glen Helen Rd.	86.28%	4.67%	9.06%	100.00%
4	Glen Helen Pkwy.	w/o Clearwater Pkwy.	91.38%	3.37%	5.25%	100.00%
5	Glen Helen Rd.	w/o Glen Helen Pkwy.	34.36%	17.80%	47.84%	100.00%

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

TABLE 6-6: GENERAL PLAN BUILDOUT WITH PROJECT VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Glen Helen Pkwy.	n/o Cajon Blvd.	87.40%	4.37%	8.22%	100.00%
2	Glen Helen Pkwy.	s/o Cajon Blvd.	85.56%	4.84%	9.60%	100.00%
3	Glen Helen Pkwy.	s/o Glen Helen Rd.	93.85%	2.75%	3.41%	100.00%
4	Glen Helen Pkwy.	w/o Clearwater Pkwy.	92.36%	3.12%	4.52%	100.00%
5	Glen Helen Rd.	w/o Glen Helen Pkwy.	36.91%	17.16%	45.93%	100.00%

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

7 OFF-SITE TRAFFIC NOISE ANALYSIS

To assess the off-site transportation CNEL noise level impacts associated with development of the proposed Project, noise contours were developed. Noise contour boundaries represent equal levels of noise exposure and are measured in CNEL from the center of the roadway.

7.1 TRAFFIC NOISE CONTOURS

Noise contours were used to assess the Project's incremental 24-hour dBA CNEL traffic-related noise impacts at receiving 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 7-6 present a summary of the exterior traffic noise levels without barrier attenuation for each traffic condition. Appendix 7.1 includes the traffic noise level contours worksheets for each traffic condition.

TABLE 7-1: EXISTING WITHOUT PROJECT CONTOURS

ID	Road	Segment[1]	CNEL at Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
				70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Glen Helen Pkwy.	n/o Cajon Blvd.	64.6	56	122	262
2	Glen Helen Pkwy.	s/o Cajon Blvd.	61.9	RW	111	240
3	Glen Helen Pkwy.	s/o Glen Helen Rd.	63.1	RW	75	161
4	Glen Helen Pkwy.	w/o Clearwater Pkwy.	66.1	75	162	350
5[3]	Glen Helen Rd.	w/o Glen Helen Pkwy.	65.4	49	106	229

[1] The GHSP EIR Noise Study Table 4.5-9 identifies the Criterion Noise Level at these roadway segments to be 65 dBA CNEL.
[2] The CNEL is calculated at the boundary of the right-of-way of the receiving adjacent land use.
[3] Due to the low existing project traffic volumes, 24-Hour CNEL noise measurements are used to describe the without Project conditions.
"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	CNEL at Receiving Land Use (dBA)[1]	Distance to Contour from Centerline (Feet)		
				70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Glen Helen Pkwy.	n/o Cajon Blvd.	73.2	85	184	395
2	Glen Helen Pkwy.	s/o Cajon Blvd.	72.9	82	176	378
3	Glen Helen Pkwy.	s/o Glen Helen Rd.	68.9	RW	94	203
4	Glen Helen Pkwy.	w/o Clearwater Pkwy.	69.9	RW	110	237
5	Glen Helen Rd.	w/o Glen Helen Pkwy.	68.7	RW	183	394

[1] 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: GENERAL PLAN BUILDOUT WITHOUT PROJECT CONTOURS

ID	Road	Segment	CNEL at Receiving Land Use (dBA)[1]	Distance to Contour from Centerline (Feet)		
				70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Glen Helen Pkwy.	n/o Cajon Blvd.	68.6	RW	90	194
2	Glen Helen Pkwy.	s/o Cajon Blvd.	67.7	RW	79	169
3	Glen Helen Pkwy.	s/o Glen Helen Rd.	68.5	RW	89	192
4	Glen Helen Pkwy.	w/o Clearwater Pkwy.	66.9	RW	70	150
5[2]	Glen Helen Rd.	w/o Glen Helen Pkwy.	65.4	49	106	229

[1] The CNEL is calculated at the boundary of the right-of-way of the receiving adjacent land use.
[2] Due to the low existing project traffic volumes, 24-Hour CNEL noise measurements are used to describe the without Project conditions.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-4: GENERAL PLAN BUILDOUT WITH PROJECT CONTOURS

ID	Road	Segment	CNEL at Receiving Land Use (dBA)[1]	Distance to Contour from Centerline (Feet)		
				70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Glen Helen Pkwy.	n/o Cajon Blvd.	74.0	96	208	448
2	Glen Helen Pkwy.	s/o Cajon Blvd.	73.8	93	201	432
3	Glen Helen Pkwy.	s/o Glen Helen Rd.	71.1	61	132	285
4	Glen Helen Pkwy.	w/o Clearwater Pkwy.	70.3	54	117	251
5	Glen Helen Rd.	w/o Glen Helen Pkwy.	68.7	RW	183	395

[1] 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.

7.2 EXISTING PROJECT TRAFFIC NOISE LEVEL INCREASES

An analysis of existing traffic noise levels plus traffic noise generated by the proposed Project has been included in this report for informational purposes and to fully analyze all the existing traffic scenarios identified in the TIA. However, the analysis of existing off-site traffic noise levels plus traffic noise generated by the proposed Project scenario will not actually occur since the Project would not be fully constructed and operational until General Plan Buildout conditions. Table 7-1 shows the Existing without Project conditions CNEL noise levels. The Existing without Project exterior noise levels range from 61.9 to 66.1 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing with Project conditions ranging from 68.7 to 73.2 dBA CNEL. Table 7-5 shows that the Project off-site traffic noise level increases range from 3.3 to 11.0 dBA CNEL on the study area roadway segments. Based on the significance criteria for off-site traffic noise presented in Table 4-1, three of the study area roadway segments are shown to experience *potentially significant* off-site traffic noise increases that would exceed the 5 dBA threshold in the Existing with Project conditions. The segments are described below.

- Glen Helen Parkway north of Cajon Boulevard (Segment #1)
- Glen Helen Parkway south of Cajon Boulevard (Segment #2)
- Glen Helen Parkway south of Glen Helen Road (Segment #3)

This is consistent with the finding of the DEIR that determined that land uses would be subject to elevated levels of vehicle noise that would exceed the 5 dBA traffic noise increase threshold. Therefore, with the implementation measures 4.5-6 and 4.5-7 outlined in the DEIR, the potential project related to traffic noise level increase impacts will be reduced to *less than significant*.

7.3 GENERAL PLAN BUILDOUT TRAFFIC NOISE LEVEL INCREASES

Table 7-3 presents the General Plan Buildout without Project conditions CNEL noise levels. The General Plan Buildout without Project exterior noise levels range from 65.4 to 68.6 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-4 shows that the General Plan Buildout with Project conditions will range from 68.7 to 74.0 dBA CNEL. Table 7-6 shows that the Project off-site traffic noise level increases range from 2.6 to 6.1 dBA CNEL. Based on the significance criteria for off-site traffic noise presented in Table 4-1, two of the study area roadway segments are shown to experience *potentially significant* off-site traffic noise increases that would exceed the 5 dBA threshold in the General Plan Buildout (2040) with Project conditions. The segments are described below.

- Glen Helen Parkway north of Cajon Boulevard (Segment #1)
- Glen Helen Parkway south of Cajon Boulevard (Segment #2)

This is consistent with the finding of the DEIR that determined that land uses would be subject to elevated levels of vehicle noise that would exceed the 5 dBA traffic noise increase threshold. Therefore, mitigation measures 4.5-6 and 4.5-7 outlined in the DEIR would be implemented to reduce project related traffic noise levels to *less than significant*.

TABLE 7-5: EXISTING WITH PROJECT TRAFFIC NOISE LEVEL INCREASES

ID	Road	Segment	CNEL at Receiving Land Use (dBA)[1]			Incremental Noise Level Increase Threshold[2]	
			No Project	With Project	Project Addition	Limit	Exceeded?
1	Glen Helen Pkwy.	n/o Cajon Blvd.	64.6	73.2	8.6	5	Yes
2	Glen Helen Pkwy.	s/o Cajon Blvd.	61.9	72.9	11.0	5	Yes
3	Glen Helen Pkwy.	s/o Glen Helen Rd.	63.1	68.9	5.8	5	Yes
4	Glen Helen Pkwy.	w/o Clearwater Pkwy.	66.1	69.9	3.8	5	No
5	Glen Helen Rd.	w/o Glen Helen Pkwy.	65.4	68.7	3.3	5	No

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.

[2] DOES THE PROJECT CREATE AN INCREMENTAL NOISE LEVEL INCREASE EXCEEDING THE SIGNIFICANCE CRITERIA (TABLE 4-1)?

TABLE 7-6: GENERAL PLAN BUILDOUT WITH PROJECT TRAFFIC NOISE LEVEL INCREASES

ID	Road	Segment	CNEL at Receiving Land Use (dBA)[1]			Incremental Noise Level Increase Threshold[2]	
			No Project	With Project	Project Addition	Limit	Exceeded?
1	Glen Helen Pkwy.	n/o Cajon Blvd.	68.6	74.0	5.4	5	Yes
2	Glen Helen Pkwy.	s/o Cajon Blvd.	67.7	73.8	6.1	5	Yes
3	Glen Helen Pkwy.	s/o Glen Helen Rd.	68.5	71.1	2.6	5	No
4	Glen Helen Pkwy.	w/o Clearwater Pkwy.	66.9	70.3	3.4	5	No
5	Glen Helen Rd.	w/o Glen Helen Pkwy.	65.4	68.7	3.3	5	No

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.

[2] Does the Project create an incremental noise level increase exceeding the significance criteria (Table 4-1)?

8 RECEIVER LOCATIONS

To assess the potential for long-term operational and short-term construction noise impacts, the following existing sensitive receiver locations, as shown on Exhibit 8-A, were identified as representative locations for analysis. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land.

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

R1: Location R1 represents the existing noise sensitive residence at 1650 Devore Road approximately 1,308 feet north of the Devore (Subarea B). Receiver R1 is placed in the private outdoor living areas (backyard) facing the Project site. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

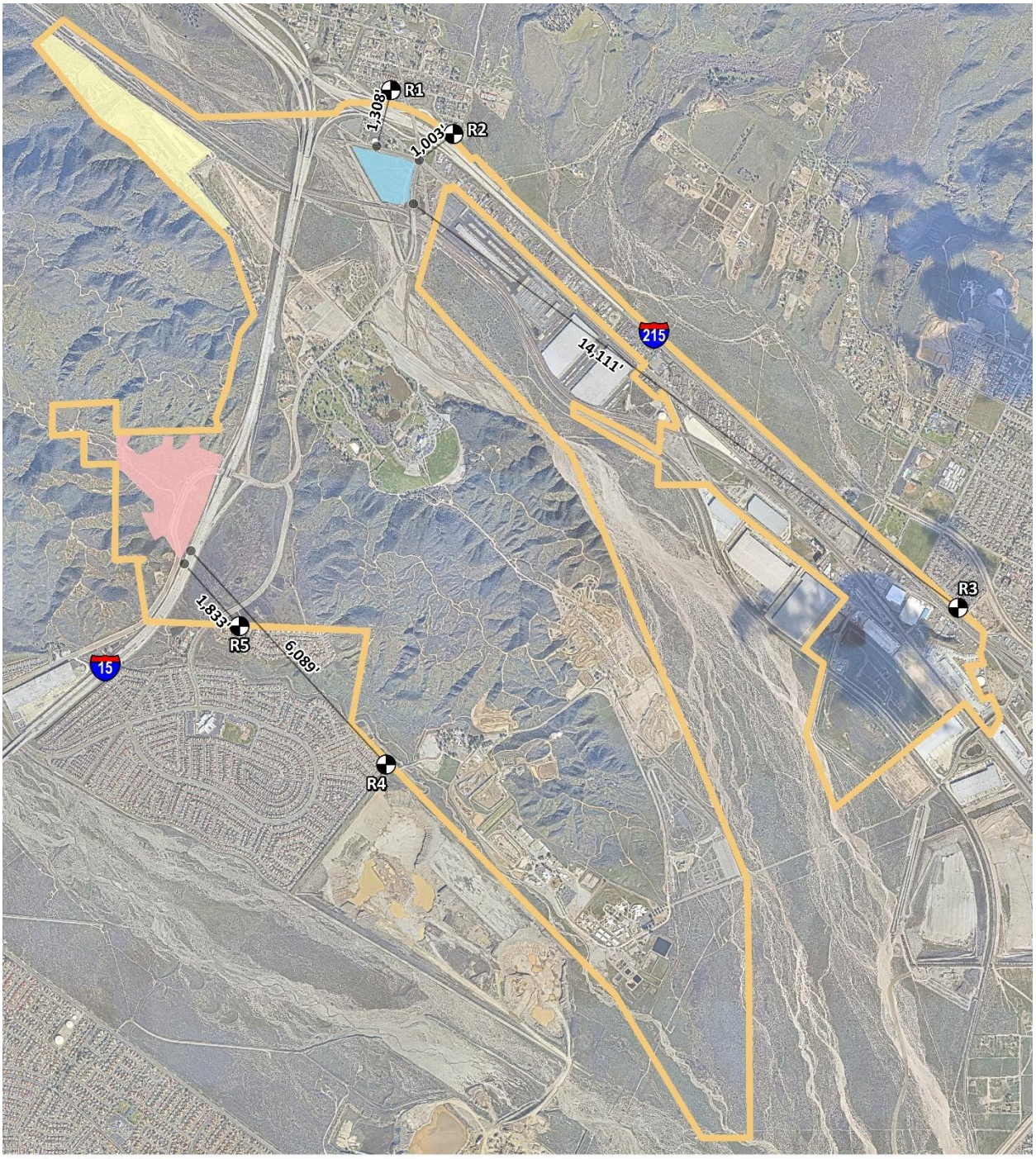
R2: Location R2 represents the existing noise sensitive residence at 18552 Parker Street, approximately 1,003 feet northeast of the Devore (Subarea B). Receiver R2 is placed in the private outdoor living areas (backyard) facing the Project site. A 24-hour noise measurement was taken near this location, L2, to describe the existing ambient noise environment.

R3: Location R3 represents the existing noise sensitive residence at 3817 W Bodega Way approximately 14,111 feet southeast of the Devore (Subarea B). Receiver R3 is placed in the private outdoor living areas (backyard) facing the Project site. A 24-hour noise measurement was taken near this location, L3, to describe the existing ambient noise environment.

R4: Location R4 represents the existing noise sensitive residence at 18325 Lapis Lane, approximately 6,089 feet southeast of the Sycamore Flats (Subarea C). Receiver R4 is placed in the private outdoor living areas (backyard) facing the Project site. A 24-hour noise measurement was taken near this location, L4, to describe the existing ambient noise environment. ambient noise environment.

R5: Location R5 represents the existing noise sensitive residence at 3301 Osage Court approximately 1,833 feet southeast of the Sycamore Flats (Subarea C). Receiver R5 is placed in the private outdoor living areas (backyard) facing the Project site. A 24-hour noise measurement was taken near this location, L5, to describe the existing ambient noise environment.

EXHIBIT 8-A: RECEIVER LOCATIONS



9 OPERATIONAL NOISE IMPACTS

This section analyzes the potential stationary-source operational noise impacts at the nearest receiver locations, identified in Section 8, resulting from the operation of the proposed Glen Helen Specific Plan Amendment land uses. Exhibit 9-A identifies the location of the Project related noise source activities.

9.1 OPERATIONAL NOISE SOURCES

This operational noise analysis is intended to describe noise level impacts associated with the expected typical of daytime and nighttime activities at the Project site. At the time this noise analysis was prepared, the future tenants and timing of future development within the Specific Plan area are unknown, and therefore, this noise study includes a conservative analysis of the proposed Project uses. Any future project that requires discretionary approval is required to complete a project specific environmental analysis consistent with the California Environmental Quality Act (CEQA) and California Environmental Quality Act (CEAQ) Guidelines. The on-site Project-related noise sources are expected to include: loading dock activity, roof-top air conditioning units, parking lot vehicle activities, trash enclosure activity, and truck 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 reasonable worst-case noise environment with the typical noise sources 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 precision 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. (17)

EXHIBIT 9-A: OPERATIONAL NOISE SOURCE LOCATIONS

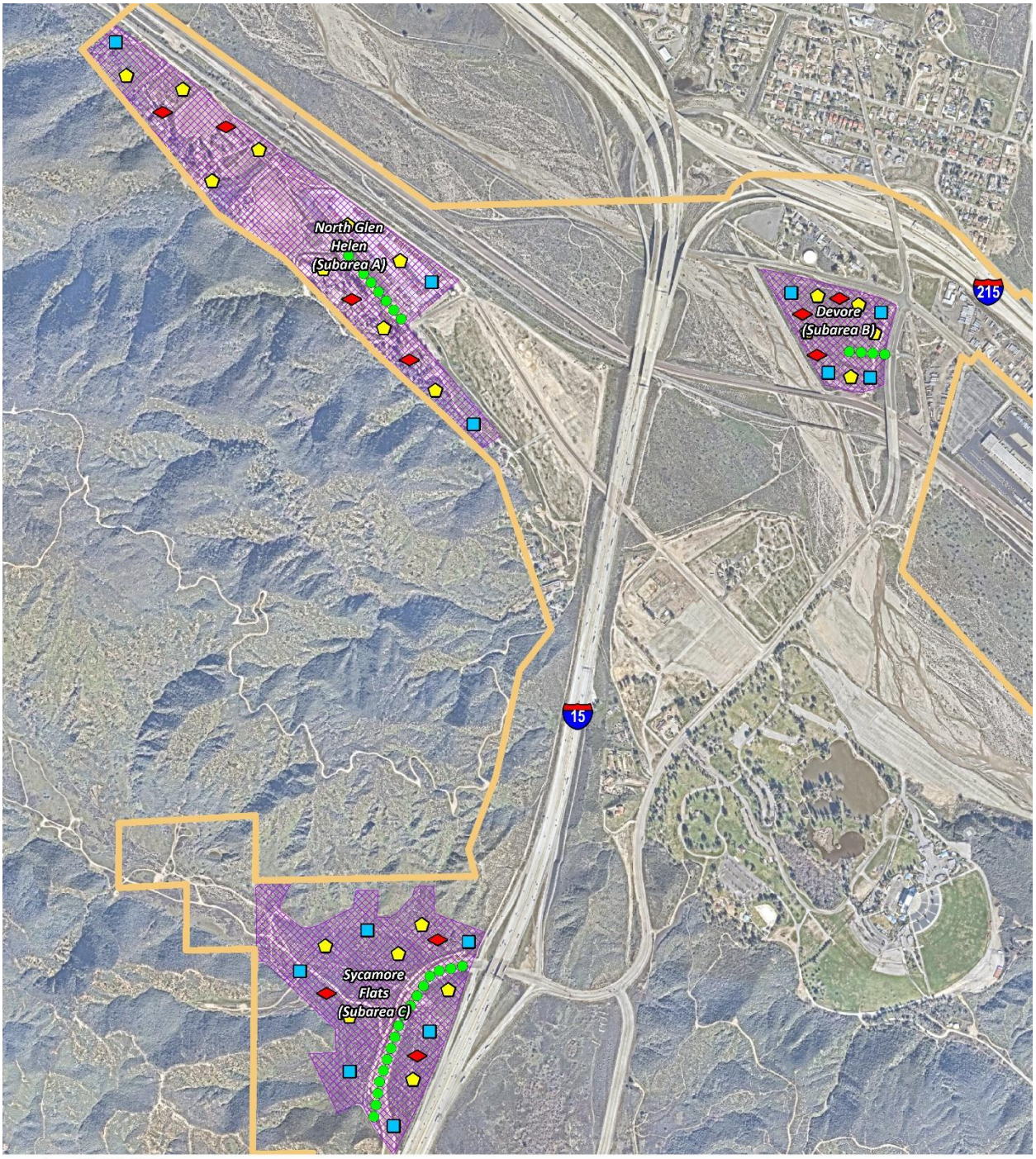


TABLE 9-1: REFERENCE NOISE LEVEL MEASUREMENTS

Reference Noise Source	Noise Source Height (Feet)	Min./ Hour[1]		Reference Noise Level (dBA L_{eq}) @ 50 Feet	Reference Noise Level (dBA L_{eq}) @ 200 Feet	Sound Power Level (dBA)[2]
		Day	Night			
Loading Dock Activity	8'	60	60	65.7	53.7	111.5
Roof-Top Air Conditioning Units	5'	39	28	57.2	45.2	88.9
Parking Lot Vehicle Movements	5'	60	60	52.6	40.6	81.1
Trash Enclosure Activity	5'	60	30	57.3	45.3	89.0
Truck Movements	8'	60	60	59.8	47.8	93.2

[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 LOADING DOCK ACTIVITY

The reference 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 slightly 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. 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 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 L_{eq}. Based on the typical operating conditions observed over a four-day measurement period, the roof-top air conditioning units are estimated to operate for and average 39 minutes per hour during the daytime hours, 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 buildings.

9.2.4 PARKING LOT VEHICLE MOVEMENTS

To describe the on-site parking lot activity, a long-term 29-hour 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.

9.2.5 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.

9.2.6 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.

9.3 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 (L_w) to describe individual noise sources.

While sound pressure levels (e.g., L_{eq}) quantify in decibels the intensity of given sound sources at a reference distance, sound power levels (L_w) are connected to the sound source and are

independent of distance. Sound pressure levels vary substantially with distance from the source and diminish 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 CadnaA noise analysis to account for mixed ground representing a combination of hard and soft surfaces. Appendix 9.1 includes the detailed noise model inputs including the planned screenwall 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 proposed Project operations that include loading dock activity, roof-top air conditioning units, parking lot vehicle activities, trash enclosure activity, and truck movements, Urban Crossroads, Inc. calculated the unmitigated 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 existing 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 existing locations are expected to range from 19.4 to 45.0 dBA L_{eq}.

TABLE 9-2: DAYTIME PROJECT OPERATIONAL NOISE LEVELS AT EXISTING RECEIVERS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA Leq)				
	R1	R2	R3	R4	R5
Loading Dock Activity	44.4	45.0	19.2	28.6	38.3
Roof-Top Air Conditioning Units	16.5	17.8	0.0	3.1	13.4
Parking Lot Vehicle Movements	11.3	12.0	0.0	0.0	6.0
Trash Enclosure Activity	18.0	17.7	0.0	2.0	11.6
Truck Movements	14.9	17.1	0.0	0.9	11.1
Total (All Noise Sources)	**44.4**	**45.0**	**19.4**	**28.6**	**38.3**

[1] See Exhibit 9-A 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 of 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 19.4 to 45.0 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 and Appendix 9.1.

TABLE 9-3: NIGHTTIME PROJECT OPERATIONAL NOISE LEVELS AT EXISTING RECEIVERS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA Leq)				
	R1	R2	R3	R4	R5
Loading Dock Activity	44.4	45.0	19.2	28.6	38.3
Roof-Top Air Conditioning Units	14.1	15.3	0.0	0.7	11.0
Parking Lot Vehicle Movements	11.3	12.0	0.0	0.0	6.0
Trash Enclosure Activity	14.0	13.7	0.0	0.0	7.7
Truck Movements	14.9	17.1	0.0	0.9	11.1
Total (All Noise Sources)	**44.4**	**45.0**	**19.4**	**28.6**	**38.3**

[1] See Exhibit 9-A 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 Project-only operational noise levels are evaluated against exterior noise level thresholds based on the County of San Bernardino exterior noise level standards at nearby existing noise-sensitive receiver locations. Table 9-4 shows the operational noise levels associated with Glen Helen Specific Plan Amendment will not exceed the exterior noise level standards, adjusted to reflect the ambient noise levels (see Table 5-1) per the County of San Bernardino Development Code Section 83.01.080[e]. Therefore, the operational noise impacts are considered *less than significant* at the nearest existing noise-sensitive receiver locations.

TABLE 9-4: OPERATIONAL NOISE LEVEL COMPLIANCE AT EXISTING RECEIVERS

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	44.4	44.4	59.5	55.8	No	No
R2	45.0	45.0	72.2	69.4	No	No
R3	19.4	19.4	79.0	77.4	No	No
R4	28.6	28.6	55.0	46.6	No	No
R5	38.3	38.3	57.0	54.2	No	No

[1] See Exhibit 8-A 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 to reflect the ambient noise levels (see Table 5-1) per the County of San Bernardino Development Code Section 83.01.080[e].
[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.

This is consistent with the finding of the DEIR that determined that the Project-related noise sources may infringe upon noise sensitive land uses. The following implementation measures were identified to reduce the potential project related to long-term operational noise level impacts to *less than significant*.

4.5-4 No industrial facilities shall be constructed within 500 feet of any commercial land uses or within 2,800 feet of any residential land use designation without the preparation of dedicated noise analysis.

4.5-5 Prior to development, a developer shall contract for a site-specific noise study for the parcel. Prior to the issuance of development permits and the approval of land use application noted acoustical analysis is to be received and approved by the County Environmental Health Services.

9.6 PROJECT OPERATIONAL NOISE LEVEL INCREASES

To describe the Project operational noise level increases, the Project operational noise levels are combined with the existing ambient noise levels measurements for the nearby receiver locations 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. (3) Instead, they must be logarithmically added using the following base equation:

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

Where "SPL1," "SPL2," etc. are equal to the sound pressure levels being combined, or in this case, the Project-operational and existing ambient noise levels. The difference between the combined Project and ambient noise levels describes the Project noise level increases to the existing ambient noise environment. 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 Table 9-5, the Project will generate a daytime operational noise level increase ranging from 0.0 to 0.1 dBA L_{eq} at the nearest receiver locations. Table 9-6 shows that the Project will generate a nighttime operational noise level increase ranging from 0.0 to 0.3 dBA L_{eq} at the nearest existing receiver locations. Project-related operational noise level increases will 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 INCREASES AT EXISTING RECEIVERS

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	44.4	L1	59.5	59.6	0.1	5.0	No
R2	45.0	L2	72.2	72.2	0.0	1.5	No
R3	19.4	L3	79.0	79.0	0.0	1.5	No
R4	28.6	L4	52.7	52.7	0.0	5.0	No
R5	38.3	L5	57.0	57.1	0.1	5.0	No

[1] See Exhibit 8-A 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 INCREASES AT EXISTING RECEIVERS

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	44.4	L1	55.8	56.1	0.3	5.0	No
R2	45.0	L2	69.4	69.4	0.0	1.5	No
R3	19.4	L3	77.4	77.4	0.0	1.5	No
R4	28.6	L4	46.6	46.7	0.1	5.0	No
R5	38.3	L5	54.2	54.3	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 construction noise source locations in relation to the nearest sensitive receiver locations previously described in Section 8. To prevent high levels of construction noise from impacting noise-sensitive land uses, County of San Bernardino Development Code Section 83.01.080[g][3], states that construction activities are limited to the hours of 7:00 a.m. to 7:00 p.m. on any day and limited at any time on Sundays and federal holidays.

10.1 CONSTRUCTION NOISE LEVELS

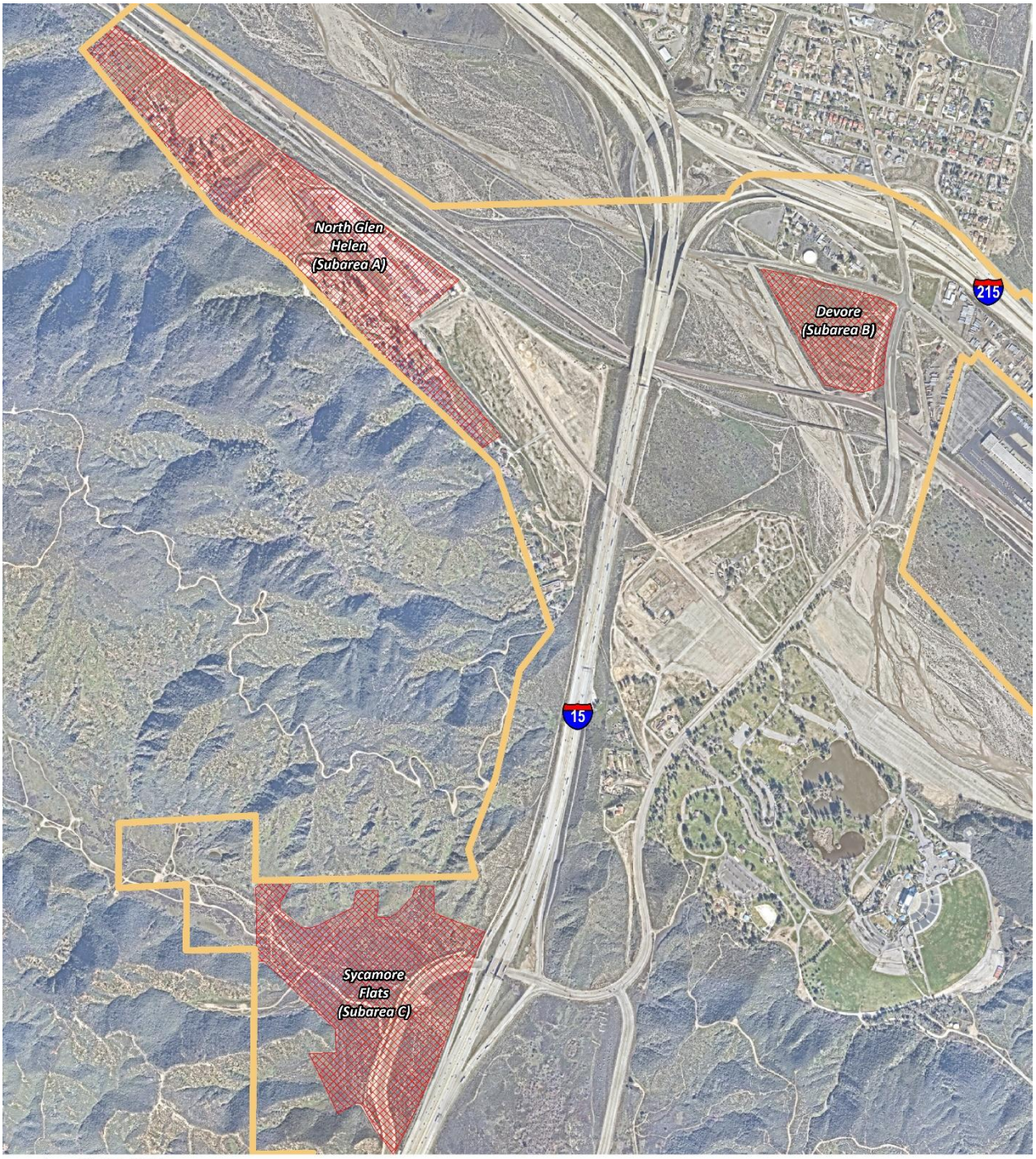
The FTA *Transit Noise and Vibration Impact Assessment Manual* recognizes that construction projects are accomplished in several different stages and outlines the procedures for assessing noise impacts during construction. Each stage has a specific equipment mix, depending on the work to be completed 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:

- Demolition
- 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 for 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.

EXHIBIT 10-A: CONSTRUCTION NOISE SOURCE LOCATIONS



10.3 CONSTRUCTION NOISE ANALYSIS

Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the Project construction noise level impacts at the nearby sensitive receiver locations were completed. Consistent with FTA guidance for detailed construction noise assessment, Table 10-1 presents the combined noise levels for the loudest construction equipment, assuming all equipment operates at the same time. To account for the dynamic nature of construction activities, the CadnaA construction noise analysis evaluates the equipment as multiple moving point sources within the construction area (Project site boundary). Construction impacts are based on the highest noise level calculated at each receiver location. As shown on Table 10-2, the construction noise levels are expected to range from 26.1 to 51.9 dBA L_{eq} at the existing nearby receiver locations. Appendix 10.1 includes the detailed CadnaA construction noise model inputs.

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 @50 Feet (dBA L_{eq})[2]	Composite Reference Noise Level @200 Feet (dBA L_{eq})[2]	Reference Power Level (dBA L_w)[3]
Demolition	Concrete Saw	83	86.8	74.8	118.4
	Grapple (on backhoe)	83			
	Gradall	79			
Site Preparation	Tractor	80	84.0	72.0	115.6
	Backhoe	74			
	Grader	81			
Grading	Scraper	80	83.3	71.3	114.9
	Excavator	77			
	Dozer	78			
Building Construction	Crane	73	80.6	68.6	112.2
	Generator	78			
	Front End Loader	75			
Paving	Paver	74	77.8	65.8	109.5
	Dump Truck	72			
	Roller	73			
Architectural Coating	Man Lift	68	76.2	64.2	107.8
	Compressor (air)	74			
	Generator (<25kVA)	70			

[1] FHWA Road Construction Noise Model.
[2] Represents the combined noise level for all equipment assuming they operate at the same time consistent with FTA Transit Noise and Vibration Impact Assessment guidance.
[3] Sound power level represents the total amount of acoustical energy (noise level) produced by a sound source independent of distance or surroundings.

TABLE 10-2: ON-SITE CONSTRUCTION EQUIPMENT SUMMARY AT EXISTING RECEIVERS

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})						
	Demolition	Site Preparation	Grading	Building Construction	Paving	Architectural Coating	Highest Levels[2]
R1	51.3	51.3	47.8	45.1	42.4	40.7	51.3
R2	51.9	51.9	48.4	45.7	43.0	41.3	51.9
R3	26.1	26.1	22.6	19.9	17.2	15.5	26.1
R4	35.5	35.5	32.0	29.3	26.6	24.9	35.5
R5	45.2	45.2	41.7	39.0	36.3	34.6	45.2

[1] Construction noise source and receiver locations are shown on Exhibit 10-A.
[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 CONSTRUCTION NOISE LEVEL 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 80 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 80 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: PROJECT SITE CONSTRUCTION NOISE LEVEL COMPLIANCE AT EXISTING RECEIVERS

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})		
	Highest Construction Noise Levels[2]	Threshold[3]	Threshold Exceeded?[4]
R1	51.3	80	No
R2	51.9	80	No
R3	26.1	80	No
R4	35.5	80	No
R5	45.2	80	No

[1] Construction noise source and receiver locations are shown on Exhibit 10-A.
[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?

This is consistent with the finding of the DEIR that determined that the Project-related noise at the site during site preparation, grading and construction could result in short-term noise increases. The following implementation measures were identified in the DEIR to reduce the potential project related to long-term operational noise level impacts to *less than significant*.

4.5-1 County Performance Standards Section 87.0905(e) exempts, "Temporary construction, repair, or demolition activities between 7:00 a.m. and 7:00 p.m. except Sundays and Federal holidays." Construction, which will be subject to distance requirements outlined in Table 4.5-7 of this document, shall be subject to these limitations.

4.5-2 Haul truck deliveries shall be subject to the same hours specified for construction equipment (see above). Additionally, any construction projects where heavy trucks would exceed 100 daily trips shall be required to have a noise mitigation plan. To the extent feasible, the plan shall denote haul routes that do not pass sensitive land uses or residential dwellings.

4.5-3 Prior to the issuance of any grading permits, the County shall condition subdivision approval of any project adjacent to any developed/occupied noise sensitive land uses by requiring the developer to submit a construction related noise mitigation plan for the County's review and approval.

10.5 NIGHTTIME CONCRETE POUR NOISE ANALYSIS

It is often typical that nighttime concrete pouring activities 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 permitted County of San Bernardino Municipal Code, Section 16.20.125.E.3 hours of *7:00 a.m. to 7:00 p.m. on any day and at any time on Sundays and federal holidays*. The Project Applicant will be required to obtain authorization for nighttime work from the County of San Bernardino. Any nighttime construction noise activities shall satisfy the noise limits outlined in Table 3-1.

10.5.1 NIGHTTIME CONCRETE POUR REFERENCE NOISE LEVEL MEASUREMENTS

To estimate the noise levels due to nighttime concrete pouring activities, sample reference noise level measurements were taken during a nighttime concrete pouring at a 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 Glen Helen Specific Plan Amendment, this analysis relies on reference sound pressure level of 67.7 dBA L_{eq} at 50 feet.

10.5.2 NIGHTTIME CONCRETE POUR NOISE LEVEL COMPLIANCE

As shown on Table 10-4, the noise levels associated with the nighttime concrete pour activities are estimated to range from 8.0 to 33.8 dBA L_{eq} and will satisfy the County of San Bernardino nighttime stationary-source exterior hourly average L_{eq} residential noise level threshold at all the receiver locations. Based on the results of this analysis, all nearest noise receiver locations will

experience *less than significant* impacts due to the Project related nighttime concrete pour activities. Appendix 10.2 includes the CadnaA nighttime concrete pour noise model inputs.

TABLE 10-4: NIGHTTIME CONCRETE POUR NOISE LEVEL COMPLIANCE AT EXISTING RECEIVERS

Receiver Location[1]	Concrete Pour Construction Noise Levels (dBA L_{eq})		
	Exterior Noise Levels[2]	Threshold[3]	Threshold Exceeded?[4]
R1	33.2	55.8	No
R2	33.8	69.4	No
R3	8.0	77.4	No
R4	17.4	46.6	No
R5	27.1	54.2	No

[1] Construction noise source and receiver locations are shown on Exhibit 10-A.
[2] Nighttime Concrete Pour noise model inputs are included in Appendix 10.2.
[3] Exterior nighttime noise level standards, adjusted to reflect the ambient noise levels (see Table 5-1) per the County of San Bernardino Development Code Section 83.01.080[e].
[4] Do the estimated Project construction noise levels exceed the construction noise level threshold?

10.6 CONSTRUCTION VIBRATION ANALYSIS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods employed. The 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 10-5. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the potential Project construction vibration levels using the following vibration assessment methods defined by the FTA. To calculate the vibration levles, the FTA provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

TABLE 10-5: 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

Table 10-6 presents the expected Project related vibration levels at the nearby receiver locations. At distances ranging from 1,003 to 14,111 feet from Project construction activities, construction vibration velocity levels are estimated to range from 0.000 to 0.001 in/sec PPV. Based on maximum acceptable continuous vibration threshold of 0.2 PPV (in/sec), the typical Project construction vibration levels will fall below the building damage thresholds at 25 feet or farther from operation of a large bulldoze, which include all the noise sensitive receiver locations. Therefore, the Project-related vibration impacts are considered *less than significant* during typical construction activities at the Project site. Further, the previously adopted GHSP Final EIR Mitigation Measures 4.5-3 and 4.5-4 that require site-specific analysis for all proposed projects would ensure that future construction activities do not exceed the vibration thresholds.

TABLE 10-6: PROJECT CONSTRUCTION VIBRATION LEVELS AT EXISTING RECEIVERS

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	1,308'	0.000	0.000	0.000	0.000	0.001	0.001	0.2	No
R2	1,003'	0.000	0.000	0.000	0.000	0.001	0.001	0.2	No
R3	14,111'	0.000	0.000	0.000	0.000	0.000	0.000	0.2	No
R4	6,089'	0.000	0.000	0.000	0.000	0.000	0.000	0.2	No
R5	1,833'	0.000	0.000	0.000	0.000	0.000	0.000	0.2	No

[1] Construction noise source and receiver locations are shown on Exhibit 10-A.
[2] Distance from receiver to limits of construction activity.
[3] Based on the Vibration Source Levels of Construction Equipment (Table 10-5).
[4] Section 83.01.090[a] of the County of San Bernardino County Code.
[5] Does the peak vibration exceed the acceptable vibration thresholds?
"PPV" = Peak Particle Velocity

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11 REFERENCES

1. **State of California.** *California Environmental Quality Act, Appendix G.* 2018.
2. **Michael Brandman Associates.** *Glen Helen Specific Plan Draft Environmental Impact Report.* November 2000.
3. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
4. **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.
5. **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.
6. **U.S. Department of Transportation Federal Highway Administration.** *Highway Noise Barrier Design Handbook.* 2001.
7. **U.S. Department of Transportation, Federal Highway Administration.** *Highway Traffic Noise in the United States, Problem and Response.* April 2000. p. 3.
8. **U.S. Environmental Protection Agency Office of Noise Abatement and Control.** *Noise Effects Handbook-A Desk Reference to Health and Welfare Effects of Noise.* October 1979 (revised July 1981). EPA 550/9/82/106.
9. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment Manual, FTA Report No. 0123.* September 2018.
10. **California Department of Transportation.** *Transportation and Construction Vibration Guidance Manual.* April 2020.
11. **Office of Planning and Research.** *State of California General Plan Guidelines.* 2019.
12. **County of San Bernardino.** *Countywide Plan.* September 2022.
13. —. *Code of Ordinances, Title 8 Development Code, Chapter 83.01 General Performance Standards.*
14. **California Court of Appeal.** *Gray v. County of Madera, F053661.* 167 Cal.App.4th 1099; - Cal.Rptr.3d, October 2008.
15. **Federal Interagency Committee on Noise.** *Federal Agency Review of Selected Airport Noise Analysis Issues.* August 1992.
16. **California Department of Transportation.** *Technical Noise Supplement.* November 2009.
17. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*
18. **EPD Solutions, Inc.** *Glen Helen Specific Plan Amendment.* January 2024.
19. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.
20. **California Department of Transportation Environmental Program, Office of Environmental Engineering.** *Use of California Vehicle Noise Reference Energy Mean Emission Levels (Calveno REMELs) in FHWA Highway Traffic Noise Prediction.* September 1995. TAN 95-03.

21. **California Department of Transportation.** *Traffic Noise Attenuation as a Function of Ground and Vegetation Final Report.* June 1995. FHWA/CA/TL-95/23.

22. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning.** *FHWA Roadway Construction Noise Model.* January, 2006.

12 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Glen Helen Specific Plan Amendment 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.

Bill Lawson, P.E., INCE
Principal
URBAN CROSSROADS, INC.
1133 Camelback #8329
Newport Beach, CA 92658
(949) 581-3148
blawson@urbanxroads.com

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:

COUNTY OF SAN BERNARDINO MUNICIPAL CODE

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CHAPTER 7: NOISE ABATEMENT AND CONTROL

Section

§ 24.0701 Purpose.

Disturbing, excessive or offensive noise may interfere with a person's right to enjoy life and property and may be detrimental to the public health and safety. The purpose of this Chapter is to regulate noise in the unincorporated area of the County of San Bernardino to promote the public health, comfort, and convenience of its inhabitants and visitors. This Chapter is not intended to establish thresholds of significance for the purpose of any analysis required by the California Environmental Quality Act and no such thresholds are established.

(Ord. 4361, passed - -2019)

§ 24.0702 Definitions.

The following definitions shall apply to this Chapter:

(a) ***AMBIENT NOISE LEVEL.*** The composite of existing noise from all sources at a given location and time. Ambient noise is sometimes referred to as background noise.

(b) ***AVERAGE SOUND LEVEL.*** The level in decibels of the mean-square A-weighted sound pressure during a stated time period, with reference to the square of the standard reference sound pressure of 20 micropascals. The ***AVERAGE SOUND LEVEL*** is equivalent to the industry standard LEQ.

(c) ***AUDIO EQUIPMENT.*** A television, stereo, radio, tape player, compact disc player, mp3 player, I-POD, or other similar device.

(d) ***A-WEIGHTED SOUND LEVEL.*** The sound level in decibels as measured on a sound level meter using the A-weighted network. The A-weighted network is the network for measuring sound that most closely resembles what the human ear hears. Sound measured using the A-weighted network is designated dB(A).

(e) ***CONSTRUCTION EQUIPMENT.*** Tools, machinery, or equipment including "special construction equipment" defined in the Vehicle Code, used in a construction operation on any construction site.

(f) ***DECIBEL.*** A unit for measuring the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals.

(g) ***DISTURBING, EXCESSIVE, OR OFFENSIVE NOISE.*** Any sound or noise that endangers the health or safety of any person, or causes discomfort or annoyance to any reasonable person of normal sensitivity.

(h) ***EMERGENCY WORK.*** Work: (1) necessary to restore property to a safe condition following a public calamity; (2) required to protect a person or property from injury or damage; or (3) by a public or private utility to restore utility service.

(i) ***ENFORCEMENT AUTHORITY.*** The County of San Bernardino Land Use Services Department, Code Enforcement Division, the San Bernardino County Sheriff's Department, and any other County department designated by the County Chief Executive Officer or Board of Supervisors to enforce the provisions of the County Code and/or this Chapter.

(j) ***MAXIMUM SOUND LEVEL.*** The highest sound level reached when measuring noise with a sound level meter using the A-weighted network and slow time weighting. The ***MAXIMUM SOUND LEVEL*** is equivalent to the industry standard known as LMAX.

(k) ***MOTOR VEHICLE.*** Any self-propelled vehicle as defined in the Vehicle Code and includes a mini-bike and a go-cart.

(l) ***NEIGHBORING INHABITANT.*** Any individual residing within 200 yards of a property that is alleged to be the source of noise in violation of this Chapter.

(m) ***OCCUPIED PROPERTY.*** Property on which there is a building for which a certificate of occupancy has been issued.

(n) ***PLAINLY AUDIBLE.*** Any sound that can be detected by a person using his or her unaided hearing faculties. As an example, if the sound source under investigation is a portable or personal vehicular sound amplification or reproduction device, the detection of the rhythmic base component of music is sufficient to verify plainly audible sound. The enforcement authority need not determine the title, specific words, or the artist performing the music.

(o) ***SOUND AMPLIFYING EQUIPMENT.*** Any machine or device used to amplify music, the human voice, or any sound such as a loudspeaker, microphone, megaphone, or other similar device.

(p) ***SOUND LEVEL.*** The weighted sound pressure level obtained using a sound level meter and frequency weighting network as provided in the American National Standards Institute (ANSI) specifications for sound level meters. As used in this Chapter, ***SOUND LEVEL*** means the same as “noise level.”

(q) ***SOUND LEVEL METER.*** An instrument for the measurement of sound levels, which meets or exceeds the requirements pertinent for a type 1 or type 2 meter in the ANSI specifications for sound level meters (ANSI § SI.4 1979, Type 1 or Type 2).

(Ord. 4361, passed - -2019)

§ 24.0703 Sound Level Measurements.

A sound level measurement made pursuant to this Chapter shall be measured:

(a) At the property line of the nearest site that is occupied, and/or zoned or designated to allow the development of noise-sensitive land uses;

(b) With a sound level meter that meets the standards of the American National Standards Institute (ANSI § SI.4 1979, Type 1 or Type 2); and

(c) Using the A-weighted sound level pressure scale in decibels (ref. pressure = 20 micronewtons per meter squared). The unit of measure shall be designated as dB(A).

(Ord. 4361, passed - -2019)

§ 24.0704 General Sound Level Limits.

The general noise standards concerning acceptable noise levels identified in §83.01.080 of this Code, or as subsequently modified or renumbered, are incorporated herein by reference. No person shall create any sound, or allow the creation of any sound, on any property that causes the sound level on any other occupied property to exceed the sound level limits set forth in § 83.01.080 of this Code.

(Ord. 4361, passed - -2019)

§ 24.0705 Disturbing, Excessive or Offensive Noise.

(a) In addition to the general limitations on sound levels in §24.0704, it shall be unlawful for any person or property owner within the County to make, cause, or allow to be made a noise that would be disturbing, excessive, or offensive to a reasonable person. The types of disturbing, excessive, or offensive noise may include, but shall not be limited to, yelling, shouting, hooting, whistling, singing, playing a musical instrument, or emitting or transmitting any loud music or noise from any audio equipment or sound amplifying equipment.

(b) The factors, standards, and conditions that may be considered in determining whether a violation of this Section has been committed, include, but are not limited to, the following:

(1) The level of the noise.

(2) The level and intensity of the background (ambient) noise, if any.

(3) The proximity of the noise to residential or commercial sleeping areas.

(4) The nature and zoning of the area within which the noise emanates and where it is received.

(5) The density of inhabitation of the area within which the noise emanates.

(6) The time of day and night the noise occurs.

(7) The duration of the noise.

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

(9) Whether the origin of the noise is natural or unnatural.

(10) Whether the noise is produced by a commercial or noncommercial activity.

(11) The number of complaints received.

(c) Unless a noise source is determined to be disturbing, excessive or offensive by the enforcement authority after

responding to or investigating a complaint, evidence of a violation of this Section must be supported by declarations from two neighboring inhabitants residing on separate properties, unless there is only one neighboring inhabitant. These declarations are to be made under penalty of perjury within a 60-day period from the date of the complaint stating in detail all of the following:

(1) That the declarant is a resident of a residential neighborhood located within 200 yards of the noise source; and

(2) Within the past 30 days the declarant has heard disturbing, excessive or offensive noise for substantially long periods to the annoyance of the declarant.

(d) A complainant residing in excess of 200 yards of the noise source may also establish evidence of a violation in accordance with all other requirements of Subdivision (c) above, provided that the complainant can provide the enforcement authority with credible evidence that he, she, or they are experiencing disturbing, excessive, or offensive noise for the enforcement authority to waive the 200 yard requirement. Evidence may include, but is not limited to, tape recordings, videotapes, sound monitoring logs, photographs, maps, or declarations of other persons.

(e) Whether the sound or noise identified by a declarant endangers the health or safety of any person, or causes discomfort or annoyance to a reasonable person of normal sensitivity, will be determined by the enforcement authority. Declarants should provide additional credible evidence in support of their declaration, which may include, but is not limited to, tape recordings, videotapes, sound monitoring logs, photographs, maps, or declarations of other persons.

(Ord. 4361, passed - -2019)

§ 24.0706 Special Sound Source Standards.

The general sound level limits in §24.0704 and disturbing, excessive or offensive noise in §24.0705 apply to sound emanating from all sources, including the following special sound sources, and the person creating, or allowing the creation of, the sound is subject to the requirements of those sections. In addition, there is a reasonable expectation that certain hours of the evening and early morning will be even quieter and more peaceful than other hours of the day and that certain sound sources occurring during this time period causes discomfort or annoyance to reasonable persons of normal sensitivities. As a result of that expectation, the following special sound sources are subject to the following additional standards, the failure to comply with which constitutes a separate violation of this Chapter and have been declared to be disturbing, excessive, or offensive noise. A noise source is established as a per se violation of this Section in the same manner as provided in Subdivision (c) of § 24.0705.

(a) *Audio Equipment.* No person shall operate, or allow the operation of, any audio equipment, whether portable or not, between the hours of 10:00 p.m. and 7:00 a.m. such that the equipment is plainly audible inside an occupied dwelling other than a dwelling in which the equipment may be located. Sound level measurements may be used, but are not required, to establish a violation of this Subdivision.

(b) *Sound Amplifying Equipment and Live Music.* No person shall install, use or operate sound amplifying equipment, or perform, or allow to be performed, live music, between the hours of 10:00 p.m. and 7:00 a.m. such that the sound amplifying equipment or live music is plainly audible inside an occupied dwelling other than a dwelling in which the sound source is located. Sound level measurements may be used, but are not required, to establish a violation of this Subdivision.

(c) *Power Tools and Equipment.* Except for emergency work, no person shall operate any power tools or equipment between the hours of 10:00 p.m. and 7:00 a.m. such that the power tools or equipment are plainly audible inside an occupied dwelling other than a dwelling in which the power tools or equipment may be located. Sound level measurements may be used, but are not required, to establish a violation of this Subdivision.

(d) *Construction Activity.* Except for emergency work, it shall be unlawful for any person to operate or cause to be operated, construction equipment between 7:00 p.m. and 7:00 a.m.

(Ord. 4361, passed - -2019)

§ 24.0707 Exemptions.

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

(a) *Emergency Work.* Noise sources associated with alerting persons to the existence of an emergency or in the performance of emergency work.

(b) *School Sponsored Activities.* Noise sources emanating from authorized school bands, school athletic and school entertainment events.

(c) *Federal or State Preempted Activities.* Any activity the noise level of which is regulated by State or Federal law.

(d) *Minor Maintenance to Residential Property.* Noise sources associated with minor maintenance to property used for residential purposes, including, but not limited to, lawnmowers, leaf blowers, etc., provided the activities take place between the hours of 7:00 a.m. and 7:00 p.m.

(e) *Public Health, Welfare, and Safety Activities.* Noise sources associated with construction, maintenance, and repair operations conducted by public agencies and/or utility companies or their contractors which are deemed necessary to serve the best interest of the public and to protect the public health, welfare, and safety, including but not limited to, trash collection, street sweeping, debris and limb removal, removal of downed wires, restoring electrical service, repairing traffic

signals, unplugging sewers, vacuuming catch basins, repairing of damaged poles, removing abandoned vehicles, repairing water hydrants and mains, gas lines, oil lines, sewers, storm drains, roads, or sidewalks, and the executing of official duties by public safety personnel. This exemption includes, without limitation, sound emanating from all equipment used by such personnel, whether stationery or mobile.

(f) *Animals.* The provisions of this Chapter shall not apply to any noise sources associated with barking dogs or other intermittent noises made by animals on any property within the County. Such noise shall be subject to the provisions of § 32.0119 (Animals Which Habitually Make Noise) of this Code.

(g) *Agriculture Operations.* Noise sources associated with mechanical devices, apparatus, or equipment associated with agriculture operations, provided that each piece of equipment or machinery powered by an internal-combustion engine is equipped with appropriate muffler and/or air intake silencer in good working order and the operations and equipment are utilized for the preparation, planting, harvesting, protection, or salvage of agricultural crops.

(h) *Authorized Events.* Noise sources associated with outdoor gatherings, public dances, shows, sporting and entertainment events and other similar events, provided the activity is conducted pursuant to a permit or license issued by the appropriate jurisdiction and contain acoustic and/or noise standard conditions of approval. This Subdivision is not intended to excuse the act of an individual not participating in the event who violates this Chapter.

(Ord. 4361, passed - -2019)

§ 24.0708 Other Public Agency Exception.

The provisions of this Chapter shall not be construed to prohibit any work at different hours by or under the direction of any other public agency or public or private utility companies in cases of necessity or emergency.

(Ord. 4361, passed - -2019)

§ 24.0709 False Statements.

No person shall knowingly provide false information, either orally or in writing, to the enforcement authority related to the enforcement of this Chapter.

(Ord. 4361, passed - -2019)

§ 24.0710 Violations and Penalties.

(a) Any person found by the enforcement authority to have negligently or knowingly violated any provision of this Chapter may be charged with an infraction. Any person found by the enforcement authority to have negligently or knowingly violated any provision of this Chapter more than once within a 180-day period may be charged with a misdemeanor. Each day a violation is committed or permitted to continue shall constitute a separate offense and shall be punishable as such.

(b) All violations of this Chapter may be enforced by the enforcement authority and addressed through the institution of a criminal action, a civil action, and/or an administrative action as set forth in Chapter 2 of Division 1 of Title 1 (Violations and Enforcement) of this Code or as otherwise provided by law. Pursuant to Cal. Penal Code § 836.5, any peace officer of the San Bernardino County Sheriff's Department may arrest a person without a warrant if he or she has reasonable cause to believe that the person has committed a misdemeanor in his or her presence that violates this Chapter.

(c) Any violation of this Chapter is declared to be a public nuisance and may be abated in accordance with law, including but not limited to by a restraining order or injunction issued by a court of competent jurisdiction.

(Ord. 4361, passed - -2019)

§ 83.01.080 Noise.

This Section establishes standards concerning acceptable noise levels for both noise-sensitive land uses and for noise-generating land uses.

(a) *Noise Measurement.* Noise shall be measured:

(1) At the property line of the nearest site that is occupied by, and/or zoned or designated to allow the development of noise-sensitive land uses;

(2) With a sound level meter that meets the standards of the American National Standards Institute (ANSI § SI4 1979, Type 1 or Type 2);

(3) Using the "A" weighted sound pressure level scale in decibels (ref. pressure = 20 micronewtons per meter squared). The unit of measure shall be designated as dB(A).

(b) *Noise Impacted Areas.* Areas within the County shall be designated as "noise-impacted" if exposed to existing or projected future exterior noise levels from mobile or stationary sources exceeding the standards listed in Subdivision (d) (Noise Standards for Stationary Noise Sources) and Subdivision (e) (Noise Standards for Adjacent Mobile Noise Sources), below. New development of residential or other noise-sensitive land uses shall not be allowed in noise-impacted areas unless effective mitigation measures are incorporated into the project design to reduce noise levels to these standards. Noise-sensitive land uses shall include residential uses, schools, hospitals, nursing homes, religious institutions, libraries, and similar uses.

(c) *Noise Standards for Stationary Noise Sources.*

(1) *Noise Standards.* Table 83-2 (Noise Standards for Stationary Noise Sources) describes the noise standard for emanations from a stationary noise source, as it affects adjacent properties:

Table 83-2

Noise Standards for Stationary Noise Sources

Affected Land Uses (Receiving Noise)	***7:00 a.m. - 10:00 p.m. Leq***	***10:00 p.m. - 7:00 a.m. Leq***
Residential	55 dB(A)	45 dB(A)
Professional Services	55 dB(A)	55 dB(A)
Other Commercial	60 dB(A)	60 dB(A)
Industrial	70 dB(A)	70 dB(A)

Leq = (Equivalent Energy Level). The sound level corresponding to a steady-state sound level containing the same total energy as a time-varying signal over a given sample period, typically one, eight or 24 hours.

dB(A) = (A-weighted Sound Pressure Level). The sound pressure level, in decibels, as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound, placing greater emphasis on those frequencies within the sensitivity range of the human ear.

Ldn = (Day-Night Noise Level). The average equivalent A-weighted sound level during a 24-hour day obtained by adding 10 decibels to the hourly noise levels measured during the night (from 10:00 p.m. to 7:00 a.m.). In this way Ldn takes into account the lower tolerance of people for noise during nighttime periods.

(2) *Noise Limit Categories.* No person shall operate or cause to be operated a source of sound at a location or allow the creation of noise on property owned, leased, occupied, or otherwise controlled by the person, which causes the noise level, when measured on another property, either incorporated or unincorporated, to exceed any one of the following:

(A) The noise standard for the receiving land use as specified in Subdivision (b) (Noise-Impacted Areas), above, for a cumulative period of more than 30 minutes in any hour.

(B) The noise standard plus five dB(A) for a cumulative period of more than 15 minutes in any hour.

(C) The noise standard plus ten dB(A) for a cumulative period of more than five minutes in any hour.

(D) The noise standard plus 15 dB(A) for a cumulative period of more than one minute in any hour.

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

(d) *Noise Standards for Adjacent Mobile Noise Sources.* Noise from mobile sources may affect adjacent properties adversely. When it does, the noise shall be mitigated for any new development to a level that shall not exceed the standards described in the following Table 83-3 (Noise Standards for Adjacent Mobile Noise Sources).

Table 83-3

Noise Standards for Adjacent Mobile Noise Sources

Land Use		***Ldn (or CNEL) dB(A)***	
Categories	***Uses***	***Interior*** (1)	***Exterior*** (2)

Table 83-3

Noise Standards for Adjacent Mobile Noise Sources

Land Use		***Ldn (or CNEL) dB(A)***	
Categories	***Uses***	***Interior*** (1)	***Exterior*** (2)
Residential	Single and multi-family, duplex, mobile homes	45	60(3)
Commercial	Hotel, motel, transient housing	45	60(3)
	Commercial retail, bank, restaurant	50	N/A
	Office building, research and development, professional offices	45	65
	Amphitheater, concert hall, auditorium, movie theater	45	N/A
Institutional/Public	Hospital, nursing home, school classroom, religious institution, library	45	65
Open Space	Park	N/A	65

Notes:

(1) The indoor environment shall exclude bathrooms, kitchens, toilets, closets and corridors.

(2) The outdoor environment shall be limited to:
- Hospital/office building patios
- Hotel and motel recreation areas
- Mobile home parks
- Multi-family private patios or balconies
- Park picnic areas
- Private yard of single-family dwellings
- School playgrounds

(3) An exterior noise level of up to 65 dB(A) (or CNEL) shall be allowed provided exterior noise levels have been substantially mitigated through a reasonable application of the best available noise reduction technology, and interior noise exposure does not exceed 45 dB(A) (or CNEL) with windows and doors closed. Requiring that windows and doors remain closed to achieve an acceptable interior noise level shall necessitate the use of air conditioning or mechanical ventilation.

CNEL = (Community Noise Equivalent Level). The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night from 10:00 p.m. to 7:00 a.m.

(e) *Increases in Allowable Noise Levels.* If the measured ambient level exceeds any of the first four noise limit categories in Subdivision (d)(2), above, the allowable noise exposure standard shall be increased to reflect the ambient noise level. If the ambient noise level exceeds the fifth noise limit category in Subdivision (d)(2), above, the maximum allowable noise level under this category shall be increased to reflect the maximum ambient noise level.

(f) *Reductions in Allowable Noise Levels.* If the alleged offense consists entirely of impact noise or simple tone noise, each of the noise levels in Table 83-2 (Noise Standards for Stationary Noise Sources) shall be reduced by five dB(A).

(g) *Exempt Noise.* The following sources of noise shall be exempt from the regulations of this Section:

(1) Motor vehicles not under the control of the commercial or industrial use.

(2) Emergency equipment, vehicles, and devices.

(3) Temporary construction, maintenance, repair, or demolition activities between 7:00 a.m. and 7:00 p.m., except Sundays and Federal holidays.

(h) *Noise Standards for Other Structures.* All other structures shall be sound attenuated against the combined input of all present and projected exterior noise to not exceed the criteria.

Table 83-4	
Noise Standards for Other Structures	
Typical Uses	***12-Hour Equivalent Sound Level (Interior) in dBA Ldn***
Educational, institutions, libraries, meeting facilities, etc.	45
General office, reception, etc.	50
Retail stores, restaurants, etc.	55
Other areas for manufacturing, assembly, testing, warehousing, etc.	65

In addition, the average of the maximum levels on the loudest of intrusive sounds occurring during a 24-hour period shall not exceed 65 dBA interior.

(Ord. 4011, passed - -2007; Am. Ord. 4245, passed - -2014)

§ 83.01.090 Vibration.

(a) *Vibration Standard.* No ground vibration shall be allowed that can be felt without the aid of instruments at or beyond the lot line, nor shall any vibration be allowed which produces a particle velocity greater than or equal to two-tenths inches per second measured at or beyond the lot line.

(b) *Vibration Measurement.* Vibration velocity shall be measured with a seismograph or other instrument capable of measuring and recording displacement and frequency, particle velocity, or acceleration. Readings shall be made at points of maximum vibration along any lot line next to a parcel within a residential, commercial and industrial land use zoning district.

(c) *Exempt Vibrations.* The following sources of vibration shall be exempt from the regulations of this Section.

(1) Motor vehicles not under the control of the subject use.

(2) Temporary construction, maintenance, repair, or demolition activities between 7:00 a.m. and 7:00 p.m., except Sundays and Federal holidays.

(Ord. 4011, passed - -2007)

APPENDIX 5.1:

STUDY AREA PHOTOS

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JN:15585

15585_L1_C 1.North
34, 13' 29.160000", 117, 24' 14.640000"

15585_L1_C 2.South
34, 13' 29.160000", 117, 24' 14.640000"

15585_L1_C 3.East
34, 13' 29.160000", 117, 24' 14.640000"

15585_L1_C 4.West
34, 13' 29.160000", 117, 24' 14.640000"

15585_L2_D 1.North
34, 13' 18.530000", 117, 24' 0.280000"

15585_L2_D 2.South
34, 13' 18.530000", 117, 24' 0.280000"

15585_L2_D 3.East
34, 13' 18.530000", 117, 24' 0.280000"

15585_L2_D 4.West
34, 13' 18.530000", 117, 24' 0.280000"

15585_L3_E 1.North
34, 11' 40.580000", 117, 21' 56.680000"

15585_L3_E 2.South
34, 11' 40.580000", 117, 21' 56.680000"

15585_L3_E 3.East
34, 11' 40.580000", 117, 21' 56.680000"

15585_L3_E 4.West
34, 11' 40.580000", 117, 21' 56.680000"

15585_L4_G 1.North
34, 11' 10.690000", 117, 24' 18.460000"

15585_L4_G 2.South
34, 11' 10.690000", 117, 24' 18.460000"

15585_L4_G 3.East
34, 11' 10.690000", 117, 24' 18.460000"

15585_L4_G 4.West
34, 11' 10.690000", 117, 24' 18.460000"

15585_L5_A 1.North
34, 11' 38.520000", 117, 24' 55.100000"

15585_L5_A 2.South
34, 11' 38.500000", 117, 24' 55.050000"

15585_L5_A 3.East
34, 11' 38.390000", 117, 24' 55.130000"

15585_L5_A 4.West
34, 11' 38.390000", 117, 24' 55.130000"

15585_L6_B 1.North
34, 13' 13.140000", 117, 25' 0.680000"

15585_L6_B 2.South
34, 13' 13.140000", 117, 25' 0.680000"

15585_L6_B 3.East
34, 13' 13.140000", 117, 25' 0.680000"

15585_L6_B 4.West
34, 13' 13.140000", 117, 25' 0.680000"

JN:15585

15585_L7_A 1.North
34, 12' 49.670000", 117, 24' 36.260000"

15585_L7_A 2.South
34, 12' 49.650000", 117, 24' 36.230000"

15585_L7_A 3.East
34, 12' 49.620000", 117, 24' 36.150000"

15585_L7_A 4.West
34, 12' 49.620000", 117, 24' 36.180000"

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APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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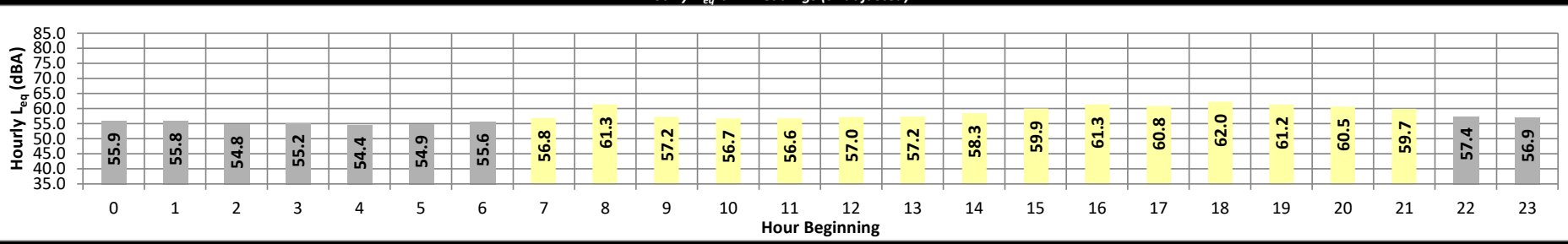
24-Hour Noise Level Measurement Summary

Date: Thursday, February 29, 2024 *Location:* L1 - Located north of the GHSP near the residence at 1650 *Meter:* Piccolo II *JN:* 15585

Project: Glen Helen *Source:* Devore 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	58.8	53.5	58.6	58.4	57.9	57.5	56.5	55.5	54.2	53.9	53.6	55.9	10.0	65.9
	1	55.8	58.4	53.0	58.2	58.0	57.7	57.4	56.5	55.6	53.8	53.4	53.1	55.8	10.0	65.8
	2	54.8	57.4	52.5	57.2	57.0	56.6	56.3	55.4	54.6	53.2	52.8	52.6	54.8	10.0	64.8
	3	55.2	59.2	52.7	58.9	58.4	57.3	56.9	55.8	54.9	53.4	53.1	52.8	55.2	10.0	65.2
	4	54.4	58.6	51.8	58.3	57.9	56.7	56.1	54.9	53.9	52.5	52.2	51.9	54.4	10.0	64.4
	5	54.9	60.3	51.8	60.0	59.7	58.5	57.8	55.4	53.7	52.4	52.1	51.8	54.9	10.0	64.9
	6	55.6	60.7	53.0	60.4	60.0	58.6	57.6	56.0	55.1	53.6	53.4	53.0	55.6	10.0	65.6
Day	7	56.8	61.7	54.3	61.3	61.0	59.8	59.0	57.1	56.2	54.9	54.6	54.4	56.8	0.0	56.8
	8	61.3	72.4	54.5	72.0	71.5	68.7	65.1	58.8	56.5	55.1	54.9	54.6	61.3	0.0	61.3
	9	57.2	66.2	52.0	65.9	65.4	64.0	62.1	55.2	54.0	52.6	52.4	52.0	57.2	0.0	57.2
	10	56.7	62.3	54.2	61.9	61.3	60.0	59.1	56.8	55.9	54.7	54.5	54.3	56.7	0.0	56.7
	11	56.6	60.0	54.6	59.8	59.4	58.6	58.1	57.1	56.4	55.2	54.9	54.7	56.6	0.0	56.6
	12	57.0	62.0	54.8	61.6	61.2	59.9	59.0	57.2	56.5	55.3	55.1	54.8	57.0	0.0	57.0
	13	57.2	61.5	54.9	61.2	60.7	59.8	59.1	57.6	56.8	55.5	55.2	55.0	57.2	0.0	57.2
	14	58.3	68.2	54.6	67.0	65.6	62.1	60.2	58.1	56.7	55.3	55.0	54.7	58.3	0.0	58.3
	15	59.9	65.9	57.3	65.6	65.2	63.9	62.4	59.8	59.0	57.9	57.6	57.4	59.9	0.0	59.9
	16	61.3	64.6	59.5	64.3	63.9	63.1	62.5	61.6	61.0	60.1	59.8	59.6	61.3	0.0	61.3
	17	60.8	63.6	59.1	63.3	63.1	62.3	61.9	61.1	60.6	59.7	59.5	59.2	60.8	0.0	60.8
	18	62.0	66.2	60.0	65.8	65.4	64.6	64.0	62.3	61.6	60.5	60.3	60.1	62.0	0.0	62.0
	19	61.2	64.5	59.2	64.1	63.8	63.2	62.8	61.6	60.8	59.7	59.5	59.3	61.2	5.0	66.2
	20	60.5	63.1	58.8	62.9	62.6	62.2	61.8	61.0	60.3	59.3	59.1	58.9	60.5	5.0	65.5
	21	59.7	62.6	57.9	62.4	62.2	61.5	61.2	60.2	59.5	58.4	58.2	58.0	59.7	5.0	64.7
Night	22	57.4	60.0	55.3	59.8	59.6	59.1	58.8	58.0	57.2	56.0	55.7	55.4	57.4	10.0	67.4
	23	56.9	60.7	54.8	60.2	59.7	59.0	58.5	57.4	56.7	55.4	55.2	54.9	56.9	10.0	66.9

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	56.6	60.0	52.0	59.8	59.4	58.6	58.1	55.2	54.0	52.6	52.4	52.0
	Max	62.0	72.4	60.0	72.0	71.5	68.7	65.1	62.3	61.6	60.5	60.3	60.1
Energy Average		59.5	Average:		63.9	63.5	62.2	61.2	59.0	58.1	57.0	56.7	56.5
Night	Min	54.4	57.4	51.8	57.2	57.0	56.6	56.1	54.9	53.7	52.4	52.1	51.8
	Max	57.4	60.7	55.3	60.4	60.0	59.1	58.8	58.0	57.2	56.0	55.7	55.4
Energy Average		55.8	Average:		59.1	58.7	57.9	57.4	56.2	55.3	53.8	53.5	53.2

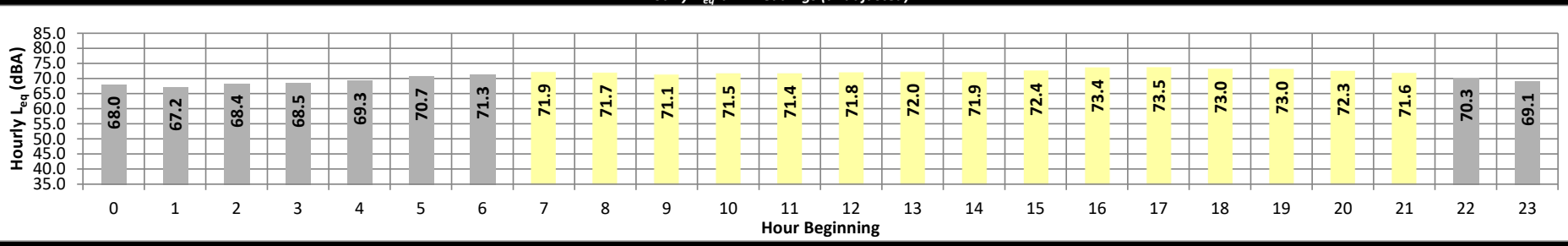
24-Hour CNEL	*Leq (dBA) Daytime (7am-10pm)*	*Leq (dBA) Nighttime (10pm-7am)*
63.6	**59.5**	**55.8**

24-Hour Noise Level Measurement Summary

Date: Thursday, February 29, 2024 *Location:* L2 - Located north of the site near the residence at 18552 *Meter:* Piccolo II *JN:* 15585

Project: Glen Helen *Source:* Parker 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	68.0	74.4	60.0	74.2	74.0	73.1	72.2	69.0	66.1	61.5	60.8	60.2	68.0	10.0	78.0
	1	67.2	72.7	60.5	72.5	72.3	71.5	70.9	68.4	65.9	61.8	61.2	60.6	67.2	10.0	77.2
	2	68.4	74.8	59.7	74.6	74.4	73.3	72.4	69.6	66.5	61.3	60.6	59.9	68.4	10.0	78.4
	3	68.5	74.8	61.0	74.5	74.2	73.2	72.4	69.5	66.9	62.5	61.8	61.2	68.5	10.0	78.5
	4	69.3	75.2	62.0	75.0	74.7	73.7	73.1	70.5	68.0	63.7	62.9	62.2	69.3	10.0	79.3
	5	70.7	76.3	63.6	76.0	75.6	74.7	74.0	71.8	69.6	65.6	64.6	63.8	70.7	10.0	80.7
	6	71.3	76.0	65.2	75.9	75.6	74.7	74.1	72.4	70.6	67.0	66.2	65.4	71.3	10.0	81.3
Day	7	71.9	77.5	66.1	76.8	76.4	75.4	74.8	73.0	71.2	67.9	67.1	66.3	71.9	0.0	71.9
	8	71.7	76.7	65.3	76.4	76.1	75.3	74.8	72.9	71.0	67.1	66.2	65.4	71.7	0.0	71.7
	9	71.1	76.1	65.1	75.9	75.5	74.7	74.2	72.3	70.4	66.7	65.9	65.3	71.1	0.0	71.1
	10	71.5	77.0	65.2	76.8	76.5	75.4	74.6	72.5	70.6	67.2	66.3	65.4	71.5	0.0	71.5
	11	71.4	76.6	65.3	76.3	76.0	75.0	74.4	72.5	70.7	67.1	66.3	65.5	71.4	0.0	71.4
	12	71.8	77.1	65.7	76.9	76.6	75.5	74.7	72.8	71.0	67.6	66.7	65.9	71.8	0.0	71.8
	13	72.0	77.8	65.8	77.5	77.2	75.9	74.9	73.0	71.2	67.7	66.9	66.0	72.0	0.0	72.0
	14	71.9	78.1	65.9	77.8	77.3	75.6	74.7	72.7	71.0	67.9	66.9	66.1	71.9	0.0	71.9
	15	72.4	77.7	67.2	77.5	77.2	76.0	75.1	73.2	71.7	68.8	68.1	67.3	72.4	0.0	72.4
	16	73.4	77.3	69.5	77.1	76.8	76.1	75.6	74.1	72.9	70.7	70.2	69.6	73.4	0.0	73.4
	17	73.5	78.2	69.9	78.0	77.7	76.7	75.8	74.1	72.9	70.9	70.5	70.0	73.5	0.0	73.5
	18	73.0	77.2	68.9	77.0	76.8	76.0	75.4	73.9	72.5	70.2	69.6	69.0	73.0	0.0	73.0
	19	73.0	77.9	68.1	77.6	77.3	76.3	75.4	73.8	72.4	69.6	69.0	68.3	73.0	5.0	78.0
	20	72.3	78.1	66.2	77.9	77.4	76.2	75.3	73.3	71.3	67.9	67.2	66.4	72.3	5.0	77.3
	21	71.6	77.4	65.5	77.2	76.8	75.8	74.8	72.6	70.6	67.0	66.4	65.6	71.6	5.0	76.6
Night	22	70.3	77.2	62.0	76.9	76.5	75.2	74.1	71.2	68.7	64.1	63.1	62.2	70.3	10.0	80.3
	23	69.1	75.4	60.5	75.1	74.8	73.8	72.9	70.2	67.6	62.4	61.4	60.6	69.1	10.0	79.1

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	71.1	76.1	65.1	75.9	75.5	74.7	74.2	72.3	70.4	66.7	65.9	65.3
	Max	73.5	78.2	69.9	78.0	77.7	76.7	75.8	74.1	72.9	70.9	70.5	70.0
Energy Average		72.2	Average:		77.1	76.8	75.7	75.0	73.1	71.4	68.3	67.6	66.8
Night	Min	67.2	72.7	59.7	72.5	72.3	71.5	70.9	68.4	65.9	61.3	60.6	59.9
	Max	71.3	77.2	65.2	76.9	76.5	75.2	74.1	72.4	70.6	67.0	66.2	65.4
Energy Average		69.4	Average:		75.0	74.7	73.7	72.9	70.3	67.8	63.3	62.5	61.8

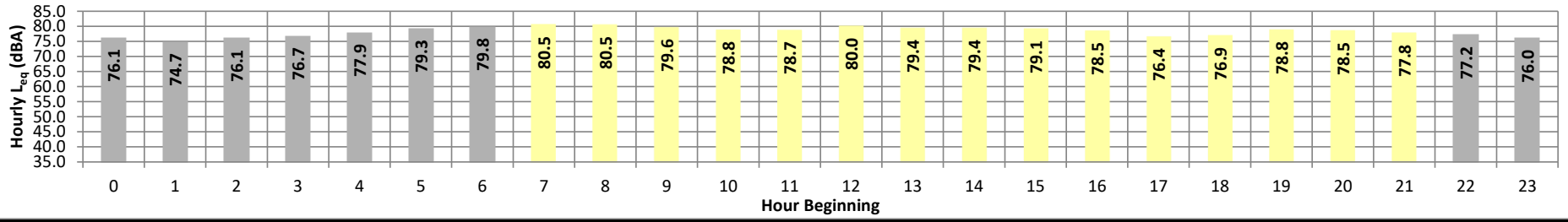
24-Hour CNEL	*Leq (dBA) Daytime (7am-10pm)*	*Leq (dBA) Nighttime (10pm-7am)*
76.8	**72.2**	**69.4**

24-Hour Noise Level Measurement Summary

Date: Thursday, February 29, 2024 *Location:* L3 - Located east of the site near the residence at 3817 W. *Meter:* Piccolo II *JN:* 15585

Project: Glen Helen *Source:* Bodega Wy. *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	76.1	86.1	62.4	85.7	85.0	82.7	81.0	76.4	71.8	64.6	63.5	62.6	76.1	10.0	86.1
	1	74.7	83.8	60.9	83.5	83.0	81.1	79.7	75.3	70.7	63.1	62.0	61.1	74.7	10.0	84.7
	2	76.1	85.5	61.7	85.2	84.5	82.5	81.1	76.6	71.8	64.4	62.8	61.8	76.1	10.0	86.1
	3	76.7	86.2	62.6	85.8	85.1	82.8	81.3	77.3	73.2	65.7	64.1	62.8	76.7	10.0	86.7
	4	77.9	86.1	64.9	85.8	85.3	83.7	82.6	78.6	75.2	68.0	66.6	65.1	77.9	10.0	87.9
	5	79.3	87.0	69.2	86.6	86.0	84.2	83.1	80.2	77.5	72.0	70.7	69.4	79.3	10.0	89.3
	6	79.8	86.7	70.4	86.3	85.8	84.3	83.4	80.8	78.5	73.1	71.8	70.5	79.8	10.0	89.8
Day	7	80.5	87.0	71.9	86.8	86.2	84.7	83.9	81.5	79.5	75.1	73.7	72.1	80.5	0.0	80.5
	8	80.5	87.7	71.1	87.3	86.8	85.0	84.1	81.5	79.1	74.1	72.7	71.3	80.5	0.0	80.5
	9	79.6	86.3	69.2	86.0	85.6	84.4	83.7	80.8	78.0	72.1	70.7	69.4	79.6	0.0	79.6
	10	78.8	86.5	69.1	86.1	85.4	83.8	82.6	79.6	77.0	71.6	70.4	69.3	78.8	0.0	78.8
	11	78.7	85.3	70.1	85.0	84.5	83.1	82.4	79.8	77.3	72.8	71.6	70.3	78.7	0.0	78.7
	12	80.0	88.9	70.7	88.2	87.1	84.7	83.5	80.7	78.3	73.4	72.1	70.9	80.0	0.0	80.0
	13	79.4	86.7	70.6	86.3	85.6	83.8	82.7	80.2	78.1	73.7	72.3	70.8	79.4	0.0	79.4
	14	79.4	86.3	72.1	85.9	85.3	83.4	82.5	80.1	78.2	74.7	73.5	72.3	79.4	0.0	79.4
	15	79.1	85.5	72.7	85.1	84.6	83.1	82.2	79.9	78.2	75.0	74.0	72.9	79.1	0.0	79.1
	16	78.5	84.6	72.7	84.2	83.7	82.3	81.5	79.2	77.5	74.6	73.8	72.9	78.5	0.0	78.5
	17	76.4	83.5	71.1	83.1	82.6	80.7	79.5	76.9	75.2	72.6	72.0	71.3	76.4	0.0	76.4
	18	76.9	83.5	70.1	83.2	82.7	81.0	80.0	77.6	75.8	72.4	71.4	70.3	76.9	0.0	76.9
	19	78.8	85.4	70.5	85.0	84.5	83.2	82.4	79.8	77.6	73.3	72.0	70.7	78.8	5.0	83.8
	20	78.5	86.8	67.7	86.5	85.8	83.7	82.4	79.3	76.5	70.9	69.5	68.0	78.5	5.0	83.5
	21	77.8	86.4	66.4	86.0	85.3	83.2	82.1	78.5	75.5	69.4	68.0	66.6	77.8	5.0	82.8
Night	22	77.2	85.4	64.0	85.1	84.5	82.9	81.8	78.0	74.6	67.6	65.8	64.2	77.2	10.0	87.2
	23	76.0	84.6	62.5	84.3	83.7	81.8	80.7	76.7	73.1	65.9	64.3	62.7	76.0	10.0	86.0

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	76.4	83.5	66.4	83.1	82.6	80.7	79.5	76.9	75.2	69.4	68.0	66.6
	Max	80.5	88.9	72.7	88.2	87.1	85.0	84.1	81.5	79.5	75.1	74.0	72.9
Energy Average		79.0	Average:		85.7	85.0	83.3	82.4	79.7	77.5	73.1	71.8	70.6
Night	Min	74.7	83.8	60.9	83.5	83.0	81.1	79.7	75.3	70.7	63.1	62.0	61.1
	Max	79.8	87.0	70.4	86.6	86.0	84.3	83.4	80.8	78.5	73.1	71.8	70.5
Energy Average		77.4	Average:		85.4	84.8	82.9	81.6	77.8	74.1	67.2	65.7	64.5

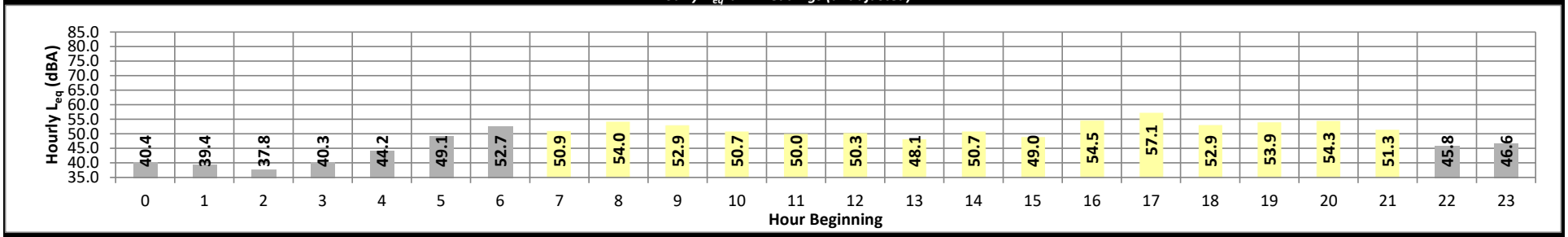
24-Hour CNEL	*Leq (dBA) Daytime (7am-10pm)*	*Leq (dBA) Nighttime (10pm-7am)*
84.4	**79.0**	**77.4**

24-Hour Noise Level Measurement Summary

Date: Thursday, February 29, 2024 *Location:* L4 - Located south of the site near the industrial compound at *Meter:* Piccolo II *JN:* 15585

Project: Glen Helen *Source:* 18325 Lapis Ln. *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	40.4	48.3	36.0	48.1	47.6	46.3	44.9	39.6	37.7	36.5	36.3	36.1	40.4	10.0	50.4
	1	39.4	45.1	36.8	44.9	44.4	43.8	42.5	39.3	38.4	37.3	37.1	36.9	39.4	10.0	49.4
	2	37.8	41.0	35.9	40.6	40.3	39.7	39.4	38.3	37.5	36.5	36.3	36.0	37.8	10.0	47.8
	3	40.3	45.2	38.4	44.8	44.0	43.0	42.5	40.8	39.5	38.7	38.6	38.4	40.3	10.0	50.3
	4	44.2	49.4	41.8	49.1	48.8	48.1	47.4	44.1	43.1	42.2	42.1	41.9	44.2	10.0	54.2
	5	49.1	58.0	37.9	57.7	57.3	56.2	55.4	48.3	42.1	38.4	38.2	38.0	49.1	10.0	59.1
	6	52.7	62.3	37.5	62.1	61.8	60.9	59.3	51.5	44.0	39.0	38.4	37.8	52.7	10.0	62.7
Day	7	50.9	59.9	39.1	59.5	59.1	58.0	57.0	50.6	44.8	40.0	39.6	39.3	50.9	0.0	50.9
	8	54.0	65.2	41.9	64.4	63.5	61.6	59.7	52.2	47.5	43.1	42.5	42.1	54.0	0.0	54.0
	9	52.9	62.2	42.7	61.7	61.2	59.8	58.3	52.2	48.5	44.1	43.4	42.9	52.9	0.0	52.9
	10	50.7	59.7	43.7	59.1	58.7	57.7	56.0	50.0	47.1	44.5	44.3	43.9	50.7	0.0	50.7
	11	50.0	59.5	38.3	59.2	58.8	57.4	55.6	49.1	44.6	39.6	39.0	38.5	50.0	0.0	50.0
	12	50.3	57.8	43.1	57.4	57.0	55.7	54.8	50.9	47.9	44.4	43.9	43.4	50.3	0.0	50.3
	13	48.1	56.2	42.1	55.5	54.8	53.3	52.0	48.4	46.0	43.3	42.8	42.2	48.1	0.0	48.1
	14	50.7	60.6	40.4	59.6	58.6	56.8	55.6	51.4	46.6	41.7	41.2	40.6	50.7	0.0	50.7
	15	49.0	58.2	40.8	57.6	56.7	54.5	53.0	49.2	46.2	42.4	41.7	41.0	49.0	0.0	49.0
	16	54.5	64.9	42.0	64.5	64.0	62.0	60.4	52.4	48.3	43.6	42.9	42.2	54.5	0.0	54.5
	17	57.1	67.1	44.9	66.9	66.6	65.1	63.9	54.4	49.0	45.8	45.4	45.1	57.1	0.0	57.1
	18	52.9	61.1	46.6	60.4	59.7	58.3	57.2	53.6	50.2	47.4	47.1	46.7	52.9	0.0	52.9
	19	53.9	63.2	46.6	62.6	62.0	60.4	58.9	53.7	50.1	47.3	47.0	46.7	53.9	5.0	58.9
	20	54.3	63.8	45.6	63.2	62.5	60.3	59.1	54.7	50.6	46.6	46.2	45.8	54.3	5.0	59.3
	21	51.3	59.4	45.5	59.0	58.5	57.0	55.6	51.7	48.8	46.2	45.9	45.6	51.3	5.0	56.3
Night	22	45.8	51.2	43.1	50.8	50.4	49.4	48.6	46.1	44.8	43.6	43.4	43.2	45.8	10.0	55.8
	23	46.6	54.2	40.9	53.7	53.1	51.7	50.7	47.3	44.2	41.7	41.4	41.1	46.6	10.0	56.6

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	48.1	56.2	38.3	55.5	54.8	53.3	52.0	48.4	44.6	39.6	39.0	38.5
	Max	57.1	67.1	46.6	66.9	66.6	65.1	63.9	54.7	50.6	47.4	47.1	46.7
Energy Average		52.7	Average:		60.7	60.1	58.5	57.1	51.6	47.8	44.0	43.5	43.1
Night	Min	37.8	41.0	35.9	40.6	40.3	39.7	39.4	38.3	37.5	36.5	36.3	36.0
	Max	52.7	62.3	43.1	62.1	61.8	60.9	59.3	51.5	44.8	43.6	43.4	43.2
Energy Average		46.6	Average:		50.2	49.7	48.8	47.9	43.9	41.3	39.3	39.1	38.8

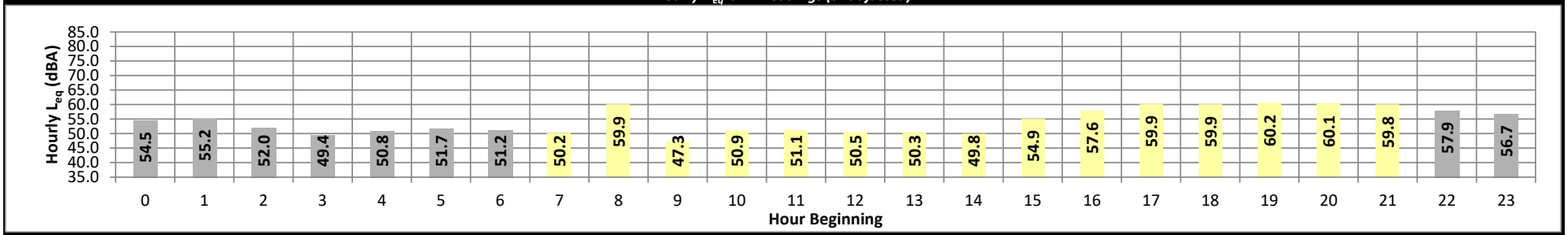
24-Hour CNEL	Leq (dBA) Daytime (7am-10pm)	Leq (dBA) Nighttime (10pm-7am)
55.4	**52.7**	**46.6**

24-Hour Noise Level Measurement Summary

Date: Thursday, February 29, 2024 *Location:* L5 - Located south of the site near the residence at 3301 Osage *Meter:* Piccolo II *JN:* 15585

Project: Glen Helen *Source:* Ct. *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	54.5	58.0	51.3	57.8	57.5	57.0	56.5	55.3	54.2	52.2	51.8	51.4	54.5	10.0	64.5
	1	55.2	58.4	52.0	58.2	57.9	57.4	57.1	56.0	54.8	53.0	52.6	52.2	55.2	10.0	65.2
	2	52.0	54.4	49.7	54.3	54.1	53.8	53.5	52.6	51.7	50.3	50.1	49.8	52.0	10.0	62.0
	3	49.4	51.5	47.7	51.4	51.2	50.8	50.6	49.9	49.3	48.2	48.0	47.7	49.4	10.0	59.4
	4	50.8	53.6	49.0	53.3	53.1	52.6	52.2	51.3	50.6	49.5	49.3	49.1	50.8	10.0	60.8
	5	51.7	54.9	49.4	54.7	54.4	53.7	53.3	52.3	51.4	50.0	49.8	49.5	51.7	10.0	61.7
	6	51.2	55.4	48.6	55.1	54.7	53.8	53.1	51.7	50.7	49.3	49.0	48.7	51.2	10.0	61.2
Day	7	50.2	55.4	47.6	55.0	54.5	53.3	52.6	50.7	49.4	48.1	47.9	47.7	50.2	0.0	50.2
	8	59.9	76.1	47.2	74.4	72.2	65.4	58.9	51.1	49.1	47.7	47.5	47.3	59.9	0.0	59.9
	9	47.3	52.6	45.2	52.3	51.9	50.4	49.3	47.4	46.7	45.7	45.5	45.3	47.3	0.0	47.3
	10	50.9	55.7	48.4	55.3	54.9	53.8	53.2	51.3	50.3	49.0	48.7	48.5	50.9	0.0	50.9
	11	51.1	55.7	48.4	55.5	55.2	53.9	53.0	51.5	50.5	49.1	48.8	48.5	51.1	0.0	51.1
	12	50.5	57.4	46.2	56.6	55.9	54.4	53.5	51.1	49.3	46.9	46.6	46.3	50.5	0.0	50.5
	13	50.3	56.0	46.9	55.5	55.1	54.0	53.2	51.0	49.4	47.6	47.3	47.0	50.3	0.0	50.3
	14	49.8	56.8	47.2	55.7	53.8	52.7	52.0	50.3	49.0	47.7	47.5	47.3	49.8	0.0	49.8
	15	54.9	62.7	51.9	61.3	60.0	57.8	57.0	55.2	54.0	52.6	52.3	52.0	54.9	0.0	54.9
	16	57.6	60.6	55.5	60.3	60.0	59.4	59.1	58.2	57.4	56.1	55.9	55.6	57.6	0.0	57.6
	17	59.9	62.6	58.1	62.4	62.1	61.5	61.3	60.3	59.7	58.7	58.5	58.2	59.9	0.0	59.9
	18	59.9	62.6	57.9	62.4	62.1	61.6	61.3	60.4	59.6	58.6	58.3	58.0	59.9	0.0	59.9
	19	60.2	63.2	57.9	63.0	62.7	62.2	61.8	60.8	59.9	58.6	58.3	58.0	60.2	5.0	65.2
	20	60.1	63.0	57.9	62.8	62.4	62.0	61.6	60.7	59.9	58.6	58.3	58.0	60.1	5.0	65.1
	21	59.8	62.8	57.4	62.5	62.2	61.7	61.3	60.4	59.5	58.2	57.9	57.5	59.8	5.0	64.8
Night	22	57.9	60.9	55.5	60.7	60.4	59.8	59.6	58.5	57.6	56.2	55.9	55.5	57.9	10.0	67.9
	23	56.7	62.5	53.8	62.2	61.5	59.4	58.4	57.2	56.2	54.6	54.2	53.9	56.7	10.0	66.7

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	47.3	52.6	45.2	52.3	51.9	50.4	49.3	47.4	46.7	45.7	45.5	45.3
	Max	60.2	76.1	58.1	74.4	72.2	65.4	61.8	60.8	59.9	58.7	58.5	58.2
Energy Average		57.0	Average:		59.7	59.0	57.6	56.6	54.7	53.6	52.2	52.0	51.7
Night	Min	49.4	51.5	47.7	51.4	51.2	50.8	50.6	49.9	49.3	48.2	48.0	47.7
	Max	57.9	62.5	55.5	62.2	61.5	59.8	59.6	58.5	57.6	56.2	55.9	55.5
Energy Average		54.2	Average:		56.4	56.1	55.4	54.9	53.9	53.0	51.5	51.2	50.9

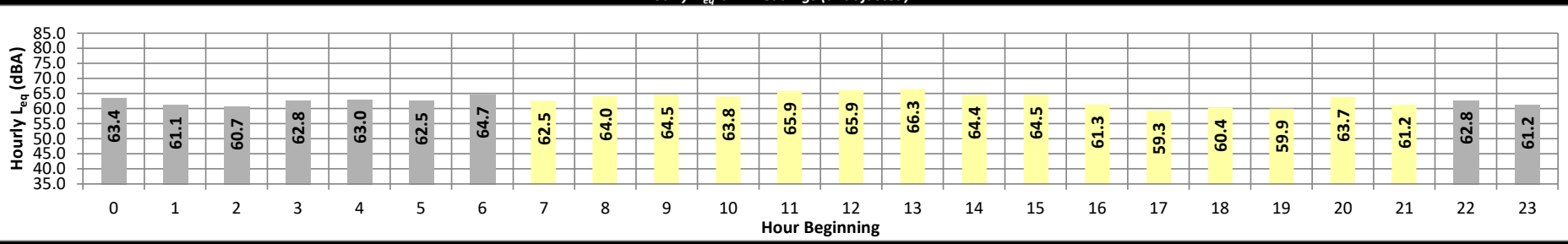
24-Hour CNEL	Leq (dBA) Daytime (7am-10pm)	Leq (dBA) Nighttime (10pm-7am)
61.9	**57.0**	**54.2**

24-Hour Noise Level Measurement Summary

Date: Thursday, February 29, 2024 *Location:* L6 - Located north of the site near the residence at 1924 Glen *Meter:* Piccolo II *JN:* 15585

Project: Glen Helen *Source:* Helen 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	63.4	71.9	58.0	71.6	71.2	69.3	67.5	62.7	61.1	58.8	58.4	58.1	63.4	10.0	73.4
	1	61.1	70.0	55.6	69.6	69.0	66.8	65.1	60.9	58.6	56.5	56.1	55.8	61.1	10.0	71.1
	2	60.7	69.4	55.1	69.1	68.8	67.1	64.8	59.9	58.3	56.2	55.9	55.2	60.7	10.0	70.7
	3	62.8	72.6	57.5	72.1	71.4	68.8	66.6	61.7	59.8	58.1	57.9	57.6	62.8	10.0	72.8
	4	63.0	67.6	60.5	67.4	67.2	66.3	65.5	63.2	62.3	61.1	60.9	60.6	63.0	10.0	73.0
	5	62.5	67.1	60.1	66.9	66.6	65.6	64.5	62.8	62.0	60.7	60.5	60.2	62.5	10.0	72.5
	6	64.7	73.8	59.7	73.3	72.6	70.7	68.8	63.7	62.0	60.3	60.1	59.8	64.7	10.0	74.7
Day	7	62.5	69.3	59.3	69.1	68.9	67.5	65.8	62.1	61.0	59.8	59.6	59.4	62.5	0.0	62.5
	8	64.0	70.3	60.6	69.9	69.5	68.1	67.0	64.5	63.0	61.2	61.0	60.7	64.0	0.0	64.0
	9	64.5	72.2	61.2	71.9	71.5	69.4	67.4	64.2	62.8	61.7	61.5	61.3	64.5	0.0	64.5
	10	63.8	72.5	59.5	72.2	71.7	69.6	67.7	63.1	61.3	60.1	59.9	59.6	63.8	0.0	63.8
	11	65.9	75.5	60.8	75.0	74.4	72.0	69.6	64.9	63.0	61.4	61.2	60.9	65.9	0.0	65.9
	12	65.9	73.2	61.7	72.9	72.6	71.2	69.8	66.0	63.8	62.3	62.1	61.8	65.9	0.0	65.9
	13	66.3	76.0	61.8	75.8	75.2	73.0	70.1	64.5	63.4	62.4	62.2	62.0	66.3	0.0	66.3
	14	64.4	74.1	60.7	73.1	71.7	68.4	66.5	64.2	63.0	61.3	61.1	60.8	64.4	0.0	64.4
	15	64.5	71.1	60.4	70.8	70.4	69.2	68.1	64.7	62.9	61.1	60.8	60.5	64.5	0.0	64.5
	16	61.3	67.6	58.2	67.3	66.8	65.3	64.1	61.5	60.2	58.8	58.6	58.3	61.3	0.0	61.3
	17	59.3	68.2	55.3	67.9	67.3	64.6	62.3	58.6	57.3	56.0	55.7	55.4	59.3	0.0	59.3
	18	60.4	70.2	54.0	70.0	69.5	67.3	65.0	58.7	56.5	54.7	54.4	54.1	60.4	0.0	60.4
	19	59.9	68.7	54.5	68.3	67.8	65.9	64.4	59.1	56.9	55.1	54.9	54.6	59.9	5.0	64.9
	20	63.7	73.1	56.3	72.8	72.2	70.1	68.0	63.6	60.2	57.3	56.8	56.4	63.7	5.0	68.7
	21	61.2	71.5	54.7	71.2	70.7	68.4	65.8	59.2	57.2	55.4	55.2	54.9	61.2	5.0	66.2
Night	22	62.8	72.6	55.3	72.4	71.8	69.7	67.3	62.4	58.8	56.0	55.7	55.4	62.8	10.0	72.8
	23	61.2	70.7	53.4	70.5	70.1	68.4	66.3	60.1	57.3	54.4	54.0	53.5	61.2	10.0	71.2

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	59.3	67.6	54.0	67.3	66.8	64.6	62.3	58.6	56.5	54.7	54.4	54.1
	Max	66.3	76.0	61.8	75.8	75.2	73.0	70.1	66.0	63.8	62.4	62.2	62.0
Energy Average		63.7	Average:		71.2	70.7	68.7	66.8	62.6	60.8	59.2	59.0	58.7
Night	Min	60.7	67.1	53.4	66.9	66.6	65.6	64.5	59.9	57.3	54.4	54.0	53.5
	Max	64.7	73.8	60.5	73.3	72.6	70.7	68.8	63.7	62.3	61.1	60.9	60.6
Energy Average		62.6	Average:		70.3	69.8	68.1	66.3	61.9	60.0	58.0	57.7	57.4

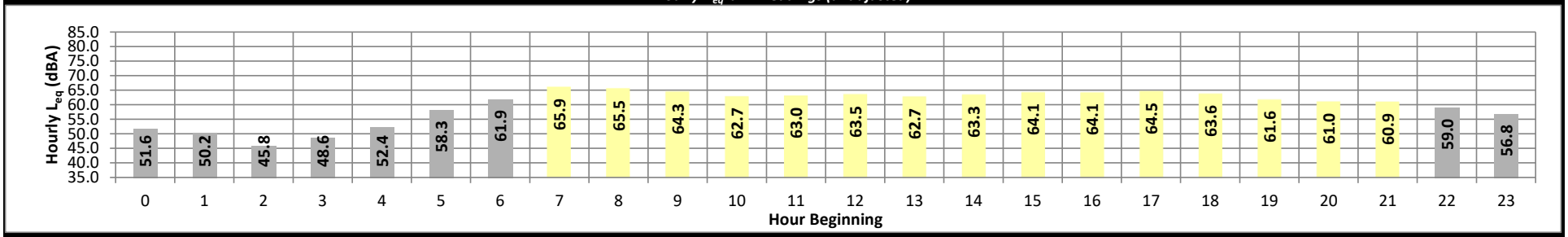
24-Hour CNEL	*Leq (dBA)* *Daytime (7am-10pm)*	*Nighttime (10pm-7am)*
69.4	**63.7**	**62.6**

24-Hour Noise Level Measurement Summary

Date: Friday, October 18, 2024 *Location:* L7 - Glen Helen Regional Park Campground *Meter:* Piccolo II *JN:* 15585

Project: Glen Helen *Source:* *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	51.6	63.7	41.2	63.3	62.6	59.1	56.2	48.1	43.9	42.0	41.8	41.4	51.6	10.0	61.6
	1	50.2	61.9	38.7	61.6	61.1	58.8	55.9	44.6	40.8	39.2	39.1	38.8	50.2	10.0	60.2
	2	45.8	57.6	36.4	57.3	56.6	53.7	51.0	41.7	38.6	36.9	36.7	36.5	45.8	10.0	55.8
	3	48.6	60.7	35.2	60.3	59.7	56.9	53.9	43.7	38.6	35.8	35.5	35.2	48.6	10.0	58.6
	4	52.4	64.7	37.7	64.3	63.5	60.6	57.7	48.0	43.4	39.0	38.3	37.8	52.4	10.0	62.4
	5	58.3	71.3	40.9	70.6	69.4	66.3	63.3	53.9	47.1	42.3	41.7	41.1	58.3	10.0	68.3
	6	61.9	72.0	47.3	71.7	71.0	68.9	67.3	61.7	56.0	49.0	48.2	47.5	61.9	10.0	71.9
Day	7	65.9	74.3	52.4	74.0	73.5	71.4	70.0	66.9	63.7	55.7	53.7	52.6	65.9	0.0	65.9
	8	65.5	72.2	53.2	71.9	71.5	70.1	69.3	67.1	63.9	56.0	54.3	53.4	65.5	0.0	65.5
	9	64.3	72.2	50.4	72.0	71.6	70.2	69.4	65.6	61.0	52.8	51.7	50.6	64.3	0.0	64.3
	10	62.7	70.6	47.9	70.3	69.8	68.3	67.4	64.2	59.9	50.4	49.2	48.1	62.7	0.0	62.7
	11	63.0	70.6	48.7	70.3	69.8	68.5	67.5	64.5	60.2	51.4	49.8	48.8	63.0	0.0	63.0
	12	63.5	70.9	50.4	70.6	70.1	68.6	67.7	64.9	61.5	52.9	51.5	50.6	63.5	0.0	63.5
	13	62.7	69.7	50.0	69.4	69.0	67.7	67.0	64.2	60.5	52.4	51.1	50.1	62.7	0.0	62.7
	14	63.3	71.0	49.1	70.6	70.1	68.5	67.6	64.8	61.3	52.3	50.6	49.4	63.3	0.0	63.3
	15	64.1	72.0	50.4	71.7	71.2	69.4	68.4	65.5	61.9	53.9	52.1	50.7	64.1	0.0	64.1
	16	64.1	73.1	50.2	72.5	71.8	69.1	67.8	65.3	61.8	53.3	51.9	50.4	64.1	0.0	64.1
	17	64.5	71.7	52.6	71.2	70.7	69.4	68.5	65.9	62.9	55.8	54.3	53.0	64.5	0.0	64.5
	18	63.6	72.2	49.9	71.9	71.4	69.4	67.8	64.6	61.0	53.3	52.1	50.3	63.6	0.0	63.6
	19	61.6	69.5	48.5	69.2	68.7	67.3	66.3	63.0	58.7	50.8	49.9	48.8	61.6	5.0	66.6
	20	61.0	69.0	47.5	68.7	68.3	66.9	65.9	62.3	57.2	49.3	48.4	47.6	61.0	5.0	66.0
	21	60.9	68.9	47.2	68.7	68.2	66.8	66.0	62.4	56.8	49.0	48.1	47.4	60.9	5.0	65.9
Night	22	59.0	68.2	47.7	67.9	67.4	65.7	64.7	59.2	53.4	48.8	48.3	47.8	59.0	10.0	69.0
	23	56.8	67.2	44.6	66.8	66.2	64.1	62.4	55.9	50.5	45.7	45.2	44.7	56.8	10.0	66.8

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	60.9	68.9	47.2	68.7	68.2	66.8	65.9	62.3	56.8	49.0	48.1	47.4
	Max	65.9	74.3	53.2	74.0	73.5	71.4	70.0	67.1	63.9	56.0	54.3	53.4
Energy Average		63.6	Average:		70.9	70.4	68.8	67.8	64.7	60.8	52.6	51.3	50.1
Night	Min	45.8	57.6	35.2	57.3	56.6	53.7	51.0	41.7	38.6	35.8	35.5	35.2
	Max	61.9	72.0	47.7	71.7	71.0	68.9	67.3	61.7	56.0	49.0	48.3	47.8
Energy Average		56.5	Average:		64.9	64.2	61.6	59.1	50.8	45.8	42.1	41.7	41.2

24-Hour CNEL	Leq (dBA) Daytime (7am-10pm)	Leq (dBA) Nighttime (10pm-7am)
65.4	**63.6**	**56.5**

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APPENDIX 7.1:

OFF-SITE TRAFFIC NOISE LEVEL CALCULATIONS

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

Scenario: E
Road Name: Glen Helen Pkwy.
Road Segment: n/o Cajon Blvd.
Project Name: Glen Helen SP
Job Number: 15585

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,810 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	581 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	52.0 feet
Centerline Dist. to Observer:	52.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-4.31	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	79.45	-21.55	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-25.50	0.41	-1.20	-5.41	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:	63.3	61.4	59.7	53.6	62.2	62.8
Medium Trucks:	57.1	55.6	49.2	47.7	56.2	56.4
Heavy Trucks:	58.0	56.5	47.5	48.7	57.1	57.2
Vehicle Noise:	65.2	63.4	60.3	55.6	64.1	64.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	21	46	98	212
CNEL:	23	49	105	227

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

Scenario: EP
Road Name: Glen Helen Pkwy.
Road Segment: n/o Cajon Blvd.
Project Name: Glen Helen SP
Job Number: 15585

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,341 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	834 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	52.0 feet
Centerline Dist. to Observer:	52.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	77.00%
Medium Trucks:	84.8%	4.9%	10.3%	7.01%
Heavy Trucks:	86.5%	2.7%	10.8%	15.99%

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:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-3.76	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	79.45	-14.17	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-10.59	0.41	-1.20	-5.41	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:	63.9	62.0	60.2	54.2	62.8	63.4
Medium Trucks:	64.5	63.0	56.6	55.1	63.5	63.8
Heavy Trucks:	72.9	71.5	62.4	63.7	72.0	72.1
Vehicle Noise:	73.9	72.4	65.1	64.6	73.0	73.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	83	178	384	828
CNEL:	85	184	395	852

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

Scenario: HY
Road Name: Glen Helen Pkwy.
Road Segment: n/o Cajon Blvd.
Project Name: Glen Helen SP
Job Number: 15585

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,470 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	1,447 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	52.0 feet
Centerline Dist. to Observer:	52.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.35	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	79.45	-17.58	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-21.54	0.41	-1.20	-5.41	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.3	65.4	63.6	57.6	66.2	66.8
Medium Trucks:	61.1	59.6	53.2	51.7	60.1	60.4
Heavy Trucks:	61.9	60.5	51.5	52.7	61.1	61.2
Vehicle Noise:	69.1	67.4	64.2	59.6	68.1	68.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	39	84	181	389
CNEL:	42	90	194	417

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

Scenario: HYP
Road Name: Glen Helen Pkwy.
Road Segment: n/o Cajon Blvd.
Project Name: Glen Helen SP
Job Number: 15585

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,001 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	1,700 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	52.0 feet
Centerline Dist. to Observer:	52.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	87.40%
Medium Trucks:	84.8%	4.9%	10.3%	4.37%
Heavy Trucks:	86.5%	2.7%	10.8%	8.22%

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:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.12	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	79.45	-13.12	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-10.38	0.41	-1.20	-5.41	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.5	65.6	63.9	57.8	66.4	67.0
Medium Trucks:	65.5	64.0	57.7	56.1	64.6	64.8
Heavy Trucks:	73.1	71.7	62.6	63.9	72.2	72.4
Vehicle Noise:	74.7	73.2	66.9	65.4	73.8	74.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	93	201	432	931
CNEL:	96	208	448	965

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

Scenario: E | Project Name: Glen Helen SP
Road Name: Glen Helen Pkwy. | Job Number: 15585
Road Segment: s/o Cajon Blvd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,130 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	313 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	52.0 feet
Centerline Dist. to Observer:	52.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-7.00	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	79.45	-24.23	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-28.19	0.41	-1.20	-5.41	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.6	58.7	57.0	50.9	59.6	60.2
Medium Trucks:	54.4	52.9	46.6	45.0	53.5	53.7
Heavy Trucks:	55.3	53.8	44.8	46.1	54.4	54.5
Vehicle Noise:	62.5	60.7	57.6	52.9	61.5	61.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	14	30	65	140
CNEL:	15	32	70	150

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

Scenario: EP | Project Name: Glen Helen SP
Road Name: Glen Helen Pkwy. | Job Number: 15585
Road Segment: s/o Cajon Blvd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,661 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	566 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	52.0 feet
Centerline Dist. to Observer:	52.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	67.34%
Medium Trucks:	84.8%	4.9%	10.3%	9.45%
Heavy Trucks:	86.5%	2.7%	10.8%	23.21%

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:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-6.03	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	79.45	-14.55	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-10.65	0.41	-1.20	-5.41	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:	61.6	59.7	58.0	51.9	60.5	61.1
Medium Trucks:	64.1	62.6	56.2	54.7	63.2	63.4
Heavy Trucks:	72.8	71.4	62.4	63.6	72.0	72.1
Vehicle Noise:	73.6	72.2	64.4	64.4	72.8	72.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	79	171	369	794
CNEL:	82	176	378	815

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

Scenario: HY | Project Name: Glen Helen SP
Road Name: Glen Helen Pkwy. | Job Number: 15585
Road Segment: s/o Cajon Blvd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,830 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	1,183 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	52.0 feet
Centerline Dist. to Observer:	52.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-1.22	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	79.45	-18.46	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-22.42	0.41	-1.20	-5.41	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.4	64.5	62.8	56.7	65.3	65.9
Medium Trucks:	60.2	58.7	52.3	50.8	59.2	59.5
Heavy Trucks:	61.0	59.6	50.6	51.8	60.2	60.3
Vehicle Noise:	68.3	66.5	63.4	58.7	67.2	67.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	34	73	158	340
CNEL:	37	79	169	365

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

Scenario: HYP | Project Name: Glen Helen SP
Road Name: Glen Helen Pkwy. | Job Number: 15585
Road Segment: s/o Cajon Blvd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,361 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	1,436 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	52.0 feet
Centerline Dist. to Observer:	52.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	85.56%
Medium Trucks:	84.8%	4.9%	10.3%	4.84%
Heavy Trucks:	86.5%	2.7%	10.8%	9.60%

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:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.94	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	79.45	-13.42	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-10.44	0.41	-1.20	-5.41	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.7	64.8	63.0	57.0	65.6	66.2
Medium Trucks:	65.2	63.7	57.4	55.8	64.3	64.5
Heavy Trucks:	73.0	71.6	62.6	63.8	72.2	72.3
Vehicle Noise:	74.5	73.0	66.4	65.2	73.6	73.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	90	194	418	900
CNEL:	93	201	432	931

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

Scenario: E | Project Name: Glen Helen SP
Road Name: Glen Helen Pkwy. | Job Number: 15585
Road Segment: s/o Glen Helen Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,060 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	406 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	52.0 feet
Centerline Dist. to Observer:	52.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-5.87	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	79.45	-23.10	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-27.06	0.41	-1.20	-5.41	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:	61.8	59.9	58.1	52.1	60.7	61.3
Medium Trucks:	55.6	54.0	47.7	46.1	54.6	54.8
Heavy Trucks:	56.4	55.0	45.9	47.2	55.5	55.7
Vehicle Noise:	63.6	61.9	58.7	54.1	62.6	63.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	17	36	77	167
CNEL:	18	39	83	179

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

Scenario: EP | Project Name: Glen Helen SP
Road Name: Glen Helen Pkwy. | Job Number: 15585
Road Segment: s/o Glen Helen Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,834 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	483 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	52.0 feet
Centerline Dist. to Observer:	52.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	86.28%
Medium Trucks:	84.8%	4.9%	10.3%	4.67%
Heavy Trucks:	86.5%	2.7%	10.8%	9.06%

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:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-5.64	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	79.45	-18.31	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-15.43	0.41	-1.20	-5.41	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:	62.0	60.1	58.3	52.3	60.9	61.5
Medium Trucks:	60.4	58.8	52.5	50.9	59.4	59.6
Heavy Trucks:	68.0	66.6	57.6	58.8	67.2	67.3
Vehicle Noise:	69.6	68.0	61.6	60.2	68.7	68.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	42	91	196	423
CNEL:	44	94	203	438

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

Scenario: HY | Project Name: Glen Helen SP
Road Name: Glen Helen Pkwy. | Job Number: 15585
Road Segment: s/o Glen Helen Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,300 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	1,430 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	52.0 feet
Centerline Dist. to Observer:	52.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.40	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	79.45	-17.64	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-21.59	0.41	-1.20	-5.41	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.2	65.3	63.6	57.5	66.1	66.8
Medium Trucks:	61.0	59.5	53.2	51.6	60.1	60.3
Heavy Trucks:	61.9	60.4	51.4	52.7	61.0	61.1
Vehicle Noise:	69.1	67.3	64.2	59.5	68.1	68.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	39	83	179	386
CNEL:	41	89	192	414

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

Scenario: HYP | Project Name: Glen Helen SP
Road Name: Glen Helen Pkwy. | Job Number: 15585
Road Segment: s/o Glen Helen Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,074 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	1,507 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	52.0 feet
Centerline Dist. to Observer:	52.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.85%
Medium Trucks:	84.8%	4.9%	10.3%	2.75%
Heavy Trucks:	86.5%	2.7%	10.8%	3.41%

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:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.33	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	79.45	-15.67	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-14.73	0.41	-1.20	-5.41	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.3	65.4	63.6	57.6	66.2	66.8
Medium Trucks:	63.0	61.5	55.1	53.6	62.0	62.3
Heavy Trucks:	68.7	67.3	58.3	59.5	67.9	68.0
Vehicle Noise:	71.7	70.1	65.2	62.3	70.8	71.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	58	126	271	584
CNEL:	61	132	285	613

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

Scenario: E
Road Name: Glen Helen Pkwy.
Road Segment: w/o Clearwater Pkwy.
Project Name: Glen Helen SP
Job Number: 15585

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,140 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	814 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	52.0 feet
Centerline Dist. to Observer:	52.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.84	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	79.45	-20.08	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-24.04	0.41	-1.20	-5.41	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.8	62.9	61.1	55.1	63.7	64.3
Medium Trucks:	58.6	57.1	50.7	49.2	57.6	57.9
Heavy Trucks:	59.4	58.0	49.0	50.2	58.6	58.7
Vehicle Noise:	66.6	64.9	61.7	57.1	65.6	66.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	27	57	123	265
CNEL:	28	61	132	284

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

Scenario: EP
Road Name: Glen Helen Pkwy.
Road Segment: w/o Clearwater Pkwy.
Project Name: Glen Helen SP
Job Number: 15585

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,914 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	891 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	52.0 feet
Centerline Dist. to Observer:	52.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	91.38%
Medium Trucks:	84.8%	4.9%	10.3%	3.37%
Heavy Trucks:	86.5%	2.7%	10.8%	5.25%

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:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.73	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	79.45	-17.06	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-15.14	0.41	-1.20	-5.41	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:	64.9	63.0	61.3	55.2	63.8	64.4
Medium Trucks:	61.6	60.1	53.7	52.2	60.6	60.9
Heavy Trucks:	68.3	66.9	57.9	59.1	67.5	67.6
Vehicle Noise:	70.5	69.0	63.4	61.2	69.6	69.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	49	106	228	490
CNEL:	51	110	237	511

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

Scenario: HY
Road Name: Glen Helen Pkwy.
Road Segment: w/o Clearwater Pkwy.
Project Name: Glen Helen SP
Job Number: 15585

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	9,870 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	987 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	52.0 feet
Centerline Dist. to Observer:	52.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.01	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	79.45	-19.25	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-23.20	0.41	-1.20	-5.41	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.6	63.7	62.0	55.9	64.5	65.1
Medium Trucks:	59.4	57.9	51.5	50.0	58.5	58.7
Heavy Trucks:	60.3	58.8	49.8	51.0	59.4	59.5
Vehicle Noise:	67.5	65.7	62.6	57.9	66.5	66.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	30	65	140	302
CNEL:	32	70	150	323

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

Scenario: HYP
Road Name: Glen Helen Pkwy.
Road Segment: w/o Clearwater Pkwy.
Project Name: Glen Helen SP
Job Number: 15585

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,644 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	1,064 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	52.0 feet
Centerline Dist. to Observer:	52.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	92.36%
Medium Trucks:	84.8%	4.9%	10.3%	3.12%
Heavy Trucks:	86.5%	2.7%	10.8%	4.52%

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:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-1.91	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	79.45	-16.62	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-15.02	0.41	-1.20	-5.41	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.7	63.8	62.1	56.0	64.6	65.2
Medium Trucks:	62.0	60.5	54.2	52.6	61.1	61.3
Heavy Trucks:	68.4	67.0	58.0	59.2	67.6	67.7
Vehicle Noise:	70.9	69.3	64.0	61.5	70.0	70.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	52	112	240	518
CNEL:	54	117	251	541

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

Scenario: EP
Road Name: Glen Helen Rd.
Road Segment: w/o Glen Helen Pkwy.
Project Name: Glen Helen SP
Job Number: 15585

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,555 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	356 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	104.0 feet
Centerline Dist. to Observer:	104.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	34.36%
Medium Trucks:	84.8%	4.9%	10.3%	17.80%
Heavy Trucks:	86.5%	2.7%	10.8%	47.84%

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:	101.316
Medium Trucks:	101.229
Heavy Trucks:	101.237

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-10.97	-4.70	-1.20	*-4.77*	0.000	0.000
Medium Trucks:	79.45	-13.82	-4.70	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-9.53	-4.70	-1.20	*-5.15*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	51.6	49.7	47.9	41.9	50.5	51.1
Medium Trucks:	59.7	58.2	51.9	50.3	58.8	59.0
Heavy Trucks:	68.8	67.4	58.4	59.6	68.0	68.1
Vehicle Noise:	69.4	68.0	59.5	60.2	68.5	68.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	83	179	385	830
CNEL:	85	183	394	849

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

Scenario: HYP
Road Name: Glen Helen Rd.
Road Segment: w/o Glen Helen Pkwy.
Project Name: Glen Helen SP
Job Number: 15585

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,705 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	371 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	104.0 feet
Centerline Dist. to Observer:	104.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	36.91%
Medium Trucks:	84.8%	4.9%	10.3%	17.16%
Heavy Trucks:	86.5%	2.7%	10.8%	45.93%

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:	101.316
Medium Trucks:	101.229
Heavy Trucks:	101.237

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-10.48	-4.70	-1.20	*-4.77*	0.000	0.000
Medium Trucks:	79.45	-13.81	-4.70	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-9.53	-4.70	-1.20	*-5.15*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	52.1	50.2	48.4	42.4	51.0	51.6
Medium Trucks:	59.7	58.2	51.9	50.3	58.8	59.0
Heavy Trucks:	68.8	67.4	58.4	59.6	68.0	68.1
Vehicle Noise:	69.4	68.0	59.6	60.2	68.5	68.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	83	179	386	832
CNEL:	85	183	395	851

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APPENDIX 9.1:

OPERATIONAL NOISE CALCULATIONS

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15585 - GHSP

CadnaA Noise Prediction Model: 15585-02.cna
Date: 07.03.24
Analyst: B. Lawson

Calculation Configuration

Configuration	
Parameter	**Value**
General	
Max. Error (dB)	**0.00**
Max. Search Radius (#(Unit,LEN))	**6096.00**
Min. Dist Src to Rcvr	**0.00**
Partition	
Raster Factor	**0.50**
Max. Length of Section (#(Unit,LEN))	**999.99**
Min. Length of Section (#(Unit,LEN))	**1.01**
Min. Length of Section (%)	**0.00**
Proj. Line Sources	**On**
Proj. Area Sources	**On**
Ref. Time	
Daytime Penalty (dB)	**0.00**
Recr. Time Penalty (dB)	**5.00**
Night-time Penalty (dB)	**10.00**
DTM	
Standard Height (m)	**365.76**
Model of Terrain	**Triangulation**
Reflection	
max. Order of Reflection	**1**
Search Radius Src	**100.00**
Search Radius Rcvr	**100.00**
Max. Distance Source - Rcvr	**1000.00 1000.00**
Min. Distance Rvcr - Reflector	**1.00 1.00**
Min. Distance Source - Reflector	**0.10**
Industrial (ISO 9613)	
Lateral Diffraction	**some Obj**
Obst. within Area Src do not shield	**On**
Screening	**Incl. Ground Att. over Barrier**
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	**3.0 20.0 0.0**
Temperature (#(Unit,TEMP))	**10**
rel. Humidity (%)	**70**
Ground Absorption G	**0.50**
Wind Speed for Dir. (#(Unit,SPEED))	**3.0**
Roads (TNM)	
Railways (FTA/FRA)	
Aircraft (???)	
Strictly acc. to AzB	

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R1	44.4	44.4	51.0	55.0	45.0	0.0				5.00	a	6741768.81	1904568.98	5.00
RECEIVERS		R2	45.1	45.0	51.7	55.0	45.0	0.0				5.00	a	6743059.49	1903661.76	5.00
RECEIVERS		R3	19.3	19.3	25.9	55.0	45.0	0.0				5.00	a	6753469.60	1893886.85	5.00
RECEIVERS		R4	28.6	28.6	35.3	55.0	45.0	0.0				5.00	a	6741668.28	1890651.85	5.00
RECEIVERS		R5	38.3	38.3	45.0	55.0	45.0	0.0				5.00	a	6738641.54	1893509.46	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	50.00	a	6737003.07	1895675.16	50.00
POINTSOURCE		AC02	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	50.00	a	6736524.39	1896641.89	50.00
POINTSOURCE		AC03	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	50.00	a	6737172.01	1897036.09	50.00
POINTSOURCE		AC04	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	50.00	a	6737772.70	1896059.97	50.00
POINTSOURCE		AC05	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	50.00	a	6738148.13	1896923.46	50.00
POINTSOURCE		AC06	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	50.00	a	6737425.43	1895149.55	50.00
POINTSOURCE		AC07	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	50.00	a	6741611.47	1902404.74	50.00
POINTSOURCE		AC08	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	50.00	a	6742015.06	1902357.81	50.00
POINTSOURCE		AC09	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	50.00	a	6742118.30	1902986.66	50.00
POINTSOURCE		AC10	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	50.00	a	6741254.81	1903174.37	50.00
POINTSOURCE		AC11	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	50.00	a	6734750.49	1905586.51	50.00
POINTSOURCE		AC12	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	50.00	a	6737791.47	1903277.62	50.00
POINTSOURCE		AC13	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	50.00	a	6738195.06	1901907.30	50.00
POINTSOURCE		CAR01	81.1	81.1	81.1	Lw	81.1					0.00	a	6737472.36	1896810.83	0.00
POINTSOURCE		CAR02	81.1	81.1	81.1	Lw	81.1					0.00	a	6737697.61	1897092.40	0.00

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night			X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(ft)		(ft)	(ft)	(ft)
POINTSOURCE		CAR03	81.1	81.1	81.1	Lw	81.1					0.00	a	6737613.14	1895600.07	0.00
POINTSOURCE		CAR04	81.1	81.1	81.1	Lw	81.1					0.00	a	6737003.07	1896210.14	0.00
POINTSOURCE		CAR05	81.1	81.1	81.1	Lw	81.1					0.00	a	6736768.42	1896885.92	0.00
POINTSOURCE		CAR06	81.1	81.1	81.1	Lw	81.1					0.00	a	6737697.61	1897092.40	0.00
POINTSOURCE		CAR07	81.1	81.1	81.1	Lw	81.1					0.00	a	6737951.03	1896463.56	0.00
POINTSOURCE		CAR08	81.1	81.1	81.1	Lw	81.1					0.00	a	6736749.65	1903409.02	0.00
POINTSOURCE		CAR09	81.1	81.1	81.1	Lw	81.1					0.00	a	6736130.19	1904554.08	0.00
POINTSOURCE		CAR10	81.1	81.1	81.1	Lw	81.1					0.00	a	6736984.30	1903831.38	0.00
POINTSOURCE		CAR11	81.1	81.1	81.1	Lw	81.1					0.00	a	6735679.68	1904253.73	0.00
POINTSOURCE		CAR12	81.1	81.1	81.1	Lw	81.1					0.00	a	6735398.10	1905135.99	0.00
POINTSOURCE		CAR13	81.1	81.1	81.1	Lw	81.1					0.00	a	6734853.73	1905267.40	0.00
POINTSOURCE		CAR14	81.1	81.1	81.1	Lw	81.1					0.00	a	6737491.13	1903484.10	0.00
POINTSOURCE		CAR15	81.1	81.1	81.1	Lw	81.1					0.00	a	6737331.57	1902836.49	0.00
POINTSOURCE		CAR16	81.1	81.1	81.1	Lw	81.1					0.00	a	6737829.01	1902235.80	0.00
POINTSOURCE		CAR17	81.1	81.1	81.1	Lw	81.1					0.00	a	6741404.99	1902798.94	0.00
POINTSOURCE		CAR18	81.1	81.1	81.1	Lw	81.1					0.00	a	6741827.35	1902367.20	0.00
POINTSOURCE		CAR19	81.1	81.1	81.1	Lw	81.1					0.00	a	6742052.60	1902789.56	0.00
POINTSOURCE		CAR20	81.1	81.1	81.1	Lw	81.1					0.00	a	6741902.43	1903061.74	0.00
POINTSOURCE		CAR21	81.1	81.1	81.1	Lw	81.1					0.00	a	6741508.23	1903146.22	0.00
POINTSOURCE		TRASH01	89.0	89.0	89.0	Lw	89		900.00	0.00	270.00	0.00	a	6741498.84	1902573.68	0.00
POINTSOURCE		TRASH02	89.0	89.0	89.0	Lw	89		900.00	0.00	270.00	0.00	a	6741714.72	1903118.06	0.00
POINTSOURCE		TRASH03	89.0	89.0	89.0	Lw	89		900.00	0.00	270.00	0.00	a	6741358.06	1902967.89	0.00
POINTSOURCE		TRASH04	89.0	89.0	89.0	Lw	89		900.00	0.00	270.00	0.00	a	6737021.84	1903108.67	0.00
POINTSOURCE		TRASH05	89.0	89.0	89.0	Lw	89		900.00	0.00	270.00	0.00	a	6737575.60	1902526.76	0.00
POINTSOURCE		TRASH06	89.0	89.0	89.0	Lw	89		900.00	0.00	270.00	0.00	a	6735811.08	1904769.95	0.00
POINTSOURCE		TRASH07	89.0	89.0	89.0	Lw	89		900.00	0.00	270.00	0.00	a	6735201.00	1904910.74	0.00
POINTSOURCE		TRASH08	89.0	89.0	89.0	Lw	89		900.00	0.00	270.00	0.00	a	6737847.79	1896942.23	0.00
POINTSOURCE		TRASH09	89.0	89.0	89.0	Lw	89		900.00	0.00	270.00	0.00	a	6736777.81	1896426.02	0.00
POINTSOURCE		TRASH10	89.0	89.0	89.0	Lw	89		900.00	0.00	270.00	0.00	a	6737650.68	1895825.33	0.00

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	72.6	72.6	72.6	Lw	93.2									8	a
LINESOURCE		TRUCK02	93.2	93.2	93.2	68.3	68.3	68.3	Lw	93.2									8	a
LINESOURCE		TRUCK03	93.2	93.2	93.2	65.4	65.4	65.4	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			6742159.39	1902581.05	8.00	1200.00
						6741780.42	1902611.23	8.00	1200.00
LINESOURCE	TRUCK02	8.00	a			6737548.15	1902859.59	8.00	1200.00
						6736899.82	1903643.66	8.00	1200.00
LINESOURCE	TRUCK03	8.00	a			6738172.96	1896702.91	8.00	1200.00
						6737800.86	1896632.50	8.00	1200.00
						6737481.74	1896144.44	8.00	1200.00
						6737294.03	1895590.68	8.00	1200.00
						6737227.68	1895168.51	8.00	1200.00

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)		
SUBAREA		DOCK01	121.5	121.5	121.5	66.3	66.3	66.3	PWL-Pt	111.5					8	a
SUBAREA		DOCK02	121.5	121.5	121.5	72.4	72.4	72.4	PWL-Pt	111.5					8	a
SUBAREA		DOCK03	121.5	121.5	121.5	67.0	67.0	67.0	PWL-Pt	111.5					8	a

Name	ID	Height				Coordinates			
		Begin		End		x	y	z	Ground
		(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
SUBAREA	DOCK01	8.00	a			6734425.12	1905517.75	8.00	1200.00
						6734713.18	1905772.43	8.00	1200.00
						6735585.96	1905142.67	8.00	1200.00
						6735597.81	1905153.28	8.00	1200.00
						6735775.11	1904944.74	8.00	1200.00
						6736850.09	1904170.11	8.00	1200.00
						6738057.78	1903299.85	8.00	1200.00
						6737548.15	1902859.59	8.00	1200.00
						6738450.55	1901798.41	8.00	1200.00
						6738247.91	1901659.63	8.00	1200.00
						6737239.89	1902592.68	8.00	1200.00
						6736822.78	1903035.83	8.00	1200.00
						6736284.63	1903559.15	8.00	1200.00

Name	ID	Height				Coordinates			
		Begin		End		x	y	z	Ground
		(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
						6735721.05	1903942.78	8.00	1200.00
SUBAREA	DOCK02	8.00	a			6740961.83	1903403.50	8.00	1200.00
						6741223.75	1903354.22	8.00	1200.00
						6741436.44	1903303.52	8.00	1200.00
						6741948.51	1903172.87	8.00	1200.00
						6742093.21	1903131.32	8.00	1200.00
						6742259.68	1903057.08	8.00	1200.00
						6742266.84	1903030.82	8.00	1200.00
						6742245.01	1902968.31	8.00	1200.00
						6742225.30	1902905.10	8.00	1200.00
						6742207.74	1902841.26	8.00	1200.00
						6742192.36	1902776.86	8.00	1200.00
						6742179.16	1902711.98	8.00	1200.00
						6742168.17	1902646.68	8.00	1200.00
						6742159.39	1902581.05	8.00	1200.00
						6742152.85	1902515.16	8.00	1200.00
						6742148.53	1902449.09	8.00	1200.00
						6742146.46	1902382.91	8.00	1200.00
						6742147.62	1902299.73	8.00	1200.00
						6742121.08	1902283.35	8.00	1200.00
						6742093.55	1902268.69	8.00	1200.00
						6742065.15	1902255.81	8.00	1200.00
						6742035.99	1902244.75	8.00	1200.00
						6742006.19	1902235.55	8.00	1200.00
						6741975.87	1902228.27	8.00	1200.00
						6741945.14	1902222.92	8.00	1200.00
						6741917.07	1902219.76	8.00	1200.00
						6741888.87	1902218.22	8.00	1200.00
						6741860.62	1902218.30	8.00	1200.00
						6741832.43	1902220.01	8.00	1200.00
						6741769.20	1902240.35	8.00	1200.00
						6741705.24	1902258.24	8.00	1200.00
						6741640.64	1902273.66	8.00	1200.00
						6741575.49	1902286.59	8.00	1200.00
SUBAREA	DOCK03	8.00	a			6736165.16	1897487.74	8.00	1200.00
						6736444.62	1897495.96	8.00	1200.00
						6736382.98	1897389.10	8.00	1200.00
						6736329.55	1897298.69	8.00	1200.00
						6736329.55	1897232.93	8.00	1200.00
						6736530.93	1897064.43	8.00	1200.00
						6736604.91	1897056.21	8.00	1200.00
						6736699.43	1897080.86	8.00	1200.00
						6736958.35	1897216.49	8.00	1200.00
						6737036.44	1897253.48	8.00	1200.00
						6737065.21	1897417.87	8.00	1200.00
						6737278.92	1897417.87	8.00	1200.00
						6737262.48	1897163.06	8.00	1200.00
						6737393.99	1897163.06	8.00	1200.00
						6737467.97	1897208.27	8.00	1200.00
						6737570.71	1897327.45	8.00	1200.00
						6737611.81	1897364.44	8.00	1200.00
						6737624.14	1897430.20	8.00	1200.00
						6737636.47	1897454.86	8.00	1200.00
						6737813.19	1897463.08	8.00	1200.00
						6737817.30	1897200.05	8.00	1200.00
						6738306.37	1897015.11	8.00	1200.00
						6738270.30	1896938.25	8.00	1200.00
						6738236.02	1896860.56	8.00	1200.00
						6738203.57	1896782.10	8.00	1200.00
						6738172.96	1896702.91	8.00	1200.00
						6738144.20	1896623.02	8.00	1200.00
						6738117.32	1896542.48	8.00	1200.00
						6738071.20	1896399.21	8.00	1200.00
						6738022.90	1896256.67	8.00	1200.00
						6737972.43	1896114.87	8.00	1200.00
						6737919.81	1895973.87	8.00	1200.00
						6737865.04	1895833.68	8.00	1200.00
						6737808.14	1895694.34	8.00	1200.00
						6737749.12	1895555.89	8.00	1200.00
						6737688.00	1895418.35	8.00	1200.00
						6737624.79	1895281.76	8.00	1200.00
						6737559.50	1895146.15	8.00	1200.00
						6737492.15	1895011.56	8.00	1200.00
						6737422.76	1894878.00	8.00	1200.00
						6737370.80	1894948.44	8.00	1200.00
						6737320.94	1895020.38	8.00	1200.00
						6737273.22	1895093.76	8.00	1200.00

Name	ID	Height		Coordinates			
		Begin	End	x	y	z	Ground
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
				6737227.68	1895168.51	8.00	1200.00
				6737184.36	1895244.56	8.00	1200.00
				6737143.29	1895321.86	8.00	1200.00
				6737137.76	1895333.52	8.00	1200.00
				6737130.35	1895344.09	8.00	1200.00
				6737121.28	1895353.28	8.00	1200.00
				6737110.81	1895360.82	8.00	1200.00
				6737099.22	1895366.51	8.00	1200.00
				6737086.84	1895370.18	8.00	1200.00
				6737074.03	1895371.74	8.00	1200.00
				6737061.13	1895371.13	8.00	1200.00
				6737048.52	1895368.37	8.00	1200.00
				6737036.55	1895363.55	8.00	1200.00
				6737025.55	1895356.80	8.00	1200.00
				6737015.83	1895348.30	8.00	1200.00
				6737007.67	1895338.30	8.00	1200.00
				6736888.48	1895272.54	8.00	1200.00
				6736613.13	1895847.92	8.00	1200.00
				6736872.04	1895856.14	8.00	1200.00
				6736863.83	1896086.29	8.00	1200.00
				6736177.49	1896739.75	8.00	1200.00
				6736107.62	1896739.75	8.00	1200.00
				6736099.40	1897446.64	8.00	1200.00

APPENDIX 10.1:

PROJECT CONSTRUCTION NOISE CALCULATIONS

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15585 - GHSP

CadnaA Noise Prediction Model: 15585-02_Construction.cna
Date: 07.03.24
Analyst: B. Lawson

Calculation Configuration

Configuration	
Parameter	**Value**
General	
Max. Error (dB)	**0.00**
Max. Search Radius (#(Unit,LEN))	**6096.00**
Min. Dist Src to Rcvr	**0.00**
Partition	
Raster Factor	**0.50**
Max. Length of Section (#(Unit,LEN))	**999.99**
Min. Length of Section (#(Unit,LEN))	**1.01**
Min. Length of Section (%)	**0.00**
Proj. Line Sources	**On**
Proj. Area Sources	**On**
Ref. Time	
Daytime Penalty (dB)	**0.00**
Recr. Time Penalty (dB)	**5.00**
Night-time Penalty (dB)	**10.00**
DTM	
Standard Height (m)	**365.76**
Model of Terrain	**Triangulation**
Reflection	
max. Order of Reflection	**1**
Search Radius Src	**100.00**
Search Radius Rcvr	**100.00**
Max. Distance Source - Rcvr	**1000.00 1000.00**
Min. Distance Rvcr - Reflector	**1.00 1.00**
Min. Distance Source - Reflector	**0.10**
Industrial (ISO 9613)	
Lateral Diffraction	**some Obj**
Obst. within Area Src do not shield	**On**
Screening	**Incl. Ground Att. over Barrier**
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	**3.0 20.0 0.0**
Temperature (#(Unit,TEMP))	**10**
rel. Humidity (%)	**70**
Ground Absorption G	**0.50**
Wind Speed for Dir. (#(Unit,SPEED))	**3.0**
Roads (TNM)	
Railways (FTA/FRA)	
Aircraft (???)	
Strictly acc. to AzB	

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R1	51.3	51.3	57.9	55.0	45.0	0.0				5.00	a	6741768.81	1904568.98	5.00
RECEIVERS		R2	51.9	51.9	58.6	55.0	45.0	0.0				5.00	a	6743059.49	1903661.76	5.00
RECEIVERS		R3	26.1	26.1	32.8	55.0	45.0	0.0				5.00	a	6753469.60	1893886.85	5.00
RECEIVERS		R4	35.5	35.5	42.1	55.0	45.0	0.0				5.00	a	6741668.28	1890651.85	5.00
RECEIVERS		R5	45.2	45.2	51.9	55.0	45.0	0.0				5.00	a	6738641.54	1893509.46	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)		
SUBAREA		CONSTRUCTION01	128.4	128.4	128.4	73.2	73.2	73.2	PWL-Pt	118.4					8	a
SUBAREA		CONSTRUCTION02	128.4	128.4	128.4	79.3	79.3	79.3	PWL-Pt	118.4					8	a
SUBAREA		CONSTRUCTION03	128.4	128.4	128.4	73.9	73.9	73.9	PWL-Pt	118.4					8	a

Name	ID	Height				Coordinates			
		Begin		End		x	y	z	Ground
		(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
SUBAREA	CONSTRUCTION01	8.00	a			6734425.12	1905517.75	8.00	1200.00
						6734713.18	1905772.43	8.00	1200.00
						6735585.96	1905142.67	8.00	1200.00
						6735597.81	1905153.28	8.00	1200.00
						6735775.11	1904944.74	8.00	1200.00
						6736850.09	1904170.11	8.00	1200.00
						6738057.78	1903299.85	8.00	1200.00
						6737548.15	1902859.59	8.00	1200.00

Name	ID	Height				Coordinates			
		Begin		End		x	y	z	Ground
		(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
						6738450.55	1901798.41	8.00	1200.00
						6738247.91	1901659.63	8.00	1200.00
						6737239.89	1902592.68	8.00	1200.00
						6736822.78	1903035.83	8.00	1200.00
						6736284.63	1903559.15	8.00	1200.00
						6735721.05	1903942.78	8.00	1200.00
SUBAREA	CONSTRUCTION02	8.00	a			6740961.83	1903403.50	8.00	1200.00
						6741223.75	1903354.22	8.00	1200.00
						6741436.44	1903303.52	8.00	1200.00
						6741948.51	1903172.87	8.00	1200.00
						6742093.21	1903131.32	8.00	1200.00
						6742259.68	1903057.08	8.00	1200.00
						6742266.84	1903030.82	8.00	1200.00
						6742245.01	1902968.31	8.00	1200.00
						6742225.30	1902905.10	8.00	1200.00
						6742207.74	1902841.26	8.00	1200.00
						6742192.36	1902776.86	8.00	1200.00
						6742179.16	1902711.98	8.00	1200.00
						6742168.17	1902646.68	8.00	1200.00
						6742159.39	1902581.05	8.00	1200.00
						6742152.85	1902515.16	8.00	1200.00
						6742148.53	1902449.09	8.00	1200.00
						6742146.46	1902382.91	8.00	1200.00
						6742147.62	1902299.73	8.00	1200.00
						6742121.08	1902283.35	8.00	1200.00
						6742093.55	1902268.69	8.00	1200.00
						6742065.15	1902255.81	8.00	1200.00
						6742035.99	1902244.75	8.00	1200.00
						6742006.19	1902235.55	8.00	1200.00
						6741975.87	1902228.27	8.00	1200.00
						6741945.14	1902222.92	8.00	1200.00
						6741917.07	1902219.76	8.00	1200.00
						6741888.87	1902218.22	8.00	1200.00
						6741860.62	1902218.30	8.00	1200.00
						6741832.43	1902220.01	8.00	1200.00
						6741769.20	1902240.35	8.00	1200.00
						6741705.24	1902258.24	8.00	1200.00
						6741640.64	1902273.66	8.00	1200.00
						6741575.49	1902286.59	8.00	1200.00
SUBAREA	CONSTRUCTION03	8.00	a			6736165.16	1897487.74	8.00	1200.00
						6736444.62	1897495.96	8.00	1200.00
						6736382.98	1897389.10	8.00	1200.00
						6736329.55	1897298.69	8.00	1200.00
						6736329.55	1897232.93	8.00	1200.00
						6736530.93	1897064.43	8.00	1200.00
						6736604.91	1897056.21	8.00	1200.00
						6736699.43	1897080.86	8.00	1200.00
						6736958.35	1897216.49	8.00	1200.00
						6737036.44	1897253.48	8.00	1200.00
						6737065.21	1897417.87	8.00	1200.00
						6737278.92	1897417.87	8.00	1200.00
						6737262.48	1897163.06	8.00	1200.00
						6737393.99	1897163.06	8.00	1200.00
						6737467.97	1897208.27	8.00	1200.00
						6737570.71	1897327.45	8.00	1200.00
						6737611.81	1897364.44	8.00	1200.00
						6737624.14	1897430.20	8.00	1200.00
						6737636.47	1897454.86	8.00	1200.00
						6737813.19	1897463.08	8.00	1200.00
						6737817.30	1897200.05	8.00	1200.00
						6738306.37	1897015.11	8.00	1200.00
						6738270.30	1896938.25	8.00	1200.00
						6738236.02	1896860.56	8.00	1200.00
						6738203.57	1896782.10	8.00	1200.00
						6738172.96	1896702.91	8.00	1200.00
						6738144.20	1896623.02	8.00	1200.00
						6738117.32	1896542.48	8.00	1200.00
						6738071.20	1896399.21	8.00	1200.00
						6738022.90	1896256.67	8.00	1200.00
						6737972.43	1896114.87	8.00	1200.00
						6737919.81	1895973.87	8.00	1200.00
						6737865.04	1895833.68	8.00	1200.00
						6737808.14	1895694.34	8.00	1200.00
						6737749.12	1895555.89	8.00	1200.00
						6737688.00	1895418.35	8.00	1200.00
						6737624.79	1895281.76	8.00	1200.00
						6737559.50	1895146.15	8.00	1200.00

Name	ID	Height			Coordinates			
		Begin		End	x	y	z	Ground
		(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
					6737492.15	1895011.56	8.00	1200.00
					6737422.76	1894878.00	8.00	1200.00
					6737370.80	1894948.44	8.00	1200.00
					6737320.94	1895020.38	8.00	1200.00
					6737273.22	1895093.76	8.00	1200.00
					6737227.68	1895168.51	8.00	1200.00
					6737184.36	1895244.56	8.00	1200.00
					6737143.29	1895321.86	8.00	1200.00
					6737137.76	1895333.52	8.00	1200.00
					6737130.35	1895344.09	8.00	1200.00
					6737121.28	1895353.28	8.00	1200.00
					6737110.81	1895360.82	8.00	1200.00
					6737099.22	1895366.51	8.00	1200.00
					6737086.84	1895370.18	8.00	1200.00
					6737074.03	1895371.74	8.00	1200.00
					6737061.13	1895371.13	8.00	1200.00
					6737048.52	1895368.37	8.00	1200.00
					6737036.55	1895363.55	8.00	1200.00
					6737025.55	1895356.80	8.00	1200.00
					6737015.83	1895348.30	8.00	1200.00
					6737007.67	1895338.30	8.00	1200.00
					6736888.48	1895272.54	8.00	1200.00
					6736613.13	1895847.92	8.00	1200.00
					6736872.04	1895856.14	8.00	1200.00
					6736863.83	1896086.29	8.00	1200.00
					6736177.49	1896739.75	8.00	1200.00
					6736107.62	1896739.75	8.00	1200.00
					6736099.40	1897446.64	8.00	1200.00

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APPENDIX 10.2:

NIGHTTIME CONCRETE POUR NOISE CALCULATIONS

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15585 - GHSP

CadnaA Noise Prediction Model: 15585-02_Pour.cna
Date: 07.03.24
Analyst: B. Lawson

Calculation Configuration

Configuration	
Parameter	**Value**
General	
Max. Error (dB)	**0.00**
Max. Search Radius (#(Unit,LEN))	**6096.00**
Min. Dist Src to Rcvr	**0.00**
Partition	
Raster Factor	**0.50**
Max. Length of Section (#(Unit,LEN))	**999.99**
Min. Length of Section (#(Unit,LEN))	**1.01**
Min. Length of Section (%)	**0.00**
Proj. Line Sources	**On**
Proj. Area Sources	**On**
Ref. Time	
Daytime Penalty (dB)	**0.00**
Recr. Time Penalty (dB)	**5.00**
Night-time Penalty (dB)	**10.00**
DTM	
Standard Height (m)	**365.76**
Model of Terrain	**Triangulation**
Reflection	
max. Order of Reflection	**1**
Search Radius Src	**100.00**
Search Radius Rcvr	**100.00**
Max. Distance Source - Rcvr	**1000.00 1000.00**
Min. Distance Rvcr - Reflector	**1.00 1.00**
Min. Distance Source - Reflector	**0.10**
Industrial (ISO 9613)	
Lateral Diffraction	**some Obj**
Obst. within Area Src do not shield	**On**
Screening	**Incl. Ground Att. over Barrier**
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	**3.0 20.0 0.0**
Temperature (#(Unit,TEMP))	**10**
rel. Humidity (%)	**70**
Ground Absorption G	**0.50**
Wind Speed for Dir. (#(Unit,SPEED))	**3.0**
Roads (TNM)	
Railways (FTA/FRA)	
Aircraft (???)	
Strictly acc. to AzB	

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R1	33.2	33.2	39.8	55.0	45.0	0.0				5.00	a	6741768.81	1904568.98	5.00
RECEIVERS		R2	33.8	33.8	40.5	55.0	45.0	0.0				5.00	a	6743059.49	1903661.76	5.00
RECEIVERS		R3	8.0	8.0	14.7	55.0	45.0	0.0				5.00	a	6753469.60	1893886.85	5.00
RECEIVERS		R4	17.4	17.4	24.0	55.0	45.0	0.0				5.00	a	6741668.28	1890651.85	5.00
RECEIVERS		R5	27.1	27.1	33.8	55.0	45.0	0.0				5.00	a	6738641.54	1893509.46	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)		
SUBAREA		CONSTRUCTION01	110.3	110.3	110.3	55.1	55.1	55.1	PWL-Pt	100.3					8	a
SUBAREA		CONSTRUCTION02	110.3	110.3	110.3	61.2	61.2	61.2	PWL-Pt	100.3					8	a
SUBAREA		CONSTRUCTION03	110.3	110.3	110.3	55.8	55.8	55.8	PWL-Pt	100.3					8	a

Name	ID	Height				Coordinates			
		Begin		End		x	y	z	Ground
		(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
SUBAREA	CONSTRUCTION01	8.00	a			6734425.12	1905517.75	8.00	1200.00
						6734713.18	1905772.43	8.00	1200.00
						6735585.96	1905142.67	8.00	1200.00
						6735597.81	1905153.28	8.00	1200.00
						6735775.11	1904944.74	8.00	1200.00
						6736850.09	1904170.11	8.00	1200.00
						6738057.78	1903299.85	8.00	1200.00
						6737548.15	1902859.59	8.00	1200.00

Name	ID	Height				Coordinates			
		Begin		End		x	y	z	Ground
		(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
						6738450.55	1901798.41	8.00	1200.00
						6738247.91	1901659.63	8.00	1200.00
						6737239.89	1902592.68	8.00	1200.00
						6736822.78	1903035.83	8.00	1200.00
						6736284.63	1903559.15	8.00	1200.00
						6735721.05	1903942.78	8.00	1200.00
SUBAREA	CONSTRUCTION02	8.00	a			6740961.83	1903403.50	8.00	1200.00
						6741223.75	1903354.22	8.00	1200.00
						6741436.44	1903303.52	8.00	1200.00
						6741948.51	1903172.87	8.00	1200.00
						6742093.21	1903131.32	8.00	1200.00
						6742259.68	1903057.08	8.00	1200.00
						6742266.84	1903030.82	8.00	1200.00
						6742245.01	1902968.31	8.00	1200.00
						6742225.30	1902905.10	8.00	1200.00
						6742207.74	1902841.26	8.00	1200.00
						6742192.36	1902776.86	8.00	1200.00
						6742179.16	1902711.98	8.00	1200.00
						6742168.17	1902646.68	8.00	1200.00
						6742159.39	1902581.05	8.00	1200.00
						6742152.85	1902515.16	8.00	1200.00
						6742148.53	1902449.09	8.00	1200.00
						6742146.46	1902382.91	8.00	1200.00
						6742147.62	1902299.73	8.00	1200.00
						6742121.08	1902283.35	8.00	1200.00
						6742093.55	1902268.69	8.00	1200.00
						6742065.15	1902255.81	8.00	1200.00
						6742035.99	1902244.75	8.00	1200.00
						6742006.19	1902235.55	8.00	1200.00
						6741975.87	1902228.27	8.00	1200.00
						6741945.14	1902222.92	8.00	1200.00
						6741917.07	1902219.76	8.00	1200.00
						6741888.87	1902218.22	8.00	1200.00
						6741860.62	1902218.30	8.00	1200.00
						6741832.43	1902220.01	8.00	1200.00
						6741769.20	1902240.35	8.00	1200.00
						6741705.24	1902258.24	8.00	1200.00
						6741640.64	1902273.66	8.00	1200.00
						6741575.49	1902286.59	8.00	1200.00
SUBAREA	CONSTRUCTION03	8.00	a			6736165.16	1897487.74	8.00	1200.00
						6736444.62	1897495.96	8.00	1200.00
						6736382.98	1897389.10	8.00	1200.00
						6736329.55	1897298.69	8.00	1200.00
						6736329.55	1897232.93	8.00	1200.00
						6736530.93	1897064.43	8.00	1200.00
						6736604.91	1897056.21	8.00	1200.00
						6736699.43	1897080.86	8.00	1200.00
						6736958.35	1897216.49	8.00	1200.00
						6737036.44	1897253.48	8.00	1200.00
						6737065.21	1897417.87	8.00	1200.00
						6737278.92	1897417.87	8.00	1200.00
						6737262.48	1897163.06	8.00	1200.00
						6737393.99	1897163.06	8.00	1200.00
						6737467.97	1897208.27	8.00	1200.00
						6737570.71	1897327.45	8.00	1200.00
						6737611.81	1897364.44	8.00	1200.00
						6737624.14	1897430.20	8.00	1200.00
						6737636.47	1897454.86	8.00	1200.00
						6737813.19	1897463.08	8.00	1200.00
						6737817.30	1897200.05	8.00	1200.00
						6738306.37	1897015.11	8.00	1200.00
						6738270.30	1896938.25	8.00	1200.00
						6738236.02	1896860.56	8.00	1200.00
						6738203.57	1896782.10	8.00	1200.00
						6738172.96	1896702.91	8.00	1200.00
						6738144.20	1896623.02	8.00	1200.00
						6738117.32	1896542.48	8.00	1200.00
						6738071.20	1896399.21	8.00	1200.00
						6738022.90	1896256.67	8.00	1200.00
						6737972.43	1896114.87	8.00	1200.00
						6737919.81	1895973.87	8.00	1200.00
						6737865.04	1895833.68	8.00	1200.00
						6737808.14	1895694.34	8.00	1200.00
						6737749.12	1895555.89	8.00	1200.00
						6737688.00	1895418.35	8.00	1200.00
						6737624.79	1895281.76	8.00	1200.00
						6737559.50	1895146.15	8.00	1200.00

Name	ID	Height			Coordinates			
		Begin		End	x	y	z	Ground
		(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
					6737492.15	1895011.56	8.00	1200.00
					6737422.76	1894878.00	8.00	1200.00
					6737370.80	1894948.44	8.00	1200.00
					6737320.94	1895020.38	8.00	1200.00
					6737273.22	1895093.76	8.00	1200.00
					6737227.68	1895168.51	8.00	1200.00
					6737184.36	1895244.56	8.00	1200.00
					6737143.29	1895321.86	8.00	1200.00
					6737137.76	1895333.52	8.00	1200.00
					6737130.35	1895344.09	8.00	1200.00
					6737121.28	1895353.28	8.00	1200.00
					6737110.81	1895360.82	8.00	1200.00
					6737099.22	1895366.51	8.00	1200.00
					6737086.84	1895370.18	8.00	1200.00
					6737074.03	1895371.74	8.00	1200.00
					6737061.13	1895371.13	8.00	1200.00
					6737048.52	1895368.37	8.00	1200.00
					6737036.55	1895363.55	8.00	1200.00
					6737025.55	1895356.80	8.00	1200.00
					6737015.83	1895348.30	8.00	1200.00
					6737007.67	1895338.30	8.00	1200.00
					6736888.48	1895272.54	8.00	1200.00
					6736613.13	1895847.92	8.00	1200.00
					6736872.04	1895856.14	8.00	1200.00
					6736863.83	1896086.29	8.00	1200.00
					6736177.49	1896739.75	8.00	1200.00
					6736107.62	1896739.75	8.00	1200.00
					6736099.40	1897446.64	8.00	1200.00

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