City Center

NOISE IMPACT ANALYSIS

CITY OF REDLANDS

PREPARED BY:

William Maddux
bmaddux@urbanxroads.com
(619) 788-1971

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
ANSI	American National Standards Institute
Calveno	California Vehicle Noise
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
INCE	Institute of Noise Control Engineering
L_{eq}	Equivalent continuous (average) sound level
mph	Miles per hour
OPR	Office of Planning and Research
PPV	Peak particle velocity
Project	City Center
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 reduction measures for the proposed City Center ("Project"). The Project site is located at the northwest corner of Eureka Street and Brookside Avenue in the City of Redlands. The Project includes 131 multifamily dwelling units and 23,476 square feet (SF) of amenity space consisting of a 9,770 SF Roof Deck, 7,380 SF Pool Plaza, 5,356SF Spa Plaza, and 527 SF Upper Lounge. The Project also proposes 10,550 SF of restaurant space on the corner of Eureka Street and Brookside Avenue. This study has been prepared consistent with applicable City of Redlands noise standards, and significance criteria based on guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

ON-SITE TRAFFIC NOISE

A noise impact analysis has been completed to determine the on-site traffic noise exposure levels that would result from nearby transportation noise sources, and to identify potential noise mitigation measures that would achieve acceptable Project exterior and interior noise levels. The primary source of traffic noise affecting the Project site is anticipated to be from Brookside Avenue and Eureka Street. No exterior noise mitigation is required to satisfy the City of Redlands General Plan Noise Element exterior land use/noise level compatibility criteria for multi-family residential uses as there are no outdoor use areas.

To satisfy the City of Redlands 45 dBA CNEL residential interior noise level standards, the planned multi-family residential units will require a noise reduction (NR) of up to 21 dBA at the residential locations. To satisfy the State50 dBA non-residential interior noise level standards, the planned restaurants will require a noise reduction of up to 18 dBA. None of residential would require special noise reduction measures other than a windows-closed condition, which requires a means of mechanical ventilation (e.g., air conditioning). Therefore, the future on-site interior traffic noise impacts will be *less than significant*. While not required as mitigation, the following building construction measures are recommended to be included on all Project building plans:

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

OFF-SITE TRAFFIC NOISE

Traffic generated by the operation of the proposed Project will influence the traffic noise levels in surrounding off-site areas. To quantify the traffic noise increases on the surrounding off-site areas, the changes in traffic noise levels on eight roadway segments surrounding the Project site were calculated based on the change in the average daily traffic (ADT) volumes. The traffic noise levels provided in this analysis are based on the traffic forecasts found in *State Street Traffic Impact Analysis* and the *VMT Screening Analysis for the City Center Project* (2) (3). To assess the off-site noise level impacts associated with the proposed Project, noise contour boundaries were developed for Existing and Cumulative Year 2025 traffic conditions. The analysis shows that the unmitigated Project-related traffic noise level increases under all traffic scenarios will be *less than significant*.

OPERATIONAL NOISE

Using reference noise levels to represent the expected noise sources from the City Center Project, this analysis estimates the Project-related stationary-source operational noise levels at nearby receiver locations. The typical activities associated with the proposed City Center are anticipated to include outdoor gatherings, mechanical ventilation, swimming pool and spa activities, trash enclosure activity, and parking lot activity. The operational noise analysis shows that Project activities will satisfy the City of Redlands daytime and nighttime exterior noise level thresholds at all receiver locations.

Further, this analysis demonstrates that the Project operational noise levels will not contribute a long-term operational noise level impact to the existing ambient noise environment at any of the sensitive receiver locations. Therefore, the operational noise level impacts associated with the proposed 24-hour, seven days per week Project activities, such as the outdoor gatherings, mechanical ventilation, swimming pool and spa activities, trash enclosure activity, and parking lot activity, are considered *less than significant*.

CONSTRUCTION NOISE

On-site construction noise represents a short-term increase on the ambient noise levels associated with the development of the Project on nearby receivers. Construction-related noise impacts are expected to create temporary and intermittent high-level noise conditions at receivers surrounding the Project site when certain activities occur at the Project site boundary. Using sample reference noise levels to represent the planned construction activities of City Center site, this analysis estimates the Project-related construction noise levels at nearby sensitive receiver locations. Since the City of Redlands General Plan and Municipal Codes do not identify specific construction noise level limits, this analysis relies on the 85 dBA L_{eq} threshold identified by the National Institute for Occupational Safety and Health (NIOSH) to quantify and determine potential construction noise level impacts. This analysis shows that the Project-related short-term construction noise levels are estimated to range from 61.5 to 76.1 dBA L_{eq} and will satisfy the 85 dBA L_{eq} threshold identified by the National Institute for Occupational Safety

and Health (NIOSH). (4) Therefore, the noise level impacts at the nearby sensitive receiver locations are considered *less than significant*.

CONSTRUCTION VIBRATION

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. Ground-borne vibration levels resulting from typical construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration (FTA). At the nearest receivers Project construction vibration velocity levels are estimated to range from 0.00 to 0.30 in/sec PPV. Based on maximum acceptable continuous vibration threshold of 0.040 PPV (in/sec), the typical Project construction vibration levels will exceed the City of Redlands thresholds residential properties located to the southwest of the Project site and vibration impacts would be *significant* without mitigation.

Therefore, Mitigation Measure (MM) Noise-1 is recommended to be included in Project construction plans to limit the equipment that would operate along the southwestern property line. With implementation of MM Noise-1, vibration level would be reduced to *less than significant.*

MM Noise-1: Large loaded trucks and dozers (greater than or equal to 80,000 pounds) (5) shall not be used within 30 feet of the southwest Property line, as shown on Exhibit ES-A. Instead, smaller, rubber-tired bulldozers (less than 80,000 pounds) shall be used within this area during Project construction to reduce vibration effects.

SUMMARY OF CEQA SIGNIFICANCE FINDINGS

The results of this City Center Noise Impact Analysis are summarized below based on the significance criteria in Section 4 of this report consistent with Appendix G of the California Environmental Quality Act (CEQA) Guidelines.

Table ES-1 shows the findings of significance for each potential noise and/or vibration impact under CEQA before and after any required mitigation measures described below.

ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

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

EXHIBIT ES-A: CONSTRUCTION VIBRATION MEASURE.



1 INTRODUCTION

This noise analysis has been completed to determine the noise impacts associated with the development of the proposed City Center ("Project"). This noise study briefly describes the proposed Project, provides information regarding noise fundamentals, sets out the regulatory setting, presents the study methods, and evaluates the potential for short-term and long-term noise impacts due to Project construction and operation.

1.1 SITE LOCATION

The proposed Project site is located at the northwest corner of Eureka Street and Brookside Avenue in City of Redlands, as shown on Exhibit 1-A. The Project site is generally surrounded by commercial land uses, with the nearest residential land uses immediately southwest of the Project site. The Project site is designated Commercial (C) on the City of Redlands General Plan Land Use Map and zoned General Commercial (C-3).

1.2 PROJECT DESCRIPTION

The Project proposes to construct a new mixed-use development consisting of multi-family residential units and restaurant uses. The Project would also develop a single-story, subterranean parking garage located beneath the proposed residential building. The Project includes 131 multifamily dwelling units and 23,476 square feet (SF) of amenity space consisting of a 9,770 SF Roof Deck, 7,380 SF Pool Plaza, 5,356SF Spa Plaza, and 527 SF Upper Lounge. The Project also proposes 10,550 SF of restaurant space on the corner of Eureka Street and Brookside Avenue, as shown in Exhibit 1-B.

The residential units would include studio, studio/den, one-bedroom, two-bedroom, and two-bedroom/den floor plans that range from approximately 517 SF to 1,252 SF. The residential building would include approximately 23,476 SF of amenity space, including a pool, lounge, rooftop bar, fitness room, shared kitchen, and game room. The proposed restaurant space would be split into three separate pads. Restaurant Pad 1 is approximately 3,505 SF, Restaurant Pad 2 is approximately 3,450 SF, and Restaurant Pad 3 is approximately 3,578 SF. Restaurant parking would be provided through a surface lot adjacent to the proposed restaurants.

EXHIBIT 1-A: LOCATION MAP



EXHIBIT 1-B: SITE PLAN



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2 FUNDAMENTALS

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

EXHIBIT 2-A: TYPICAL NOISE LEVELS

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

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

2.1 RANGE OF NOISE

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. (6) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA

at approximately 100 feet, which can cause serious discomfort. (7) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.2 NOISE DESCRIPTORS

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

Peak hour or equivalent noise levels, while useful, do not completely describe a given noise environment. Noise levels lower than peak hour may be disturbing if they occur during times when quiet is most desirable, namely evening and nighttime (sleeping) hours. To account for this, the Community Noise Equivalent Level (CNEL), representing a composite 24-hour noise level is utilized. The CNEL is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time-of-day corrections require the addition of 5 decibels to dBA L_{eq} sound levels in the evening from 7:00 p.m. to 10:00 p.m., and the addition of 10 decibels to dBA L_{eq} sound levels at night between 10:00 p.m. and 7:00 a.m. These additions are made to account for the noise sensitive time periods during the evening and night hours when sound appears louder. CNEL does not represent the actual sound level heard at any time, but rather represents the total sound exposure. The City of Redlands 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. Based on guidance from the U.S. Department of Transportation, Federal Highway Administration (FHWA), Office of Environment and Planning, Noise and Air Quality Branch, 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. (6)

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. (8)

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. (6)

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. (8)

2.3.5 REFLECTION

Field studies conducted by the FHWA have shown that the reflection from barriers and buildings does not substantially increase noise levels. (8) If all the noise striking a structure was reflected back to a given receiving point, the increase would be theoretically limited to 3 dBA. Further, not all the acoustical energy is reflected back to same point. Some of the energy would go over the structure, some is reflected to points other than the given receiving point, some is scattered by ground coverings (e.g., grass and other plants), and some is blocked by intervening structures and/or obstacles (e.g., the noise source itself). Additionally, some of the reflected energy is lost due to the longer path that the noise must travel. FHWA measurements made to quantify

reflective increases in traffic noise have not shown an increase of greater than 1-2 dBA; an increase that is not perceptible to the average human ear.

2.4 NOISE CONTROL

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

2.5 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by up to 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receiver. Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source. (8)

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. (9)

2.7 COMMUNITY RESPONSE TO NOISE

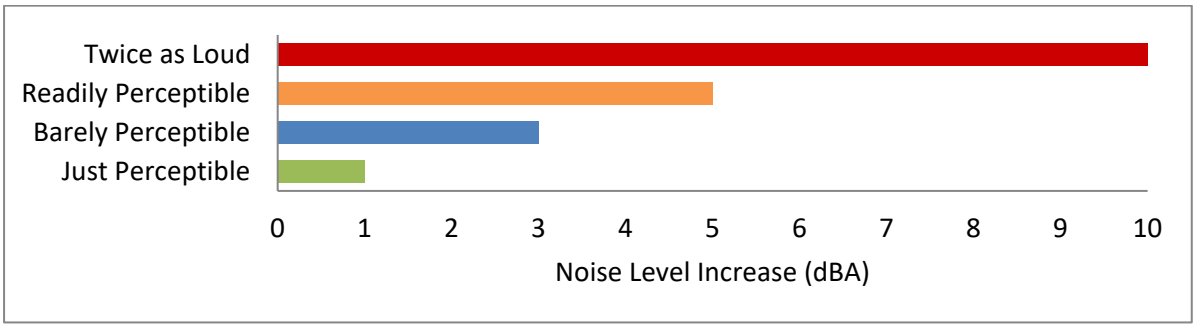
Community responses to noise varies depending upon everyone's susceptibility to noise and personal attitudes about noise. Several factors are related to the level of community annoyance including:

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

Approximately ten percent of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints will occur. Twenty-five percent of the population will not complain even in very severe noise environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. (10) Surveys have shown that about ten percent of the people exposed to

traffic noise of 60 dBA will report being highly annoyed with the noise, and each increase of one dBA is associated with approximately two percent more people being highly annoyed. When traffic noise exceeds 60 dBA or aircraft noise exceeds 55 dBA, people may begin to complain. (10) 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*. (8)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



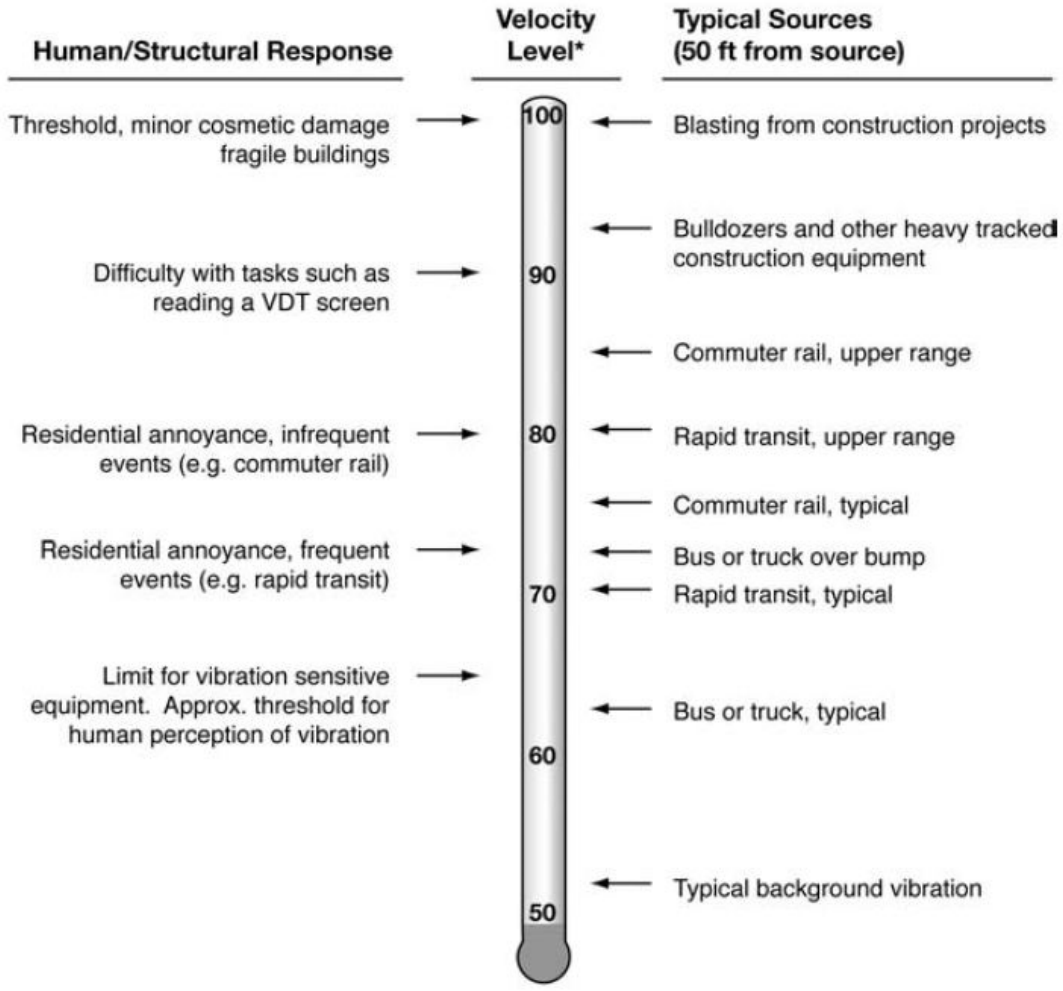
2.8 VIBRATION

Per the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* (11), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such as explosions. As is the case with airborne sound, ground-borne vibrations may be described by amplitude and frequency.

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

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

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



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

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

3 REGULATORY SETTING

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

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared per guidelines adopted by the Governor's Office of Planning and Research (OPR). (12) The purpose of the Noise Element is to *limit the exposure of the community to excessive noise levels*. In addition, the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts.

3.2 STATE OF CALIFORNIA BUILDING STANDARDS

3.2.1 RESIDENTIAL

The State of California's interior noise standards for all new construction with habitable spaces are codified in the California Code of Regulations (CCR), Title 24, Building Standards Administrative Code, Chapter 12, Section 1206. A habitable space in a building is defines as a space used for "living, sleeping, eating, or cooking. Bathrooms, toilet rooms, closets, halls, storage, or utility spaces and similar areas are not considered habitable spaces." These noise standards are primarily applicable to all new residential construction, inns, hotels, motels, and residential care facility land uses in California for controlling interior noise levels resulting from exterior noise sources. The acceptable interior noise limit is 45 CNEL in all habitable rooms (13).

3.2.2 NON-RESIDENTIAL/HIGH RISE RESIDENTIAL

The State of California's Green Building Standards Code contains mandatory measures for non-residential building construction in Section 5.507 on Environmental Comfort. (14) These noise standards are applied to new construction in California for controlling interior noise levels resulting from exterior noise sources. The regulations specify that acoustical studies must be prepared when non-residential structures are developed in areas where the exterior noise levels exceed 65 dBA CNEL, such as within a noise contour of an airport, freeway, railroad, and other areas where noise contours are not readily available. If the development falls within an airport or freeway 65 dBA CNEL noise contour, the combined sound transmission class (STC) rating of

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

3.3 CITY OF REDLANDS GENERAL PLAN SAFETY ELEMENT

The City of Redlands has adopted a Noise Element of the General to control and abate environmental noise, and to protect the citizens of the City of Redlands from excessive exposure to noise. (15) The Noise Element specifies the maximum allowable exterior noise levels for new developments impacted by transportation noise sources such as arterial roads, freeways, airports and railroads. In addition, the Noise Element identifies several polices to minimize the impacts of excessive noise levels throughout the community and establishes noise level requirements for all land uses. The noise standards identified in the City of Redlands General Plan (Table 7-10) are guidelines to evaluate the land use compatibility of transportation-related noise. The compatibility criteria, shown on Exhibit 3-A, provides the City with a planning tool to gauge the compatibility of land uses relative to existing and future exterior noise levels.

The *Noise/Land Use Compatibility Matrix and Interpretation* table describes categories of compatibility and not specific noise standards. Noise-sensitive residential land use is considered *clearly compatible* (Zone A) with unmitigated exterior noise levels of less than 60 dBA CNEL, and *normally incompatible* (Zone C) with unmitigated exterior noise levels below 75 dBA CNEL. For Zone C, *normally incompatible* land use, *new construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in the design.* (15)

EXHIBIT 3-A: NOISE/LAND USE COMPATIBILITY MATRIX

Land Use Categories		Community Noise Equivalent Level (CNEL)							
Categories	**Uses**	**<**	**60**	**65**	**70**	**75**	**80**	**85**	**>**
RESIDENTIAL	Single Family, Duplex Multiple Family	A	C	C	C		D	D	D
RESIDENTIAL	Mobile Homes	A	C	C	C		D	D	D
COMMERCIAL Regional, District	Hotel, Motel, Transient Lodging	A	A	B	B		C	C	D
COMMERCIAL Regional, Village District, Special	Commercial Retail, Bank, Restaurant, Movie Theater	A	A	A	A		B	B	C
COMMERCIAL INDUSTRIAL INSTITUTIONAL	Office Building, Research & Dev., Professional Offices, City Office Building	A	A	A	B		B	C	D
COMMERCIAL Recreation INSTITUTIONAL Civic Center	Amphitheater, Concert Hall, Auditorium, Meeting Hall	B	B	C	C		D	D	D
COMMERCIAL Recreation	Childrens Amusement Park, Miniature Golf Course, Go-cart Track, Equestrian Center, Sports Club	A	A	A	A		B	B	B
COMMERCIAL General, Special INDUSTRIAL, INSTITUTIONAL	Automobile Service Station, Auto Dealership, Manufacturing, Warehousing, Wholesale, Utilities	A	A	A	A		B	B	B
INSTITUTIONAL General	Hospital, Church, Library, Schools Classroom	A	A	B	C		C	D	D
OPEN SPACE	Parks	A	A	A	B		C	D	D
OPEN SPACE	Golf Course, Cemeteries, Nature Centers, Wildlife Reserves, Wildlife Habitat	A	A	A	A		B	C	C
AGRICULTURE	Agriculture	A	A	A	A		A	A	A

Zone A CLEARLY COMPATIBLE	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.
ZONE B NORMALLY COMPATIBLE	New construction or development should be undertaken only after detailed analysis of the noise reduction requirements are made and needed noise insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.
ZONE C NORMALLY INCOMPATIBLE	New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in the design.
ZONE D CLEARLY INCOMPATIBLE	New construction or development should generally not be undertaken.

Source: Mestre Greve Associates; Guidelines for the Preparation and Content of the Noise Element of the General Plan, prepared by the California Department of Health Services in coordination with The Governor's Office of Planning and Research. Adapted to the City of Redlands' standards.

TABLE 3-1: OPERATIONAL NOISE STANDARDS

Land Use[1]	Time Period	Exterior Noise Level Standards (dBA L_{eq})[2]
Residential, Institutional	Daytime (7:00 a.m. to 10:00 p.m.)	60
	Nighttime (10:00 p.m. to 7:00 a.m.)	50

[1] Source: City of Redlands Municipal Code, Section 8.06.070 (Appendix 3.1).
[2] L_{eq} represents a steady state sound level containing the same total energy as a time varying signal over a given sample period.

3.5 CONSTRUCTION NOISE STANDARDS

To analyze noise impacts originating from the construction of the City Center Project, noise from construction activities is typically limited to the hours of operation established under a jurisdiction's Municipal Code. Section 8.06.090(F) the City of Redlands Municipal 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 6:00 p.m. Monday to Saturdays; with no activity allowed on Sundays or holidays. (16) However, neither the City of Redlands General Plan and Municipal Codes 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, the following construction noise level threshold is used in this noise study.

To evaluate whether the Project will generate potentially significant construction noise levels at off-site sensitive receiver locations, a construction-related noise level threshold is adopted from the *Criteria for Recommended Standard: Occupational Noise Exposure* prepared by the National Institute for Occupational Safety and Health (NIOSH). (4) A division of the U.S. Department of Health and Human Services, NIOSH identifies a noise level threshold based on the duration of exposure to the source. The construction related noise level threshold starts at 85 dBA for more than eight hours per day, and for every 3 dBA increase, the exposure time is cut in half. This results in noise level thresholds of 88 dBA for more than four hours per day, 92 dBA for more than one hour per day, 96 dBA for more than 30 minutes per day, and up to 100 dBA for more than 15 minutes per day. (4) For the purposes of this analysis, the lowest, more conservative construction noise level threshold of 85 dBA L_{eq} is used as an acceptable threshold for construction noise at the nearby sensitive receiver locations. Since this construction-related noise level threshold represents the energy average of the noise source over a given time, they are expressed as L_{eq} noise levels. Therefore, the noise level threshold of 85 dBA L_{eq} over a period of eight hours or more is used to evaluate the potential Project-related construction noise level impacts at the nearby sensitive receiver locations.

The 85 dBA L_{eq} threshold is also consistent with the FTA *Transit Noise and Vibration Impact Assessment* criteria for construction noise which identifies an hourly construction noise level threshold of 90 dBA L_{eq} during daytime hours, and 80 dBA L_{eq} during nighttime hours for construction for general assessment at noise-sensitive uses (e.g., residential, medical/hospital,

school, etc.). (17) Detailed assessment, according to the FTA, identifies an 8-hour dBA L_{eq} noise level threshold specific to noise-sensitive uses of 80 dBA L_{eq}. Therefore, the Noise Study relies on the NIOSH 85 dBA L_{eq} threshold, consistent with FTA general and detailed assessment criteria for noise-sensitive uses and represents an appropriate threshold for construction noise analysis.

3.6 CONSTRUCTION VIBRATION STANDARDS

The City of Redlands Municipal Code, Section 8.06.020, defines the vibration perception threshold as 0.01 inches per second (in/sec) RMS. Based on FTA methodology, an RMS of 0.01 in/sec equates to 0.04 in/sec PPV.

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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?

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

The Project site is not located within an airport land use plan or within 2 miles of a public airport, or within the vicinity of a private airstrip. Therefore, the Project would not result in potential noise impacts for people residing or working at the Project site. As such, the Project does not have the potential to expose people residing or working in the Project area to excessive noise levels and no impact would occur. No further analysis of CEQA Guideline C is required.

4.1 NOISE-SENSITIVE RECEIVERS

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Guidelines described above at the closest sensitive receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing ambient noise levels, and the location of noise-sensitive receivers to determine if a noise increase represents a significant adverse environmental impact. This approach recognizes *that there is no single noise increase that renders the noise impact significant.* (18) This is primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted—the so-called *ambient* environment.

In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will typically be judged. The Federal Interagency Committee on Noise (FICON) (19) developed guidance to be used for the assessment of project-generated increases in noise levels that consider the ambient noise level. The FICON recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise

impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics, such as the average-daily noise level (i.e., CNEL) or median noise level (L_{50}).

As previously stated, the approach used in this noise study recognizes *that there is no single noise increase that renders the noise impact significant*, based on a 2008 California Court of Appeal ruling on Gray v. County of Madera. (18) For example, if the ambient noise environment is quiet (<60 dBA) and the new noise source greatly increases the noise levels, an impact may occur if the noise criteria may be exceeded. Therefore, for this analysis, FICON identifies a *readily perceptible* 5 dBA or greater project-related noise level increase is considered a significant impact when the noise criteria for a given land use is exceeded. Per the FICON, in areas where the without project noise levels range from 60 to 65 dBA, a 3 dBA *barely perceptible* noise level increase appears to be appropriate for most people. When the without project noise levels already exceed 65 dBA, any increase in community noise louder than 1.5 dBA or greater is considered a significant impact if the noise criteria for a given land use is exceeded, since it likely contributes to an existing noise exposure exceedance. Table 4-1 below provides a summary of the potential noise impact significance criteria, based on guidance from FICON.

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

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

Federal Interagency Committee on Noise (FICON), 1992.

4.2 SIGNIFICANCE CRITERIA SUMMARY

Noise impacts shall be considered significant if any of the following occur as a direct result of the proposed development. Table 4-2 shows the significance criteria summary matrix.

OFF-SITE TRAFFIC NOISE

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

ON-SITE TRAFFIC NOISE

- If the on-site noise levels:
    1. exceed an interior noise level of 45 dBA CNEL for residential uses or exceed an interior noise level of 55 dBA CNEL for commercial uses (City of Redlands General Plan Noise Element).

OPERATIONAL NOISE

- If Project-related operational (stationary-source) noise levels exceed the base exterior noise level standard of 60 dBA L_{eq} during the daytime hours (7:00 a.m. to 10:00 p.m.) and 50 dBA L_{eq} during the nighttime hours (10:00 p.m. to 7:00 a.m.) for noise-sensitive residential and institutional uses in the Project study area, Section 8.06.070 identifies (16).
    1. When the noise levels at existing and future noise-sensitive land uses (e.g., residential, etc.):
    2. are less than 60 dBA L_{eq} and the Project creates a readily perceptible 5 dBA L_{eq} or greater Project-related noise level increase; or
    3. range from 60 to 65 dBA L_{eq} and the Project creates a barely perceptible 3 dBA L_{eq} or greater Project-related noise level increase; or
    4. already exceed 65 dBA L_{eq}, and the Project creates a community noise level impact of greater than 1.5 dBA L_{eq} (FICON, 1992).

CONSTRUCTION NOISE AND VIBRATION

- If Project-related construction activities:
    1. occur at any time other than the permitted hours of 7:00 a.m. to 6:00 p.m. Monday to Saturdays; with no activity allowed on Sundays or holidays (City of Redlands Municipal Code, Section 8.06.090(F)); or
    2. create noise levels which exceed the 85 dBA L_{eq} acceptable noise level threshold at the nearby sensitive receiver locations (NIOSH, Criteria for Recommended Standard: Occupational Noise Exposure).
- If short-term Project generated construction vibration levels exceed the City of Redlands acceptable vibration standard of 0.01 in/sec RMS (0.04 in/sec PPV) at sensitive receiver locations (City of Redlands Municipal Code, Section 8.06.020).

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5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, 24-hour noise level measurements were taken at four locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Thursday, April 15, 2021.

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. 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. (20)

5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site. Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent every part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (6) 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*. (11)

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. (11) In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Receivers represent a location of noise sensitive areas and are used to estimate the future noise level impacts. Collecting reference ambient noise level measurements at the nearby sensitive receiver locations allows for a comparison of the before and after Project noise levels

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

5.3 NOISE MEASUREMENT RESULTS

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

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

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]	
		Daytime	Nighttime
L1	Located north of the Project site near single-family residence at 321 West State Street.	49.3	48.0
L2	Located southeast of the Project site near single-family residence at 124 West Vine Street.	58.8	59.4
L3	Located south of the Project site near Cortner Chapel at 221 Brookside Avenue.	55.3	53.8
L4	Located west of the Project site near single-family residence at 18 Kendall Street.	52.7	56.5

[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 equivalent noise levels represent the energy average of all hourly noise levels observed during these time periods expressed as a single number. Appendix 5.1 provides summary worksheets of the noise levels for each of the daytime and nighttime hours.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS



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6 TRAFFIC NOISE METHODS AND PROCEDURES

The following section outlines the methods and procedures used to estimate and analyze the future traffic noise environment. Consistent with the City of Redlands General Plan Policies for multi-family residential land use, all transportation related noise levels are presented in terms of the 24-hour CNEL's.

6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The estimated roadway noise impacts from vehicular traffic were calculated using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (21) 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. (22) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period.

6.2 ON-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

The on-site roadway parameters including the ADT volumes used for this analysis are presented on Table 6-1. Based on the City of Redlands General Plan, Table 5-3: Level of Service and Capacity, Brookside Avenue and Eureka Street

TABLE 6-1: ON-SITE ROADWAY PARAMETERS

Roadway	Lanes	Classification[1]	Design Capacity (ADT)[2]	Speed (MPH)[3]	Site Conditions
Brookside Ave.	4	Major Arterial	30,000	30	Soft
Eureka Street	4	Minor Arterial	30,000	30	Soft

1 City of Redlands General Plan, Table 5-3: Roadway/Highway Segment Level of Service and Capacity Values
2 City of Redlands General Plan, Figure 5-5: Roadway Classification.
3 Posted Speed Limit

The traffic volumes shown on Table 6-1 reflect future long-range traffic conditions needed to assess the future on-site traffic noise environment and to identify potential mitigation measures (if any) that address the worst-case future conditions. For the purposes of this analysis, soft site conditions were used to analyze the on-site traffic noise impacts for the Project study area. Soft site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. Research conducted by Caltrans has shown that the use of soft site

conditions is appropriate for the application of the FHWA traffic noise prediction model used in this analysis. (23) Table 6-2 presents the time-of-day vehicle splits by vehicle type used to develop the 24-hour CNEL, and Table 6-3 presents the total traffic flow distributions (vehicle mixes) used for this analysis. The information in Tables 6-2 and 6-3 provides the hourly distribution percentages of automobile, medium trucks, and heavy trucks for input into the FHWA Model based on roadway types.

TABLE 6-2: 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] Typical Southern California time of day vehicle splits.
"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 6-3: DISTRIBUTION OF TRAFFIC FLOW BY VEHICLE TYPE (VEHICLE MIX)

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

[1] Typical Southern California vehicle mix.

The site plan is used to identify the relationship between the roadway centerline elevation, the pad elevation and the centerline distance to any intervening noise barriers, and the building façade. The exterior noise level impacts were placed five feet above the pad elevation at the proposed building façade for first-floor level analysis. Second through fifth floor receivers were place 9 feet above each floor level (i.e., 14 feet, 23 feet, 32 feet, etc.).

6.3 OFF-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

Table 6-4 identifies the eight off-site study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the City of Redlands General Plan Connected City Element, and the posted vehicle speeds. Consistent with the Traffic Analysis prepared by Urban Crossroads, Inc. for the State Street Village Project, (24) the off-site traffic noise analysis includes the following traffic scenarios.

- Existing
- Existing Plus Project (E+P)
- Cumulative Year 2025 (CY)
- Cumulative Year 2025 Plus Project (CY+P)

The average daily traffic (ADT) volumes used for this study are presented on Table 6-5. Table 6-2 and Table 6-3 provides the time of day (daytime, evening, and nighttime) vehicle splits used for calculating CNEL values.

TABLE 6-4: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	Receiving Land Use[1]	Classification[2]	Centerline Distance to Receiving Land Use (Feet)[3]	Vehicle Speed (mph)
1	Eureka St.	n/o Redlands Blvd.	Non-Sensitive	Minor Arterial	36'	35
2	Eureka St.	s/o Redlands Blvd.	Non-Sensitive	Minor Arterial	36'	35
3	Eureka St.	s/o Citrus Ave.	Sensitive	Minor Arterial	36'	25
4	Brookside Ave.	e/o Eureka St.	Non-Sensitive	Major Arterial	55'	35
5	Brookside Ave.	w/o Eureka St.	Sensitive	Major Arterial	55'	35
6	Brookside Ave.	e/o Center St.	Sensitive	Major Arterial	55'	35
7	Redlands Blvd.	w/o Eureka St.	Non-Sensitive	Boulevard	40'	35
8	Redlands Blvd.	e/o Eureka St.	Non-Sensitive	Boulevard	40'	35

[1] Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.
[2] City of Redlands General Plan Connected City Element.
[3] Based upon the right-of-way distances for each roadway classification provided in the General Plan Circulation Element.

TABLE 6-5: AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic Volumes[1]			
			Existing		Opening Year	
			Without Project	With Project	Without Project	With Project
1	Eureka St.	n/o Redlands Blvd.	12,994	14,741	14,629	16,376
2	Eureka St.	s/o Redlands Blvd.	10,874	13,223	11,999	14,348
3	Eureka St.	s/o Citrus Ave.	5,657	6,084	6,124	6,571
4	Brookside Ave.	e/o Eureka St.	13,785	16,115	15,095	17,425
5	Brookside Ave.	w/o Eureka St.	15,328	15,860	16,993	17,525
6	Brookside Ave.	e/o Center St.	13,254	13,778	14,439	14,963
7	Redlands Blvd.	w/o Eureka St.	19,986	20,532	22,835	23,381
8	Redlands Blvd.	e/o Eureka St.	19,876	21,026	22,380	23,530

[1] State Street Village Traffic Analysis, Urban Crossroads, Inc.

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7 ON-SITE TRANSPORTATION NOISE IMPACTS

An on-site exterior noise impact analysis has been completed to determine the noise exposure levels that would result from adjacent transportation noise sources in the Project study area, and to identify potential noise mitigation measures that would achieve acceptable Project exterior and interior noise levels. The primary source of transportation noise affecting the Project site is from Brookside Avenue and Eureka Street. The Project will also experience some background traffic noise from the Project's internal traffic movements, however, due to the low traffic volume/speed, traffic noise from these pathways will not make a significant contribution to the noise environment.

7.1 ON-SITE EXTERIOR NOISE ANALYSIS

Using the FHWA traffic noise prediction model and the parameters outlined in Tables 6-1 through 6-3, the expected future exterior noise levels are calculated for buildings facing Brookside Avenue and Eureka Street. Table 7-1 presents a summary of future exterior noise level impacts at the façade of each floor for each on-site receiver location shown on Exhibit 7-A. The on-site traffic noise level impacts indicate that noise levels at the Project buildings adjacent to Brookside Avenue and Eureka Street will experience unmitigated exterior noise levels of ranging from 64.4 to 67.3 dBA CNEL. The on-site traffic noise analysis calculations are provided in Appendix 7.1.

According to the *Land Use Compatibility for Community Noise Exposure* level shown on Exhibit 3-A, this noise analysis shows that the unmitigated exterior noise levels for the Project's multi-family residential land uses are considered *normally incompatible* with exterior noise levels ranging from 60 to 75 dBA CNEL. For *normally incompatible* noise levels, *new construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.* Noise levels at all restaurant locations are considered *clearly compatible* with noise levels below 75 dBA CNEL. Clearly compatible does not have any special noise requirements.

As the Project residential component would be exposed to noise levels considered *Normally Incompatible*, this noise analysis provides the following assessment of the interior noise reduction requirements to needed satisfy the City of Redlands 45 dBA CNEL interior noise level standard.

EXHIBIT 7-A: ON-SITE RECEIVER LOCATIONS



TABLE 7-1: EXTERIOR NOISE LEVELS (CNEL)

On-Site Receiver Location[1]	Roadway	Unmitigated Exterior Noise Level (dBA CNEL)[1]				
		1st Floor	2nd Floor	3rd Floor	4th Floor	5th Floor
Unit 1	Brookside Ave	66.2	65.9	65.6	65.1	64.6
Unit 2	Brookside Ave	66.2	65.9	65.6	65.1	64.6
Unit 3	Brookside Ave	66.2	--	65.6	65.1	--
Unit 4	Brookside Ave	66.2	65.9	65.6	65.1	64.6
Unit 5	Brookside Ave	66.2	65.9	65.6	65.1	64.6
Rest 1	Brookside Ave	66.2	--	--	--	--
Rest 2	Brookside Ave	66.2	--	--	--	--
Rest 2	Eureka St	67.3	--	--	--	--
Rest 3	Eureka St	67.3	--	--	--	--

"--" = No Unit, Rest = Restaurant

[1] See Exhibit 7-A for receiver locations.

[2] Exterior noise calculations at the building façade are shown in Appendix 7.1.

7.2 INTERIOR NOISE ANALYSIS

To ensure that the Project provides an acceptable interior noise environment, this analysis relies on the City of Redlands 45 dBA CNEL interior noise limit for new construction.

7.2.1 NOISE REDUCTION METHODOLOGY

The interior noise level is the difference between the predicted exterior noise level at the building façade and the noise reduction of the structure. Typical building construction will provide a Noise Reduction (NR) of approximately 12 dBA with "windows open" and a minimum 25 dBA noise reduction with "windows closed." (8) (25) However, sound leaks, cracks and openings within the window assembly can greatly diminish its effectiveness in reducing noise. Several methods are used to improve interior noise reduction, including: [1] weather-stripped solid core exterior doors; [2] upgraded dual glazed windows; [3] mechanical ventilation/air conditioning; and [4] exterior wall/roof assembles free of cut outs or openings.

7.2.2 INTERIOR NOISE LEVEL ASSESSMENT

Tables 7-2 to 7-6 show that all the residential units will require a windows-closed condition and a means of mechanical ventilation (e.g., air conditioning). Table 7-2 shows that the future noise levels at the first-floor building façade are estimated to range from 62.2 to 67.3 dBA CNEL. Based on standard construction, with windows in a closed position, the interior noise levels would range from 41.2 to 42.3 dBA CNEL. The ground floor interior noise level analysis shows that the State of California 50 dBA interior noise standards can be satisfied using standard windows with a standard STC rating of 27 for all non-residential spaces.

TABLE 7-2: GROUND FLOOR NON-RESIDENITAL INTERIOR TRAFFIC NOISE LEVELS

Receiver Location	Noise Level at Façade[1]	Required Interior NR[2]	Minimum Calculated Interior NR[3]	Upgraded Windows[4]	Interior Noise Level[5]	Threshold	Threshold Exceeded?
Rest 1	66.2	16.2	25.0	No	41.2	50	No
Rest 2	66.2	16.2	25.0	No	41.2	50	No
Rest 2	67.3	17.3	25.0	No	42.3	50	No
Rest 3	67.3	17.3	25.0	No	42.3	50	No

[1] Exterior noise level at the facade with a windows closed condition requiring a means of mechanical ventilation (e.g. air conditioning).
[2] Noise reduction required to satisfy the State of California interior noise standard for non-residential occupied spaces.
[3] Minimum calculated interior noise reduction from all rooms for each unit plan as shown on Table 7-1.
[4] Does the required interior noise reduction trigger upgraded windows with a minimum STC rating of greater than 27?
[5] Estimated interior noise level with minimum STC rating for all windows.
"NR" = Noise Reduction

Table 7-3 shows the future noise levels at the first-floor building façade are estimated to be 65.9 dBA CNEL with an interior noise level of 40.9 dBA CNEL. The second-floor interior noise level analysis shows that the City of Redlands 45 dBA CNEL interior noise standards can be satisfied using standard windows for all second-floor units, based on standard construction, with the windows in a closed position.

TABLE 7-3: FIRST FLOOR INTERIOR TRAFFIC NOISE LEVELS

Receiver Location	Noise Level at Façade[1]	Required Interior NR[2]	Minimum Calculated Interior NR[3]	Upgraded Windows[4]	Interior Noise Level[5]	Threshold	Threshold Exceeded?
Unit 1	65.9	20.9	25.0	No	40.9	45	No
Unit 2	65.9	20.9	25.0	No	40.9	45	No
Unit 4	65.9	20.9	25.0	No	40.9	45	No
Unit 5	65.9	20.9	25.0	No	40.9	45	No

[1] Exterior noise level at the facade with a windows closed condition requiring a means of mechanical ventilation (e.g. air conditioning).
[2] Noise reduction required to satisfy the City of Redlands General Plan 45 dBA CNEL interior noise standard for residential uses.
[3] Minimum calculated interior noise reduction from all rooms for each unit plan as shown on Table 7-1.
[4] Does the required interior noise reduction trigger upgraded windows with a minimum STC rating of greater than 27?
[5] Estimated interior noise level with minimum STC rating for all windows.
"NR" = Noise Reduction

Table 7-4 shows the future noise levels at the secondd-floor building façade are estimated to 65.6 dBA CNEL with an interior noise level of 40.6 dBA CNEL. The third-floor interior noise level analysis shows that the City of Redlands 45 dBA CNEL interior noise standards can be satisfied using standard windows for all third-floor units, based on standard construction, with the windows in a closed position.

TABLE 7-4: SECOND FLOOR INTERIOR TRAFFIC NOISE LEVELS

Receiver Location	Noise Level at Façade[1]	Required Interior NR[2]	Minimum Calculated Interior NR[3]	Upgraded Windows[4]	Interior Noise Level[5]	Threshold	Threshold Exceeded?
Unit 1	65.6	20.6	25.0	No	40.6	45	No
Unit 2	65.6	20.6	25.0	No	40.6	45	No
Unit 3	65.6	20.6	25.0	No	40.6	45	No
Unit 4	65.6	20.6	25.0	No	40.6	45	No
Unit 5	65.6	20.6	25.0	No	40.6	45	No

[1] Exterior noise level at the facade with a windows closed condition requiring a means of mechanical ventilation (e.g. air conditioning).
[2] Noise reduction required to satisfy the City of Redlands General Plan 45 dBA CNEL interior noise standard for residential uses.
[3] Minimum calculated interior noise reduction from all rooms for each unit plan as shown on Table 8-2.
[4] Does the required interior noise reduction trigger upgraded windows with a minimum STC rating of greater than 27?
[5] Estimated interior noise level with minimum STC rating for all windows.
"NR" = Noise Reduction

Table 7-5 shows the future noise levels at the third-floor building façade are estimated to be 65.1 dBA CNEL with an interior noise level of 40.1 dBA CNEL. The fourth-floor interior noise level analysis shows that the City of Redlands 45 dBA CNEL interior noise standards can be satisfied using standard windows for all fourth-floor units, based on standard construction, with the windows in a closed position.

TABLE 7-5: THIRD FLOOR INTERIOR TRAFFIC NOISE LEVELS

Receiver Location	Noise Level at Façade[1]	Required Interior NR[2]	Minimum Calculated Interior NR[3]	Upgraded Windows[4]	Interior Noise Level[5]	Threshold	Threshold Exceeded?
Unit 1	65.1	20.1	25.0	No	40.1	45	No
Unit 2	65.1	20.1	25.0	No	40.1	45	No
Unit 3	65.1	20.1	25.0	No	40.1	45	No
Unit 4	65.1	20.1	25.0	No	40.1	45	No
Unit 5	65.1	20.1	25.0	No	40.1	45	No

[1] Exterior noise level at the facade with a windows closed condition requiring a means of mechanical ventilation (e.g. air conditioning).
[2] Noise reduction required to satisfy the City of Redlands General Plan 45 dBA CNEL interior noise standard for residential uses.
[3] Minimum calculated interior noise reduction from all rooms for each unit plan as shown on Table 8-2.
[4] Does the required interior noise reduction trigger upgraded windows with a minimum STC rating of greater than 27?
[5] Estimated interior noise level with minimum STC rating for all windows.
"NR" = Noise Reduction

Table 7-6 shows the future noise levels at the fourth-floor building façade are estimated to range be 64.6 dBA CNEL with an interior noise level 39.6 dBA CNEL. The fifth-floor interior noise level analysis shows that the City of Redlands 45 dBA CNEL interior noise standards can be satisfied using standard windows for all fifth-floor units, based on standard construction, with the windows in a closed position.

TABLE 7-6: FOURTH FLOOR INTERIOR TRAFFIC NOISE LEVELS

Receiver Location	Noise Level at Façade[1]	Required Interior NR[2]	Minimum Calculated Interior NR[3]	Upgraded Windows[4]	Interior Noise Level[5]	Threshold	Threshold Exceeded?
Unit 1	64.6	19.6	25.0	No	39.6	45	No
Unit 2	64.6	19.6	25.0	No	39.6	45	No
Unit 4	64.6	19.6	25.0	No	39.6	45	No
Unit 5	64.6	19.6	25.0	No	39.6	45	No

[1] Exterior noise level at the facade with a windows closed condition requiring a means of mechanical ventilation (e.g. air conditioning).
[2] Noise reduction required to satisfy the City of Redlands General Plan 45 dBA CNEL interior noise standard for residential uses.
[3] Minimum calculated interior noise reduction from all rooms for each unit plan as shown on Table 7-1.
[4] Does the required interior noise reduction trigger upgraded windows with a minimum STC rating of greater than 27?
[5] Estimated interior noise level with minimum STC rating for all windows.
"NR" = Noise Reduction

8 OFF-SITE TRANSPORTATION NOISE IMPACTS

To assess the off-site transportation CNEL noise level impacts associated with development of the proposed Project, noise contours were developed based on the traffic impact analysis prepared for the in *State Street Traffic Impact Analysis* and the *VMT Screening Analysis for the City Center Project* (2) (3). Trips generated by the Project were added to the volumes presented in that traffic study with 100 percent of the Project's traffic volume (1,751) added to Eureka Street north of Citrus Avenue, 50 percent of the total Project's traffic was assigned to Brookside Avenue, and 25 percent was assigned to all other roadways. Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway. Noise contours were developed for the following traffic scenarios:

- Existing Conditions Without Project: This scenario refers to the existing present-day noise conditions without the proposed Project.
    1. Existing With Project: This scenario refers to the existing present-day noise conditions with the proposed Project.
- Cumulative Year 2025 Without the Project: This scenario refers to Year 2025 cumulative noise conditions without the proposed Project.
    1. Cumulative Year 2025 Year With Project: This scenario includes all cumulative projects identified in the *State Street Traffic Impact Analysis*.

8.1 TRAFFIC NOISE CONTOURS

Noise contours were used to assess the Project's incremental traffic-related noise impacts at land uses adjacent to roadways conveying Project traffic. The noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70, 65, and 60 dBA noise levels. The noise contours do not consider the effect of any existing noise barriers or topography that may attenuate ambient noise levels. In addition, because the noise contours reflect modeling of vehicular noise on area roadways, they appropriately do not reflect noise contributions from the surrounding stationary noise sources within the Project study area. Tables 8-1 and 8-4 present a summary of the exterior traffic noise levels, without barrier attenuation, for the eight study area roadway segments analyzed from the without Project to the with Project conditions for Existing and Cumulative Year 2025 conditions. Appendix 8.1 includes a summary of the traffic noise level contours for each of the traffic scenarios.

TABLE 8-1: EXISTING WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	CNEL at Nearest Receiving Land Use (dBA)[1]	Distance to Contour from Centerline (Feet)		
				70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Eureka St.	n/o Redlands Blvd.	67.4	RW	52	112
2	Eureka St.	s/o Redlands Blvd.	66.6	RW	46	99
3	Eureka St.	s/o Citrus Ave.	60.1	RW	RW	37
4	Brookside Ave.	e/o Eureka St.	65.3	RW	58	125
5	Brookside Ave.	w/o Eureka St.	65.8	RW	62	134
6	Brookside Ave.	e/o Center St.	65.2	RW	57	122
7	Redlands Blvd.	w/o Eureka St.	69.6	RW	81	176
8	Redlands Blvd.	e/o Eureka St.	69.6	RW	81	175

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 8-2: EXISTING WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	CNEL at Nearest Receiving Land Use (dBA)[1]	Distance to Contour from Centerline (Feet)		
				70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Eureka St.	n/o Redlands Blvd.	67.9	RW	56	122
2	Eureka St.	s/o Redlands Blvd.	67.5	RW	53	113
3	Eureka St.	s/o Citrus Ave.	60.5	RW	RW	39
4	Brookside Ave.	e/o Eureka St.	66.0	RW	64	139
5	Brookside Ave.	w/o Eureka St.	66.0	RW	64	137
6	Brookside Ave.	e/o Center St.	65.3	RW	58	125
7	Redlands Blvd.	w/o Eureka St.	69.8	RW	83	179
8	Redlands Blvd.	e/o Eureka St.	69.9	RW	84	182

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 8-3: CUMULATIVE YEAR 2025 WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	CNEL at Nearest Receiving Land Use (dBA)[1]	Distance to Contour from Centerline (Feet)		
				70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Eureka St.	n/o Redlands Blvd.	67.9	RW	56	121
2	Eureka St.	s/o Redlands Blvd.	67.0	RW	49	106
3	Eureka St.	s/o Citrus Ave.	60.5	RW	RW	39
4	Brookside Ave.	e/o Eureka St.	65.7	RW	62	133
5	Brookside Ave.	w/o Eureka St.	66.3	RW	67	144
6	Brookside Ave.	e/o Center St.	65.6	RW	60	129
7	Redlands Blvd.	w/o Eureka St.	70.2	41	89	192
8	Redlands Blvd.	e/o Eureka St.	70.1	41	88	189

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 8-4: CUMULATIVE YEAR 2025 WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	CNEL at Nearest Receiving Land Use (dBA)[1]	Distance to Contour from Centerline (Feet)		
				70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Eureka St.	n/o Redlands Blvd.	68.4	RW	61	131
2	Eureka St.	s/o Redlands Blvd.	67.8	RW	55	120
3	Eureka St.	s/o Citrus Ave.	60.8	RW	RW	41
4	Brookside Ave.	e/o Eureka St.	66.4	RW	68	146
5	Brookside Ave.	w/o Eureka St.	66.4	RW	68	147
6	Brookside Ave.	e/o Center St.	65.7	RW	61	132
7	Redlands Blvd.	w/o Eureka St.	70.3	42	90	195
8	Redlands Blvd.	e/o Eureka St.	70.3	42	91	196

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

8.2 EXISTING PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

An analysis of Existing traffic noise levels plus traffic noise generated by the proposed Project has been included in this report. However, the analysis of existing 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 Year 2025 cumulative conditions.

Table 8-1 shows the Existing without Project conditions CNEL noise levels. The Existing without Project exterior noise levels are expected to range from 60.1 to 67.4 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 8-2 shows the Existing with Project conditions range from 60.5 to 67.9 dBA CNEL. Table 8-5 shows that the Project off-site traffic noise level increases range from 0.4 to 0.9 dBA CNEL on the study area roadway segments.

8.3 YEAR 2025 CUMULATIVE PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 8-3 presents the Year 2021 Cumulative without Project conditions CNEL noise levels. The Year 2025 Cumulative without Project exterior noise levels are expected to range from 60.5 to 67.9 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography.

Table 8-4 shows the Year 2025 Cumulative with Project conditions range from 60.8 to 68.4 dBA CNEL. Table 8-6 shows that the Project off-site traffic noise level increases range from 0.3 to 0.8 dBA CNEL. Based on the significance criteria for off-site traffic noise, land uses adjacent to the study area roadway segments would experience *less than significant* noise level impacts due to unmitigated Project-related traffic noise levels.

TABLE 8-5: EXISTING WITH PROJECT TRAFFIC NOISE LEVEL INCREASES

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]			Incremental Noise Level Increase Threshold[3]	
				No Project	With Project	Project Addition	Limit	Exceeded?
1	Eureka St.	n/o Redlands Blvd.	Non-Sensitive	67.4	67.9	0.5	5.0	No
2	Eureka St.	s/o Redlands Blvd.	Non-Sensitive	66.6	67.5	0.9	5.0	No
3	Eureka St.	s/o Citrus Ave.	Sensitive	60.1	60.5	0.4	3.0	No
4	Brookside Ave.	e/o Eureka St.	Non-Sensitive	65.3	66.0	0.7	5.0	No
5	Brookside Ave.	w/o Eureka St.	Sensitive	65.8	66.0	0.2	1.5	No
6	Brookside Ave.	e/o Center St.	Sensitive	65.2	65.3	0.1	1.5	No
7	Redlands Blvd.	w/o Eureka St.	Non-Sensitive	69.6	69.8	0.2	5.0	No
8	Redlands Blvd.	e/o Eureka St.	Non-Sensitive	69.6	69.9	0.3	5.0	No

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

TABLE 8-6: CUMULATIVE YEAR 2025 WITH PROJECT TRAFFIC NOISE LEVEL INCREASES

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]			Noise-Sensitive Land Use?	Incremental Noise Level Increase Threshold[3]	
				No Project	With Project	Project Addition		Limit	Exceeded?
1	Eureka St.	n/o Redlands Blvd.	Non-Sensitive	67.9	68.4	0.5	No	5.0	No
2	Eureka St.	s/o Redlands Blvd.	Non-Sensitive	67.0	67.8	0.8	No	5.0	No
3	Eureka St.	s/o Citrus Ave.	Sensitive	60.5	60.8	0.3	Yes	3.0	No
4	Brookside Ave.	e/o Eureka St.	Non-Sensitive	65.7	66.4	0.7	No	5.0	No
5	Brookside Ave.	w/o Eureka St.	Sensitive	66.3	66.4	0.1	Yes	1.5	No
6	Brookside Ave.	e/o Center St.	Sensitive	65.6	65.7	0.1	Yes	1.5	No
7	Redlands Blvd.	w/o Eureka St.	Non-Sensitive	70.2	70.3	0.1	No	3.0	No
8	Redlands Blvd.	e/o Eureka St.	Non-Sensitive	70.1	70.3	0.2	No	3.0	No

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

9 SENSITIVE RECEIVER LOCATIONS

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

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

R1: Location R1 represents existing noise sensitive residence at 321 West State Street, approximately 71 feet north of the Project site. Since there are no private outdoor living areas (backyards) facing the Project site, receiver R1 is placed at the building façade. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents the existing noise sensitive residence at 124 West Vine Street, approximately 370 feet southeast of the Project site. Receiver R2 is placed at the private outdoor living areas (backyards) 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 Cortner Chapel at 221 Brookside Avenue, approximately 135 feet south of the Project site. Since there are no private outdoor living areas (backyards) facing the Project site, receiver R3 is placed at the building façade. A 24-hour noise measurement was taken near this location, L3, to describe the existing ambient noise environment.

R4: Location R4 represents the existing noise sensitive residence at 11204 Lilac Avenue, approximately 11 feet west of the Project site. Receiver R4 is placed at the private outdoor living areas (backyards) facing the Project site. A 24-hour noise measurement was taken near this location, L4, to describe the existing ambient noise environment.

EXHIBIT 9-A: RECEIVER LOCATIONS



10 OPERATIONAL NOISE IMPACTS

This section analyzes the potential stationary-source operational noise impacts at the nearest receiver locations, identified in Section 9, resulting from the operation of the proposed City Center Project.

10.1 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. The proposed mixed-use development is not expected to include any specific type of operational noise levels beyond the typical noise sources associated with residential and retail commercial land uses in the Project study area. However, to present a conservative approach, on-site Project-only operational noise sources are analyzed in this noise study and are expected to include: outdoor gatherings, mechanical ventilation, swimming pool and spa activities, trash enclosure activity, and parking lot activity.

OUTDOOR GATHERINGS

To describe the outdoor activity areas, a reference noise level measurement was taken. At 50 feet, the reference noise level is 62.9 dBA Leq at a noise source height of 5 feet. The reference noise level measurement includes outdoor eating, drinking, with laughing and talking with background music etc. collected by Urban Crossroads, Inc. The outdoor activity is expected to be limited to the daytime hours of 7:00 a.m. to 10:00 p.m.

SWIMMING POOLS AND SPA ACTIVITY

To represent the noise levels associated with pool activities, Urban Crossroads collected a reference noise level measurement at an existing outdoor pool and spa. The measured reference noise level at the uniform 50-foot reference distance is 54.7 dBA Leq for pool activity. The pool activity noise levels include kids playing, running, screaming, splashing, playing with a ball, and parents talking. Noise associated with pool activities is expected to occur for the entire hour (60 minutes).

ROOF-TOP AIR CONDITIONING UNITS

To assess the noise levels created by the roof-top air conditioning units, reference noise levels were taken from equipment specifications for a commercial 6-ton roof-top packaged air conditioning unit (VRV-IV Heat Recovery Unit REYQ272TTJU) and a 3-ton residential packaged air conditioning unit (Carrier 48VGB24). Twenty-one 6-ton units were used on the proposed restaurants. Sixty-three points representing 313 3-ton units (939 tons of cooling) were modeled for the land uses on Site A. The roof-top air conditioning units were modeled as operating 45 minutes per hour during the daytime and 30 minutes during the nighttime. For this noise analysis, the air conditioning units are expected to be located on the roof of the proposed buildings. The roof-top air conditioning units are anticipated to be located 3 feet above the roof.

At a uniform reference distance of 50 feet, the 6-ton units would generate a reference noise level of 47.4 dBA L_{eq} and the 3-ton units would generate a reference noise level of 44.4 dBA L_{eq}.

TRASH ENCLOSURE ACTIVITY

To describe the noise levels associated with a trash enclosure, Urban Crossroads collected a reference noise level measurement on May 3rd, 2018, at an existing commercial and office park trash enclosure within a parking lot on the northeast corner of Baker Street and Red Hill Avenue. The measured reference noise level at the uniform 50-foot reference distance is 48.0 dBA L_{eq} for the trash enclosure activity. The trash enclosure activity noise levels include two metal gates opening and closing, the metal gates scraping against a concrete floor, dumpster movement on metal wheels, trash dropping into the metal dumpster, and background parking lot vehicle movements. Noise associated with trash enclosure activities is expected to occur for 60 minutes per hour to represent worst-case conditions.

PARKING LOT/GARAGE ACTIVITY

To determine the noise levels associated with parking lot vehicle movements, Urban Crossroads collected reference noise level measurements over a 24-hour period on May 17th, 2017, at the parking lot for the Panasonic Avionics Corporation in the City of Lake Forest. The peak hour of activity measured over the 24-hour noise level measurement period occurred between 12:00 p.m. to 1:00 p.m., or the typical lunch hour for employees working in the area. The measured reference noise level at 50 feet from parking lot vehicle movements was measured at 44.7 dBA L_{eq}. The parking lot noise levels are mainly due to cars pulling in and out of spaces during peak lunch hour activity and employees talking. Noise associated with parking lot vehicle movements is expected to operate for the entire hour (60 minutes).

10.2 REFERENCE NOISE LEVELS

To estimate the 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. 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 reference project operational noise levels are based on the Project related noise sources shown on Exhibit 10-A. The reference Project operational sound power levels are summarized in Table 10-1.

TABLE 10-1: REFERENCE NOISE LEVELS

Noise Source[1]	Noise Source Height (Feet)	Source Type	Min./Hour[2]		Reference Noise Level (dBA L_{eq}) @ 50 Feet	Sound Power Level (dBA)[3]
			Day	Night		
Outdoor Gatherings	5'	Point	60	30	62.9	94.5
Swimming Pool and Spa	5'	Point	60	30	54.7	94.6
6-Ton AC	3'	Point	60	60	47.4	79.0
3-ton AC	3'	Point	60	60	44.4	76.0
Trash Enclosure Activity	8'	Point	10	10	48.0	89.0
Parking Lot Activities	3'	Area	60	30	44.7	91.4

[1] As measured by Urban Crossroads, Inc.

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

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

10.3 CADNAA NOISE PREDICTION MODEL

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

Using the ISO 9613 protocol, CadnaA will calculate the distance from each noise source to the noise receiver locations, using the ground absorption, distance, and barrier/building attenuation inputs to provide a summary of noise level at each receiver and the partial noise level contributions by noise source. Consistent with the ISO 9613 protocol, the CadnaA noise prediction model relies on the reference sound power level (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 noise analysis to account for mixed ground representing a combination of hard and soft surfaces. Appendix 10.1 includes the detailed noise model inputs used to estimate the Project operational noise levels presented in this section.

EXHIBIT 10-A: OPERATIONAL NOISE SOURCE LOCATIONS



10.4 PROJECT OPERATIONAL NOISE LEVELS

Using the reference noise levels to represent the proposed Project operations that include outdoor gatherings, swimming pool and spa use, trash enclosure activity, air conditioning, and parking lot activity, 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 sensitive receiver locations. Table 10-2 shows the Project operational daytime noise levels. The hourly noise levels at the off-site receiver locations are expected to range from 38.5 to 43.6 dBA L_{eq}. Appendix 10.1 includes the detailed noise model inputs used to estimate the Project operational noise levels presented in this section.

TABLE 10-2: PROJECT DAYTIME OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA L_{eq})			
	R1	R2	R3	R4
Gathering Areas	34.2	31.3	32.8	23.1
Pool and Spas	25.5	19.3	25.2	33.5
Air Conditioning	39.5	37.3	41.2	43.1
Trash Enclosure Activity	37.6	25.2	27.2	6.7
Parking Lot Activity	23.8	5.7	14.2	16.1
Total (All Noise Sources)	**42.5**	**38.5**	**42.0**	**43.6**

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

Tables 10-3 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 off-site receiver locations are expected to range from 37.1 to 42.4 dBA L_{eq}. The differences between the daytime and nighttime noise levels is largely related to the duration of noise activity (Table 10-1). Appendix 10.1 includes the detailed noise model inputs including the existing perimeter walls used to estimate the Project operational noise levels presented in this section.

TABLE 10-3: PROJECT NIGHTTIME OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA L_{eq})			
	R1	R2	R3	R4
Gathering Areas	30.2	27.3	28.8	19.2
Swimming Pool and Spas	21.5	15.3	21.3	29.5
Air Conditioning	38.5	36.3	40.3	42.1
Trash Enclosure Activity	36.6	24.2	26.2	5.7
Parking Lot /Garage	19.8	1.7	10.3	12.1
Total (All Noise Sources)	**41.1**	**37.1**	**40.8**	**42.4**

[1] See Exhibit 9-A for the noise source locations. CadnaA noise model calculations are included in Appendix 10.1.

10.5 PROJECT OPERATIONAL NOISE LEVEL COMPLIANCE

Tables 10-4 shows the Project operational noise levels during the daytime and nighttime hours. The daytime hourly noise levels at the off-site receiver locations are expected to range from 38.5 to 43.6 dBA L_{eq}. The nighttime hourly noise levels at the off-site receiver locations are expected to range from 37.1 to 42.4 dBA L_{eq}. The differences between the daytime and nighttime noise levels are largely related to the duration of noise activity. Appendix 10.1 includes the detailed noise model inputs used to estimate the Project operational noise levels presented in this section.

TABLE 10-4: OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	Project Operational Noise Levels (dBA Leq)[2]		Noise Level Standards (dBA Leq)[3]		Noise Level Standards Exceeded?[4]	
	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
R1	42.5	41.1	60	55	No	No
R2	38.5	37.1	60	55	No	No
R3	42.0	40.8	60	55	No	No
R4	43.6	42.4	60	55	No	No

[1] See Exhibit 9-A for the receiver locations.
[2] Proposed Project operational noise levels as shown on Table 10-1.
[3] City of Redlands Municipal Code, Section 8.06.070 (Appendix 3.1)
[4] Do the estimated Project operational noise source activities exceed the noise level standards?
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

10.6 PROJECT OPERATIONAL NOISE LEVEL INCREASES

To describe the Project operational noise level increases, the Project operational noise levels are combined with the existing ambient noise levels measurements for the nearest receiver locations potentially impacted by Project operational noise sources. Since the units used to measure noise, decibels (dB), are logarithmic units, the Project-operational and existing ambient noise levels cannot be combined using standard arithmetic equations. (6) 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 10-2 and 10-3, respectively.

As indicated on Tables 10-5 and 10-6, the Project will generate an unmitigated daytime and nighttime operational noise level increases ranging from 0.0 to 0.8 dBA L_{eq} at the nearest receiver locations. In effect, the amount to which a given noise level increase is considered acceptable is

reduced based on existing ambient noise conditions. Based on the significance criteria presented in Section 4.2, the Project-related operational noise level increases will satisfy the operational noise level increase criteria at the nearest sensitive receiver locations and the impact will be *less than significant.*

TABLE 10-5: DAYTIME PROJECT OPERATIONAL NOISE LEVEL INCREASES

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Increase Criteria	Increase Criteria Exceeded?
R1	42.5	L1	49.3	50.1	0.8	5.0	No
R2	38.5	L2	58.8	58.8	0.0	5.0	No
R3	42.0	L2	58.8	58.9	0.1	5.0	No
R4	43.6	L3	55.3	55.6	0.3	5.0	No

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

TABLE 10-6: NIGHTTIME OPERATIONAL NOISE LEVEL INCREASES

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Increase Criteria	Increase Criteria Exceeded?
R1	41.1	L1	48.0	48.8	0.8	5.0	No
R2	37.1	L2	59.4	59.4	0.0	5.0	No
R3	40.8	L2	59.4	59.5	0.1	5.0	No
R4	42.4	L3	53.8	54.1	0.3	5.0	No

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

11 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 nearby sensitive receiver locations previously described in Section 9.

11.1 CONSTRUCTION NOISE LEVELS

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

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

11.2 CONSTRUCTION REFERENCE NOISE LEVELS

To describe peak construction noise activities, this construction noise analysis was prepared using reference noise level measurements published in the Update of Noise Database for Prediction of Noise on Construction and Open Sites by the Department for Environment, Food and Rural Affairs (DEFRA). (26). The DEFRA database provides the most recent and comprehensive source of reference construction noise levels. Table 11-1 provides a summary of the DEFRA construction reference noise level measurements expressed in hourly average dBA L_{eq} using the estimated FHWA Roadway Construction Noise Model (RCNM) usage factors (27) to describe the typical construction activities for each stage of Project construction.

EXHIBIT 11-A: TYPICAL CONSTRUCTION NOISE SOURCE LOCATIONS



TABLE 11-1: CONSTRUCTION REFERENCE NOISE LEVELS

Construction Stage	Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})	Highest Reference Noise Level (dBA L_{eq})
Site Preparation	Crawler Tractors	77	77
	Hauling Trucks	71	
	Rubber Tired Dozers	71	
Grading	Graders	79	79
	Excavators	64	
	Compactors	67	
Building Construction	Cranes	67	72
	Tractors	72	
	Welders	65	
Paving	Pavers	70	70
	Paving Equipment	69	
	Rollers	69	
Architectural Coating	Cranes	67	67
	Air Compressors	67	
	Generator Sets	67	

[1] Update of noise database for prediction of noise on construction and open site expressed in hourly average L_{eq} based on estimated usage factor.

11.3 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. To assess the worst-case construction noise levels, the Project construction noise analysis relies on the highest noise level impacts when the equipment with the highest reference noise level is operating at the closest point from the edge of primary construction activity (Project site boundary) to each receiver location. As shown on Table 11-2, the highest construction noise levels are expected to range from 61.5 to 76.1 dBA L_{eq} at the nearest receiver locations. Appendix 11.1 includes the detailed CadnaA construction noise model inputs.

The construction noise analysis presents a conservative approach with the highest noise-level-producing equipment for each stage of Project construction operating at the closest point from primary construction activity to the nearby sensitive receiver locations. This scenario is unlikely to occur during typical construction activities and likely overstates the construction noise levels which will be experienced at each receiver location.

TABLE 11-2: CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})					
	Site Preparation	Grading	Building Construction	Paving	Architectural Coating	Highest Levels[2]
R1	69.1	71.1	64.1	62.1	59.1	71.1
R2	59.5	61.5	54.5	52.5	49.5	61.5
R3	65.9	67.9	60.9	58.9	55.9	67.9
R4	74.1	76.1	69.1	67.1	64.1	76.1

[1] Construction noise source and receiver locations are shown on Exhibit 11-A.
[2] Construction noise level calculations based on distance from the project site boundaries (construction activity area) to nearby receiver locations. CadnaA construction noise model inputs are included in Appendix 11.1.

11.4 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 85 dBA L_{eq} is used as a reasonable threshold to assess the daytime construction noise level impacts. The construction noise analysis shows that the noise levels at the nearest receiver locations will satisfy the reasonable daytime 85 dBA L_{eq} significance threshold during Project construction activities, as shown on Table 11-3. Therefore, the noise impacts due to Project construction noise are considered *less than significant* at all receiver locations.

TABLE 11-3: CONSTRUCTION NOISE LEVEL COMPLIANCE

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})		
	Highest Construction Noise Levels[2]	Threshold[3]	Threshold Exceeded?[4]
R1	71.1	85	No
R2	61.5	85	No
R3	67.9	85	No
R4	76.1	85	No

[1] Noise receiver locations are shown on Exhibit 11-A.
[2] Highest construction noise level operating at the Project site boundary to nearby receiver locations (Table 11-2).
[3] Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual.
[4] Do the estimated Project construction noise levels exceed the construction noise level threshold?

11.5 CONSTRUCTION VIBRATION IMPACTS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. Ground-borne vibration levels resulting from typical construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration (FTA). (11) However, while vehicular traffic is rarely perceptible, construction has

the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Ground vibration levels associated with various types of construction equipment are summarized on Table 11-4. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the potential Project construction vibration levels using the following vibration assessment methods defined by the FTA. To describe the human response (annoyance) associated with vibration impacts the FTA provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

TABLE 11-4: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

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

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

Using the vibration source level of construction equipment provided on Table 11-4 and the construction vibration assessment methodology published by the FTA, it is possible to estimate the Project vibration impacts. Table 10-5 presents the expected Project related vibration levels at the nearby receiver locations. At distances ranging from 11 to 370 feet from the Project construction activities, construction vibration velocity levels are estimated to range from 0.000 to 0.30 in/sec PPV. Based on maximum acceptable continuous vibration threshold of 0.040 PPV (in/sec), the typical Project construction vibration levels will exceed the vibration thresholds at R4, which represents the residential Properties southwest of the Project site. As shown in Table 11-5, smaller dozer would result in 0.01 PPV in/sec, which would not exceed the vibration limit. Therefore, the Project-related vibration impacts associated with larger equipment, i.e., over 80,000 pounds, are considered *significant* without mitigation.

Therefore, MM Noise-1 is recommended to be included in Project construction plans to limit the equipment that would operate along the southwestern property line. With implementation of MM Noise-1, vibration level would be reduced to *less than significant.*

MM Noise-1: Large loaded trucks and dozers (greater than or equal to 80,000 pounds) (5) shall not be used within 30 feet of the southwest Property line, as shown on Exhibit ES-A. Instead, smaller, rubber-tired bulldozers (less than 80,000 pounds) shall be used within this area during Project construction to reduce vibration effects.

TABLE 11-5: PROJECT CONSTRUCTION VIBRATION LEVELS, UNMITIGATED

Receiver 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	Highest Vibration Level		
R1	71'	0.001	0.007	0.016	0.019	0.019	0.04	No
R2	370'	0.000	0.001	0.001	0.002	0.002	0.04	No
R3	135'	0.000	0.003	0.006	0.007	0.007	0.04	No
R4	11'	0.010	0.120	0.260	0.305	0.305	0.04	**Yes**

[1] Construction receiver locations are shown on Exhibit 11-A.
[2] Distance from receiver location to Project construction boundary.
[3] Based on the Vibration Source Levels of Construction Equipment (Table 11-4).
[4] City of Redlands Municipal Code Section 8.06.020
[5] Does the peak vibration exceed the acceptable vibration thresholds?
"PPV" = Peak Particle Velocity

12 REFERENCES

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10. **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.
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19. **Federal Interagency Committee on Noise.** *Federal Agency Review of Selected Airport Noise Analysis Issues.* August 1992.
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21. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.

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

24. **Urban Crossroads, Inc.** *Tentative Parcel Map 2015-06 Traffic Impact Analysis.* October 2019.

25. **California Department of Transportation.** *Traffic Noise Analysis Protocol.* May 2011.

26. **Department of Environment, Food and Rural Affiars (Defra).** *Update of Noise Database for Prediction of Noise on Construction and Open Sites.* 2004.

27. **FHWA.** *Roadway Construction Noise Model.* January 2006.

13 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed City Center Project. The information contained in this noise study report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (619) 788-1971.

William Maddux
Senior Associate
URBAN CROSSROADS, INC.
(619) 788-1971
bmaddux@urbanxroads.com

EDUCATION

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

PROFESSIONAL AFFILIATIONS

ASA – Acoustical Society of America
APA – American Planning Association
AWMA – Air and Waste Management Association

PROFESSIONAL CERTIFICATIONS

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

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APPENDIX 3.1:

CITY OF REDLANDS MUNICIPAL CODE

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CHAPTER 8.06

COMMUNITY NOISE CONTROL

SECTION:

8.06.010: Purpose

8.06.020: Definitions

8.06.030: General Noise Regulations

8.06.040: Enforcement Authority

8.06.050: Noise Measurement Procedure

8.06.060: Noise Measurement Methodology

8.06.070: Exterior Noise Limits

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8.06.090: Noise Disturbances Prohibited

8.06.100: Residential Air Conditioning Or Air Handling Equipment

8.06.110: Tampering

8.06.120: Exemptions

8.06.130: Preexisting Noise Sources

8.06.140: Violation; Penalty

8.06.010: PURPOSE:
The purpose of this chapter is to implement the noise control provisions of the Redlands general plan by establishing comprehensive regulations for the control of noise within the city. (Ord. 2579 § 1, 2004)

8.06.020: DEFINITIONS:
The following words and phrases shall have the meanings set out in this section. All terminology used in this chapter, not defined below, shall be in conformance with applicable publications of the American National Standards Institute (ANSI) or its successor body.

A-WEIGHTED SOUND LEVEL: The sound level in decibels as measured on a sound level meter using the A-weighting network. The level so read is designated dBA.

AMBIENT NOISE LEVEL: The all encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding the alleged offensive noise, at the location and approximate time at which a comparison with the alleged offensive noise is to be made.

COMMERCIAL: Generally consisting of uses permitted in the commercial zones as set forth in title 18 of this code or adopted specific plans.

CONSTRUCTION: Any site preparation, grading, assembly, erection, substantial repair, alteration and related material handling and disposition, or similar activity, for or on public or private rights of way, structures, utilities or public or private property.

CUMULATIVE PERIOD: An additive period of time composed of individual time segments that may be continuous or interrupted.

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

DEMOLITION: Any dismantling, intentional destruction or removal of structures, utilities, public or private right of way surfaces or similar improvements on public or private property.

EMERGENCY WORK: Any work performed for the purpose of preventing or alleviating the physical trauma or property damage which requires immediate mitigation.

FIXED NOISE SOURCE: A stationary device which creates sounds while fixed or motionless including, but not limited to, residential, agricultural, industrial and commercial machinery and equipment, pumps, fans, compressors, air conditioners or refrigeration equipment.

INDUSTRIAL: Generally consisting of uses permitted in the industrial zones as set forth in title 18 of this code or adopted specific plans.

LICENSED: The possession of a license or a permit issued by the appropriate jurisdictional authority; or, where no permits or licenses are issued, the sanctioning of the activity by the jurisdiction as noted in public record.

MOBILE NOISE SOURCE: Any noise source other than a fixed noise source.

MOTOR VEHICLE: Shall include any and all self-propelled vehicles as defined in the California Vehicle Code.

MUFFLER OR SOUND DISSIPATIVE DEVICE: A device consisting of a series of chambers or baffle plates, or other mechanical design, for the purpose of receiving exhaust gas from an internal combustion engine and effective in reducing noise.

NOISE CONTROL OFFICER ("NCO"): The code enforcement division of the city or such other employees of the city so designated by the city manager to enforce this chapter.

NOISE DISTURBANCE: Any sound not in compliance with the quantitative standards as listed herein which either:

A. Endangers or injures the safety or health of human beings or animals;

B. Annoys or disturbs reasonable persons of normal sensitivities;

C. Endangers or injures personal or real property; or

D. Violates section 8.06.030 or 8.06.090 of this chapter.

NOISE SENSITIVE ZONE: Any area designated as such pursuant to this chapter for the purpose of ensuring exceptional quiet.

NOISE ZONE: Any defined areas or regions of a generally consistent land use wherein the ambient noise levels are within a range of five (5) dB.

PERSON: Any individual, association, partnership or corporation, and includes any officer, employee, department, agency or instrumentality of a state or any political subdivision of a state.

POWERED MODEL VEHICLE: Any self-propelled, airborne, waterborne or landborne plane, vessel or vehicle which is not designed to carry persons including, but not limited to, any model airplane, boat, car or rocket.

PUBLIC RIGHT OF WAY: Any street, avenue, boulevard, highway, sidewalk, alley or similar place owned or controlled by a governmental entity.

PUBLIC SPACE: Any real property or structure thereon which is owned or controlled by a governmental entity.

RESIDENTIAL: Generally consisting of uses as permitted in the residential zones as set forth in title 18 of this code or adopted specific plans.

SOUND AMPLIFYING EQUIPMENT: Any device for the amplification of the human voice, music or any other sound, excluding standard automobile radios or stereo systems when used and heard only by the occupants of the vehicle in which the radio or stereo system is installed, excluding warning devices on authorized emergency vehicles or horns or other warning devices on any vehicle used only for traffic safety purposes.

SOUND LEVEL METER: An instrument, including a microphone, amplifier, output meter and frequency weighting networks for the measurement of sound levels which meets or exceeds the requirements of the American National Standard Institute's S1.4-1971, or the most recent revision thereof, for type 1 or type 2 sound level meters.

SOUND TRUCK: Any motor vehicle regardless of motive power, whether in motion or stationary, having mounted thereon or attached thereto, any sound amplifying equipment.

VIBRATION PERCEPTION THRESHOLD: The minimum ground or structure borne vibrational motion necessary to cause a normal person to be aware of the vibration by such direct means as, but not limited to, sensation by touch or visual observation of moving objects. The perception threshold shall be presumed to be a motion velocity of 0.01 inches per second over the range of one to one hundred (100) Hz.

WEEKDAY: Any day, Monday through Friday, which is not a legal holiday. (Ord. 2579 § 1, 2004)

8.06.030: GENERAL NOISE REGULATIONS:
It shall be unlawful for any person to wilfully or negligently make, or cause to be made, any loud, unnecessary or unusual noise which disturbs the peace and quiet of any neighborhood or which causes discomfort or annoyance to a reasonable person of normal sensitivity in the area. The factors that may be considered in determining whether a violation of this chapter exists include, but are not limited to, the following:

A. The sound level of the objectionable noise;

B. The sound level of the ambient noise;

C. The proximity of the noise to residential living or sleeping facilities;

D. The nature and zoning of the area within which the noise emanates;

E. The number of persons affected by the noise;

F. The time of day or night the noise occurs;

G. The duration of the noise;

H. The tonal, informational or musical content of the noise;

I. Whether the noise is continuous, recurrent or intermittent;

J. Whether the noise is produced by a commercial or noncommercial activity;

K. Whether the nature of the noise is usual or unusual;

L. Whether the origin of the noise is natural or unnatural; and

M. Whether the noise occurs on a weekday, weekend or a holiday. (Ord. 2579 § 1, 2004)

8.06.040: ENFORCEMENT AUTHORITY:

A. The NCO and the NCO's duly authorized representatives may enforce the provisions of this chapter.

B. The NCO and its authorized representatives shall have satisfactorily completed an instructional program as recommended by the measuring instrument's manufacturer.

C. No person shall interfere with, oppose or resist the NCO or any authorized person charged with the enforcement of this chapter when such persons are engaged in the performance of their duties. (Ord. 2579 § 1, 2004)

8.06.050: NOISE MEASUREMENT PROCEDURE:

The NCO, equipped with sound level measurement equipment satisfying the requirements in section 8.06.020 of this chapter, may investigate any complaint relating to a violation of this chapter. The investigation shall consist of a measurement and the gathering of data to adequately define the noise problem and include, but not be limited to, the following:

A. Type of noise source;

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

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

D. Total duration of noise produced by noise source; and

E. Date and time of noise measurement survey. (Ord. 2579 § 1, 2004)

8.06.060: NOISE MEASUREMENT METHODOLOGY:

A. Utilizing the A-weighting scale of the sound level meter and the "slow" meter response (use "fast" response for impulsive type sounds), the noise level shall be measured at a position or positions at any point on the receiver's property deemed appropriate to determine whether the noise level complies with this chapter.

B. The microphone shall be located four (4) to five feet (5') above the ground; ten feet (10') or more from the nearest reflective surface, where possible. However, in those cases where another elevation is deemed appropriate, the latter shall be utilized. If the noise complaint is related to interior noise levels, interior noise measurements shall be made within the affected residential building or unit. The measurements shall be made at a point at least four feet (4') from the wall, ceiling or floor nearest the noise source, with the windows closed.

C. Calibration of the measurement equipment, utilizing an acoustic calibrator, shall be performed immediately prior to recording any noise data. Standard maintenance of the measuring equipment shall be in accordance with the manufacturer's recommendations.

D. No outdoor measurements shall be taken:

1. During periods when wind speeds (including gusts) exceed fifteen (15) miles per hour;

2. Without a windscreen, as recommended by the measuring instrument's manufacturer, properly attached to the measuring instrument;

3. Under any condition that allows the measuring instrument to become wet (e.g., rain or condensation); or

4. When the ambient temperature is out of the range of the tolerance of the measuring instrument. (Ord. 2579 § 1, 2004)

8.06.070: EXTERIOR NOISE LIMITS:

A. The noise standards for the categories of land uses identified in table 1 of this section shall, unless otherwise specifically indicated, apply to all such property within a designated zone.

TABLE 1

MAXIMUM PERMISSIBLE SOUND LEVELS BY RECEIVING LAND USE

Receiving Land Use Category	Time Period	Noise Level - dBA
Single-family residential districts	10:00 P.M. – 7:00 A.M. 7:00 A.M. – 10:00 P.M.	50 60
Multi-family residential districts; public space; institutional	10:00 P.M. – 7:00 A.M. 7:00 A.M. – 10:00 P.M.	50 60
Commercial	10:00 P.M. – 7:00 A.M. 7:00 A.M. – 10:00 P.M.	60 65
Industrial	Any time	75

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

1. The noise standard for that land use specified in table 1 of this section for a cumulative period of more than thirty (30) minutes in any hour; or

2. The noise standard specified in table 1 of this section plus five (5) dB for a cumulative period of more than fifteen (15) minutes in any hour; or

3. The noise standard specified in table 1 of this section plus ten (10) dB for a cumulative period of more than five (5) minutes in any hour; or

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

5. The noise standard specified in table 1 of this section plus twenty (20) dB or the maximum measured ambient level, for any period of time.

C. If the measured ambient level exceeds the allowable noise exposure standard within any of the first four (4) noise limit categories above, the allowable noise exposure standard shall be adjusted in five (5) dB increments in each category as appropriate to encompass or reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under this category shall be increased to reflect the maximum ambient noise level.

D. The ambient noise shall be measured at the same location along the property line utilized in subsection 8.06.060B of this chapter, with the alleged offending noise source inoperative. If the alleged offending noise source cannot be shut down, the ambient noise shall be estimated by performing a measurement in the same general area of the source but at a sufficient distance that the noise from the source is at least ten (10) dB below the ambient in order that only the ambient level be measured. If the difference between the ambient and the noise source is five (5) to ten (10) dB, then the level of the ambient itself can be reasonably determined by subtracting a one decibel correction to account for the contribution of the source.

E. In the event the alleged offensive noise contains a steady, audible tone such as a whine, screech, hum, or is a repetitive noise such as hammering or riveting, or contains music or speech conveying informational content, the standard limits set forth in table 1 of this section shall be reduced by five (5) dB. (Ord. 2579 § 1, 2004)

8.06.080: INTERIOR NOISE STANDARDS:

A. No person shall operate or cause to be operated any source of sound, or allow the creation of any noise, which causes the noise level when measured inside a neighboring receiving occupied building to exceed the following standards:

1. The noise standard for that land use specified in table 2 of this section for a cumulative period of more than five (5) minutes in any hour.

2. The noise standard for that land use specified in table 2 of this section plus five (5) dB for a cumulative period of more than one minute in any hour.

3. The noise standard for that land use specified in table 2 of this section plus ten (10) dB for the maximum measured ambient noise level for any period of time.

B. If the measured ambient level exceeds the allowable exterior noise exposure standard in table 1 of this chapter, the allowable interior noise exposure level shall be adjusted in five (5) dB increments as appropriate to reflect the ambient noise level.

TABLE 2

MAXIMUM PERMISSIBLE INTERIOR SOUND LEVELS BY RECEIVING LAND USE

Receiving Land Use Category	Time Period	Noise Level - dBA
Single-family residential districts	Any time	45
Multi-family residential districts; institutional; hotels	Any time	45
Commercial	Any time	50
Industrial	Any time	60

(Ord. 2579 § 1, 2004)

8.06.090: NOISE DISTURBANCES PROHIBITED:
The following acts, and the causing or permitting thereof, are declared to be in violation of this chapter:

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

1. Between the hours of ten o'clock (10:00) P.M. and seven o'clock (7:00) A.M. in such a manner as to create a noise disturbance across a residential or commercial real property line or at any time to violate the provisions of section 8.06.030 or 8.06.070 of this chapter.

2. In such a manner as to exceed the levels set forth for public space in table 1 of this chapter, measured at a distance of at least fifty feet (50') from such device operating on a public right of way or public space.

B. Loudspeaker Or Stereo Systems: Using or operating for any purpose any loudspeaker, loudspeaker system, stereo system or similar device between the hours of ten o'clock (10:00) P.M. and seven o'clock (7:00) A.M., such that the sound therefrom creates a noise disturbance across a residential property line, or at any time violates the provisions of section 8.06.030 or 8.06.070 of this chapter, except for noncommercial public speaking, public assembly or activity for which an exemption has been provided for in either this section or section 8.06.120 of this chapter.

C. Street Sales: Offering for sale, selling anything, or advertising by shouting or outcry within the city except by permit issued by the city. This subsection shall not be construed to prohibit the selling by outcry of merchandise, food or beverages at licensed sporting events, parades, fairs, circuses or other similar licensed public entertainment events.

D. Animals And Birds: Owning, possessing or harboring any animal or bird which frequently, or for long duration, howls, barks, meows, squawks or makes other sound which creates a noise disturbance across a residential or commercial real property line or within a noise sensitive zone.

E. Loading And Unloading: Loading, unloading, opening, closing or other handling of boxes, crates, containers, building materials, refuse containers or similar objects between the hours of ten o'clock (10:00) P.M. and six o'clock (6:00) A.M. in such a manner as to cause a noise disturbance across a residential real property line or at any time to violate section 8.06.030 of this chapter.

F. Construction And/Or Demolition: Operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between weekday hours of six o'clock (6:00) P.M. and seven o'clock (7:00) A.M., including Saturdays, or at any time on Sundays or holidays, such that the sound therefrom creates a noise disturbance across a residential or commercial real property line, except for emergency work by public service utilities, the city or another governmental entity. All mobile or stationary internal combustion engine powered equipment or machinery shall be equipped with exhaust and air intake silencers in proper working order, or suitable to meet the standards set forth herein.

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

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

1. Between the hours of seven o'clock (7:00) P.M. and seven o'clock (7:00) A.M. so as to create a noise disturbance across a residential or commercial real property line or at any time in violation of section 8.06.030 of this chapter.

2. In such a manner as to exceed the levels set forth for public space land use in table 1 of this chapter measured at a distance not less than one hundred feet (100') from any point on the path of a vehicle operating on public space or public right of way.

I. Stationary, Nonemergency Signaling Devices:

1. Sounding or permitting the sounding of any electronically amplified signal from any stationary bell, chime, siren, whistle or similar device intended primarily for nonemergency purposes, from any place for more than ten (10) seconds in any hourly period.

2. Places of worship and public and private schools shall be exempt from the operation of this subsection.

J. Emergency Signaling Devices:

1. Alarms, Sirens, Whistles: The intentional sounding or permitting the sounding outdoors of any fire, burglar or civil defense alarm, siren, whistle or similar stationary emergency signaling device, except for emergency purposes or for testing as provided in subsection J2 of this section.

2. Testing:

a. Testing of a stationary emergency signaling device shall not occur before seven o'clock (7:00) A.M. or after seven o'clock (7:00) P.M. Any such testing shall use only the minimum cycle test time. In no case shall such test time exceed sixty (60) seconds.

b. Testing of the complete emergency signaling system, including the functioning of the signaling device, and the personnel response to the signaling device, shall not occur more than once in each calendar month. Such testing shall not occur before seven o'clock (7:00) A.M. or after ten o'clock (10:00) P.M. The time limit specified in subsection J2a of this section shall not apply to such complete system testing.

3. Burglar, Fire, Motor Vehicle Alarms: Sounding or permitting the sounding of any exterior burglar or fire alarm or any motor vehicle burglar alarm unless such alarm is terminated within five (5) minutes of activation.

K. Noise Sensitive Zones: Creating or causing the creation of any sound within any noise sensitive zone, so as to exceed the specified land use noise standards set forth in table 1 of this chapter and subsection 8.06.070B of this chapter, or so as to interfere with the functions of such activity or annoy the occupants in the activity, provided that conspicuous signs are displayed indicating the presence of the zone.

L. Domestic Power Tools And Machinery:

1. Operating or permitting the operation of any mechanically powered saw, sander, drill, grinder, lawn or garden tool, or similar tool between ten o'clock (10:00) P.M. and seven o'clock (7:00) A.M., so as to create a noise disturbance across a residential or commercial real property line.

2. Motor, machinery and pumps, such as swimming pool equipment, shall be sufficiently enclosed or muffled and maintained so as not to create a noise disturbance in accordance with table 1, section 8.06.070 of this chapter.

M. Places Of Public Entertainment: Operating or permitting the operation or playing of any loudspeaker, musical instrument or other source of sound in any place of public entertainment that exceeds ninety five (95) dBA as read on the slow response of a sound level meter at any point normally occupied by a customer, without a conspicuous and legible sign with minimum one inch (1") letter height stating:

WARNING! SOUND LEVELS WITHIN MAY CAUSE HEARING IMPAIRMENT.

(Ord. 2579 § 1, 2004)

8.06.100: RESIDENTIAL AIR CONDITIONING OR AIR HANDLING EQUIPMENT:
It shall be unlawful to operate or permit the operation of any air conditioning or air handling equipment in such a manner as to exceed the sound levels set forth in table 1, section 8.06.070 of this chapter. (Ord. 2579 § 1, 2004)

8.06.110: TAMPERING:
The following acts or the causing thereof are prohibited:

A. The removal or rendering inoperative, other than for purposes of maintenance, repair or replacement, of any noise control device or element thereof of any product required to meet specified noise emission limits under federal, state or local law.

B. The removal of any noise label from any product identified in subsection A of this section.

C. The use of a product identified in subsection A of this section, which has had a noise control device or element thereof or noise label removed or rendered inoperative. (Ord. 2579 § 1, 2004)

8.06.120: EXEMPTIONS:
A. Emergency Exemption: This chapter shall not apply to:

1. The emission of sound for the purpose of alerting persons to the existence of an emergency such as, but not limited to, loudspeakers, horns, sirens, whistles or other similar devices which emit sound, only for the time required to make notification of the emergency condition; or

2. The emission of sound in the performance of emergency work or the temporary provision of essential services such as, but not limited to, utility system repairs or upgrades, infrastructure repairs, structural repairs and other unscheduled, infrequent and nonrecurring activities, required to protect persons and property from physical harm or loss of essential services.

B. Warning Devices: This chapter shall not apply to warning devices necessary for the protection of public safety. Police, fire and ambulance sirens and train horns are exempt from this chapter.

C. Outdoor Activities: This chapter shall not apply to occasional outdoor public gatherings, public dances, shows, and sporting and entertainment events conducted within city parks and city owned facilities, including events conducted at the Redlands Bowl, provided such events are conducted pursuant to a permit or license issued by the city.

D. School Activities: This chapter shall not apply to activities and operations conducted on the grounds of any public or private elementary, intermediate or secondary school or colleges and universities.

E. Hospital: This chapter shall not apply to activities and operations conducted within the grounds of the Redlands Community Hospital provided that said activities and operations are in compliance with the acoustical provisions of the hospital's conditional use permit.

F. Minor Maintenance Of Residential Property: This chapter shall not apply to noise sources associated with the minor maintenance of residential property, provided such activities take place between the hours of seven o'clock (7:00) A.M. to eight o'clock (8:00) P.M. on weekdays, and seven o'clock (7:00) A.M. to eight o'clock (8:00) P.M. on weekends and legal holidays, and provided that such activities generate no more than ninety (90) dBA at or within the real property line of the residential property. Activities covered under this provision include, but are not limited to, maintenance of landscaping and minor repair of residential dwellings or ancillary structures.

G. Construction Activity: This chapter shall not apply to noise sources associated with new construction, remodeling, rehabilitation or grading of any property provided such activities take place between the hours of seven o'clock (7:00) A.M. and six o'clock (6:00) P.M. on weekdays, including Saturdays, with no activities taking place at any time on Sundays or federal holidays. All motorized equipment used in such activity shall be equipped with functioning mufflers.

H. Agricultural Operations: This chapter shall not apply to mobile noise sources associated with agricultural operations for use in maintenance, cultivation, planting and harvesting of agricultural areas provided said activities take place between the hours of seven o'clock (7:00) A.M. to eight o'clock (8:00) P.M. on weekdays, including Saturdays, with no activities taking place at any time on Sundays or federal holidays. All motorized equipment used in such activity shall be equipped with functioning mufflers.

I. Chapter Application: This chapter shall not apply to any activity in which state or federal law has preempted the regulation of such activity. (Ord. 2579 § 1, 2004)

8.06.130: PREEXISTING NOISE SOURCES:

Those commercial and industrial operations in existence prior to the date of adoption hereof, if in compliance with the city's zoning laws, may be granted a period from such date within which to comply with this chapter.

A. Such compliance period shall be based on the estimated cost to make the equipment comply, as follows:

1. If the cost is one thousand dollars ($1,000.00) or less, ninety (90) days;

2. If the cost is one thousand dollars ($1,000.00) to five thousand dollars ($5,000.00), one year;

3. If the cost is five thousand dollars ($5,000.00) to twenty thousand dollars ($20,000.00), two (2) years; or

4. If the cost is greater than twenty thousand dollars ($20,000.00) or more, three (3) years.

B. At the time of request for extended compliance periods in subsections A2 through A4 of this section, any person requesting such extension shall submit a plan for such compliance, including temporary mitigation of such noise levels to within five (5) dBA of the complying level. Such extended period and temporary mitigation shall not exceed one year beyond the initial compliance period. If the compliance period is granted, mitigation measures included in the plan must be completed within ninety (90) days from the date of approval of the compliance period.

C. If, at the end of the compliance period, it is shown that compliance with the provisions herein constitute a hardship in terms of technical and economical feasibility, additional applications for exception may be granted on an annual basis until such time as compliance may be effected, provided the temporary mitigation remains in place.

D. Requests for extended compliance periods or exceptions shall be submitted to the city's planning commission with the submittal of plans and other information as required by the community development director. Such applications shall be filed by the owner of the property affected thereby or the owner's authorized agent, with the community development director, on forms furnished by the director, which shall set forth fully the nature of the proposed use, and the facts sufficient to justify the granting of the compliance period in accordance with the provisions of this chapter.

E. The applicant shall furnish to the director an accurate list of the names and addresses of all property owners to whom notice must be given as provided in this chapter.

F. Each such application shall be accompanied by a filing and processing fee in the amount established by resolution of the city council. Any applicant may withdraw his application by filing a written request to do so at any time prior to final action thereon, provided that there shall be no refund of fees. (Ord. 2579 § 1, 2004)

8.06.140: VIOLATION; PENALTY:

A. It is illegal to use, occupy or maintain property in violation of this chapter.

B. Violation of this chapter shall be a misdemeanor, but may be prosecuted as either a misdemeanor or an infraction in the discretion of the city attorney.

C. Any person who violates the provisions of this chapter is guilty of a separate offense for each day, or portion thereof, during which the violation continues.

D. Violation of this chapter that threatens to be continuing in nature is a public nuisance which may be abated or enjoined in accordance with the law. (Ord. 2579 § 1, 2004)

APPENDIX 5.1:

NOISE LEVEL MEASUREMENT PHOTOGRAPHS

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JN: 14444 Study Area Photos



L1_E
34, 3' 21.780000"117, 11' 12.170000"



L1_N
34, 3' 21.790000"117, 11' 12.170000"



L1_S
34, 3' 21.810000"117, 11' 12.200000"



L1_W
34, 3' 21.790000"117, 11' 12.170000"



L2_E
34, 3' 18.670000"117, 11' 4.760000"



L2_N
34, 3' 18.690000"117, 11' 4.840000"

JN: 14444 Study Area Photos



L2_S
34, 3' 18.670000"117, 11' 4.780000"



L2_W
34, 3' 18.670000"117, 11' 4.810000"



L3_E
34, 3' 16.440000"117, 11' 10.500000"



L3_N
34, 3' 16.500000"117, 11' 10.500000"



L3_S
34, 3' 16.450000"117, 11' 10.500000"



L3_W
34, 3' 16.440000"117, 11' 10.500000"

JN: 14444 Study Area Photos



L4_E
34, 3' 18.430000"117, 11' 13.020000"



L4_N
34, 3' 18.470000"117, 11' 13.050000"



L4_S
34, 3' 18.440000"117, 11' 13.020000"



L4_W
34, 3' 18.430000"117, 11' 13.020000"

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APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

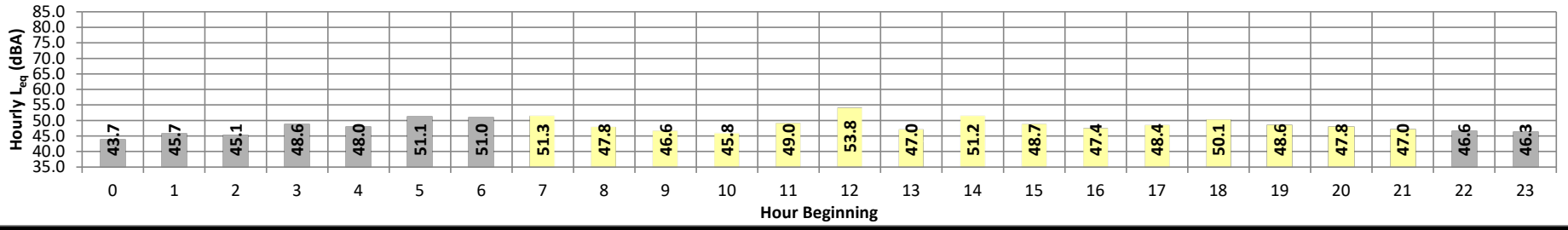
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24-Hour Noise Level Measurement Summary

Date: Monday, April 25, 2022 *Location:* L1 - Located north of the Project site near single-family *Meter:* Piccolo II *JN:* 14444

Project: Redlands City Center *Source:* residence at 321 West State Street. *Analyst:* A. Khan

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	43.7	48.6	41.1	48.3	47.9	46.9	46.2	44.1	42.9	41.6	41.4	41.2	43.7	10.0	53.7
	1	45.7	52.6	42.1	52.2	51.8	50.4	49.4	45.6	44.0	42.7	42.5	42.2	45.7	10.0	55.7
	2	45.1	48.3	42.9	48.0	47.7	47.2	46.9	45.6	44.7	43.5	43.2	43.0	45.1	10.0	55.1
	3	48.6	55.9	44.6	55.2	54.5	53.5	52.7	48.4	46.7	45.2	45.0	44.7	48.6	10.0	58.6
	4	48.0	53.2	45.5	52.8	52.5	51.5	50.9	48.1	47.0	46.0	45.8	45.6	48.0	10.0	58.0
	5	51.1	57.4	48.4	57.1	56.9	55.2	53.8	51.2	50.0	48.9	48.7	48.5	51.1	10.0	61.1
	6	51.0	55.7	48.9	55.4	54.9	53.8	53.3	51.3	50.4	49.5	49.3	49.0	51.0	10.0	61.0
Day	7	51.3	59.3	47.1	58.7	58.2	56.7	55.3	50.8	49.3	47.7	47.5	47.2	51.3	0.0	51.3
	8	47.8	54.9	42.6	54.5	54.0	52.8	52.1	48.2	45.5	43.4	43.0	42.7	47.8	0.0	47.8
	9	46.6	52.8	42.4	52.5	52.1	50.8	49.8	47.1	45.2	43.3	42.9	42.5	46.6	0.0	46.6
	10	45.8	52.6	41.5	52.2	51.6	50.2	49.2	46.1	44.2	42.2	41.9	41.6	45.8	0.0	45.8
	11	49.0	60.4	43.1	58.9	57.5	54.7	52.6	48.3	46.0	43.8	43.5	43.2	49.0	0.0	49.0
	12	53.8	61.5	43.8	61.3	61.1	60.6	59.8	53.9	47.6	44.5	44.2	43.9	53.8	0.0	53.8
	13	47.0	58.0	42.3	55.7	54.4	52.3	50.4	46.4	44.7	43.0	42.7	42.4	47.0	0.0	47.0
	14	51.2	58.2	45.7	57.7	57.2	55.3	54.6	51.9	50.0	47.2	46.6	45.9	51.2	0.0	51.2
	15	48.7	73.7	44.8	71.7	69.7	65.1	63.0	55.8	50.0	46.5	46.0	45.2	48.7	0.0	48.7
	16	47.4	55.1	43.4	54.7	54.0	52.5	51.7	48.9	46.5	44.3	44.0	43.6	47.4	0.0	47.4
	17	48.4	53.6	45.3	53.2	52.8	51.9	51.1	48.8	47.4	46.0	45.7	45.4	48.4	0.0	48.4
	18	50.1	57.6	45.9	57.2	56.6	54.8	53.8	50.3	48.3	46.6	46.3	46.0	50.1	0.0	50.1
	19	48.6	55.0	44.5	54.5	54.0	52.8	51.7	49.0	47.3	45.3	45.0	44.7	48.6	5.0	53.6
	20	47.8	55.1	43.8	54.6	54.0	52.8	51.7	47.8	46.0	44.4	44.1	43.9	47.8	5.0	52.8
	21	47.0	51.9	43.9	51.6	51.3	50.2	49.6	47.8	46.3	44.5	44.2	44.0	47.0	5.0	52.0
Night	22	46.6	50.6	44.1	50.3	50.0	49.5	48.9	47.0	46.0	44.7	44.5	44.2	46.6	10.0	56.6
	23	46.3	50.7	43.6	50.3	49.8	48.9	48.4	47.1	45.7	44.2	44.0	43.7	46.3	10.0	56.3

Timeframe	*Hour*	*L_{eq}*	*L_{max}*	*L_{min}*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	45.8	51.9	41.5	51.6	51.3	50.2	49.2	46.1	44.2	42.2	41.9	41.6
	Max	53.8	73.7	47.1	71.7	69.7	65.1	63.0	55.8	50.0	47.7	47.5	47.2
Energy Average		49.3	Average:		56.6	55.9	54.2	53.1	49.4	46.9	44.8	44.5	44.1
Night	Min	43.7	48.3	41.1	48.0	47.7	46.9	46.2	44.1	42.9	41.6	41.4	41.2
	Max	51.1	57.4	48.9	57.1	56.9	55.2	53.8	51.3	50.4	49.5	49.3	49.0
Energy Average		48.0	Average:		52.2	51.8	50.8	50.1	47.6	46.4	45.2	44.9	44.7

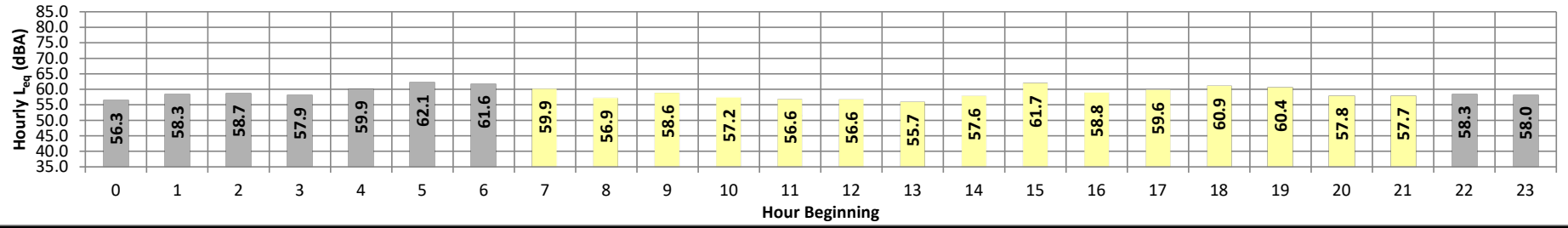
L_{eq} (dBA)		
24-Hour	*Daytime (7am-10pm)*	*Nighttime (10pm-7am)*
48.8	**49.3**	**48.0**

24-Hour Noise Level Measurement Summary

Date: Monday, April 25, 2022 *Location:* L2 - Located southeast of the Project site near single-family *Meter:* Piccolo II *JN:* 14444

Project: Redlands City Center *Source:* residence at 124 West Vine Street. *Analyst:* A. Khan

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	56.3	61.6	52.3	61.3	61.0	60.2	59.6	57.0	55.1	53.1	52.7	52.4	56.3	10.0	66.3
	1	58.3	68.3	53.6	67.6	66.7	64.6	63.3	58.9	56.9	54.5	54.2	53.8	58.3	10.0	68.3
	2	58.7	63.3	54.1	63.0	62.6	61.8	61.2	59.7	58.2	55.2	54.7	54.3	58.7	10.0	68.7
	3	57.9	62.4	54.3	62.1	61.7	61.1	60.6	58.8	57.2	55.1	54.7	54.4	57.9	10.0	67.9
	4	59.9	67.2	57.2	67.0	66.6	64.9	63.6	60.8	59.5	57.9	57.6	57.3	59.9	10.0	69.9
	5	62.1	74.2	59.7	73.9	73.2	70.1	67.0	63.0	61.5	60.3	60.0	59.8	62.1	10.0	72.1
	6	61.6	66.2	59.5	66.0	65.8	65.3	64.6	62.3	61.2	60.0	59.8	59.6	61.6	10.0	71.6
Day	7	59.9	74.2	55.1	72.4	70.6	66.6	64.8	60.9	58.5	56.0	55.6	55.2	59.9	0.0	59.9
	8	56.9	64.1	50.3	63.7	63.1	61.7	60.6	57.6	55.5	51.7	51.1	50.5	56.9	0.0	56.9
	9	58.6	64.1	52.7	63.8	63.5	62.8	62.3	59.2	57.5	54.3	53.7	53.0	58.6	0.0	58.6
	10	57.2	67.8	49.4	67.0	66.3	63.7	61.7	56.0	53.3	50.4	49.9	49.5	57.2	0.0	57.2
	11	56.6	63.6	51.2	63.3	62.8	61.5	60.6	57.1	54.8	52.2	51.7	51.3	56.6	0.0	56.6
	12	56.6	65.7	51.7	65.0	64.5	63.4	62.7	59.6	56.1	52.6	52.2	51.8	56.6	0.0	56.6
	13	55.7	64.5	50.2	63.9	63.2	61.2	59.7	55.7	53.4	50.9	50.5	50.3	55.7	0.0	55.7
	14	57.6	66.4	51.5	65.9	65.3	63.5	62.2	57.3	54.8	52.4	52.1	51.6	57.6	0.0	57.6
	15	61.7	74.1	50.7	72.5	71.2	68.2	66.6	60.2	56.5	51.9	51.4	50.9	61.7	0.0	61.7
	16	58.8	71.3	52.3	70.9	70.7	70.2	69.2	60.4	57.0	53.7	53.1	52.4	58.8	0.0	58.8
	17	59.6	67.4	54.5	66.7	66.0	64.7	63.1	59.9	57.8	55.3	55.0	54.6	59.6	0.0	59.6
	18	60.9	71.7	54.9	70.9	70.3	68.7	66.7	61.1	58.7	55.8	55.4	55.0	60.9	0.0	60.9
	19	60.4	71.3	53.8	70.8	69.8	68.0	66.3	60.4	57.5	54.7	54.3	53.9	60.4	5.0	65.4
	20	57.8	71.6	52.3	71.3	71.0	70.1	68.7	59.3	55.7	53.0	52.7	52.4	57.8	5.0	62.8
	21	57.7	63.1	54.4	62.7	62.3	61.3	60.3	58.3	56.9	55.1	54.9	54.5	57.7	5.0	62.7
Night	22	58.3	63.9	54.9	63.5	63.1	61.7	60.9	58.7	57.4	55.7	55.4	55.0	58.3	10.0	68.3
	23	58.0	62.6	54.6	62.2	61.8	61.1	60.6	58.7	57.3	55.5	55.1	54.7	58.0	10.0	68.0

Timeframe	*Hour*	*L_{eq}*	*L_{max}*	*L_{min}*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	55.7	63.1	49.4	62.7	62.3	61.2	59.7	55.7	53.3	50.4	49.9	49.5
	Max	61.7	74.2	55.1	72.5	71.2	70.2	69.2	61.1	58.7	56.0	55.6	55.2
Energy Average		58.8	Average:		67.4	66.7	65.0	63.7	58.9	56.3	53.3	52.9	52.5
Night	Min	56.3	61.6	52.3	61.3	61.0	60.2	59.6	57.0	55.1	53.1	52.7	52.4
	Max	62.1	74.2	59.7	73.9	73.2	70.1	67.0	63.0	61.5	60.3	60.0	59.8
Energy Average		59.4	Average:		65.2	64.7	63.4	62.4	59.8	58.2	56.4	56.0	55.7

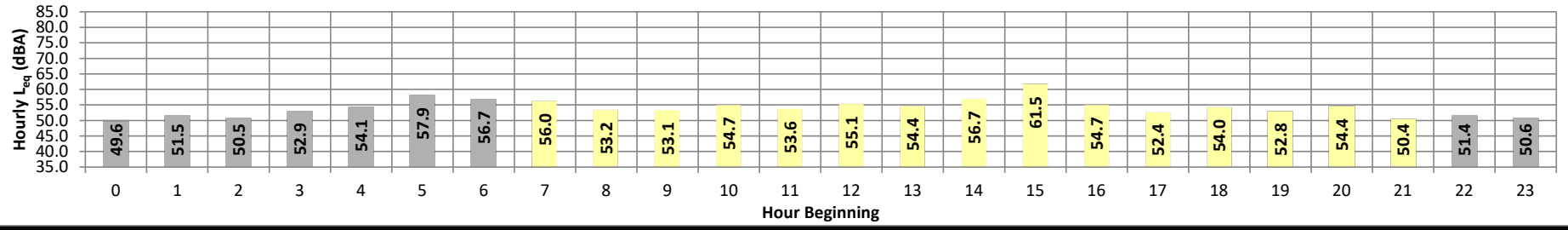
L_{eq} (dBA)	*Daytime (7am-10pm)*	*Nighttime (10pm-7am)*
24-Hour		
59.0	**58.8**	**59.4**

24-Hour Noise Level Measurement Summary

Date: Monday, April 25, 2022 *Location:* L3 - Located south of the Project site near Cortner Chapel at *Meter:* Piccolo II *JN:* 14444

Project: Redlands City Center *Source:* 221 Brookside Avenue. *Analyst:* A. Khan

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	49.6	57.7	46.5	57.0	56.1	53.5	52.1	49.5	48.3	47.0	46.8	46.6	49.6	10.0	59.6
	1	51.5	57.3	48.8	57.0	56.5	55.4	54.5	51.7	50.5	49.3	49.1	48.9	51.5	10.0	61.5
	2	50.5	53.6	48.2	53.3	53.1	52.7	52.3	51.2	50.2	48.7	48.5	48.3	50.5	10.0	60.5
	3	52.9	59.1	49.2	58.5	58.0	57.0	56.4	53.3	51.4	49.9	49.6	49.3	52.9	10.0	62.9
	4	54.1	58.1	52.1	57.9	57.4	56.4	55.9	54.7	53.6	52.6	52.4	52.2	54.1	10.0	64.1
	5	57.9	64.9	54.1	64.5	64.2	62.3	60.8	58.0	56.6	54.9	54.6	54.3	57.9	10.0	67.9
	6	56.7	63.1	54.1	62.6	62.2	60.9	60.0	56.4	55.5	54.6	54.4	54.2	56.7	10.0	66.7
Day	7	56.0	63.5	52.6	63.0	62.2	60.4	59.2	55.8	54.6	53.3	53.0	52.8	56.0	0.0	56.0
	8	53.2	60.1	48.5	59.8	59.2	57.6	56.6	53.7	51.7	49.4	49.0	48.7	53.2	0.0	53.2
	9	53.1	62.0	47.4	61.6	61.0	59.0	57.1	52.7	50.6	48.4	48.0	47.6	53.1	0.0	53.1
	10	54.7	63.9	47.0	63.5	62.9	61.2	59.8	54.4	50.3	47.9	47.6	47.2	54.7	0.0	54.7
	11	53.6	61.9	47.8	61.5	60.9	59.1	57.8	53.7	51.2	48.6	48.2	47.9	53.6	0.0	53.6
	12	55.1	63.3	48.7	62.8	62.0	60.5	59.4	56.3	51.7	49.4	49.1	48.8	55.1	0.0	55.1
	13	54.4	64.5	47.4	64.1	63.6	61.3	59.4	52.8	50.3	48.2	47.9	47.5	54.4	0.0	54.4
	14	56.7	66.5	48.7	66.0	65.3	63.3	61.5	56.1	52.5	49.6	49.2	48.9	56.7	0.0	56.7
	15	61.5	74.2	47.6	72.8	71.8	68.9	66.5	58.3	55.0	49.9	48.6	47.8	61.5	0.0	61.5
	16	54.7	64.4	47.4	64.0	63.2	60.6	58.7	55.4	51.3	48.3	47.9	47.5	54.7	0.0	54.7
	17	52.4	58.7	48.9	58.4	58.0	56.5	55.4	52.7	51.2	49.6	49.3	49.0	52.4	0.0	52.4
	18	54.0	62.2	48.9	61.8	61.1	59.4	58.0	53.9	51.8	49.7	49.4	49.1	54.0	0.0	54.0
	19	52.8	61.5	47.3	61.2	60.7	58.4	56.7	52.5	50.3	48.0	47.7	47.4	52.8	5.0	57.8
	20	54.4	64.0	46.7	63.5	62.8	60.9	59.4	54.6	48.8	47.2	47.0	46.8	54.4	5.0	59.4
	21	50.4	55.9	47.9	55.4	54.8	53.5	52.6	50.9	49.6	48.4	48.2	48.0	50.4	5.0	55.4
Night	22	51.4	56.3	49.1	56.0	55.6	54.5	53.7	51.8	50.7	49.6	49.4	49.2	51.4	10.0	61.4
	23	50.6	54.5	48.5	54.2	53.9	53.0	52.5	51.0	50.1	48.9	48.8	48.5	50.6	10.0	60.6

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	50.4	55.9	46.7	55.4	54.8	53.5	52.6	50.9	48.8	47.2	47.0	46.8
	Max	61.5	74.2	52.6	72.8	71.8	68.9	66.5	58.3	55.0	53.3	53.0	52.8
Energy Average		55.3	Average:		62.6	62.0	60.0	58.5	54.3	51.4	49.1	48.7	48.3
Night	Min	49.6	53.6	46.5	53.3	53.1	52.7	52.1	49.5	48.3	47.0	46.8	46.6
	Max	57.9	64.9	54.1	64.5	64.2	62.3	60.8	58.0	56.6	54.9	54.6	54.3
Energy Average		53.8	Average:		57.9	57.5	56.2	55.4	53.1	51.9	50.6	50.4	50.2

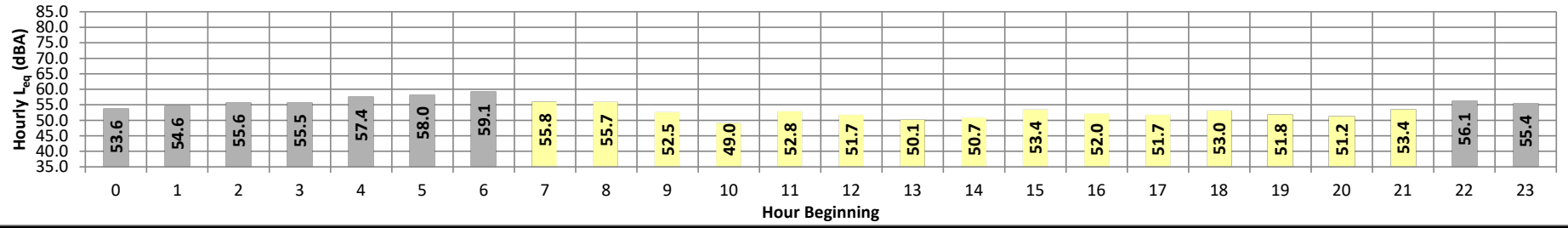
24-Hour	L_{eq} (dBA) Daytime (7am-10pm)	Nighttime (10pm-7am)
54.8	**55.3**	**53.8**

24-Hour Noise Level Measurement Summary

Date: Monday, April 25, 2022 | *Location:* L4 - Located west of the Project site near single-family | *Meter:* Piccolo II | *JN:* 14444

Project: Redlands City Center | *Source:* residence at 18 Kendall Street. | *Analyst:* A. Khan

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	53.6	58.6	50.6	58.3	58.0	57.2	56.7	54.4	53.0	51.4	51.1	50.7	53.6	10.0	63.6
	1	54.6	61.3	51.3	61.0	60.6	59.5	58.8	56.1	54.2	52.2	51.8	51.4	54.6	10.0	64.6
	2	55.6	59.2	52.0	58.9	58.7	58.3	57.9	56.6	55.3	52.9	52.5	52.1	55.6	10.0	65.6
	3	55.5	64.4	52.6	63.8	63.5	62.5	61.8	57.7	55.3	53.4	53.1	52.7	55.5	10.0	65.5
	4	57.4	62.1	55.2	61.7	61.5	60.6	60.1	58.6	57.1	55.8	55.5	55.3	57.4	10.0	67.4
	5	58.0	63.7	56.9	63.5	63.2	62.3	61.6	59.5	58.5	57.4	57.2	57.0	58.0	10.0	68.0
	6	59.1	63.5	57.6	63.2	62.9	62.3	61.5	59.8	59.1	58.1	57.9	57.7	59.1	10.0	69.1
Day	7	55.8	61.3	54.6	60.7	60.2	59.4	58.7	57.1	56.1	55.1	54.9	54.7	55.8	0.0	55.8
	8	55.7	64.1	48.9	63.2	62.5	60.9	60.0	56.8	54.4	50.8	50.1	49.3	55.7	0.0	55.7
	9	52.5	59.9	47.4	59.0	58.4	57.3	56.3	52.8	50.7	48.7	48.2	47.6	52.5	0.0	52.5
	10	49.0	60.5	45.5	60.1	59.5	57.3	55.9	51.2	48.7	46.3	46.0	45.6	49.0	0.0	49.0
	11	52.8	60.0	48.7	59.5	58.7	57.3	56.2	53.1	51.1	49.3	49.1	48.8	52.8	0.0	52.8
	12	51.7	62.6	48.9	62.1	61.6	60.0	59.2	56.6	53.7	49.5	49.2	49.0	51.7	0.0	51.7
	13	50.1	58.3	45.6	57.8	57.3	55.9	54.1	49.9	47.8	46.2	45.9	45.7	50.1	0.0	50.1
	14	50.7	57.5	46.6	57.1	56.6	55.2	54.4	51.1	49.1	47.3	47.0	46.7	50.7	0.0	50.7
	15	53.4	73.8	46.6	72.3	70.9	68.0	65.2	56.4	52.9	48.4	47.6	46.9	53.4	0.0	53.4
	16	52.0	61.1	46.6	60.5	59.8	56.8	55.3	52.0	49.9	47.6	47.2	46.8	52.0	0.0	52.0
	17	51.7	58.5	47.9	58.0	57.6	56.2	54.9	51.9	50.3	48.6	48.3	48.1	51.7	0.0	51.7
	18	53.0	60.4	48.3	59.9	59.3	58.0	56.8	53.3	50.8	48.9	48.7	48.4	53.0	0.0	53.0
	19	51.8	59.1	47.2	58.8	58.3	57.2	56.0	52.0	49.7	47.8	47.6	47.3	51.8	5.0	56.8
	20	51.2	66.5	47.4	66.0	65.5	63.4	61.9	54.5	51.3	48.0	47.7	47.5	51.2	5.0	56.2
	21	53.4	57.0	51.3	56.7	56.3	55.5	55.0	53.9	53.0	51.8	51.6	51.4	53.4	5.0	58.4
Night	22	56.1	60.4	53.8	60.1	59.9	59.1	58.5	57.1	56.0	54.4	54.2	53.9	56.1	10.0	66.1
	23	55.4	59.4	52.4	59.0	58.7	58.0	57.6	56.0	54.9	53.1	52.8	52.5	55.4	10.0	65.4

Timeframe	*Hour*	*L_{eq}*	*L_{max}*	*L_{min}*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	49.0	57.0	45.5	56.7	56.3	55.2	54.1	49.9	47.8	46.2	45.9	45.6
	Max	55.8	73.8	54.6	72.3	70.9	68.0	65.2	57.1	56.1	55.1	54.9	54.7
Energy Average		52.7	Average:		60.8	60.2	58.6	57.3	53.5	51.3	49.0	48.6	48.3
Night	Min	53.6	58.6	50.6	58.3	58.0	57.2	56.7	54.4	53.0	51.4	51.1	50.7
	Max	59.1	64.4	57.6	63.8	63.5	62.5	61.8	59.8	59.1	58.1	57.9	57.7
Energy Average		56.5	Average:		61.1	60.8	60.0	59.4	57.3	55.9	54.3	54.0	53.7

24-Hour	*L_{eq} (dBA) Daytime (7am-10pm)*	*Nighttime (10pm-7am)*
54.5	**52.7**	**56.5**

APPENDIX 7.1:

ON-SITE TRAFFIC NOISE LEVEL CALCULATIONS

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

Scenario: First Floor With Wall
Road Name: Brookside Ave
Lot No: Unit 1

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	45 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	57.356
Medium Trucks:	56.839
Heavy Trucks:	55.944

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-1.00	-1.20	*-12.12*	0.000	0.000
Medium Trucks:	73.11	-12.66	-0.94	-1.20	*-12.63*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-0.84	-1.20	*-13.93*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.9	63.0	61.2	55.2	63.8	64.4
Medium Trucks:	58.3	56.8	50.4	48.9	57.4	57.6
Heavy Trucks:	60.1	58.7	49.7	50.9	59.3	59.4
Vehicle Noise:	66.8	65.1	61.8	57.2	65.8	66.2

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.9	63.0	61.2	55.2	63.8	64.4
Medium Trucks:	58.3	56.8	50.4	48.9	57.4	57.6
Heavy Trucks:	60.1	58.7	49.7	50.9	59.3	59.4
Vehicle Noise:	66.8	65.1	61.8	57.2	65.8	66.2

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

Scenario: First Floor With Wall
Road Name: Brookside Ave
Lot No: Unit 2

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	45 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	57.356
Medium Trucks:	56.839
Heavy Trucks:	55.944

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-1.00	-1.20	*-12.12*	0.000	0.000
Medium Trucks:	73.11	-12.66	-0.94	-1.20	*-12.63*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-0.84	-1.20	*-13.93*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.9	63.0	61.2	55.2	63.8	64.4
Medium Trucks:	58.3	56.8	50.4	48.9	57.4	57.6
Heavy Trucks:	60.1	58.7	49.7	50.9	59.3	59.4
Vehicle Noise:	66.8	65.1	61.8	57.2	65.8	66.2

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.9	63.0	61.2	55.2	63.8	64.4
Medium Trucks:	58.3	56.8	50.4	48.9	57.4	57.6
Heavy Trucks:	60.1	58.7	49.7	50.9	59.3	59.4
Vehicle Noise:	66.8	65.1	61.8	57.2	65.8	66.2

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

Scenario: First Floor With Wall
Road Name: Brookside Ave
Lot No: Unit 3

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	45 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	57.356
Medium Trucks:	56.839
Heavy Trucks:	55.944

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-1.00	-1.20	*-12.12*	0.000	0.000
Medium Trucks:	73.11	-12.66	-0.94	-1.20	*-12.63*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-0.84	-1.20	*-13.93*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.9	63.0	61.2	55.2	63.8	64.4
Medium Trucks:	58.3	56.8	50.4	48.9	57.4	57.6
Heavy Trucks:	60.1	58.7	49.7	50.9	59.3	59.4
Vehicle Noise:	66.8	65.1	61.8	57.2	65.8	66.2

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.9	63.0	61.2	55.2	63.8	64.4
Medium Trucks:	58.3	56.8	50.4	48.9	57.4	57.6
Heavy Trucks:	60.1	58.7	49.7	50.9	59.3	59.4
Vehicle Noise:	66.8	65.1	61.8	57.2	65.8	66.2

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

Scenario: First Floor With Wall
Road Name: Brookside Ave
Lot No: Unit 4

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	45 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	57.356
Medium Trucks:	56.839
Heavy Trucks:	55.944

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-1.00	-1.20	*-12.12*	0.000	0.000
Medium Trucks:	73.11	-12.66	-0.94	-1.20	*-12.63*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-0.84	-1.20	*-13.93*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.9	63.0	61.2	55.2	63.8	64.4
Medium Trucks:	58.3	56.8	50.4	48.9	57.4	57.6
Heavy Trucks:	60.1	58.7	49.7	50.9	59.3	59.4
Vehicle Noise:	66.8	65.1	61.8	57.2	65.8	66.2

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.9	63.0	61.2	55.2	63.8	64.4
Medium Trucks:	58.3	56.8	50.4	48.9	57.4	57.6
Heavy Trucks:	60.1	58.7	49.7	50.9	59.3	59.4
Vehicle Noise:	66.8	65.1	61.8	57.2	65.8	66.2

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

Scenario: First Floor With Wall
Road Name: Brookside Ave
Lot No: Unit 5

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	45 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	57.356
Medium Trucks:	56.839
Heavy Trucks:	55.944

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-1.00	-1.20	*-12.12*	0.000	0.000
Medium Trucks:	73.11	-12.66	-0.94	-1.20	*-12.63*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-0.84	-1.20	*-13.93*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.9	63.0	61.2	55.2	63.8	64.4
Medium Trucks:	58.3	56.8	50.4	48.9	57.4	57.6
Heavy Trucks:	60.1	58.7	49.7	50.9	59.3	59.4
Vehicle Noise:	66.8	65.1	61.8	57.2	65.8	66.2

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.9	63.0	61.2	55.2	63.8	64.4
Medium Trucks:	58.3	56.8	50.4	48.9	57.4	57.6
Heavy Trucks:	60.1	58.7	49.7	50.9	59.3	59.4
Vehicle Noise:	66.8	65.1	61.8	57.2	65.8	66.2

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

Scenario: First Floor With Wall
Road Name: Brookside Ave
Lot No: Rest 1

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	45 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	57.356
Medium Trucks:	56.839
Heavy Trucks:	55.944

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-1.00	-1.20	*-12.12*	0.000	0.000
Medium Trucks:	73.11	-12.66	-0.94	-1.20	*-12.63*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-0.84	-1.20	*-13.93*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.9	63.0	61.2	55.2	63.8	64.4
Medium Trucks:	58.3	56.8	50.4	48.9	57.4	57.6
Heavy Trucks:	60.1	58.7	49.7	50.9	59.3	59.4
Vehicle Noise:	66.8	65.1	61.8	57.2	65.8	66.2

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.9	63.0	61.2	55.2	63.8	64.4
Medium Trucks:	58.3	56.8	50.4	48.9	57.4	57.6
Heavy Trucks:	60.1	58.7	49.7	50.9	59.3	59.4
Vehicle Noise:	66.8	65.1	61.8	57.2	65.8	66.2

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

Scenario: First Floor With Wall
Road Name: Brookside Ave
Lot No: Rest 2

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	45 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	57.356
Medium Trucks:	56.839
Heavy Trucks:	55.944

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-1.00	-1.20	*-12.12*	0.000	0.000
Medium Trucks:	73.11	-12.66	-0.94	-1.20	*-12.63*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-0.84	-1.20	*-13.93*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.9	63.0	61.2	55.2	63.8	64.4
Medium Trucks:	58.3	56.8	50.4	48.9	57.4	57.6
Heavy Trucks:	60.1	58.7	49.7	50.9	59.3	59.4
Vehicle Noise:	66.8	65.1	61.8	57.2	65.8	66.2

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.9	63.0	61.2	55.2	63.8	64.4
Medium Trucks:	58.3	56.8	50.4	48.9	57.4	57.6
Heavy Trucks:	60.1	58.7	49.7	50.9	59.3	59.4
Vehicle Noise:	66.8	65.1	61.8	57.2	65.8	66.2

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

Scenario: First Floor With Wall
Road Name: Eureka St
Lot No: Rest 2

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.703
Medium Trucks:	48.093
Heavy Trucks:	47.031

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	0.07	-1.20	*-11.82*	0.000	0.000
Medium Trucks:	73.11	-12.66	0.15	-1.20	*-12.43*	0.000	0.000
Heavy Trucks:	78.76	-16.61	0.30	-1.20	*-13.97*	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:	66.0	64.1	62.3	56.2	64.9	65.5
Medium Trucks:	59.4	57.9	51.5	50.0	58.5	58.7
Heavy Trucks:	61.2	59.8	50.8	52.0	60.4	60.5
Vehicle Noise:	67.9	66.2	62.9	58.3	66.9	67.3

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.0	64.1	62.3	56.2	64.9	65.5
Medium Trucks:	59.4	57.9	51.5	50.0	58.5	58.7
Heavy Trucks:	61.2	59.8	50.8	52.0	60.4	60.5
Vehicle Noise:	67.9	66.2	62.9	58.3	66.9	67.3

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

Scenario: First Floor With Wall
Road Name: Eureka St
Lot No: Rest 3

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.703
Medium Trucks:	48.093
Heavy Trucks:	47.031

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	0.07	-1.20	*-11.82*	0.000	0.000
Medium Trucks:	73.11	-12.66	0.15	-1.20	*-12.43*	0.000	0.000
Heavy Trucks:	78.76	-16.61	0.30	-1.20	*-13.97*	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:	66.0	64.1	62.3	56.2	64.9	65.5
Medium Trucks:	59.4	57.9	51.5	50.0	58.5	58.7
Heavy Trucks:	61.2	59.8	50.8	52.0	60.4	60.5
Vehicle Noise:	67.9	66.2	62.9	58.3	66.9	67.3

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.0	64.1	62.3	56.2	64.9	65.5
Medium Trucks:	59.4	57.9	51.5	50.0	58.5	58.7
Heavy Trucks:	61.2	59.8	50.8	52.0	60.4	60.5
Vehicle Noise:	67.9	66.2	62.9	58.3	66.9	67.3

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

Scenario: Second Floor With Wall
Road Name: Brookside Ave
Lot No: Unit 1

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	45 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	23.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	60.189
Medium Trucks:	59.350
Heavy Trucks:	57.607

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-1.31	-1.20	*-18.34*	0.000	0.000
Medium Trucks:	73.11	-12.66	-1.22	-1.20	*-19.15*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-1.03	-1.20	*-21.22*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.6	62.7	60.9	54.9	63.5	64.1
Medium Trucks:	58.0	56.5	50.2	48.6	57.1	57.3
Heavy Trucks:	59.9	58.5	49.5	50.7	59.1	59.2
Vehicle Noise:	66.5	64.8	61.5	57.0	65.5	65.9

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.6	62.7	60.9	54.9	63.5	64.1
Medium Trucks:	58.0	56.5	50.2	48.6	57.1	57.3
Heavy Trucks:	59.9	58.5	49.5	50.7	59.1	59.2
Vehicle Noise:	66.5	64.8	61.5	57.0	65.5	65.9

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

Scenario: Second Floor With Wall
Road Name: Brookside Ave
Lot No: Unit 2

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	45 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	23.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	60.189
Medium Trucks:	59.350
Heavy Trucks:	57.607

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-1.31	-1.20	*-18.34*	0.000	0.000
Medium Trucks:	73.11	-12.66	-1.22	-1.20	*-19.15*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-1.03	-1.20	*-21.22*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.6	62.7	60.9	54.9	63.5	64.1
Medium Trucks:	58.0	56.5	50.2	48.6	57.1	57.3
Heavy Trucks:	59.9	58.5	49.5	50.7	59.1	59.2
Vehicle Noise:	66.5	64.8	61.5	57.0	65.5	65.9

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.6	62.7	60.9	54.9	63.5	64.1
Medium Trucks:	58.0	56.5	50.2	48.6	57.1	57.3
Heavy Trucks:	59.9	58.5	49.5	50.7	59.1	59.2
Vehicle Noise:	66.5	64.8	61.5	57.0	65.5	65.9

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

Scenario: Second Floor With Wall
Road Name: Brookside Ave
Lot No: Unit 3

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	45 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	23.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	60.189
Medium Trucks:	59.350
Heavy Trucks:	57.607

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-1.31	-1.20	*-18.34*	0.000	0.000
Medium Trucks:	73.11	-12.66	-1.22	-1.20	*-19.15*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-1.03	-1.20	*-21.22*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.6	62.7	60.9	54.9	63.5	64.1
Medium Trucks:	58.0	56.5	50.2	48.6	57.1	57.3
Heavy Trucks:	59.9	58.5	49.5	50.7	59.1	59.2
Vehicle Noise:	66.5	64.8	61.5	57.0	65.5	65.9

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.6	62.7	60.9	54.9	63.5	64.1
Medium Trucks:	58.0	56.5	50.2	48.6	57.1	57.3
Heavy Trucks:	59.9	58.5	49.5	50.7	59.1	59.2
Vehicle Noise:	66.5	64.8	61.5	57.0	65.5	65.9

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

Scenario: Second Floor With Wall
Road Name: Brookside Ave
Lot No: Unit 4

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	45 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	23.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	60.189
Medium Trucks:	59.350
Heavy Trucks:	57.607

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-1.31	-1.20	*-18.34*	0.000	0.000
Medium Trucks:	73.11	-12.66	-1.22	-1.20	*-19.15*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-1.03	-1.20	*-21.22*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.6	62.7	60.9	54.9	63.5	64.1
Medium Trucks:	58.0	56.5	50.2	48.6	57.1	57.3
Heavy Trucks:	59.9	58.5	49.5	50.7	59.1	59.2
Vehicle Noise:	66.5	64.8	61.5	57.0	65.5	65.9

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.6	62.7	60.9	54.9	63.5	64.1
Medium Trucks:	58.0	56.5	50.2	48.6	57.1	57.3
Heavy Trucks:	59.9	58.5	49.5	50.7	59.1	59.2
Vehicle Noise:	66.5	64.8	61.5	57.0	65.5	65.9

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

Scenario: Second Floor With Wall
Road Name: Brookside Ave
Lot No: Unit 5

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	45 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	23.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	60.189
Medium Trucks:	59.350
Heavy Trucks:	57.607

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-1.31	-1.20	*-18.34*	0.000	0.000
Medium Trucks:	73.11	-12.66	-1.22	-1.20	*-19.15*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-1.03	-1.20	*-21.22*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.6	62.7	60.9	54.9	63.5	64.1
Medium Trucks:	58.0	56.5	50.2	48.6	57.1	57.3
Heavy Trucks:	59.9	58.5	49.5	50.7	59.1	59.2
Vehicle Noise:	66.5	64.8	61.5	57.0	65.5	65.9

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.6	62.7	60.9	54.9	63.5	64.1
Medium Trucks:	58.0	56.5	50.2	48.6	57.1	57.3
Heavy Trucks:	59.9	58.5	49.5	50.7	59.1	59.2
Vehicle Noise:	66.5	64.8	61.5	57.0	65.5	65.9

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

Scenario: Second Floor With Wall
Road Name: Brookside Ave
Lot No: Rest 1

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	45 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	23.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	60.189
Medium Trucks:	59.350
Heavy Trucks:	57.607

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-1.31	-1.20	*-18.34*	0.000	0.000
Medium Trucks:	73.11	-12.66	-1.22	-1.20	*-19.15*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-1.03	-1.20	*-21.22*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.6	62.7	60.9	54.9	63.5	64.1
Medium Trucks:	58.0	56.5	50.2	48.6	57.1	57.3
Heavy Trucks:	59.9	58.5	49.5	50.7	59.1	59.2
Vehicle Noise:	66.5	64.8	61.5	57.0	65.5	65.9

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.6	62.7	60.9	54.9	63.5	64.1
Medium Trucks:	58.0	56.5	50.2	48.6	57.1	57.3
Heavy Trucks:	59.9	58.5	49.5	50.7	59.1	59.2
Vehicle Noise:	66.5	64.8	61.5	57.0	65.5	65.9

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

Scenario: Second Floor With Wall
Road Name: Brookside Ave
Lot No: Rest 2

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	45 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	23.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	60.189
Medium Trucks:	59.350
Heavy Trucks:	57.607

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-1.31	-1.20	*-18.34*	0.000	0.000
Medium Trucks:	73.11	-12.66	-1.22	-1.20	*-19.15*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-1.03	-1.20	*-21.22*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.6	62.7	60.9	54.9	63.5	64.1
Medium Trucks:	58.0	56.5	50.2	48.6	57.1	57.3
Heavy Trucks:	59.9	58.5	49.5	50.7	59.1	59.2
Vehicle Noise:	66.5	64.8	61.5	57.0	65.5	65.9

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.6	62.7	60.9	54.9	63.5	64.1
Medium Trucks:	58.0	56.5	50.2	48.6	57.1	57.3
Heavy Trucks:	59.9	58.5	49.5	50.7	59.1	59.2
Vehicle Noise:	66.5	64.8	61.5	57.0	65.5	65.9

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

Scenario: Second Floor With Wall
Road Name: Eureka St
Lot No: Rest 2

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	23.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	52.010
Medium Trucks:	51.035
Heavy Trucks:	48.998

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-0.36	-1.20	*-17.58*	0.000	0.000
Medium Trucks:	73.11	-12.66	-0.24	-1.20	*-18.53*	0.000	0.000
Heavy Trucks:	78.76	-16.61	0.03	-1.20	*-20.97*	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:	65.5	63.6	61.9	55.8	64.4	65.0
Medium Trucks:	59.0	57.5	51.2	49.6	58.1	58.3
Heavy Trucks:	61.0	59.6	50.5	51.8	60.1	60.2
Vehicle Noise:	67.5	65.8	62.5	57.9	66.5	66.9

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.5	63.6	61.9	55.8	64.4	65.0
Medium Trucks:	59.0	57.5	51.2	49.6	58.1	58.3
Heavy Trucks:	61.0	59.6	50.5	51.8	60.1	60.2
Vehicle Noise:	67.5	65.8	62.5	57.9	66.5	66.9

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

Scenario: Second Floor With Wall
Road Name: Eureka St
Lot No: Rest 3

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	23.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	52.010
Medium Trucks:	51.035
Heavy Trucks:	48.998

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-0.36	-1.20	*-17.58*	0.000	0.000
Medium Trucks:	73.11	-12.66	-0.24	-1.20	*-18.53*	0.000	0.000
Heavy Trucks:	78.76	-16.61	0.03	-1.20	*-20.97*	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:	65.5	63.6	61.9	55.8	64.4	65.0
Medium Trucks:	59.0	57.5	51.2	49.6	58.1	58.3
Heavy Trucks:	61.0	59.6	50.5	51.8	60.1	60.2
Vehicle Noise:	67.5	65.8	62.5	57.9	66.5	66.9

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.5	63.6	61.9	55.8	64.4	65.0
Medium Trucks:	59.0	57.5	51.2	49.6	58.1	58.3
Heavy Trucks:	61.0	59.6	50.5	51.8	60.1	60.2
Vehicle Noise:	67.5	65.8	62.5	57.9	66.5	66.9

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

Scenario: Third Floor With Wall
Road Name: Brookside Ave
Lot No: Unit 1

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	45 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	32.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	64.170
Medium Trucks:	63.056
Heavy Trucks:	60.576

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-1.73	-1.20	*-23.48*	0.000	0.000
Medium Trucks:	73.11	-12.66	-1.61	-1.20	*-24.55*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-1.35	-1.20	*-27.31*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.2	62.3	60.5	54.4	63.1	63.7
Medium Trucks:	57.6	56.1	49.8	48.2	56.7	56.9
Heavy Trucks:	59.6	58.2	49.1	50.4	58.7	58.9
Vehicle Noise:	66.1	64.4	61.1	56.6	65.1	65.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.2	62.3	60.5	54.4	63.1	63.7
Medium Trucks:	57.6	56.1	49.8	48.2	56.7	56.9
Heavy Trucks:	59.6	58.2	49.1	50.4	58.7	58.9
Vehicle Noise:	66.1	64.4	61.1	56.6	65.1	65.6

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

Scenario: Third Floor With Wall
Road Name: Brookside Ave
Lot No: Unit 2

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	45 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	32.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	64.170
Medium Trucks:	63.056
Heavy Trucks:	60.576

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-1.73	-1.20	*-23.48*	0.000	0.000
Medium Trucks:	73.11	-12.66	-1.61	-1.20	*-24.55*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-1.35	-1.20	*-27.31*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.2	62.3	60.5	54.4	63.1	63.7
Medium Trucks:	57.6	56.1	49.8	48.2	56.7	56.9
Heavy Trucks:	59.6	58.2	49.1	50.4	58.7	58.9
Vehicle Noise:	66.1	64.4	61.1	56.6	65.1	65.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.2	62.3	60.5	54.4	63.1	63.7
Medium Trucks:	57.6	56.1	49.8	48.2	56.7	56.9
Heavy Trucks:	59.6	58.2	49.1	50.4	58.7	58.9
Vehicle Noise:	66.1	64.4	61.1	56.6	65.1	65.6

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

Scenario: Third Floor With Wall
Road Name: Brookside Ave
Lot No: Unit 3

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	45 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	32.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	64.170
Medium Trucks:	63.056
Heavy Trucks:	60.576

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-1.73	-1.20	*-23.48*	0.000	0.000
Medium Trucks:	73.11	-12.66	-1.61	-1.20	*-24.55*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-1.35	-1.20	*-27.31*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.2	62.3	60.5	54.4	63.1	63.7
Medium Trucks:	57.6	56.1	49.8	48.2	56.7	56.9
Heavy Trucks:	59.6	58.2	49.1	50.4	58.7	58.9
Vehicle Noise:	66.1	64.4	61.1	56.6	65.1	65.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.2	62.3	60.5	54.4	63.1	63.7
Medium Trucks:	57.6	56.1	49.8	48.2	56.7	56.9
Heavy Trucks:	59.6	58.2	49.1	50.4	58.7	58.9
Vehicle Noise:	66.1	64.4	61.1	56.6	65.1	65.6

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

Scenario: Third Floor With Wall
Road Name: Brookside Ave
Lot No: Unit 4

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	45 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	32.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	64.170
Medium Trucks:	63.056
Heavy Trucks:	60.576

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-1.73	-1.20	*-23.48*	0.000	0.000
Medium Trucks:	73.11	-12.66	-1.61	-1.20	*-24.55*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-1.35	-1.20	*-27.31*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.2	62.3	60.5	54.4	63.1	63.7
Medium Trucks:	57.6	56.1	49.8	48.2	56.7	56.9
Heavy Trucks:	59.6	58.2	49.1	50.4	58.7	58.9
Vehicle Noise:	66.1	64.4	61.1	56.6	65.1	65.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.2	62.3	60.5	54.4	63.1	63.7
Medium Trucks:	57.6	56.1	49.8	48.2	56.7	56.9
Heavy Trucks:	59.6	58.2	49.1	50.4	58.7	58.9
Vehicle Noise:	66.1	64.4	61.1	56.6	65.1	65.6

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

Scenario: Third Floor With Wall
Road Name: Brookside Ave
Lot No: Unit 5

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	45 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	32.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	64.170
Medium Trucks:	63.056
Heavy Trucks:	60.576

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-1.73	-1.20	*-23.48*	0.000	0.000
Medium Trucks:	73.11	-12.66	-1.61	-1.20	*-24.55*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-1.35	-1.20	*-27.31*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.2	62.3	60.5	54.4	63.1	63.7
Medium Trucks:	57.6	56.1	49.8	48.2	56.7	56.9
Heavy Trucks:	59.6	58.2	49.1	50.4	58.7	58.9
Vehicle Noise:	66.1	64.4	61.1	56.6	65.1	65.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.2	62.3	60.5	54.4	63.1	63.7
Medium Trucks:	57.6	56.1	49.8	48.2	56.7	56.9
Heavy Trucks:	59.6	58.2	49.1	50.4	58.7	58.9
Vehicle Noise:	66.1	64.4	61.1	56.6	65.1	65.6

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

Scenario: Third Floor With Wall
Road Name: Brookside Ave
Lot No: Rest 1

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	45 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	32.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	64.170
Medium Trucks:	63.056
Heavy Trucks:	60.576

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-1.73	-1.20	*-23.48*	0.000	0.000
Medium Trucks:	73.11	-12.66	-1.61	-1.20	*-24.55*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-1.35	-1.20	*-27.31*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.2	62.3	60.5	54.4	63.1	63.7
Medium Trucks:	57.6	56.1	49.8	48.2	56.7	56.9
Heavy Trucks:	59.6	58.2	49.1	50.4	58.7	58.9
Vehicle Noise:	66.1	64.4	61.1	56.6	65.1	65.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.2	62.3	60.5	54.4	63.1	63.7
Medium Trucks:	57.6	56.1	49.8	48.2	56.7	56.9
Heavy Trucks:	59.6	58.2	49.1	50.4	58.7	58.9
Vehicle Noise:	66.1	64.4	61.1	56.6	65.1	65.6

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

Scenario: Third Floor With Wall
Road Name: Brookside Ave
Lot No: Rest 2

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	45 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	32.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	64.170
Medium Trucks:	63.056
Heavy Trucks:	60.576

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-1.73	-1.20	*-23.48*	0.000	0.000
Medium Trucks:	73.11	-12.66	-1.61	-1.20	*-24.55*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-1.35	-1.20	*-27.31*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.2	62.3	60.5	54.4	63.1	63.7
Medium Trucks:	57.6	56.1	49.8	48.2	56.7	56.9
Heavy Trucks:	59.6	58.2	49.1	50.4	58.7	58.9
Vehicle Noise:	66.1	64.4	61.1	56.6	65.1	65.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.2	62.3	60.5	54.4	63.1	63.7
Medium Trucks:	57.6	56.1	49.8	48.2	56.7	56.9
Heavy Trucks:	59.6	58.2	49.1	50.4	58.7	58.9
Vehicle Noise:	66.1	64.4	61.1	56.6	65.1	65.6

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

Scenario: Third Floor With Wall
Road Name: Eureka St
Lot No: Rest 2

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	32.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	56.569
Medium Trucks:	55.302
Heavy Trucks:	52.457

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-0.91	-1.20	*-22.15*	0.000	0.000
Medium Trucks:	73.11	-12.66	-0.76	-1.20	*-23.38*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-0.42	-1.20	*-26.59*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.0	63.1	61.3	55.3	63.9	64.5
Medium Trucks:	58.5	57.0	50.6	49.1	57.5	57.8
Heavy Trucks:	60.5	59.1	50.1	51.3	59.7	59.8
Vehicle Noise:	67.0	65.3	62.0	57.4	66.0	66.4

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.0	63.1	61.3	55.3	63.9	64.5
Medium Trucks:	58.5	57.0	50.6	49.1	57.5	57.8
Heavy Trucks:	60.5	59.1	50.1	51.3	59.7	59.8
Vehicle Noise:	67.0	65.3	62.0	57.4	66.0	66.4

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

Scenario: Third Floor With Wall
Road Name: Eureka St
Lot No: Rest 3

Project Name: Center City
Job Number: 14444
Analyst: Bill Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,000 vehicles
Vehicle Speed:	30 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	32.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	56.569
Medium Trucks:	55.302
Heavy Trucks:	52.457

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	4.58	-0.91	-1.20	*-22.15*	0.000	0.000
Medium Trucks:	73.11	-12.66	-0.76	-1.20	*-23.38*	0.000	0.000
Heavy Trucks:	78.76	-16.61	-0.42	-1.20	*-26.59*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.0	63.1	61.3	55.3	63.9	64.5
Medium Trucks:	58.5	57.0	50.6	49.1	57.5	57.8
Heavy Trucks:	60.5	59.1	50.1	51.3	59.7	59.8
Vehicle Noise:	67.0	65.3	62.0	57.4	66.0	66.4

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.0	63.1	61.3	55.3	63.9	64.5
Medium Trucks:	58.5	57.0	50.6	49.1	57.5	57.8
Heavy Trucks:	60.5	59.1	50.1	51.3	59.7	59.8
Vehicle Noise:	67.0	65.3	62.0	57.4	66.0	66.4

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APPENDIX 8.1:

OFF-SITE TRAFFIC NOISE LEVEL CALCULATIONS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Eureka St.
Road Segment: n/o Redlands Blvd.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	12,994	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	958	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	24	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	36.0	feet
Centerline Dist. to Observer:	36.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	34.307
Medium Trucks:	34.049
Heavy Trucks:	34.074

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-1.04	2.35	-1.20	*-4.55*	0.000	0.000
Medium Trucks:	75.75	-18.28	2.40	-1.20	*-4.86*	0.000	0.000
Heavy Trucks:	81.57	-22.24	2.39	-1.20	*-5.63*	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:	64.4	63.8	62.1	56.0	64.6	65.2
Medium Trucks:	58.7	58.5	52.1	50.6	59.0	59.3
Heavy Trucks:	60.5	60.4	51.4	52.6	61.0	61.1
Vehicle Noise:	66.6	66.3	62.8	58.4	67.0	67.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	23	49	105	226
CNEL:	24	52	112	241

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Eureka St.
Road Segment: s/o Redlands Blvd.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,874	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	802	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	24	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	36.0	feet
Centerline Dist. to Observer:	36.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	34.307
Medium Trucks:	34.049
Heavy Trucks:	34.074

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-1.82	2.35	-1.20	*-4.55*	0.000	0.000
Medium Trucks:	75.75	-19.06	2.40	-1.20	*-4.86*	0.000	0.000
Heavy Trucks:	81.57	-23.01	2.39	-1.20	*-5.63*	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:	63.6	63.1	61.3	55.2	63.9	64.5
Medium Trucks:	57.9	57.7	51.3	49.8	58.3	58.5
Heavy Trucks:	59.8	59.7	50.6	51.9	60.2	60.3
Vehicle Noise:	65.9	65.5	62.0	57.7	66.2	66.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	20	43	93	200
CNEL:	21	46	99	214

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Eureka St.
Road Segment: s/o Citrus Ave.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,657	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	417	vehicles
Vehicle Speed:	25	mph
Near/Far Lane Distance:	18	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	36.0	feet
Centerline Dist. to Observer:	36.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	35.214
Medium Trucks:	34.961
Heavy Trucks:	34.986

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	58.73	-3.19	2.18	-1.20	*-4.55*	0.000	0.000
Medium Trucks:	70.80	-20.43	2.23	-1.20	*-4.86*	0.000	0.000
Heavy Trucks:	77.97	-24.39	2.22	-1.20	*-5.63*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	56.5	55.9	54.2	48.1	56.7	57.4
Medium Trucks:	51.4	51.2	44.8	43.3	51.8	52.0
Heavy Trucks:	54.6	54.5	45.5	46.7	55.1	55.2
Vehicle Noise:	59.4	59.1	55.2	51.2	59.8	60.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	7	16	35	75
CNEL:	8	17	37	79

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Brookside Ave.
Road Segment: e/o Eureka St.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,785	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	1,017	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	52	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	55.0	feet
Centerline Dist. to Observer:	55.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.724
Medium Trucks:	48.542
Heavy Trucks:	48.560

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-0.79	0.07	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	75.75	-18.03	0.09	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-21.98	0.09	-1.20	*-5.38*	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:	62.4	61.8	60.0	54.0	62.6	63.2
Medium Trucks:	56.6	56.4	50.1	48.5	57.0	57.2
Heavy Trucks:	58.5	58.4	49.3	50.6	58.9	59.1
Vehicle Noise:	64.6	64.2	60.8	56.4	64.9	65.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	25	54	117	252
CNEL:	27	58	125	269

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Brookside Ave.
Road Segment: w/o Eureka St.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,328	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	1,131	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	52	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	55.0	feet
Centerline Dist. to Observer:	55.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.724
Medium Trucks:	48.542
Heavy Trucks:	48.560

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-0.33	0.07	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	75.75	-17.56	0.09	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-21.52	0.09	-1.20	*-5.38*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	62.8	62.3	60.5	54.4	63.1	63.7
Medium Trucks:	57.1	56.9	50.5	49.0	57.4	57.7
Heavy Trucks:	58.9	58.8	49.8	51.0	59.4	59.5
Vehicle Noise:	65.1	64.7	61.2	56.9	65.4	65.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	27	58	126	271
CNEL:	29	62	134	289

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Brookside Ave.
Road Segment: e/o Center St.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,254	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	978	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	52	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	55.0	feet
Centerline Dist. to Observer:	55.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.724
Medium Trucks:	48.542
Heavy Trucks:	48.560

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-0.96	0.07	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	75.75	-18.20	0.09	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-22.15	0.09	-1.20	*-5.38*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	62.2	61.6	59.9	53.8	62.4	63.0
Medium Trucks:	56.4	56.3	49.9	48.4	56.8	57.0
Heavy Trucks:	58.3	58.2	49.2	50.4	58.8	58.9
Vehicle Noise:	64.4	64.0	60.6	56.2	64.7	65.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	25	53	114	246
CNEL:	26	57	122	262

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Redlands Blvd.
Road Segment: w/o Eureka St.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	19,986	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	1,474	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	40.0	feet
Centerline Dist. to Observer:	40.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	0.83	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	75.75	-16.41	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-20.37	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.7	66.1	64.3	58.3	66.9	67.5
Medium Trucks:	60.9	60.7	54.4	52.8	61.3	61.5
Heavy Trucks:	62.8	62.7	53.6	54.9	63.2	63.4
Vehicle Noise:	68.9	68.5	65.1	60.7	69.2	69.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	35	76	164	354
CNEL:	38	81	176	378

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Redlands Blvd.
Road Segment: e/o Eureka St.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	19,876	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	1,466	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	40.0	feet
Centerline Dist. to Observer:	40.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	0.80	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	75.75	-16.44	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-20.39	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.6	66.1	64.3	58.2	66.9	67.5
Medium Trucks:	60.9	60.7	54.3	52.8	61.3	61.5
Heavy Trucks:	62.8	62.7	53.6	54.9	63.2	63.3
Vehicle Noise:	68.9	68.5	65.0	60.7	69.2	69.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	35	76	164	353
CNEL:	38	81	175	377

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E + P
Road Name: Eureka St.
Road Segment: n/o Redlands Blvd.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,741 vehicles
Peak Hour Percentage:	7.38%
Peak Hour Volume:	1,087 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	36.0 feet
Centerline Dist. to Observer:	36.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	34.307
Medium Trucks:	34.049
Heavy Trucks:	34.074

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-0.50	2.35	-1.20	*-4.55*	0.000	0.000
Medium Trucks:	75.75	-17.73	2.40	-1.20	*-4.86*	0.000	0.000
Heavy Trucks:	81.57	-21.69	2.39	-1.20	*-5.63*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.0	64.4	62.6	56.6	65.2	65.8
Medium Trucks:	59.2	59.0	52.7	51.1	59.6	59.8
Heavy Trucks:	61.1	61.0	51.9	53.2	61.5	61.7
Vehicle Noise:	67.2	66.8	63.4	59.0	67.5	67.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	25	53	114	245
CNEL:	26	56	122	262

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E + P
Road Name: Eureka St.
Road Segment: s/o Redlands Blvd.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,223	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	975	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	24	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	36.0	feet
Centerline Dist. to Observer:	36.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	34.307
Medium Trucks:	34.049
Heavy Trucks:	34.074

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-0.97	2.35	-1.20	*-4.55*	0.000	0.000
Medium Trucks:	75.75	-18.21	2.40	-1.20	*-4.86*	0.000	0.000
Heavy Trucks:	81.57	-22.16	2.39	-1.20	*-5.63*	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:	64.5	63.9	62.1	56.1	64.7	65.3
Medium Trucks:	58.7	58.6	52.2	50.7	59.1	59.3
Heavy Trucks:	60.6	60.5	51.5	52.7	61.1	61.2
Vehicle Noise:	66.7	66.3	62.9	58.5	67.0	67.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	23	49	106	228
CNEL:	24	53	113	244

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E + P
Road Name: Eureka St.
Road Segment: s/o Citrus Ave.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	6,084 vehicles
Peak Hour Percentage:	7.38%
Peak Hour Volume:	449 vehicles
Vehicle Speed:	25 mph
Near/Far Lane Distance:	18 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	36.0 feet
Centerline Dist. to Observer:	36.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	35.214
Medium Trucks:	34.961
Heavy Trucks:	34.986

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	58.73	-2.88	2.18	-1.20	*-4.55*	0.000	0.000
Medium Trucks:	70.80	-20.12	2.23	-1.20	*-4.86*	0.000	0.000
Heavy Trucks:	77.97	-24.07	2.22	-1.20	*-5.63*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	56.8	56.3	54.5	48.4	57.1	57.7
Medium Trucks:	51.7	51.5	45.2	43.6	52.1	52.3
Heavy Trucks:	54.9	54.8	45.8	47.0	55.4	55.5
Vehicle Noise:	59.7	59.4	55.5	51.6	60.1	60.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	8	17	36	78
CNEL:	8	18	39	83

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E + P
Road Name: Brookside Ave.
Road Segment: e/o Eureka St.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,115	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	1,189	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	52	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	55.0	feet
Centerline Dist. to Observer:	55.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.724
Medium Trucks:	48.542
Heavy Trucks:	48.560

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-0.11	0.07	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	75.75	-17.35	0.09	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-21.30	0.09	-1.20	*-5.38*	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:	63.1	62.5	60.7	54.7	63.3	63.9
Medium Trucks:	57.3	57.1	50.7	49.2	57.7	57.9
Heavy Trucks:	59.2	59.1	50.0	51.3	59.6	59.7
Vehicle Noise:	65.3	64.9	61.5	57.1	65.6	66.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	28	60	130	280
CNEL:	30	64	139	299

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E + P
Road Name: Brookside Ave.
Road Segment: w/o Eureka St.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,860	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	1,170	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	52	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	55.0	feet
Centerline Dist. to Observer:	55.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.724
Medium Trucks:	48.542
Heavy Trucks:	48.560

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-0.18	0.07	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	75.75	-17.42	0.09	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-21.37	0.09	-1.20	*-5.38*	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:	63.0	62.4	60.6	54.6	63.2	63.8
Medium Trucks:	57.2	57.0	50.7	49.1	57.6	57.8
Heavy Trucks:	59.1	59.0	49.9	51.2	59.6	59.7
Vehicle Noise:	65.2	64.8	61.4	57.0	65.5	66.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	28	60	129	277
CNEL:	30	64	137	296

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E + P
Road Name: Brookside Ave.
Road Segment: e/o Center St.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,778	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	1,016	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	52	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	55.0	feet
Centerline Dist. to Observer:	55.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.724
Medium Trucks:	48.542
Heavy Trucks:	48.560

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-0.79	0.07	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	75.75	-18.03	0.09	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-21.98	0.09	-1.20	*-5.38*	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:	62.4	61.8	60.0	54.0	62.6	63.2
Medium Trucks:	56.6	56.4	50.1	48.5	57.0	57.2
Heavy Trucks:	58.5	58.4	49.3	50.6	58.9	59.1
Vehicle Noise:	64.6	64.2	60.8	56.4	64.9	65.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	25	54	117	252
CNEL:	27	58	125	269

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E + P
Road Name: Redlands Blvd.
Road Segment: w/o Eureka St.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,532	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	1,514	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	40.0	feet
Centerline Dist. to Observer:	40.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	0.94	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	75.75	-16.30	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-20.25	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.8	66.2	64.4	58.4	67.0	67.6
Medium Trucks:	61.0	60.8	54.5	52.9	61.4	61.6
Heavy Trucks:	62.9	62.8	53.8	55.0	63.4	63.5
Vehicle Noise:	69.0	68.6	65.2	60.8	69.3	69.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	36	78	167	360
CNEL:	39	83	179	385

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E + P
Road Name: Redlands Blvd.
Road Segment: e/o Eureka St.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	21,026	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	1,551	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	40.0	feet
Centerline Dist. to Observer:	40.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	1.05	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	75.75	-16.19	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-20.15	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.9	66.3	64.5	58.5	67.1	67.7
Medium Trucks:	61.1	61.0	54.6	53.0	61.5	61.7
Heavy Trucks:	63.0	62.9	53.9	55.1	63.5	63.6
Vehicle Noise:	69.1	68.7	65.3	60.9	69.4	69.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	37	79	170	366
CNEL:	39	84	182	391

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: Eureka St.
Road Segment: n/o Redlands Blvd.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,629 vehicles
Peak Hour Percentage:	7.38%
Peak Hour Volume:	1,079 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	36.0 feet
Centerline Dist. to Observer:	36.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	34.307
Medium Trucks:	34.049
Heavy Trucks:	34.074

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-0.53	2.35	-1.20	*-4.55*	0.000	0.000
Medium Trucks:	75.75	-17.77	2.40	-1.20	*-4.86*	0.000	0.000
Heavy Trucks:	81.57	-21.72	2.39	-1.20	*-5.63*	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	64.3	62.6	56.5	65.1	65.8
Medium Trucks:	59.2	59.0	52.6	51.1	59.5	59.8
Heavy Trucks:	61.0	60.9	51.9	53.2	61.5	61.6
Vehicle Noise:	67.2	66.8	63.3	58.9	67.5	67.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	24	53	113	244
CNEL:	26	56	121	261

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: Eureka St.
Road Segment: s/o Redlands Blvd.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,999	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	885	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	24	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	36.0	feet
Centerline Dist. to Observer:	36.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	34.307
Medium Trucks:	34.049
Heavy Trucks:	34.074

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-1.39	2.35	-1.20	*-4.55*	0.000	0.000
Medium Trucks:	75.75	-18.63	2.40	-1.20	*-4.86*	0.000	0.000
Heavy Trucks:	81.57	-22.58	2.39	-1.20	*-5.63*	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:	64.1	63.5	61.7	55.7	64.3	64.9
Medium Trucks:	58.3	58.1	51.8	50.2	58.7	58.9
Heavy Trucks:	60.2	60.1	51.0	52.3	60.6	60.8
Vehicle Noise:	66.3	65.9	62.5	58.1	66.6	67.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	21	46	99	214
CNEL:	23	49	106	229

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: Eureka St.
Road Segment: s/o Citrus Ave.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	6,124 vehicles
Peak Hour Percentage:	7.38%
Peak Hour Volume:	452 vehicles
Vehicle Speed:	25 mph
Near/Far Lane Distance:	18 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	36.0 feet
Centerline Dist. to Observer:	36.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	35.214
Medium Trucks:	34.961
Heavy Trucks:	34.986

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	58.73	-2.85	2.18	-1.20	*-4.55*	0.000	0.000
Medium Trucks:	70.80	-20.09	2.23	-1.20	*-4.86*	0.000	0.000
Heavy Trucks:	77.97	-24.04	2.22	-1.20	*-5.63*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	56.9	56.3	54.5	48.5	57.1	57.7
Medium Trucks:	51.7	51.5	45.2	43.6	52.1	52.3
Heavy Trucks:	55.0	54.9	45.8	47.1	55.4	55.5
Vehicle Noise:	59.8	59.4	55.5	51.6	60.1	60.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	8	17	37	79
CNEL:	8	18	39	84

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: Brookside Ave.
Road Segment: e/o Eureka St.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,095	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	1,113	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	52	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	55.0	feet
Centerline Dist. to Observer:	55.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.724
Medium Trucks:	48.542
Heavy Trucks:	48.560

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-0.39	0.07	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	75.75	-17.63	0.09	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-21.59	0.09	-1.20	*-5.38*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	62.8	62.2	60.4	54.4	63.0	63.6
Medium Trucks:	57.0	56.8	50.5	48.9	57.4	57.6
Heavy Trucks:	58.9	58.8	49.7	51.0	59.3	59.5
Vehicle Noise:	65.0	64.6	61.2	56.8	65.3	65.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	27	58	124	268
CNEL:	29	62	133	286

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: Brookside Ave.
Road Segment: w/o Eureka St.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,993	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	1,253	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	52	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	55.0	feet
Centerline Dist. to Observer:	55.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.724
Medium Trucks:	48.542
Heavy Trucks:	48.560

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	0.12	0.07	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	75.75	-17.12	0.09	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-21.07	0.09	-1.20	*-5.38*	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	62.7	60.9	54.9	63.5	64.1
Medium Trucks:	57.5	57.3	51.0	49.4	57.9	58.1
Heavy Trucks:	59.4	59.3	50.2	51.5	59.9	60.0
Vehicle Noise:	65.5	65.1	61.7	57.3	65.8	66.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	29	62	135	290
CNEL:	31	67	144	310

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: Brookside Ave.
Road Segment: e/o Center St.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,439	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	1,065	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	52	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	55.0	feet
Centerline Dist. to Observer:	55.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.724
Medium Trucks:	48.542
Heavy Trucks:	48.560

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-0.59	0.07	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	75.75	-17.82	0.09	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-21.78	0.09	-1.20	*-5.38*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	62.6	62.0	60.2	54.2	62.8	63.4
Medium Trucks:	56.8	56.6	50.3	48.7	57.2	57.4
Heavy Trucks:	58.7	58.6	49.5	50.8	59.1	59.3
Vehicle Noise:	64.8	64.4	61.0	56.6	65.1	65.6

Centerline Distance to Noise Contour (in feet)

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

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: Redlands Blvd.
Road Segment: w/o Eureka St.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,835	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	1,684	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	40.0	feet
Centerline Dist. to Observer:	40.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	1.40	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	75.75	-15.83	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-19.79	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.2	66.7	64.9	58.8	67.5	68.1
Medium Trucks:	61.5	61.3	54.9	53.4	61.9	62.1
Heavy Trucks:	63.4	63.3	54.2	55.5	63.8	63.9
Vehicle Noise:	69.5	69.1	65.6	61.3	69.8	70.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	39	83	180	387
CNEL:	41	89	192	413

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: Redlands Blvd.
Road Segment: e/o Eureka St.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,380 vehicles
Peak Hour Percentage:	7.38%
Peak Hour Volume:	1,651 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	40.0 feet
Centerline Dist. to Observer:	40.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	1.32	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	75.75	-15.92	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-19.88	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.1	66.6	64.8	58.7	67.4	68.0
Medium Trucks:	61.4	61.2	54.9	53.3	61.8	62.0
Heavy Trucks:	63.3	63.2	54.1	55.4	63.7	63.9
Vehicle Noise:	69.4	69.0	65.5	61.2	69.7	70.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	38	82	177	382
CNEL:	41	88	189	408

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYCP
Road Name: Eureka St.
Road Segment: n/o Redlands Blvd.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,376	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	1,208	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	24	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	36.0	feet
Centerline Dist. to Observer:	36.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	34.307
Medium Trucks:	34.049
Heavy Trucks:	34.074

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-0.04	2.35	-1.20	*-4.55*	0.000	0.000
Medium Trucks:	75.75	-17.28	2.40	-1.20	*-4.86*	0.000	0.000
Heavy Trucks:	81.57	-21.23	2.39	-1.20	*-5.63*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.4	64.8	63.1	57.0	65.6	66.2
Medium Trucks:	59.7	59.5	53.1	51.6	60.0	60.3
Heavy Trucks:	61.5	61.4	52.4	53.6	62.0	62.1
Vehicle Noise:	67.7	67.3	63.8	59.4	68.0	68.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	26	57	122	263
CNEL:	28	61	131	281

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYCP
Road Name: Eureka St.
Road Segment: s/o Redlands Blvd.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,348	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	1,058	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	24	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	36.0	feet
Centerline Dist. to Observer:	36.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	34.307
Medium Trucks:	34.049
Heavy Trucks:	34.074

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-0.61	2.35	-1.20	*-4.55*	0.000	0.000
Medium Trucks:	75.75	-17.85	2.40	-1.20	*-4.86*	0.000	0.000
Heavy Trucks:	81.57	-21.81	2.39	-1.20	*-5.63*	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	64.3	62.5	56.4	65.1	65.7
Medium Trucks:	59.1	58.9	52.5	51.0	59.5	59.7
Heavy Trucks:	61.0	60.9	51.8	53.1	61.4	61.6
Vehicle Noise:	67.1	66.7	63.2	58.9	67.4	67.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	24	52	112	241
CNEL:	26	55	120	258

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYCP
Road Name: Eureka St.
Road Segment: s/o Citrus Ave.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	6,571 vehicles
Peak Hour Percentage:	7.38%
Peak Hour Volume:	485 vehicles
Vehicle Speed:	25 mph
Near/Far Lane Distance:	18 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	36.0 feet
Centerline Dist. to Observer:	36.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	35.214
Medium Trucks:	34.961
Heavy Trucks:	34.986

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	58.73	-2.54	2.18	-1.20	*-4.55*	0.000	0.000
Medium Trucks:	70.80	-19.78	2.23	-1.20	*-4.86*	0.000	0.000
Heavy Trucks:	77.97	-23.74	2.22	-1.20	*-5.63*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	57.2	56.6	54.8	48.8	57.4	58.0
Medium Trucks:	52.0	51.9	45.5	43.9	52.4	52.6
Heavy Trucks:	55.3	55.2	46.1	47.4	55.7	55.9
Vehicle Noise:	60.1	59.7	55.8	51.9	60.4	60.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	8	18	38	82
CNEL:	9	19	41	88

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYCP
Road Name: Brookside Ave.
Road Segment: e/o Eureka St.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,425	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	1,285	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	52	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	55.0	feet
Centerline Dist. to Observer:	55.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.724
Medium Trucks:	48.542
Heavy Trucks:	48.560

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	0.23	0.07	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	75.75	-17.01	0.09	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-20.96	0.09	-1.20	*-5.38*	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:	63.4	62.8	61.1	55.0	63.6	64.2
Medium Trucks:	57.6	57.4	51.1	49.5	58.0	58.2
Heavy Trucks:	59.5	59.4	50.4	51.6	60.0	60.1
Vehicle Noise:	65.6	65.2	61.8	57.4	65.9	66.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	29	64	137	295
CNEL:	31	68	146	315

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYCP
Road Name: Brookside Ave.
Road Segment: w/o Eureka St.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,525	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	1,293	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	52	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	55.0	feet
Centerline Dist. to Observer:	55.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.724
Medium Trucks:	48.542
Heavy Trucks:	48.560

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	0.26	0.07	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	75.75	-16.98	0.09	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-20.94	0.09	-1.20	*-5.38*	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:	63.4	62.8	61.1	55.0	63.6	64.3
Medium Trucks:	57.7	57.5	51.1	49.6	58.0	58.3
Heavy Trucks:	59.5	59.4	50.4	51.6	60.0	60.1
Vehicle Noise:	65.7	65.3	61.8	57.4	66.0	66.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	30	64	137	296
CNEL:	32	68	147	316

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYCP
Road Name: Brookside Ave.
Road Segment: e/o Center St.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,963 vehicles
Peak Hour Percentage:	7.38%
Peak Hour Volume:	1,104 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	52 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	55.0 feet
Centerline Dist. to Observer:	55.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.724
Medium Trucks:	48.542
Heavy Trucks:	48.560

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	-0.43	0.07	-1.20	*-4.67*	0.000	0.000
Medium Trucks:	75.75	-17.67	0.09	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-21.63	0.09	-1.20	*-5.38*	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:	62.7	62.2	60.4	54.3	63.0	63.6
Medium Trucks:	57.0	56.8	50.4	48.9	57.3	57.6
Heavy Trucks:	58.8	58.7	49.7	50.9	59.3	59.4
Vehicle Noise:	65.0	64.6	61.1	56.7	65.3	65.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	27	57	124	266
CNEL:	28	61	132	285

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYCP
Road Name: Redlands Blvd.
Road Segment: w/o Eureka St.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,381	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	1,725	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	40.0	feet
Centerline Dist. to Observer:	40.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	1.51	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	75.75	-15.73	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-19.69	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.3	66.8	65.0	58.9	67.6	68.2
Medium Trucks:	61.6	61.4	55.1	53.5	62.0	62.2
Heavy Trucks:	63.5	63.4	54.3	55.6	63.9	64.1
Vehicle Noise:	69.6	69.2	65.7	61.4	69.9	70.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	39	85	182	393
CNEL:	42	90	195	420

Tuesday, May 31, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYCP
Road Name: Redlands Blvd.
Road Segment: e/o Eureka St.

Project Name: Stage Street Village
Job Number: 14013

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,530	vehicles
Peak Hour Percentage:	7.38%	
Peak Hour Volume:	1,736	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	40.0	feet
Centerline Dist. to Observer:	40.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	1.53	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	75.75	-15.70	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-19.66	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.4	66.8	65.0	59.0	67.6	68.2
Medium Trucks:	61.6	61.4	55.1	53.5	62.0	62.2
Heavy Trucks:	63.5	63.4	54.3	55.6	64.0	64.1
Vehicle Noise:	69.6	69.2	65.8	61.4	69.9	70.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	39	85	183	395
CNEL:	42	91	196	422

Tuesday, May 31, 2022

APPENDIX 10.1:

CADNAA OPERATIONAL NOISE MODEL INPUTS

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14444 - City Center - Operation

CadnaA Noise Prediction Model: 14444-02_Operation.cna
Date: 25.05.22
Analyst: B. Maddux

Calculation Configuration

Configuration	
Parameter	**Value**
General	
Max. Error (dB)	**0.00**
Max. Search Radius (#(Unit,LEN))	**2000.01**
Min. Dist Src to Rcvr	**0.00**
Partition	
Raster Factor	**0.50**
Max. Length of Section (#(Unit,LEN))	**999.99**
Min. Length of Section (#(Unit,LEN))	**1.01**
Min. Length of Section (%)	**0.00**
Proj. Line Sources	**On**
Proj. Area Sources	**On**
Ref. Time	
Reference Time Day (min)	**960.00**
Reference Time Night (min)	**480.00**
Daytime Penalty (dB)	**0.00**
Recr. Time Penalty (dB)	**5.00**
Night-time Penalty (dB)	**10.00**
DTM	
Standard Height (m)	**0.00**
Model of Terrain	**Triangulation**
Reflection	
max. Order of Reflection	**2**
Search Radius Src	**100.00**
Search Radius Rcvr	**100.00**
Max. Distance Source - Rcvr	**1000.00 1000.00**
Min. Distance Rvcr - Reflector	**1.00 1.00**
Min. Distance Source - Reflector	**0.10**
Industrial (ISO 9613)	
Lateral Diffraction	**some Obj**
Obst. within Area Src do not shield	**On**
Screening	**Incl. Ground Att. over Barrier**
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	**3.0 20.0 0.0**
Temperature (#(Unit,TEMP))	**10**
rel. Humidity (%)	**70**
Ground Absorption G	**0.50**
Wind Speed for Dir. (#(Unit,SPEED))	**3.0**
Roads (TNM)	
Railways (FTA/FRA)	
Aircraft (???)	
Strictly acc. to AzB	

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
R1		R1	56.2	56.2	62.8	0.0	0.0	0.0		x	Total	5.00	a	6277975.04	2329230.47	5.00
R2		R2	48.2	48.2	54.9	0.0	0.0	0.0		x	Total	5.00	a	6278566.01	2328823.52	5.00
R3		R3	50.6	50.6	57.3	0.0	0.0	0.0		x	Total	5.00	a	6278052.82	2328697.13	5.00
R4		R4	47.9	47.9	54.6	0.0	0.0	0.0		x	Total	5.00	a	6277790.32	2328912.41	5.00

Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night			X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(ft)		(ft)	(ft)	(ft)
POINTSOURCE		AC01	76.0	76.0	76.0	Lw	76					4.00	g	6278133.75	2329027.27	24.00
POINTSOURCE		AC02	76.0	76.0	76.0	Lw	76					4.00	g	6278128.12	2329027.34	24.00
POINTSOURCE		AC03	76.0	76.0	76.0	Lw	76					4.00	g	6278122.78	2329027.41	24.00
POINTSOURCE		AC04	76.0	76.0	76.0	Lw	76					4.00	g	6278122.29	2329022.13	24.00
POINTSOURCE		AC05	76.0	76.0	76.0	Lw	76					4.00	g	6278127.92	2329021.93	24.00
POINTSOURCE		AC06	76.0	76.0	76.0	Lw	76					4.00	g	6278133.47	2329021.65	24.00
POINTSOURCE		AC07	76.0	76.0	76.0	Lw	76					4.00	g	6278146.11	2328989.01	24.00
POINTSOURCE		AC08	76.0	76.0	76.0	Lw	76					4.00	g	6278149.10	2328984.29	24.00
POINTSOURCE		AC09	76.0	76.0	76.0	Lw	76					4.00	g	6278152.01	2328979.70	24.00
POINTSOURCE		AC10	76.0	76.0	76.0	Lw	76					4.00	g	6278155.00	2328975.12	24.00
POINTSOURCE		AC11	76.0	76.0	76.0	Lw	76					4.00	g	6278157.92	2328970.33	24.00
POINTSOURCE		AC12	76.0	76.0	76.0	Lw	76					4.00	g	6278160.90	2328965.88	24.00
POINTSOURCE		AC13	76.0	76.0	76.0	Lw	76					4.00	g	6278105.48	2328949.08	24.00
POINTSOURCE		AC14	76.0	76.0	76.0	Lw	76					4.00	g	6278108.33	2328944.57	24.00

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		AC15	76.0	76.0	76.0	Lw	76					4.00	g	6278111.25	2328939.84	24.00
POINTSOURCE		AC16	76.0	76.0	76.0	Lw	76					4.00	g	6278114.23	2328935.05	24.00
POINTSOURCE		AC17	76.0	76.0	76.0	Lw	76					4.00	g	6278109.37	2328932.41	24.00
POINTSOURCE		AC18	76.0	76.0	76.0	Lw	76					4.00	g	6278106.46	2328936.86	24.00
POINTSOURCE		AC19	76.0	76.0	76.0	Lw	76					4.00	g	6278103.61	2328941.44	24.00
POINTSOURCE		AC20	76.0	76.0	76.0	Lw	76					4.00	g	6278100.69	2328946.09	24.00
POINTSOURCE		AC21	76.0	76.0	76.0	Lw	76					4.00	g	6277927.28	2328938.98	44.00
POINTSOURCE		AC22	76.0	76.0	76.0	Lw	76					4.00	g	6277930.21	2328934.53	44.00
POINTSOURCE		AC23	76.0	76.0	76.0	Lw	76					4.00	g	6277933.14	2328929.98	44.00
POINTSOURCE		AC24	76.0	76.0	76.0	Lw	76					4.00	g	6277936.40	2328925.09	44.00
POINTSOURCE		AC25	76.0	76.0	76.0	Lw	76					4.00	g	6277922.29	2328936.05	44.00
POINTSOURCE		AC26	76.0	76.0	76.0	Lw	76					4.00	g	6277925.55	2328931.60	44.00
POINTSOURCE		AC27	76.0	76.0	76.0	Lw	76					4.00	g	6277928.26	2328927.05	44.00
POINTSOURCE		AC28	76.0	76.0	76.0	Lw	76					4.00	g	6277931.08	2328922.16	44.00
POINTSOURCE		AC29	76.0	76.0	76.0	Lw	76					4.00	g	6277912.64	2328930.41	44.00
POINTSOURCE		AC30	76.0	76.0	76.0	Lw	76					4.00	g	6277917.63	2328933.34	44.00
POINTSOURCE		AC31	76.0	76.0	76.0	Lw	76					4.00	g	6277923.49	2328924.33	44.00
POINTSOURCE		AC32	76.0	76.0	76.0	Lw	76					4.00	g	6277921.42	2328916.52	44.00
POINTSOURCE		AC33	76.0	76.0	76.0	Lw	76					4.00	g	6277918.60	2328921.40	44.00
POINTSOURCE		AC34	76.0	76.0	76.0	Lw	76					4.00	g	6277926.74	2328919.45	44.00
POINTSOURCE		AC35	76.0	76.0	76.0	Lw	76					4.00	g	6277915.89	2328925.96	44.00
POINTSOURCE		AC36	76.0	76.0	76.0	Lw	76					4.00	g	6277920.56	2328928.89	44.00
POINTSOURCE		AC37	76.0	76.0	76.0	Lw	76					4.00	g	6277906.34	2328919.88	44.00
POINTSOURCE		AC38	76.0	76.0	76.0	Lw	76					4.00	g	6277917.19	2328913.37	44.00
POINTSOURCE		AC39	76.0	76.0	76.0	Lw	76					4.00	g	6277911.88	2328910.44	44.00
POINTSOURCE		AC40	76.0	76.0	76.0	Lw	76					4.00	g	6277903.09	2328924.33	44.00
POINTSOURCE		AC41	76.0	76.0	76.0	Lw	76					4.00	g	6277913.94	2328918.26	44.00
POINTSOURCE		AC42	76.0	76.0	76.0	Lw	76					4.00	g	6277908.08	2328927.26	44.00
POINTSOURCE		AC43	76.0	76.0	76.0	Lw	76					4.00	g	6277909.05	2328915.33	44.00
POINTSOURCE		AC44	76.0	76.0	76.0	Lw	76					4.00	g	6277911.01	2328922.81	44.00
POINTSOURCE		AC45	76.0	76.0	76.0	Lw	76					4.00	g	6277898.20	2328921.73	44.00
POINTSOURCE		AC46	76.0	76.0	76.0	Lw	76					4.00	g	6277896.47	2328914.35	44.00
POINTSOURCE		AC47	76.0	76.0	76.0	Lw	76					4.00	g	6277902.00	2328904.91	44.00
POINTSOURCE		AC48	76.0	76.0	76.0	Lw	76					4.00	g	6277901.13	2328917.28	44.00
POINTSOURCE		AC49	76.0	76.0	76.0	Lw	76					4.00	g	6277893.21	2328918.80	44.00
POINTSOURCE		AC50	76.0	76.0	76.0	Lw	76					4.00	g	6277907.32	2328907.84	44.00
POINTSOURCE		AC51	76.0	76.0	76.0	Lw	76					4.00	g	6277899.18	2328909.79	44.00
POINTSOURCE		AC52	76.0	76.0	76.0	Lw	76					4.00	g	6277904.06	2328912.72	44.00
POINTSOURCE		AC53	76.0	76.0	76.0	Lw	76					4.00	g	6277857.08	2328890.80	44.00
POINTSOURCE		AC54	76.0	76.0	76.0	Lw	76					4.00	g	6277855.13	2328883.32	44.00
POINTSOURCE		AC55	76.0	76.0	76.0	Lw	76					4.00	g	6277849.16	2328892.32	44.00
POINTSOURCE		AC56	76.0	76.0	76.0	Lw	76					4.00	g	6277867.82	2328883.97	44.00
POINTSOURCE		AC57	76.0	76.0	76.0	Lw	76					4.00	g	6277878.24	2328909.58	44.00
POINTSOURCE		AC58	76.0	76.0	76.0	Lw	76					4.00	g	6277883.23	2328912.51	44.00
POINTSOURCE		AC59	76.0	76.0	76.0	Lw	76					4.00	g	6277868.58	2328903.93	44.00
POINTSOURCE		AC60	76.0	76.0	76.0	Lw	76					4.00	g	6277881.49	2328905.13	44.00
POINTSOURCE		AC61	76.0	76.0	76.0	Lw	76					4.00	g	6277877.37	2328890.04	44.00
POINTSOURCE		AC62	76.0	76.0	76.0	Lw	76					4.00	g	6277869.88	2328891.78	44.00
POINTSOURCE		AC63	76.0	76.0	76.0	Lw	76					4.00	g	6277892.34	2328898.62	44.00
POINTSOURCE		AC64	76.0	76.0	76.0	Lw	76					4.00	g	6277887.03	2328895.69	44.00
POINTSOURCE		AC65	76.0	76.0	76.0	Lw	76					4.00	g	6277865.00	2328888.85	44.00
POINTSOURCE		AC66	76.0	76.0	76.0	Lw	76					4.00	g	6277873.57	2328906.86	44.00
POINTSOURCE		AC67	76.0	76.0	76.0	Lw	76					4.00	g	6277852.41	2328887.87	44.00
POINTSOURCE		AC68	76.0	76.0	76.0	Lw	76					4.00	g	6277873.14	2328886.90	44.00
POINTSOURCE		AC69	76.0	76.0	76.0	Lw	76					4.00	g	6277882.69	2328892.97	44.00
POINTSOURCE		AC70	76.0	76.0	76.0	Lw	76					4.00	g	6277886.16	2328908.06	44.00
POINTSOURCE		AC71	76.0	76.0	76.0	Lw	76					4.00	g	6277866.95	2328896.34	44.00
POINTSOURCE		AC72	76.0	76.0	76.0	Lw	76					4.00	g	6277879.43	2328897.86	44.00
POINTSOURCE		AC73	76.0	76.0	76.0	Lw	76					4.00	g	6277874.55	2328894.93	44.00
POINTSOURCE		AC74	76.0	76.0	76.0	Lw	76					4.00	g	6277871.84	2328899.48	44.00
POINTSOURCE		AC75	76.0	76.0	76.0	Lw	76					4.00	g	6277884.21	2328900.57	44.00
POINTSOURCE		AC76	76.0	76.0	76.0	Lw	76					4.00	g	6277857.95	2328878.43	44.00
POINTSOURCE		AC77	76.0	76.0	76.0	Lw	76					4.00	g	6277864.02	2328900.79	44.00
POINTSOURCE		AC78	76.0	76.0	76.0	Lw	76					4.00	g	6277862.29	2328893.41	44.00
POINTSOURCE		AC79	76.0	76.0	76.0	Lw	76					4.00	g	6277889.09	2328903.50	44.00
POINTSOURCE		AC80	76.0	76.0	76.0	Lw	76					4.00	g	6277863.26	2328881.36	44.00
POINTSOURCE		AC81	76.0	76.0	76.0	Lw	76					4.00	g	6277860.01	2328886.25	44.00
POINTSOURCE		AC82	76.0	76.0	76.0	Lw	76					4.00	g	6277859.03	2328897.86	44.00
POINTSOURCE		AC83	76.0	76.0	76.0	Lw	76					4.00	g	6277876.50	2328902.41	44.00
POINTSOURCE		AC84	76.0	76.0	76.0	Lw	76					4.00	g	6277854.15	2328895.25	44.00
POINTSOURCE		Park01	87.8	87.8	87.8	Lw	87.8					5.00	a	6278144.46	2329138.32	5.00
POINTSOURCE		Park02	87.8	87.8	87.8	Lw	87.8					5.00	a	6278030.57	2329140.75	5.00
POINTSOURCE		Park03	87.8	87.8	87.8	Lw	87.8					5.00	a	6277942.03	2329145.61	5.00
POINTSOURCE		Park04	87.8	87.8	87.8	Lw	87.8					5.00	a	6278130.22	2329099.08	5.00
POINTSOURCE		Park05	87.8	87.8	87.8	Lw	87.8					5.00	a	6278081.96	2329031.03	5.00
POINTSOURCE		Park06	87.8	87.8	87.8	Lw	87.8					5.00	a	6278038.56	2329054.99	5.00
POINTSOURCE		Park07	87.8	87.8	87.8	Lw	87.8					5.00	a	6278011.13	2329056.38	5.00

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		Park08	87.8	87.8	87.8	Lw	87.8					5.00	a	6278076.06	2328930.33	5.00
POINTSOURCE		Park09	87.8	87.8	87.8	Lw	87.8					5.00	a	6278049.32	2328899.78	5.00
POINTSOURCE		Park10	87.8	87.8	87.8	Lw	87.8					5.00	a	6277810.43	2329112.97	5.00
POINTSOURCE		Park11	87.8	87.8	87.8	Lw	87.8					5.00	a	6277751.06	2329117.14	5.00
POINTSOURCE		Park12	87.8	87.8	87.8	Lw	87.8					5.00	a	6277748.63	2329084.15	5.00
POINTSOURCE		Seating01	91.5	91.5	91.5	Lw	91.5					5.00	g	6277825.36	2329070.61	35.00
POINTSOURCE		Seating02	91.5	91.5	91.5	Lw	91.5					5.00	g	6277859.04	2329069.57	35.00
POINTSOURCE		Seating03	91.5	91.5	91.5	Lw	91.5					5.00	g	6277845.50	2329040.75	35.00
POINTSOURCE		Seating04	91.5	91.5	91.5	Lw	91.5					5.00	g	6277869.46	2329039.71	35.00
POINTSOURCE		Seating05	91.5	91.5	91.5	Lw	91.5					5.00	g	6277887.17	2329035.20	35.00
POINTSOURCE		Seating06	91.5	91.5	91.5	Lw	91.5					5.00	g	6277906.26	2329034.15	35.00
POINTSOURCE		Seating07	91.5	91.5	91.5	Lw	91.5					5.00	g	6277918.76	2329020.96	35.00
POINTSOURCE		Seating08	91.5	91.5	91.5	Lw	91.5					5.00	g	6277918.42	2329001.52	35.00
POINTSOURCE		Seating09	91.5	91.5	91.5	Lw	91.5					5.00	g	6277889.60	2329045.96	35.00
POINTSOURCE		Seating10	91.5	91.5	91.5	Lw	91.5					5.00	g	6277905.22	2329045.27	35.00
POINTSOURCE		Seating11	91.5	91.5	91.5	Lw	91.5					5.00	g	6277921.19	2329044.92	35.00
POINTSOURCE		Seating12	91.5	91.5	91.5	Lw	91.5					5.00	g	6277936.82	2329044.57	35.00
POINTSOURCE		Seating13	91.5	91.5	91.5	Lw	91.5					5.00	g	6277935.43	2329028.95	35.00
POINTSOURCE		Seating14	91.5	91.5	91.5	Lw	91.5					5.00	g	6277935.43	2329013.67	35.00
POINTSOURCE		Seating15	91.5	91.5	91.5	Lw	91.5					5.00	g	6277958.69	2329015.75	35.00
POINTSOURCE		Seating16	91.5	91.5	91.5	Lw	91.5					5.00	g	6277960.08	2329042.49	35.00
POINTSOURCE		Seating17	91.5	91.5	91.5	Lw	91.5					5.00	g	6277925.01	2329070.96	35.00
POINTSOURCE		Seating18	91.5	91.5	91.5	Lw	91.5					5.00	g	6277896.89	2329073.04	35.00
POINTSOURCE		Seating19	91.5	91.5	91.5	Lw	91.5					4.00	g	6278117.54	2328904.57	4.00
POINTSOURCE		Seating20	91.5	91.5	91.5	Lw	91.5					4.00	g	6278129.00	2328911.34	4.00
POINTSOURCE		Seating21	91.5	91.5	91.5	Lw	91.5					4.00	g	6278139.24	2328918.63	4.00
POINTSOURCE		Seating22	91.5	91.5	91.5	Lw	91.5					4.00	g	6278149.66	2328924.36	4.00
POINTSOURCE		Seating23	91.5	91.5	91.5	Lw	91.5					4.00	g	6278159.55	2328930.26	4.00
POINTSOURCE		Seating24	91.5	91.5	91.5	Lw	91.5					4.00	g	6278181.43	2328945.19	4.00
POINTSOURCE		Seating25	91.5	91.5	91.5	Lw	91.5					4.00	g	6278192.89	2328951.79	4.00
POINTSOURCE		Seating26	91.5	91.5	91.5	Lw	91.5					4.00	g	6278206.60	2328960.12	4.00
POINTSOURCE		Seating27	91.5	91.5	91.5	Lw	91.5					4.00	g	6278214.07	2329000.22	4.00
POINTSOURCE		Seating28	91.5	91.5	91.5	Lw	91.5					4.00	g	6278208.34	2329007.86	4.00
POINTSOURCE		Seating29	91.5	91.5	91.5	Lw	91.5					4.00	g	6278202.09	2329016.02	4.00
POINTSOURCE		Seating30	91.5	91.5	91.5	Lw	91.5					4.00	g	6278195.84	2329027.83	4.00
POINTSOURCE		Seating31	91.5	91.5	91.5	Lw	91.5					4.00	g	6278180.73	2329052.31	4.00
POINTSOURCE		Seating32	91.5	91.5	91.5	Lw	91.5					4.00	g	6278189.07	2329054.22	4.00
POINTSOURCE		Seating33	91.5	91.5	91.5	Lw	91.5					4.00	g	6278184.90	2329064.81	4.00
POINTSOURCE		Seating34	91.5	91.5	91.5	Lw	91.5					4.00	g	6278176.05	2329062.72	4.00
POINTSOURCE		Trash1	88.9	88.9	88.9	Lw	88.9					8.00	a	6278094.81	2329139.36	8.00
POINTSOURCE		Pool1	89.3	89.3	89.3	Lw	89.3					5.00	a	6277861.82	2328999.08	5.00
POINTSOURCE		Pool2	89.3	89.3	89.3	Lw	89.3					5.00	a	6277884.74	2328998.39	5.00
POINTSOURCE		Pool3	89.3	89.3	89.3	Lw	89.3					5.00	a	6277937.17	2328889.02	5.00

Building(s)

Name	M.	ID	RB	Residents	Absorption	Height		Coordinates			
						Begin		x	y	z	Ground
						(ft)		(ft)	(ft)	(ft)	(ft)
BUILDING		BUILDING00001	x	0		40.00	a	6277848.51	2328982.17	40.00	0.00
								6277872.73	2328942.85	40.00	0.00
								6277916.74	2328968.37	40.00	0.00
								6277944.87	2328924.62	40.00	0.00
								6277895.65	2328894.41	40.00	0.00
								6277914.66	2328863.94	40.00	0.00
								6277880.54	2328843.11	40.00	0.00
								6277861.53	2328873.84	40.00	0.00
								6277855.26	2328870.48	40.00	0.00
								6277805.51	2328956.40	40.00	0.00
BUILDING		BUILDING00003	x	0		20.00	a	6278138.31	2329015.37	20.00	0.00
								6278095.67	2329018.73	20.00	0.00
								6278098.16	2329067.99	20.00	0.00
								6278109.78	2329067.45	20.00	0.00
								6278110.43	2329083.84	20.00	0.00
								6278166.85	2329081.77	20.00	0.00
								6278174.45	2329076.89	20.00	0.00
								6278174.99	2329071.36	20.00	0.00
								6278167.07	2329064.63	20.00	0.00
								6278165.98	2329040.87	20.00	0.00
								6278150.68	2329041.41	20.00	0.00
								6278150.25	2329031.21	20.00	0.00
								6278139.29	2329031.75	20.00	0.00
BUILDING		BUILDING00004	x	0		20.00	a	6278139.29	2329007.01	20.00	0.00
								6278186.81	2329032.84	20.00	0.00
								6278214.16	2328990.74	20.00	0.00
								6278203.31	2328984.77	20.00	0.00
								6278210.04	2328973.81	20.00	0.00

Name	M.	ID	RB	Residents	Absorption	Height		Coordinates			
						Begin		x	y	z	Ground
						(ft)		(ft)	(ft)	(ft)	(ft)
								6278165.33	2328946.36	20.00	0.00
								6278137.66	2328991.61	20.00	0.00
								6278145.58	2328996.92	20.00	0.00
BUILDING		BUILDING00005	x	0		20.00	a	6278123.66	2329001.91	20.00	0.00
								6278161.32	2328940.50	20.00	0.00
								6278104.02	2328909.79	20.00	0.00
								6278078.20	2328950.92	20.00	0.00
								6278100.01	2328964.48	20.00	0.00
								6278102.07	2328970.55	20.00	0.00
								6278093.28	2328983.58	20.00	0.00
BUILDING		BUILDING00002	x	0		30.00	a	6277982.16	2329088.89	30.00	0.00
								6277978.12	2328996.31	30.00	0.00
								6278029.29	2328915.32	30.00	0.00
								6278018.57	2328908.72	30.00	0.00
								6278048.35	2328861.59	30.00	0.00
								6277912.96	2328779.81	30.00	0.00
								6277805.10	2328949.30	30.00	0.00
								6277848.51	2328982.17	30.00	0.00
								6277872.73	2328942.85	30.00	0.00
								6277912.01	2328965.62	30.00	0.00
								6277944.87	2328924.62	30.00	0.00
								6277902.12	2328898.38	30.00	0.00
								6277940.70	2328837.64	30.00	0.00
								6277982.89	2328862.90	30.00	0.00
								6277944.87	2328924.62	30.00	0.00
								6277912.01	2328965.62	30.00	0.00
								6277915.18	2329029.04	30.00	0.00
								6277840.96	2329031.39	30.00	0.00
								6277838.09	2328975.92	30.00	0.00
								6277805.10	2328949.30	30.00	0.00
								6277812.92	2329085.15	30.00	0.00
								6277941.61	2329080.81	30.00	0.00
								6277942.26	2329090.57	30.00	0.00

APPENDIX 11.1:

CADNAA CONSTRUCTION NOISE MODEL INPUTS

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14444 - City Center - Construction

CadnaA Noise Prediction Model: 14444-02_Construction.cna
Date: 25.05.22
Analyst: B. Maddux

Calculation Configuration

Configuration	
Parameter	**Value**
General	
Max. Error (dB)	**0.00**
Max. Search Radius (#(Unit,LEN))	**2000.01**
Min. Dist Src to Rcvr	**0.00**
Partition	
Raster Factor	**0.50**
Max. Length of Section (#(Unit,LEN))	**999.99**
Min. Length of Section (#(Unit,LEN))	**1.01**
Min. Length of Section (%)	**0.00**
Proj. Line Sources	**On**
Proj. Area Sources	**On**
Ref. Time	
Reference Time Day (min)	**960.00**
Reference Time Night (min)	**480.00**
Daytime Penalty (dB)	**0.00**
Recr. Time Penalty (dB)	**5.00**
Night-time Penalty (dB)	**10.00**
DTM	
Standard Height (m)	**0.00**
Model of Terrain	**Triangulation**
Reflection	
max. Order of Reflection	**2**
Search Radius Src	**100.00**
Search Radius Rcvr	**100.00**
Max. Distance Source - Rcvr	**1000.00 1000.00**
Min. Distance Rvcr - Reflector	**1.00 1.00**
Min. Distance Source - Reflector	**0.10**
Industrial (ISO 9613)	
Lateral Diffraction	**some Obj**
Obst. within Area Src do not shield	**On**
Screening	**Incl. Ground Att. over Barrier**
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	**3.0 20.0 0.0**
Temperature (#(Unit,TEMP))	**10**
rel. Humidity (%)	**70**
Ground Absorption G	**0.50**
Wind Speed for Dir. (#(Unit,SPEED))	**3.0**
Roads (TNM)	
Railways (FTA/FRA)	
Aircraft (???)	
Strictly acc. to AzB	

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
R1		R1	71.1	-31.9	68.1	0.0	0.0	0.0		x	Total	5.00	a	6277975.04	2329230.47	5.00
R2		R2	61.5	-41.5	58.5	0.0	0.0	0.0		x	Total	5.00	a	6278566.01	2328823.52	5.00
R3		R3	67.9	-35.1	64.9	0.0	0.0	0.0		x	Total	5.00	a	6278052.82	2328697.13	5.00
R4		R4	76.1	-26.9	73.1	0.0	0.0	0.0		x	Total	5.00	a	6277790.32	2328912.41	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)		
Construction Activity		CA1	118.8	15.8	15.8	77.8	-25.2	-25.2	PWL-Pt	115.8					8	a

Name	Height				Coordinates			
	Begin		End		x	y	z	Ground
	(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
Construction Activity	8.00	a			6277704.55	2329042.82	8.00	0.00
					6277705.41	2329151.35	8.00	0.00
					6277787.56	2329149.54	8.00	0.00
					6277834.87	2329132.83	8.00	0.00
					6277884.82	2329144.15	8.00	0.00
					6277885.43	2329163.21	8.00	0.00
					6278192.00	2329153.16	8.00	0.00
					6278191.47	2329080.51	8.00	0.00
					6278205.28	2329037.49	8.00	0.00

Name	Height		Coordinates			
	Begin	End	x	y	z	Ground
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
			6278238.27	2328973.66	8.00	0.00
			6278229.29	2328963.65	8.00	0.00
			6277902.91	2328760.26	8.00	0.00
			6277757.56	2328981.86	8.00	0.00
			6277778.53	2328995.47	8.00	0.00
			6277788.30	2328995.52	8.00	0.00
			6277789.73	2329048.41	8.00	0.00