Ottawa Business Center

NOISE IMPACT ANALYSIS

CITY OF VICTORVILLE

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LIST OF ABBREVIATED TERMS

(1)	Reference
ANSI	American National Standards Institute
Calveno	California Vehicle Noise
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
INCE	Institute of Noise Control Engineering
L_{eq}	Equivalent continuous (average) sound level
L_{max}	Maximum level measured over the time interval
mph	Miles per hour
PPV	Peak Particle Velocity
Project	Ottawa Business 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 mitigation measures for the proposed Ottawa Business Center development ("Project"). The Project site is located at the northeast corner of Hesperia Road and Ottawa Street in the City of Victorville. The Project is proposed to consist of 200,000 square feet of high-cube cold storage warehouse use and 796,520 square feet of high-cube fulfillment center warehouse use. This noise study has been prepared to satisfy applicable City of Victorville noise standards and significance criteria based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

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

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Off-Site Noise	7	*Potentially Significant*	*Potentially Significant*
On-Site Noise	8	*Less Than Significant*	-
Operational Noise	11	*Less Than Significant*	-
Construction Noise	12	*Less Than Significant*	-
Construction Vibration		*Less Than Significant*	-

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1 INTRODUCTION

This noise analysis has been completed to determine the noise impacts associated with the development of the proposed Ottawa Business 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 procedures for noise analysis, and evaluates off-site noise impacts, long-term stationary-source operational noise, and short-term construction noise and vibration impacts.

1.1 SITE LOCATION

The proposed Project is located at the northeast corner of Hesperia Road and Ottawa Street in the City of Victorville, as shown on Exhibit 1-A. An industrial use is located to the south, residential uses located to the east across the Union Pacific railroad, and vacant land surrounds the Project site to the west and north. The Project Site is currently vacant.

1.2 PROJECT DESCRIPTION

The Project is proposed to consist of 200,000 square feet of high-cube cold storage warehouse use and 796,520 square feet of high-cube fulfillment center warehouse use, as shown on Exhibit 1-B. It is anticipated that the Project would be developed in a single phase with an anticipated Opening Year of 2024.

The on-site Project-related operational noise sources are expected to include: cold storage loading dock activity, roof-top air conditioning units, trash enclosure activity, parking lot vehicle movements, and truck movements. This report assumes the Project will operate 24-hours daily for seven days per week.

EXHIBIT 1-A: LOCATION MAP

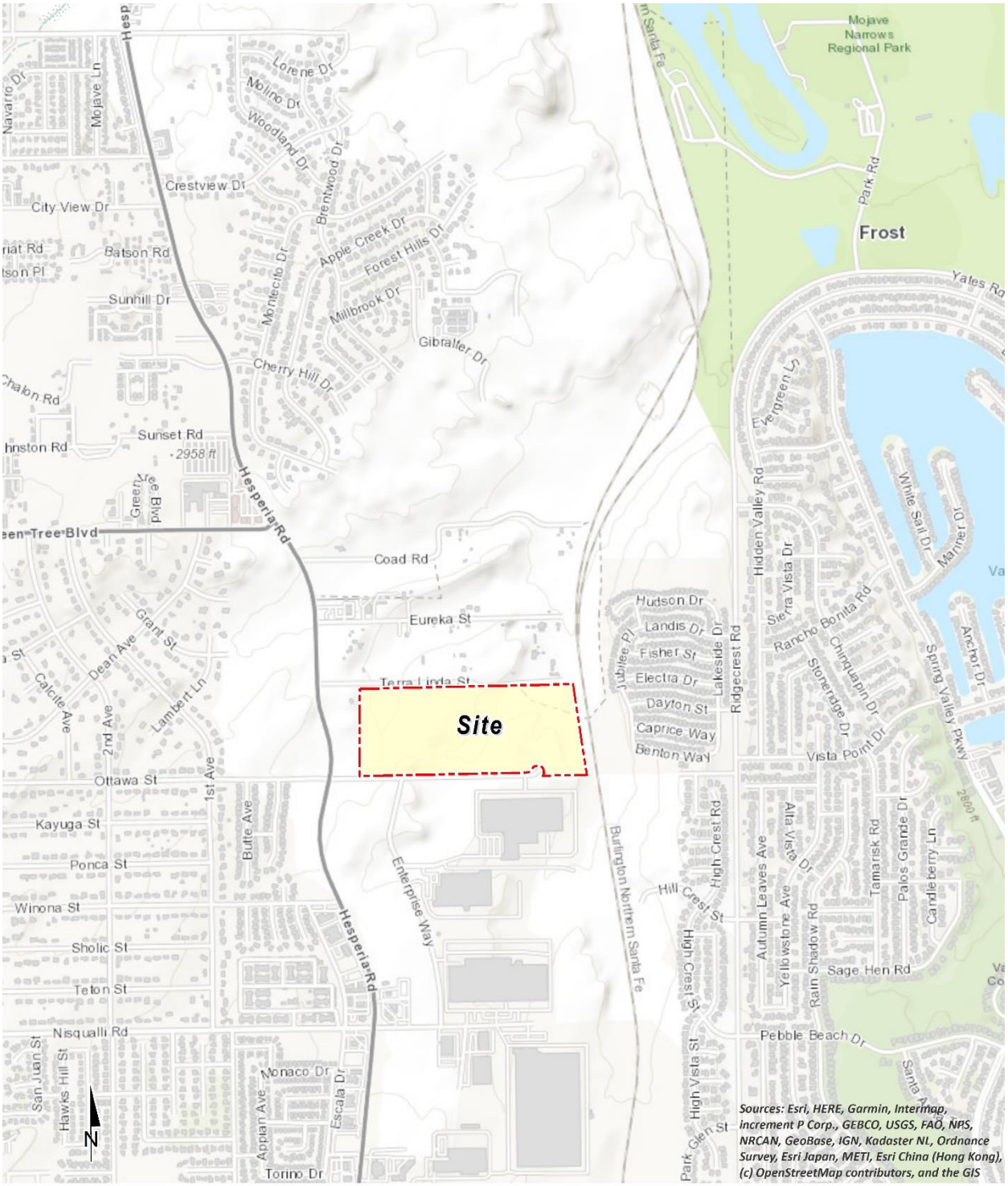
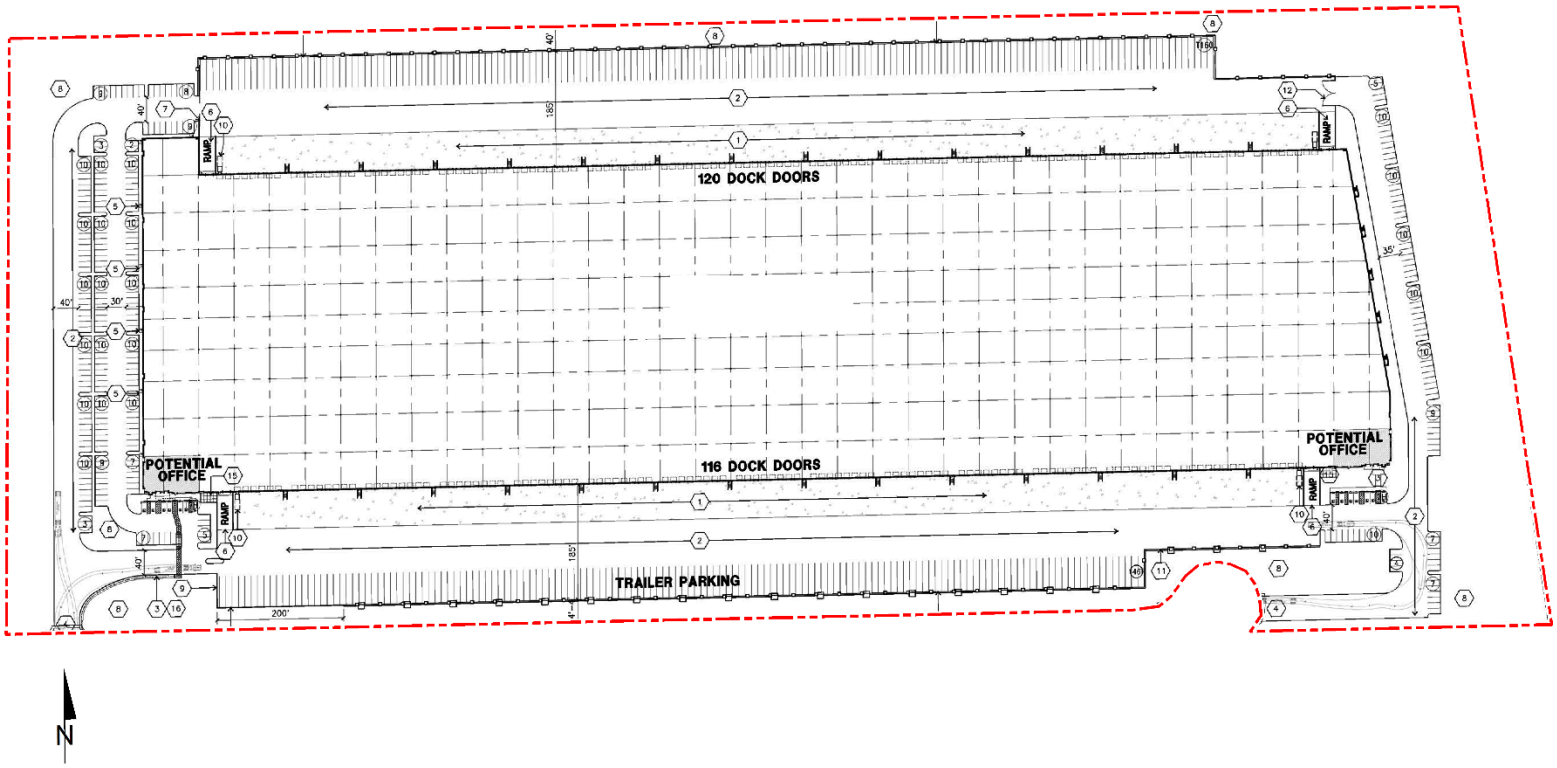


EXHIBIT 1-B: SITE PLAN



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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. (2) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA

at approximately 1,000 feet, which can cause serious discomfort. (3) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.2 NOISE DESCRIPTORS

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

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

2.3 SOUND PROPAGATION

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

2.3.1 GEOMETRIC SPREADING

Sound from a localized source (i.e., a stationary point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source. (2)

2.3.2 GROUND ABSORPTION

The propagation path of noise from a highway to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective wave canceling adds to the attenuation associated with geometric spreading. Traditionally, 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. (4)

2.3.3 ATMOSPHERIC EFFECTS

Receivers located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects. (2)

2.3.4 SHIELDING

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

2.4 NOISE CONTROL

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

2.5 NOISE BARRIER ATTENUATION

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

2.6 LAND USE COMPATIBILITY WITH NOISE

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development, so too can the mismanagement of noise impacts impair the economic health and growth potential of a community by reducing the area's desirability as a place to live, shop and work. For this reason, land use compatibility with the noise environment is an important consideration in the planning and design process. The FHWA encourages State and Local government to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway, or that the developments are planned, designed, and constructed in such a way that noise impacts are minimized. (5)

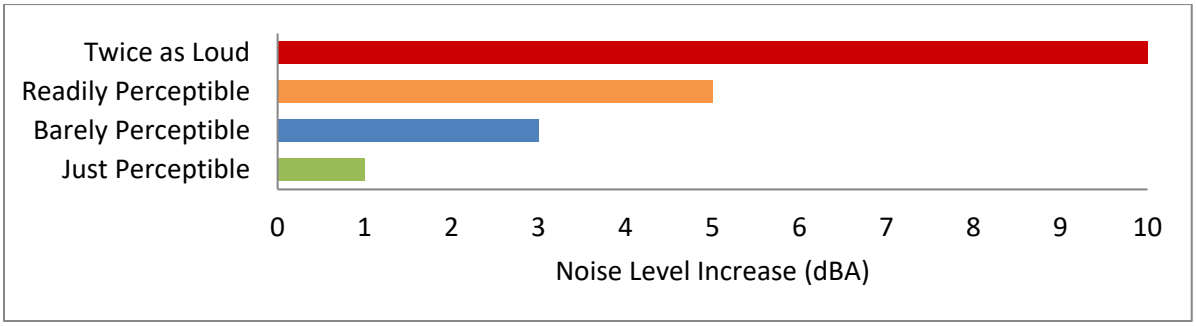
2.7 COMMUNITY RESPONSE TO NOISE

Community responses to noise may range from registering a complaint by telephone or letter, to initiating court action, depending upon everyone's susceptibility to noise and personal attitudes about noise. Several factors are related to the level of community annoyance including:

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

Surveys have shown that community response to noise varies from no reaction to vigorous action for newly introduced noises averaging from 10 dB below existing to 25 dB above existing. (7) According to research originally published in the Noise Effects Handbook (6), the percentage of high annoyance ranges from approximately 0 percent at 45 dB or less, 10 percent are highly annoyed around 60 dB, and increases rapidly to approximately 70 percent being highly annoyed at approximately 85 dB or greater. Despite this variability in behavior on an individual level, the population can be expected to exhibit the following responses to changes in noise levels as shown on Exhibit 2-B. A change of 3 dBA is considered barely perceptible, and changes of 5 dBA are considered readily perceptible. (4)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



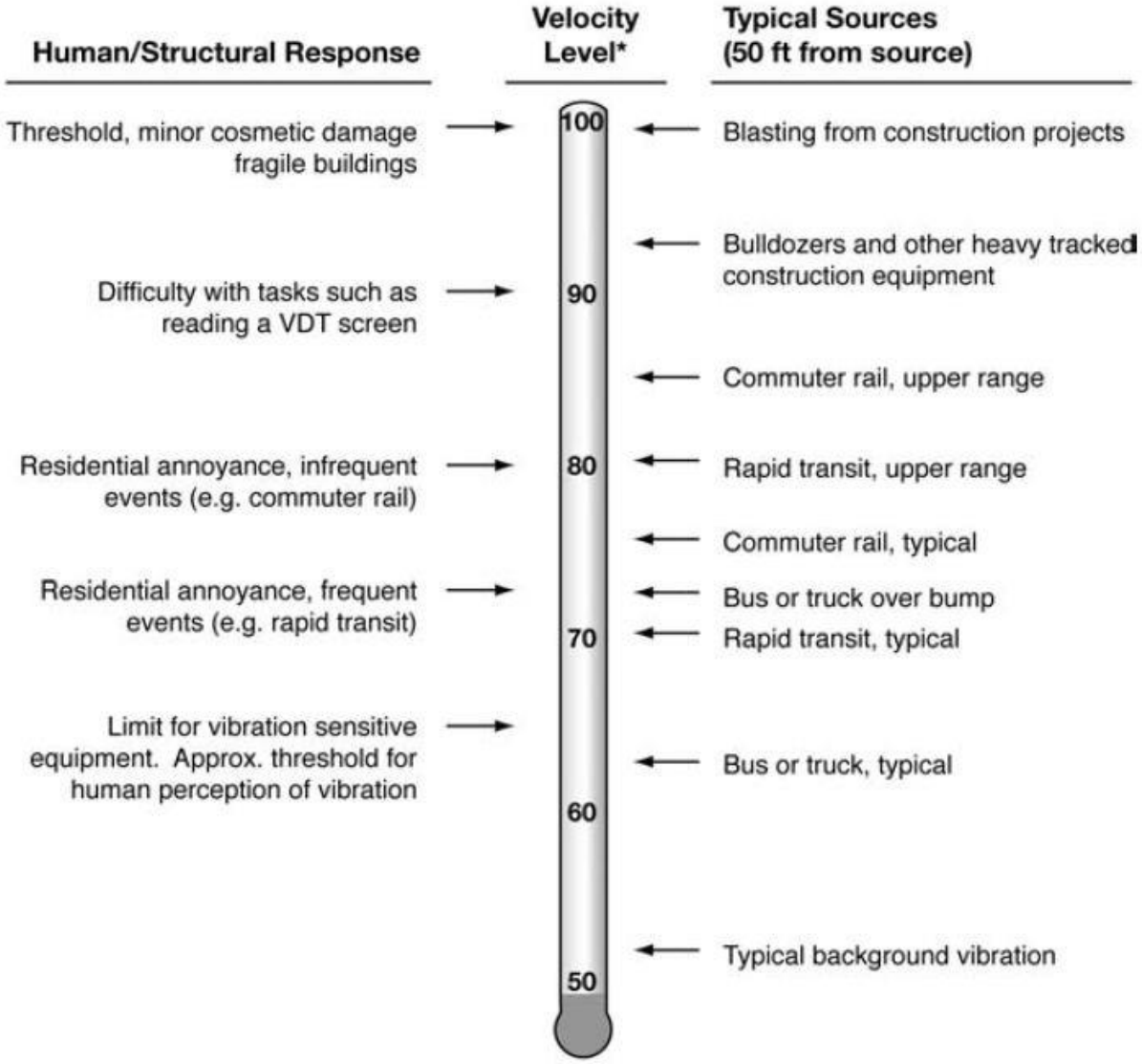
2.8 VIBRATION

Per the Federal Transit Administration (FTA) *Transit Noise Impact and Vibration Impact Assessment Manual* (7) , 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). (8) 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 GREEN BUILDING STANDARDS CODE

The State of California's Green Building Standards Code contains mandatory measures for non-residential building construction in Section 5.507 on Environmental Comfort. (9) 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 noise source. If the development falls within an airport or freeway 65 dBA CNEL noise contour, buildings shall be construction to provide an interior noise level environment attributable to exterior sources that does not exceed an hourly equivalent level of 50 dBA L_{eq} in occupied areas during any hour of operation.

3.3 CITY OF VICTORVILLE GENERAL PLAN NOISE ELEMENT

The City of Victorville *General Plan Noise Element* is *intended to limit exposure of the community to excessive noise levels*. (10) The City of Victorville *General Plan Noise Element* land use compatibility standards specify the noise levels allowable for new developments impacted by transportation noise sources. The City's compatibility criteria, found in Table N-3 of the *General Plan,* identify the criteria for the multi-family and commercial land uses such as the Project, as shown on Exhibit 3-A. For the multi-family residential land use, exterior noise levels of less than 65 dBA CNEL are considered *normally acceptable*, *conditionally acceptable* with exterior noise

levels between 65 to 70 dBA CNEL, and *normally unacceptable* with exterior noise levels above 70 dBA CNEL. For the commercial land use, exterior noise levels of less than 70 dBA CNEL are considered *normally acceptable*, and *conditionally acceptable* with exterior noise levels between 70 to 75 dBA CNEL, and *normally unacceptable* with exterior noise levels above 75 dBA CNEL.

EXHIBIT 3-A: LAND USE NOISE COMPATIBILITY CRITERIA

Table N-3
Victorville Land Use Compatibility Standards

	Community Noise Exposure Ldn or CNEL, dB						
Land Use Categories	55	60	65	70	75	80 +	
Residential - Low Density, Single Family, Duplex, Multi-family, Mobile Home	1	1	2	2	3	4	4
Transient Lodging - Motels, Hotels	1	1	2	2	3	3	4
Schools, Libraries, Churches, Hospitals, Nursing Homes	1	1	2	3	3	4	4
Auditoriums, Concert Halls, Amphitheaters	2	2	3	3	4	4	4
Sports Arena, Outdoor Spectator Sports	2	2	2	2	3	3	3
Playgrounds, Neighborhood Parks	1	1	1	2	3	3	3
Golf Courses, Riding Stables, Water Recreation, Cemeteries	1	1	1	2	2	4	4
Office Buildings, Business Commercial, Retail Commercial and Professional	1	1	1	2	2	3	3
Industrial, Manufacturing, Utilities	1	1	1	1	2	2	2
Agriculture	1	1	1	1	1	1	1

Legend:
1. NORMALLY ACCEPTABLE: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
2. CONDITIONALLY ACCEPTABLE: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and Schools, Libraries, Churches, Hospitals, Nursing Homes 1 needed noise insulation features included in the design. Conventional construction, with closed windows and fresh air supply systems or air conditioning will normally suffice.
3. NORMALLY UNACCEPTABLE: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
4. CLEARLY UNACCEPTABLE: New construction or development should generally not be undertaken.

Source: City of Victorville General Plan Noise Element, Table N-3.

3.4 OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as the Ottawa Business Center Project, stationary-source (operational) noise such as the expected cold storage loading dock activity, roof-top air conditioning units, trash enclosure activity, parking lot vehicle movements, and truck movements are typically evaluated against standards established under a jurisdiction's Municipal Code.

Section 13.01.030 of the City of Victorville Municipal Code, establishes the noise level standards for stationary noise sources. For residential properties, the exterior noise level shall not exceed 65 dBA L_{eq} during the daytime hours (7:00 a.m. to 10:00 p.m.) and 55 dBA L_{eq} during the nighttime hours (10:00 p.m. to 7:00 a.m.). (11) For commercial uses, exterior noise levels shall not exceed 70 dBA L_{eq} at any time. For the industrial uses the exterior noise levels commercial uses shall not exceed 75 dBA L_{eq} at any time. The operational noise level standards are shown on Table 3-1.

TABLE 3-1: OPERATIONAL NOISE STANDARDS

Land Use	Exterior Noise Levels (dBA L_{eq})[2]	
	Daytime (7am-10pm)	Nighttime (10pm-7am)
Residential	65	55
Commercial	70	
Industrial	75	

[1] City of Victorville Municipal Code, Section 13.01.030 (Appendix 3.1).

[2] L_{eq} represents a steady state sound level containing the same total energy as a time varying signal over a given period.

3.5 CONSTRUCTION NOISE STANDARDS

Section 13.01.060.9 of the City of Victorville Municipal Code, provided in Appendix 3.1, indicates that construction activity is considered exempt from the noise level standards on private properties that are determined by the director of building and safety to be essential to the completion of a project. However, neither the City of Victorville General Plan or Municipal Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers, which would allow for a quantified determination of what CEQA constitutes a *substantial temporary or periodic noise increase*. Therefore, a numerical construction threshold based on Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* is used for analysis of daytime construction impacts, as discussed below.

According to the FTA, local noise ordinances are typically not very useful in evaluating construction noise. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Project construction noise criteria should account for the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use. Due to the lack of standardized construction noise thresholds, the FTA provides guidelines that can be considered reasonable criteria for

construction noise assessment. The FTA considers a daytime exterior construction noise level of 80 dBA L_{eq} as a reasonable threshold for noise sensitive residential land use. (7 p. 179).

3.6 CONSTRUCTION VIBRATION STANDARDS

Construction activity can result in varying degrees of ground-borne vibration, depending on the equipment and methods used, distance to the affected structures and soil type. Construction vibration is generally associated with pile driving and rock blasting. Other construction equipment such as air compressors, light trucks, hydraulic loaders, etc., generates little or no ground vibration. (7)

To analyze vibration impacts originating from the operation and construction of the Ottawa Business Center, vibration-generating activities are appropriately evaluated against standards established under a City of Victorville's Municipal Code, if such standards exist. However, the City of Victorville does not identify specific vibration level limits. Therefore, for analysis purposes, the Caltrans *Transportation and Construction Vibration Guidance Manual*, (12 p. 38) Table 19, vibration damage are used in this noise study to assess potential temporary construction-related impacts at adjacent building locations. The nearest noise sensitive buildings adjacent to the Project site can best be described as "older residential structures" with a maximum acceptable continuous vibration threshold of 0.3 PPV (in/sec).

4 SIGNIFICANCE CRITERIA

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

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

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

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

4.1 NOISE LEVEL INCREASES (THRESHOLD A)

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Guidelines described above at the closest sensitive receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing 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.* (13) This is primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted—the so-called *ambient* environment.

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) (14) developed guidance to be used for the assessment of project-generated increases in noise levels that consider the ambient noise level. The FICON recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics, such as the average-daily noise level (CNEL) and equivalent continuous noise level (L_{eq}). The FICON guidance provides an established source of criteria to assess the impacts of substantial temporary or permanent increase in ambient noise levels. Based on the FICON criteria, the amount to which a given noise level increase is considered acceptable is reduced when the without Project noise levels are already shown to exceed certain land-use specific exterior noise level criteria. The specific levels are based on typical responses to noise level increases of 5 dBA or *readily perceptible*, 3 dBA or *barely perceptible*, and 1.5 dBA depending on the underlying without Project noise levels for noise-sensitive uses. These levels of increases and their perceived acceptance are consistent with guidance provided by both the Federal Highway Administration (4 p. 9) and Caltrans (15 p. 2_48).

4.2 VIBRATION (THRESHOLD B)

As described in Section 3.6, the vibration impacts originating from the construction of the Ottawa Business Center, vibration-generating activities are appropriately evaluated using the Caltrans vibration damage thresholds to assess potential temporary construction-related impacts at adjacent building locations. The nearest noise sensitive buildings adjacent to the Project site can best be described as "older residential structures" with a maximum acceptable continuous vibration threshold of 0.3 PPV (in/sec).

4.3 CEQA GUIDELINES NOT FURTHER ANALYZED (THRESHOLD C)

CEQA Noise Threshold C applies when there are nearby public and private airports and/or air strips and focuses on land use compatibility of the Project to nearby airports and airstrips. The Project site is not located within two miles of an airport or airstrip. The closest airport is the Apple Valley Airport located around 7.19 northeast of the Project site. As such, the Project site would not be exposed to excessive noise levels from airport operations, and therefore, impacts are considered *less than significant,* and no further noise analysis is conducted in relation to Appendix G to the CEQA Guidelines, Noise Threshold C.

4.4 SIGNIFICANCE CRITERIA SUMMARY

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

TABLE 4-1: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Condition(s)	Significance Criteria	
		Daytime	Nighttime
Off-Site[1]	If ambient is < 60 dBA CNEL	≥ 5 dBA CNEL Project increase	
	If ambient is 60 - 65 dBA CNEL	≥ 3 dBA CNEL Project increase	
	If ambient is > 65 dBA CNEL	≥ 1.5 dBA CNEL Project increase	
On-Site	Exterior Noise Compatibility Criteria[2]	See Exhibit 3-A	
	Interior Noise Level Standard[3]	50 dBA L_{eq}	
Operational	Exterior Noise Level Standards[4]	See Table 3-1	
	If ambient is < 60 dBA Leq[1]	≥ 5 dBA L_{eq} Project increase	
	If ambient is 60 - 65 dBA Leq[1]	≥ 3 dBA L_{eq} Project increase	
	If ambient is > 65 dBA Leq[1]	≥ 1.5 dBA L_{eq} Project increase	
Construction	Noise Level Threshold[5]	80 dBA L_{eq}	
	Vibration Level Threshold[6]	0.3 PPV (in/sec)	

[1] FICON, 1992.
[2] City of Victorville General Plan Noise Element Land Use Compatibility Standards (Table N-3).
[3] State of California Green Building Standards Code 5.507.4.2.
[4] City of Victorville Municipal Code, Section 13.01.030 (Appendix 3.1).
[5] Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual.
[6] Caltrans Transportation and Construction Vibration Manual, April 2020 Table 19.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, 24-hour noise level measurements were taken at five 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, May 27, 2021. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the equivalent daytime and nighttime hourly noise levels. 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. (16)

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*. (2) 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*. (7)

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. (7) 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.

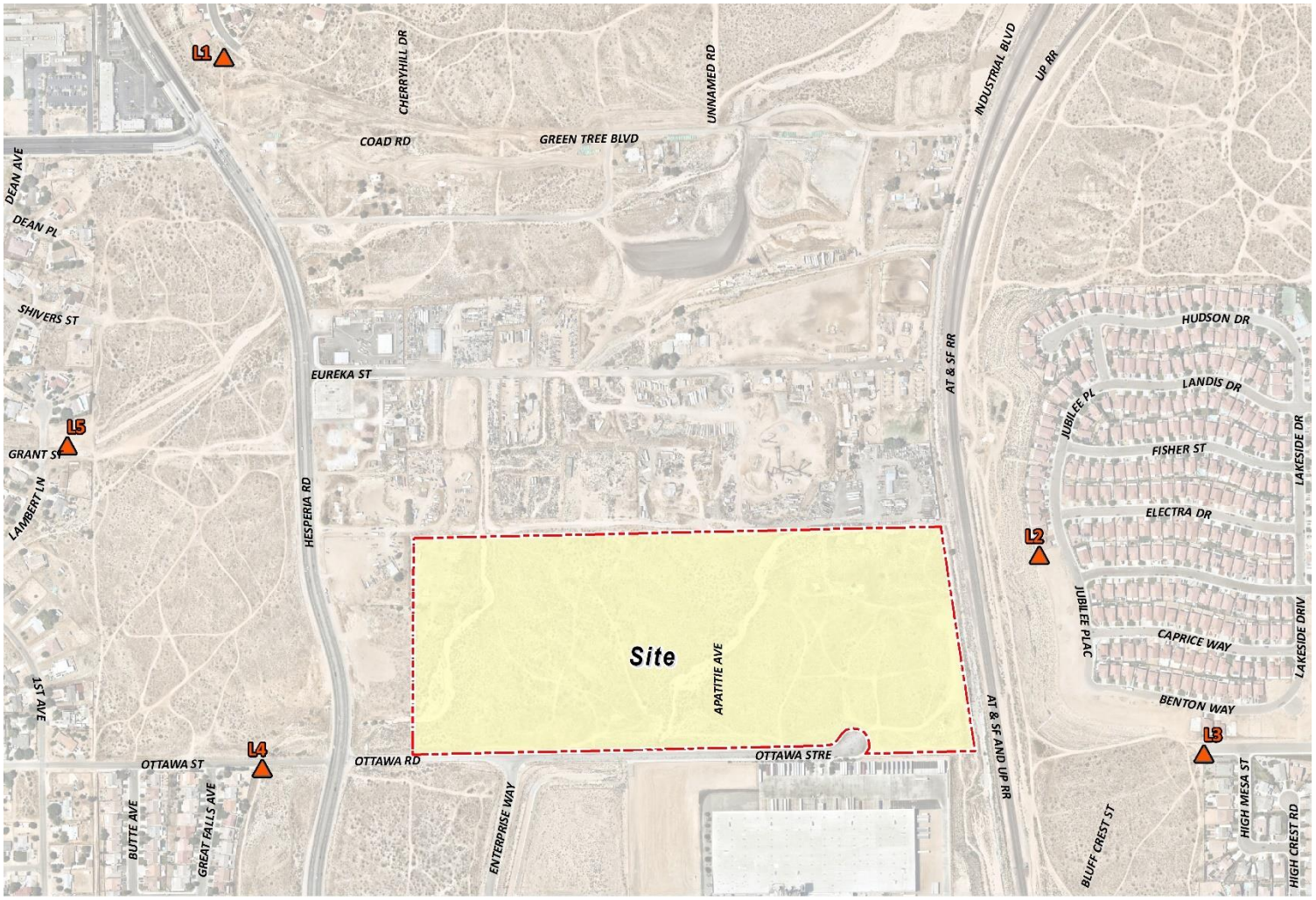
TABLE 5-1: AMBIENT NOISE LEVEL MEASUREMENTS

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]		CNEL
		Daytime	Nighttime	
L1	Located north of the Project site on Tropicana Drive near existing single-family residential home at 13758 Tropicana Drive.	56.6	55.1	62.2
L2	Located east of the Project site on Jubilee Place near existing single-family residential home at 13432 Jubilee Place.	56.2	54.6	61.7
L3	Located east of the Project site on Bluff Crest Street near existing single-family residential home at 13284 High Mesa Street.	56.1	57.6	64.0
L4	Located west of the Project site on Ottawa Street near existing single-family residential home at 13291 Great Falls Avenue.	58.1	56.2	63.3
L5	Located west of the Project site on Grant Street near existing single-family residential home at 16883 Lambert Lane.	48.7	52.4	58.6

[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 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 5-1 provides the equivalent noise levels used to describe the daytime and nighttime ambient conditions and the calculated 24-hour CNEL. These daytime and nighttime energy average noise levels represent the average of all hourly noise levels observed during these time periods expressed as a single number. Appendix 5.2 provides summary worksheets of the noise levels for each of the daytime and nighttime hours.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS



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6 METHODS AND PROCEDURES

The following section outlines the methods and procedures used to estimate and analyze the future transportation related noise environment. Consistent with the City of Victorville *Land Use Compatibility Standards* guidelines outline on Exhibit 3-A, all transportation related noise levels are presented in terms of the 24-hour CNEL's.

6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The expected roadway noise level increases from vehicular traffic were calculated by Urban Crossroads, Inc. using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (17) 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. (18) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period. Research conducted by Caltrans has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model used in this analysis. (19)

6.1.1 OFF-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

Table 6-1 presents the roadway parameters used to assess the Project's off-site transportation noise impacts. Table 6-1 identifies the eight off-site study area roadway segments, the distance from the centerline to adjacent receiving land use based on the functional roadway classifications per the City of Victorville General Plan Circulation Element, and the vehicle speeds. The ADT volumes used in this study are presented on Table 6-2 are based on the Ottawa Business Center *Traffic Analysis* prepared by Urban Crossroads, Inc. for the following traffic conditions:

1. Existing Without Project (2021)
2. Existing With Project (E+P)
3. Opening Year Cumulative (2024) Without Project (OY)
4. Opening Year Cumulative (2024) With Project (OYP)
5. Future Year (2034) Without Project (FY)
6. Future Year (2034) With Project (FYP)

TABLE 6-1: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	Classification[1]	Centerline Distance to Receiving Land Use[2]	Vehicle Speed (mph)
1	Seventh Av.	s/o Nisqualli Rd.	Arterial	42'	40
2	Hesperia Rd.	n/o Ottawa St.	Super Arterial	62'	50
3	Hesperia Rd.	s/o Ottawa St.	Super Arterial	62'	50
4	Hesperia Rd.	s/o Nisqualli Rd.	Super Arterial	62'	45
5	La Mesa Rd.	w/o Amargosa Rd.	Major Arterial	50'	45
6	Nisqualli Rd.	e/o Mariposa Rd.	Major Arterial	50'	45
7	Ottawa St.	w/o Hesperia Rd.	Collector	32'	45
8	Nisqualli Rd.	w/o Hesperia Rd.	Arterial	42'	45

[1] City of Victorville General Plan Circulation Element
[2] Based upon the right-of-way distances for each roadway classification provided in the General Plan Circulation Element.

TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic Volumes[1]					
			Existing		OY 2023		FY 2034	
			Without Project	With Project	Without Project	With Project	Without Project	With Project
1	Seventh Av.	s/o Nisqualli Rd.	13,658	13,742	13,742	13,826	17,880	17,964
2	Hesperia Rd.	n/o Ottawa St.	35,265	35,766	35,767	36,268	45,979	46,480
3	Hesperia Rd.	s/o Ottawa St.	35,573	37,113	37,113	38,653	46,378	47,917
4	Hesperia Rd.	s/o Nisqualli Rd.	28,590	28,924	29,796	30,130	36,984	37,318
5	La Mesa Rd.	w/o Amargosa Rd.	43,020	43,187	43,188	43,355	55,651	55,818
6	Nisqualli Rd.	e/o Mariposa Rd.	35,573	36,695	37,113	38,235	46,378	47,500
7	Ottawa St.	w/o Hesperia Rd.	733	817	817	901	948	1,032
8	Nisqualli Rd.	w/o Hesperia Rd.	15,891	17,097	17,097	18,303	20,557	21,762

[1] Ottawa Business Center Traffic Analysis, Urban Crossroads, Inc.

The ADT volumes vary for each roadway segment based on the existing traffic volumes and the combination of project traffic distributions. In addition, the off-site traffic noise analysis is based on a PM peak hour to average daily traffic (peak-to-daily) relationship of 9.38%. (20)

Table 6-3 provides the time of day (daytime, evening, and nighttime) vehicle splits. The daily Project truck trip-ends were assigned to the individual off-site study area roadway segments based on the Project truck trip distribution percentages documented in the *Traffic Impact Analysis*. Using the Project truck trips in combination with the Project trip distribution, Urban Crossroads, Inc. calculated the number of additional Project truck trips and vehicle mix percentages for each of the study area roadway segments. Table 6-4 shows the traffic flow by vehicle type (vehicle mix) used for all without Project traffic scenarios, and Tables 6-5 through 6-

7 show the vehicle mixes used for the with Project traffic scenarios. Due to the added Project truck trips, the increase in Project traffic volumes and the distributions of trucks on the study area road segments, the percentage of autos, medium trucks and heavy trucks will vary for each of the traffic scenarios. This explains why the existing and future traffic volumes and vehicle mixes vary between seemingly identical study area roadway segments.

TABLE 6-3: TIME OF DAY VEHICLE SPLITS

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 vehicle mix.
"Daytime" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

TABLE 6-4: WITHOUT PROJECT VEHIVCLE MIX

Classification	Total % Traffic Flow			Total
	Autos	Medium Trucks	Heavy Trucks	
All Roadways[1]	95.48%	2.99%	1.53%	100.00%

[1] Based on an existing vehicle count taken at Hesperia Road and Nisqualli Road (Ottawa Business Center, Traffic Analysis, Urban Crossroads, Inc.). Vehicle mix percentage values rounded to the nearest one-hundredth.

TABLE 6-5: EXISTING WITH PROJECT VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Seventh Av.	s/o Nisqualli Rd.	95.51%	2.97%	1.52%	100.00%
2	Hesperia Rd.	n/o Ottawa St.	95.55%	2.94%	1.51%	100.00%
3	Hesperia Rd.	s/o Ottawa St.	94.45%	3.00%	2.55%	100.00%
4	Hesperia Rd.	s/o Nisqualli Rd.	95.54%	2.95%	1.51%	100.00%
5	La Mesa Rd.	w/o Amargosa Rd.	95.50%	2.98%	1.52%	100.00%
6	Nisqualli Rd.	e/o Mariposa Rd.	94.38%	3.04%	2.58%	100.00%
7	Ottawa St.	w/o Hesperia Rd.	95.95%	2.68%	1.37%	100.00%
8	Nisqualli Rd.	w/o Hesperia Rd.	93.15%	3.08%	3.77%	100.00%

[1] Ottawa Business Center, Traffic Analysis, Urban Crossroads, Inc.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

TABLE 6-6: OYC 2024 WITH PROJECT VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Seventh Av.	s/o Nisqualli Rd.	95.51%	2.97%	1.52%	100.00%
2	Hesperia Rd.	n/o Ottawa St.	95.55%	2.95%	1.51%	100.00%
3	Hesperia Rd.	s/o Ottawa St.	94.49%	3.00%	2.51%	100.00%
4	Hesperia Rd.	s/o Nisqualli Rd.	95.53%	2.95%	1.51%	100.00%
5	La Mesa Rd.	w/o Amargosa Rd.	95.50%	2.98%	1.52%	100.00%
6	Nisqualli Rd.	e/o Mariposa Rd.	94.43%	3.04%	2.54%	100.00%
7	Ottawa St.	w/o Hesperia Rd.	95.90%	2.71%	1.39%	100.00%
8	Nisqualli Rd.	w/o Hesperia Rd.	93.30%	3.07%	3.62%	100.00%

[1] Ottawa Business Center, Traffic Analysis, Urban Crossroads, Inc.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

TABLE 6-7: FY 2034 WITH PROJECT VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Seventh Av.	s/o Nisqualli Rd.	95.50%	2.97%	1.52%	100.00%
2	Hesperia Rd.	n/o Ottawa St.	95.53%	2.95%	1.51%	100.00%
3	Hesperia Rd.	s/o Ottawa St.	94.68%	3.00%	2.32%	100.00%
4	Hesperia Rd.	s/o Nisqualli Rd.	95.52%	2.96%	1.52%	100.00%
5	La Mesa Rd.	w/o Amargosa Rd.	95.50%	2.98%	1.52%	100.00%
6	Nisqualli Rd.	e/o Mariposa Rd.	94.63%	3.03%	2.34%	100.00%
7	Ottawa St.	w/o Hesperia Rd.	95.85%	2.74%	1.41%	100.00%
8	Nisqualli Rd.	w/o Hesperia Rd.	93.65%	3.06%	3.29%	100.00%

[1] Ottawa Business Center, Traffic Analysis, Urban Crossroads, Inc.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

6.2 CADNAA NOISE PREDICTION MODEL

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

Using the ISO 9613-2 protocol, CadnaA will calculate the distance from each operational noise source to the noise receiver locations, using the ground absorption, distance, and barrier/building attenuation inputs to provide a summary of noise level at each receiver and the partial noise level contributions by noise source. Consistent with the ISO 9613-2 protocol, the CadnaA noise prediction model relies on the reference sound power level (L_w) to describe

individual noise sources. While sound pressure levels (e.g., L_{eq}) quantify in decibels the intensity of given sound sources at a reference distance, sound power levels (L_w) are connected to the sound source and are independent of distance. Sound pressure levels vary substantially with distance from the source and diminish because of intervening obstacles and barriers, air absorption, wind, and other factors. Sound power is the acoustical energy emitted by the sound source and is an absolute value that is not affected by the environment.

6.2.1 CADNAA OPERATIONAL NOISE METHODOLOGY

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.

6.2.2 FEDERAL TRANSIT AND RAIL ADMINISTRATION METHODOLOGIES

The CadnaA noise prediction model provides the Federal Transit Administration (FTA) and Federal Railroad Administration (FRA) methodology protocol for railroad-related noise modeling. This includes emission parameters for multiple types of trains and associated noise sources such as locomotives, cars, and horns or warning signals. The FTA/FRA methodology within the CadnaA model analyzes each train pass-by event based on the number and type of locomotives, and cars during the daytime, evening, and nighttime hours to calculate the exterior noise levels.

The existing train volumes shown on Exhibit 6-8 were obtained from the Department of Transportation Crossing Inventory Form at Lilac Avenue (Crossing Number 026080V). (21) According to Crossing Inventory Form included in Appendix 6-1, the number of daily train movements is 34 during the daytime and 34 during nighttime hours with a total of 68 daily train movements at a speed of 50 miles per hour.

TABLE 6-8: EXISTING RAILROAD PARAMETERS

Type of Rail Activity	Speed (mph)	Trains Per Day		
		Daytime	Nighttime	Total
Freight[1]	50	34	34	68

[1] U.S. Department of Transportation Crossing Inventory Number 026080V dated 4/14/2020.
"Day" = 7:00 a.m. to 10:00 p.m.; "Night" = 10:00 p.m. to 7:00 a.m.

6.3 CONSTRUCTION VIBRATION ASSESSMENT METHODOLOGY

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). (7) However, while vehicular traffic is rarely perceptible, construction has

the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Ground vibration levels associated with various types of construction equipment are summarized on Table 6-9. 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 FTA. To determine vibration impacts the FTA provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.1}$

TABLE 6-9: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

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

Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual

7 OFF-SITE TRAFFIC NOISE ANALYSIS

To assess the off-site transportation CNEL noise level impacts associated with development of the proposed Project, noise contours were developed based on *Ottawa Business Center Traffic Analysis*, prepared by Urban Crossroads, Inc. (20)

7.1 NOISE CONTOURS

Noise contours were used to assess the Project's incremental 24-hour dBA CNEL traffic-related noise impacts at receiving land uses adjacent to roadways conveying Project traffic. The noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70, 65, and 60 dBA CNEL noise levels. The noise contours do not consider the effect of any existing noise barriers or topography that may attenuate ambient noise levels. In addition, because the noise contours reflect modeling of vehicular noise on area roadways, they appropriately do not reflect noise contributions from the surrounding stationary noise sources within the Project study area.

Tables 7-1 through 7-6 present a summary of the exterior traffic noise levels, without barrier attenuation, for the eight study area roadway segments analyzed under each of the following conditions:

1. Existing Without Project (2021)
2. Existing With Project (E+P)
3. Opening Year Cumulative (2024) Without Project (OY)
4. Opening Year Cumulative (2024) With Project (OYP)
5. Future Year (2034) Without Project (FY)
6. Future Year (2034) With Project (FYP)

Appendix 7.1 includes a summary of the traffic noise level contours for each of the traffic scenarios.

TABLE 7-1: EXISTING WITHOUT PROJECT 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	Seventh Av.	s/o Nisqualli Rd.	69.5	RW	83	179
2	Hesperia Rd.	n/o Ottawa St.	74.0	114	246	531
3	Hesperia Rd.	s/o Ottawa St.	74.0	115	248	534
4	Hesperia Rd.	s/o Nisqualli Rd.	72.0	84	182	391
5	La Mesa Rd.	w/o Amargosa Rd.	74.8	104	224	483
6	Nisqualli Rd.	e/o Mariposa Rd.	73.9	92	197	425
7	Ottawa St.	w/o Hesperia Rd.	60.2	RW	RW	33
8	Nisqualli Rd.	w/o Hesperia Rd.	71.3	51	110	238

[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 7-2: EXISTING WITH PROJECT 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	Seventh Av.	s/o Nisqualli Rd.	69.5	RW	83	180
2	Hesperia Rd.	n/o Ottawa St.	74.0	115	248	534
3	Hesperia Rd.	s/o Ottawa St.	74.9	132	284	612
4	Hesperia Rd.	s/o Nisqualli Rd.	72.0	85	182	393
5	La Mesa Rd.	w/o Amargosa Rd.	74.8	104	224	483
6	Nisqualli Rd.	e/o Mariposa Rd.	74.9	106	228	490
7	Ottawa St.	w/o Hesperia Rd.	60.5	RW	RW	35
8	Nisqualli Rd.	w/o Hesperia Rd.	73.2	68	147	317

[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 7-3: OPENING YEAR CUMULATIVE (2024) WITHOUT PROJECT 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	Seventh Av.	s/o Nisqualli Rd.	69.5	RW	84	180
2	Hesperia Rd.	n/o Ottawa St.	74.0	115	249	536
3	Hesperia Rd.	s/o Ottawa St.	74.2	118	255	549
4	Hesperia Rd.	s/o Nisqualli Rd.	72.2	87	187	402
5	La Mesa Rd.	w/o Amargosa Rd.	74.8	104	225	484
6	Nisqualli Rd.	e/o Mariposa Rd.	74.1	94	203	437
7	Ottawa St.	w/o Hesperia Rd.	60.7	RW	RW	36
8	Nisqualli Rd.	w/o Hesperia Rd.	71.6	54	116	250

[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 7-4: OPENING YEAR CUMULATIVE (2024) WITH PROJECT 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	Seventh Av.	s/o Nisqualli Rd.	69.5	RW	84	180
2	Hesperia Rd.	n/o Ottawa St.	74.1	116	250	539
3	Hesperia Rd.	s/o Ottawa St.	75.1	135	291	626
4	Hesperia Rd.	s/o Nisqualli Rd.	72.2	87	187	404
5	La Mesa Rd.	w/o Amargosa Rd.	74.8	104	225	484
6	Nisqualli Rd.	e/o Mariposa Rd.	75.0	108	233	502
7	Ottawa St.	w/o Hesperia Rd.	60.9	RW	RW	37
8	Nisqualli Rd.	w/o Hesperia Rd.	73.4	70	152	327

[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 7-5: FUTURE YEAR (2034) WITHOUT PROJECT 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	Seventh Av.	s/o Nisqualli Rd.	70.6	46	100	215
2	Hesperia Rd.	n/o Ottawa St.	75.1	136	294	633
3	Hesperia Rd.	s/o Ottawa St.	75.2	137	296	637
4	Hesperia Rd.	s/o Nisqualli Rd.	73.1	100	216	465
5	La Mesa Rd.	w/o Amargosa Rd.	75.9	123	266	573
6	Nisqualli Rd.	e/o Mariposa Rd.	75.1	109	235	507
7	Ottawa St.	w/o Hesperia Rd.	61.4	RW	RW	39
8	Nisqualli Rd.	w/o Hesperia Rd.	72.4	61	131	282

[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 7-6: FUTURE YEAR (2034) WITH PROJECT 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	Seventh Av.	s/o Nisqualli Rd.	70.6	46	100	215
2	Hesperia Rd.	n/o Ottawa St.	75.2	137	295	636
3	Hesperia Rd.	s/o Ottawa St.	75.9	153	329	709
4	Hesperia Rd.	s/o Nisqualli Rd.	73.1	100	216	466
5	La Mesa Rd.	w/o Amargosa Rd.	75.9	124	266	574
6	Nisqualli Rd.	e/o Mariposa Rd.	75.8	122	263	567
7	Ottawa St.	w/o Hesperia Rd.	61.6	RW	RW	41
8	Nisqualli Rd.	w/o Hesperia Rd.	73.9	77	165	356

[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.

7.2 EXISTING PROJECT TRAFFIC NOISE LEVEL INCREASES

An analysis of existing traffic noise levels plus traffic noise generated by the proposed Project has been provided to fully analyze the existing traffic scenarios identified in the Traffic Analysis prepared by Urban Crossroads, Inc. Table 7-1 shows the Existing without Project conditions CNEL noise levels. The Existing without Project exterior noise levels range from 60.2 to 74.8 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing with Project conditions ranging from 60.5 to 74.9 dBA CNEL. Table 7-7 shows that the Project off-site traffic noise level increases range from 0.0 to 1.9 dBA CNEL on

the study area roadway segments. Based on the significance criteria for off-site traffic noise presented in Table 4-1, the following study area roadway segment is shown to experience *potentially significant* off-site traffic noise level increase due to the proposed Project truck trip distribution under Existing with Project conditions.

- Existing noise-sensitive use on Nisqualli Road west of Hesperia Road (Segment #8)

7.3 PROJECT OPENING YEAR CUMULATIVE (2024) TRAFFIC NOISE LEVEL INCREASES

Table 7-3 presents the Project Opening Year Cumulative (2024) without Project conditions CNEL noise levels. The Project Opening Year Cumulative (2024) without Project exterior noise levels range from 60.7 to 74.8 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-4 shows that the Project Opening Year Cumulative (2024) with Project conditions will also range from 60.9 to 75.1 dBA CNEL. Table 7-8 shows that the Project off-site traffic noise level increases range from 0.0 to 1.8 dBA CNEL. Based on the significance criteria for off-site traffic noise presented in Table 4-1, the following study area roadway segment is shown to experience *potentially significant* off-site traffic noise level increases due to the proposed Project truck trip distribution under Opening Year Cumulative (2024) with Project conditions.

- Existing noise-sensitive use on Nisqualli Road west of Hesperia Road (Segment #8)

7.4 FUTURE YEAR (2034) PROJECT TRAFFIC NOISE LEVEL INCREASES

Table 7-5 presents the Future Year (2034) without Project conditions CNEL noise levels. The Future Year (2034) without Project exterior noise levels range from 61.4 to 75.9 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-6 shows that the Future Year (2034) with Project conditions will also range from 61.6 to 75.9 dBA CNEL. Table 7-9 shows that the Project off-site traffic noise level increases range from 0.0 to 1.5 dBA CNEL. Based on the significance criteria for off-site traffic noise presented in Table 4-1, the following study area roadway segment is shown to experience *potentially significant* off-site traffic noise level increases due to the proposed Project truck trip distribution under Future Year (2034) with Project conditions.

- Existing noise-sensitive use on Nisqualli Road west of Hesperia Road (Segment #8)

TABLE 7-7: EXISTING PROJECT TRAFFIC NOISE LEVEL INCREASES

ID	Road	Segment	CNEL at Receiving Land Use (dBA)[1]			Incremental Noise Level Increase Threshold[2]	
			No Project	With Project	Project Addition	Limit	Exceeded?
1	Seventh Av.	s/o Nisqualli Rd.	69.5	69.5	0.0	1.5	No
2	Hesperia Rd.	n/o Ottawa St.	74.0	74.0	0.0	1.5	No
3	Hesperia Rd.	s/o Ottawa St.	74.0	74.9	0.9	1.5	No
4	Hesperia Rd.	s/o Nisqualli Rd.	72.0	72.0	0.0	1.5	No
5	La Mesa Rd.	w/o Amargosa Rd.	74.8	74.8	0.0	1.5	No
6	Nisqualli Rd.	e/o Mariposa Rd.	73.9	74.9	1.0	1.5	No
7	Ottawa St.	w/o Hesperia Rd.	60.2	60.5	0.3	3.0	No
8	Nisqualli Rd.	w/o Hesperia Rd.	71.3	73.2	1.9	1.5	**Yes**

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.
[2] Does the Project create an incremental noise level increase exceeding the significance criteria (Table 4-1)?

TABLE 7-8: OPENING YEAR CUMULATIVE (2024) TRAFFIC NOISE LEVEL INCREASES

ID	Road	Segment	CNEL at Receiving Land Use (dBA)[1]			Incremental Noise Level Increase Threshold[2]	
			No Project	With Project	Project Addition	Limit	Exceeded?
1	Seventh Av.	s/o Nisqualli Rd.	69.5	69.5	0.0	1.5	No
2	Hesperia Rd.	n/o Ottawa St.	74.0	74.1	0.1	1.5	No
3	Hesperia Rd.	s/o Ottawa St.	74.2	75.1	0.9	1.5	No
4	Hesperia Rd.	s/o Nisqualli Rd.	72.2	72.2	0.0	1.5	No
5	La Mesa Rd.	w/o Amargosa Rd.	74.8	74.8	0.0	1.5	No
6	Nisqualli Rd.	e/o Mariposa Rd.	74.1	75.0	0.9	1.5	No
7	Ottawa St.	w/o Hesperia Rd.	60.7	60.9	0.2	3.0	No
8	Nisqualli Rd.	w/o Hesperia Rd.	71.6	73.4	1.8	1.5	**Yes**

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.
[2] Does the Project create an incremental noise level increase exceeding the significance criteria (Table 4-1)?

TABLE 7-9: FUTURE YEAR (2034) PROJECT TRAFFIC NOISE LEVEL INCREASES

ID	Road	Segment	CNEL at Receiving Land Use (dBA)[1]			Incremental Noise Level Increase Threshold[2]	
			No Project	With Project	Project Addition	Limit	Exceeded?
1	Seventh Av.	s/o Nisqualli Rd.	70.6	70.6	0.0	1.5	No
2	Hesperia Rd.	n/o Ottawa St.	75.1	75.2	0.1	1.5	No
3	Hesperia Rd.	s/o Ottawa St.	75.2	75.9	0.7	1.5	No
4	Hesperia Rd.	s/o Nisqualli Rd.	73.1	73.1	0.0	1.5	No
5	La Mesa Rd.	w/o Amargosa Rd.	75.9	75.9	0.0	1.5	No
6	Nisqualli Rd.	e/o Mariposa Rd.	75.1	75.8	0.7	1.5	No
7	Ottawa St.	w/o Hesperia Rd.	61.4	61.6	0.2	3.0	No
8	Nisqualli Rd.	w/o Hesperia Rd.	72.4	73.9	1.5	1.5	**Yes**

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.
[2] Does the Project create an incremental noise level increase exceeding the significance criteria (Table 4-1)?

7.5 OFF-SITE TRAFFIC NOISE MITIGATION

To reduce the *potentially significant* Project traffic noise level increases on the study area roadway segment (Segment #8) for Existing plus Project, Opening Year, and Future Year conditions, potential noise mitigation measures are identified in this analysis. Potential mitigation measures discussed below include rubberized asphalt hot mix pavement and off-site noise barriers for the existing residential land uses adjacent to impacted roadway segments.

7.5.1 RUBBERIZED ASPHALT

Due to the potential noise attenuation benefits, rubberized asphalt is considered as a mitigation measure for the off-site Project-related traffic noise level increases. To reduce traffic noise levels at the noise source, Caltrans research has shown that rubberized asphalt can provide noise attenuation of approximately 4 dBA for automobile traffic noise levels. (22) Changing the pavement type of a roadway has been shown to reduce the amount of tire/pavement noise produced at the source under both near-term and long-term conditions. Traffic noise is generated primarily by the interaction of the tires and pavement, the engine, and exhaust systems. For automobiles noise, as much as 75 to 90-percent of traffic noise is generated by the interaction of the tires and pavement, especially when traveling at higher and constant speeds. (2) According to research conducted by Caltrans (22) and the Canadian Ministry of Transportation and Highways (23) a 4 dBA reduction in tire/pavement noise is attainable using rubberized asphalt under typical operating conditions.

The effectiveness of reducing traffic noise levels is higher on roadways with low percentages of heavy trucks, since the heavy truck engine and exhaust noise is not affected by rubberized alternative pavement due to the truck engine and exhaust stack height above the pavement itself. (22) Per Caltrans guidance a truck stack height is modeled using a height of 11.5 feet above the road. (4) (24) With the primary off-site traffic noise source consisting of heavy trucks with a stack height of 11.5 feet off the ground, the tire/pavement noise reduction benefits associated rubberized asphalt will be primarily limited to autos.

While the off-site Project-related traffic noise level increases would theoretically be reduced with the 4 dBA reduction provided by rubberized asphalt, the reduction would not provide reliable benefits for the noise levels generated by heavy truck traffic. This is, as previously stated, due to the noise source height difference between automobiles and trucks. While rubberized asphalt will provide some noise reduction, this noise study recognizes that this is only effective for tire-on-pavement noise at higher speeds and would not reduce truck-related off-site traffic noise levels associated with truck engine and exhaust stacks to less than significant levels. Since the use of rubberized asphalt would not lower the off-site traffic noise levels below a level of significance, rubberized asphalt is not proposed as mitigation for the Project and the off-site Project-related traffic noise level increases at adjacent land uses would remain *significant.*

7.5.2 OFF-SITE NOISE BARRIERS

Since existing and future noise-sensitive receiving land uses are located adjacent to the impacted roadway segment in the Project study area, off-site noise barriers were considered in this analysis

as a potential traffic noise mitigation measure to reduce the impacts. Off-site noise barriers are estimated to provide a *readily perceptible* 5 dBA reduction which, according to the FHWA, is *simple* to attain when blocking the line-of-sight from the noise source to the receiver. (4) As previously discussed, Caltrans guidance in the Highway Design Manual, Section 1102.3(3), indicates that for design purposes, *the noise barrier should intercept the line of sight from the exhaust stack of a truck to the receptor*, and an 11.5-foot-high truck stack height is assumed to represent the truck engine and exhaust noise source. (24) Therefore, any exterior noise barriers at receiving noise sensitive land uses experiencing Project-related traffic noise level increases would need to be high enough and long enough to block the line-of-sight from the noise source (at 11.5 feet high per Caltrans) to the receiver (at 5 feet high per FHWA guidance) in order to provide a 5 dBA reduction per FHWA guidance. (24)

In addition, according to FHWA guidance, outdoor living areas are generally limited to outdoor living areas of frequent human use (e.g., backyards of single-family homes). Therefore, front and side yards of residential homes adjacent to off-site roadway segments do not represent noise sensitive areas of frequent human use that require exterior noise mitigation. (4) Exterior noise mitigation in the form of noise barriers is not anticipated to provide the FHWA attainable reduction of 5 dBA required to reduce the off-site traffic noise level increases and would also require potential openings for driveway access to individual residential lots fronting the road. As such, off-site noise barriers would not be feasible and would not lower the off-site traffic noise levels below a level of significance, and therefore, noise barriers are not proposed as mitigation for the Project.

7.5.3 SIGNIFICANT OFF-SITE TRAFFIC NOISE IMPACTS

Both rubberized asphalt and off-site noise barriers are considered as potential noise mitigation measures to reduce the *potentially significant* off-site traffic noise level increases shown on Tables 7-7 to 7-9. However, neither form of mitigation would eliminate the off-site traffic noise level increases at the adjacent land uses to the impacted roadway segments. Therefore, the Project-related off-site traffic noise level increases at adjacent noise-sensitive land are considered a *significant and unavoidable* impact.

8 ON-SITE NOISE LEVELS

To satisfy the State of California's Green Building Standards Code contains mandatory measures for non-residential building construction in Section 5.507.4.2 on Environmental Comfort (9), an on-site exterior noise impact analysis has been completed to determine the noise exposure levels.

8.1 ON-SITE EXTERIOR NOISE ANALYSIS

Based on the Project site plan, the Project would potentially have offices at the southwest and southeast of the proposed building. Based on the distance to the nearest airport, the Project would not be subject excessive aircraft noise levels. However, the project may be subject to ground level transportation noise from roadway traffic on the west end and the adjacent railroad on the east end. Traffic noise levels are based on traffic modeling conducted for the off-site impacts, the details of which are presented in Chapter 7 and Appendix 7.1. Based on the Future Year with Project conditions, noise levels approximately 62 feet from Hesperia Road are projected to be 75.1 dBA L_{eq}. The proposed building is located approximately 500 feet from the center of Hesperia Road, at this distance the noise level would attenuate to approximately 61.5 dBA L_{eq}.

A review of the existing ambient noise measurements provided in Section 5 shows that the areas near the Project site including are exposed to unmitigated exterior noise levels ranging from 50.1 to 58.1 dBA L_{eq} (measurement location L2). This includes the existing unmitigated ambient noise level measurement at 270 feet from the BNSF railroad. It is expected that the Project exterior building located approximately 310 feet west of the BNSF railroad will experience similar exterior noise levels to what was measured at location L2.

8.2 ON-SITE INTERIOR NOISE ANALYSIS

The interior noise level is the difference between the predicted exterior noise level at the building facade and the noise reduction of the structure. Standard building construction will provide a Noise Reduction (NR) of approximately 25 dBA with "windows closed." (25) To satisfy the 50 dBA L_{eq} interior noise level performance criteria outlined in the California Green Building Standards Code Section 5.507.4.2, an interior noise reduction of up to 8.1 dBA and a "windows closed" condition requiring a means of mechanical ventilation (e.g. air conditioning) are required for the occupied offices within the Project.

The interior noise analysis indicates that typical building construction with an interior noise reduction of 25 dBA will provide an interior noise level of 33.1 dBA L_{eq} (exterior noise level of 58.1 dBA minus the typical noise reduction of 25 dBA). The interior noise analysis demonstrates that the Ottawa Business Center will satisfy the 50 dBA L_{eq} interior noise level performance criteria outlined in the California Green Building Standards Code Section 5.507.4.2 using standard building construction. Therefore, the on-site interior noise levels are considered *less than significant*.

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9 RECEIVER LOCATIONS

To assess the potential for long-term operational and short-term construction noise impacts, the following off-site 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, five 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 17049 Montecito Drive, approximately 2,232 feet northwest of the Project site. Receiver R1 is placed in the private outdoor living areas (backyard) facing the Project site. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents the existing noise sensitive residence at 13432 Jubilee Place, approximately 380 feet east of the Project site Receiver R2 is placed in the private outdoor living areas (backyard) facing the Project site. A 24-hour noise measurement was taken near this location, L2, to describe the existing ambient noise environment.

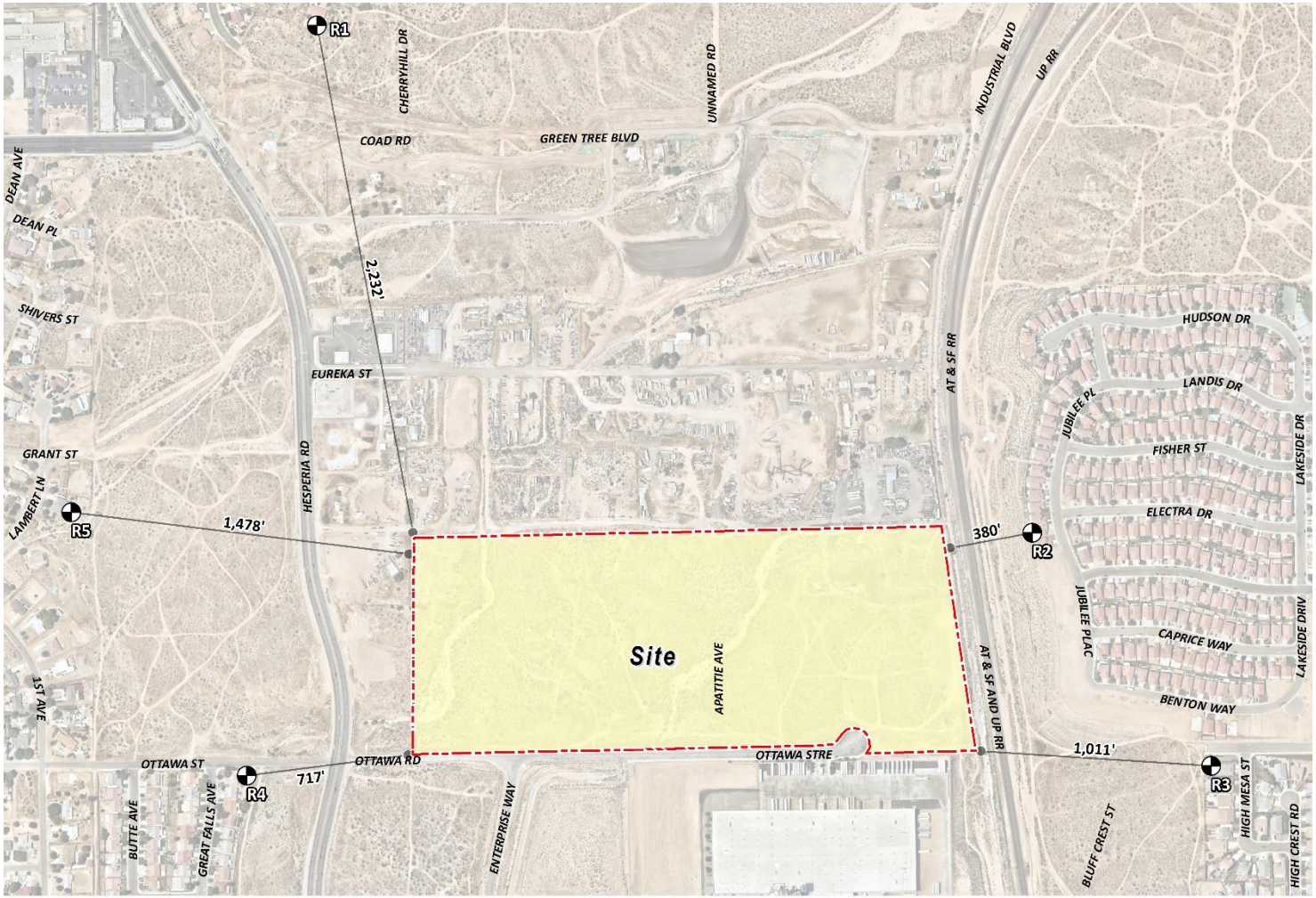
R3: Location R3 represents the existing noise sensitive residence at 13284 High Mesa Street, approximately 1,011 feet southeast of the Project site. Receiver R3 is placed in the private outdoor living areas (backyard) facing the Project site. A 24-hour noise measurement was taken near this location, L3, to describe the existing ambient noise environment.

R4: Location R4 represents the existing noise sensitive residence at 13291 Great Falls Avenue, approximately 717 feet southwest of the Project site. Receiver R4 is placed in the private outdoor living areas (backyard) facing the Project site. A 24-hour noise measurement was taken near this location, L4, to describe the existing ambient noise environment.

R5: Location R5 represents the existing noise sensitive residence at 16873 Lambert Lane, approximately 1,478 feet northwest of the Project site. Receiver R5 is placed in the

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

EXHIBIT 9-A: RECEIVER LOCATIONS



LEGEND:

N

Receiver Locations

Distance from receiver to Project site boundary (in feet)

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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 Ottawa Business Center Project. Exhibit 11-A identifies the representative noise source activities used to assess the operational noise levels.

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

10.2 REFERENCE NOISE LEVELS

To estimate the Project operational noise impacts, reference noise level measurements were collected from similar types of activities to represent the noise levels expected with the development of the proposed Project. This section provides a detailed description of the reference noise level measurements shown on Table 10-1 used to estimate the Project operational noise impacts. It is important to note that the following projected noise levels assume the worst-case noise environment with the cold storage loading dock activity, roof-top air conditioning units, trash enclosure activity, parking lot vehicle movements, and truck movements all operating at the same time. These sources of noise activity will likely vary throughout the day.

10.2.1 MEASUREMENT PROCEDURES

The reference noise level measurements presented in this section were collected using a Larson Davis LxT Type 1 precisions sound level meter (serial number 01146). The LxT sound level meter was calibrated using a Larson-Davis calibrator, Model CAL 200, was programmed in "slow" mode to record noise levels in "A" weighted form and was located at approximately five feet above the ground elevation for each measurement. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (16)

EXHIBIT 10-A: OPERATIONAL NOISE SOURCE LOCATIONS

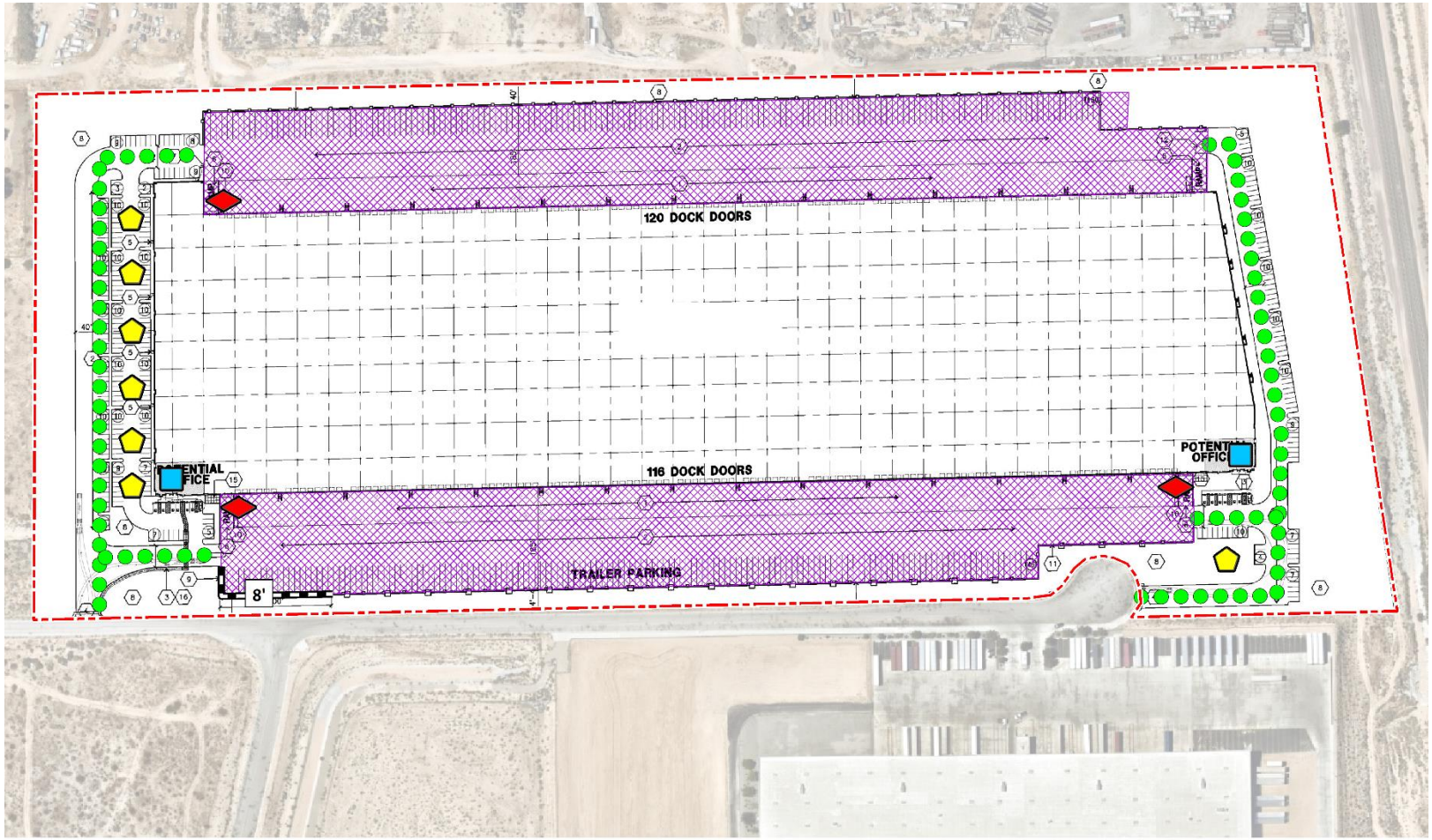

TABLE 10-1: REFERENCE NOISE LEVEL MEASUREMENTS

Noise Source[1]	Noise Source Height (Feet)	Min./Hour[2]		Reference Noise Level @ 50 feet (dBA L_{eq})	Sound Power Level (dBA)[3]
		Day	Night		
Cold Storage Loading Dock Activity	8'	60	60	65.7	111.5
Roof-Top Air Conditioning Units	5'	39	28	57.2	88.9
Trash Enclosure Activity	5'	10	10	57.3	89.0
Parking Lot Vehicle Movements	5'	60	60	56.1	87.8
Truck Movements	8'	60	60	59.8	93.2

[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. "Day" = 7:00 a.m. to 10:00 p.m.; "Night" = 10:00 p.m. to 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.

10.2.2 COLD STORAGE LOADING DOCK ACTIVITY

The reference loading dock activities are intended to describe the typical operational noise source levels associated with the Project. This includes truck idling, reefer activity (refrigerator truck/cold storage), deliveries, backup alarms, unloading/loading, docking including a combination of tractor trailer semi-trucks, two-axle delivery trucks, and background forklift operations. At a uniform reference distance of 50 feet, Urban Crossroads collected a reference noise level of 65.7 dBA L_{eq}. The loading dock activity noise level measurement was taken over a fifteen-minute period and represents multiple noise sources taken from the center of activity. Specifically, the reference noise level measurement represents one truck located approximately 30 feet from the noise level meter with another truck passing by to park roughly 20 feet away. Throughout the reference noise level measurement, a separate docked and running reefer truck was located approximately 50 feet east of the measurement location. Additional background noise sources included truck pass-by noise, truck drivers talking to each other next to docked trucks, and air brake release noise when trucks parked.

10.2.3 ROOF-TOP AIR CONDITIONING UNITS

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

10.2.4 TRASH ENCLOSURE ACTIVITY

To describe the noise levels associated with a trash enclosure activity, Urban Crossroads collected a reference noise level measurement at an existing trash enclosure containing two dumpster bins. The trash enclosure noise levels describe metal gates opening and closing, metal scraping against concrete floor sounds, dumpster movement on metal wheels, and trash dropping into the metal dumpster. The reference noise levels describe trash enclosure noise activities when trash is dropped into an empty metal dumpster, as would occur at the Project Site. The measured reference noise level at the uniform 50-foot reference distance is 57.3 dBA L_{eq} for the trash enclosure activity. The reference noise level describes the expected noise source activities associated with the trash enclosures for the Project's proposed building. Typical trash enclosure activities are estimated to occur for 10 minutes per hour.

10.2.5 PARKING LOT

To describe the on-site parking lot activity, a long-term 29-hour reference noise level measurement was within the staff parking lot of an Amazon distribution center. At 50 feet from the center of activity, the parking lot produced a reference noise level of 56.1 dBA L_{eq}. Parking activities are expected to take place during the full hour (60 minutes) throughout the daytime and evening hours. The parking lot noise levels are mainly due cars pulling in and out of parking spaces in combination with car doors opening and closing.

10.2.6 TRUCK MOVEMENTS

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

10.3 PROJECT OPERATIONAL NOISE LEVELS

Using the reference noise levels to represent the proposed Project operations that include cold storage loading dock activity, roof-top air conditioning units, trash enclosure activity, parking lot vehicle movements, and truck movements, Urban Crossroads, Inc. calculated the operational source noise levels that are expected to be generated at the Project site and the Project-related noise level increases that would be experienced at each of the sensitive receiver locations. Table 10-2 shows the Project operational noise levels during the daytime hours of 7:00 a.m. to 10:00 p.m. The daytime hourly noise levels at the nearest receiver locations are expected to range from 43.9 to 51.6 dBA L_{eq}.

Table 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 nearest receiver locations are expected to range from 43.0 to 50.6 dBA L_{eq}. The differences between the daytime and nighttime noise levels are largely related to the duration of noise activity (Table 10-1). Appendix 10.1 includes the detailed noise model inputs including the planned 8-foot-high noise barrier as shown on Exhibit 10-A.

10.4 PROJECT OPERATIONAL NOISE LEVEL COMPLIANCE

To demonstrate compliance with local noise regulations, the Project-only operational noise levels are evaluated against exterior noise level thresholds based on the City of Victorville exterior noise level standards at nearby noise-sensitive receiver locations. Table 10-4 shows the operational noise levels associated with Ottawa Business Center Project will satisfy the City of Victorville 65 dBA L_{eq} daytime and 55 dBA L_{eq} nighttime exterior noise level standards at all nearest receiver locations. Therefore, the operational noise impacts are considered *less than significant* at the nearby noise-sensitive receiver locations.

TABLE 10-2: DAYTIME PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA Leq)				
	R1	R2	R3	R4	R5
Cold Storage Loading Dock Activity	43.7	51.4	46.8	48.7	45.2
Roof-Top Air Conditioning Units	20.9	29.6	25.4	27.1	22.8
Trash Enclosure Activity	14.8	22.5	17.1	21.2	18.2
Parking Lot Vehicle Movements	24.0	29.3	26.7	32.7	28.1
Truck Movements	26.8	36.8	32.6	35.1	30.1
Total (All Noise Sources)	**43.9**	**51.6**	**47.0**	**49.0**	**45.4**

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

TABLE 10-3: NIGHTTIME PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA Leq)				
	R1	R2	R3	R4	R5
Cold Storage Loading Dock Activity	42.8	50.4	45.8	47.7	44.2
Roof-Top Air Conditioning Units	20.0	28.7	24.4	26.2	21.8
Trash Enclosure Activity	13.8	21.6	16.1	20.3	17.2
Parking Lot Vehicle Movements	23.0	28.4	25.7	31.8	27.2
Truck Movements	26.8	36.8	32.6	35.1	30.1
Total (All Noise Sources)	**43.0**	**50.6**	**46.1**	**48.1**	**44.5**

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

TABLE 10-4: OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	Project Operational Noise Levels (dBA Leq)[2]		Noise Level Standards (dBA Leq)[3]		Threshold Exceeded?[4]	
	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
R1	43.9	43.0	65	55	No	No
R2	51.6	50.6	65	55	No	No
R3	47.0	46.1	65	55	No	No
R4	49.0	48.1	65	55	No	No
R5	45.4	44.5	65	55	No	No

[1] See Exhibit 10-A for the noise source locations.
[2] Proposed Project operational noise levels as shown on Tables 10-3 and 10-4.
[3] City of Victorville Municipal Code, Section 13.01.030 (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.

10.5 PROJECT OPERATIONAL NOISE LEVEL INCREASES

To describe the Project operational noise level increases, the Project operational noise levels are combined with the existing ambient noise levels measurements for the nearby receiver locations potentially impacted by Project operational noise sources. Since the units used to measure noise, decibels (dB), are logarithmic units, the Project-operational and existing ambient noise levels cannot be combined using standard arithmetic equations. (2) Instead, they must be logarithmically added using the following base equation:

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

Where "SPL1," "SPL2," etc. are equal to the sound pressure levels being combined, or in this case, the Project-operational and existing ambient noise levels. The difference between the combined Project and ambient noise levels describes the Project noise level increases to the existing ambient noise environment. Noise levels that would be experienced at receiver locations when Project-source noise is added to the daytime and nighttime ambient conditions are presented on Tables 10-5 and 10-6, respectively. As indicated on Tables 10-5 and 10-6, the Project will generate a daytime and nighttime operational noise level increases ranging from 0.2 to 1.5 dBA L_{eq} at the nearest receiver locations. Project-related operational noise level increases will satisfy the operational noise level increase significance criteria presented in Table 4-1, the increases at the sensitive receiver locations 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[7]	Increase Criteria Exceeded?[7]
R1	43.9	L1	56.6	56.8	0.2	5.0	No
R2	51.6	L2	56.2	57.5	1.3	5.0	No
R3	47.0	L3	56.1	56.6	0.5	5.0	No
R4	49.0	L4	58.1	58.6	0.5	5.0	No
R5	45.4	L5	48.7	50.4	1.7	5.0	No

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

TABLE 10-6: NIGHTTIME 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[7]	Increase Criteria Exceeded?[7]
R1	43.0	L1	55.1	55.4	0.3	5.0	No
R2	50.6	L2	54.6	56.1	1.5	5.0	No
R3	46.1	L3	57.6	57.9	0.3	5.0	No
R4	48.1	L4	56.2	56.8	0.6	5.0	No
R5	44.5	L5	52.4	53.0	0.6	5.0	No

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

11 CONSTRUCTION ANALYSIS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 11-A shows the construction noise source locations in relation to the nearest 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 TYPICAL 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: CONSTRUCTION NOISE SOURCE AND RECEIVER LOCATIONS

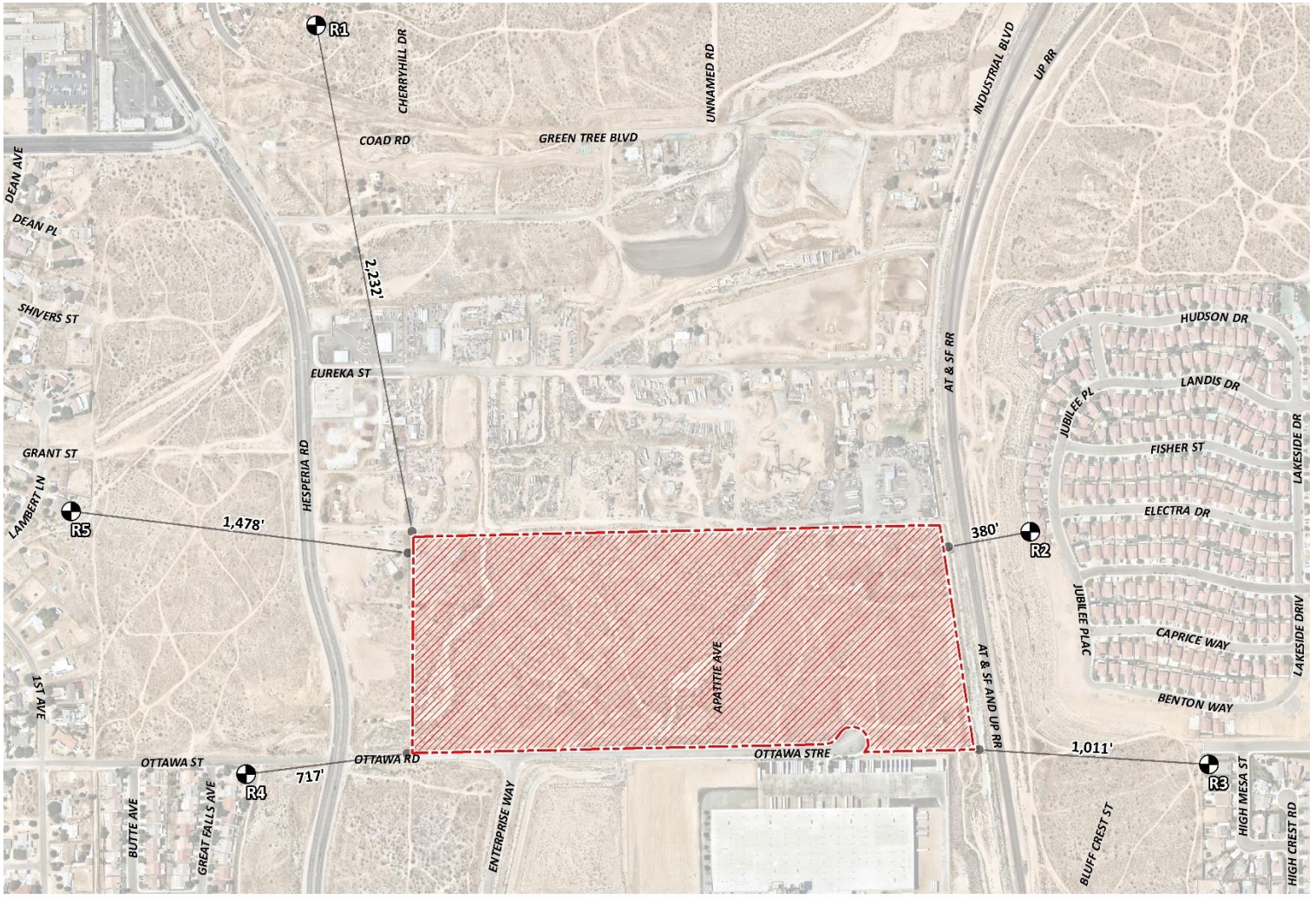

TABLE 11-1: CONSTRUCTION REFERENCE NOISE LEVELS

Construction Stage	Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})[1]	Combined Noise Level (dBA L_{eq})
Site Preparation	Crawler Tractors	77	79
	Hauling Trucks	71	
	Rubber Tired Dozers	71	
Grading	Graders	79	79
	Compactors	67	
	Excavators	64	
Building Construction	Tractors	72	74
	Cranes	67	
	Welders	65	
Paving	Pavers	70	74
	Paving Equipment	69	
	Rollers	69	
Architectural Coating	Cranes	67	72
	Air Compressors	67	
	Generator Sets	67	

[1] Update of Noise Database for Prediction of Noise on Construction and Open Sites by the Department for Environment, Food and Rural Affairs (DEFRA) expressed in hourly average L_{eq} based on estimated usage factors from the FHWA Roadway Construction Noise Model (RCNM).
[2] Represents the combined noise level for all equipment assuming they operate at the same time consistent with FTA Transit Noise and Vibration Impact Assessment guidance for general construction noise assessment.

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 nearest sensitive receiver locations were completed. To assess the worst-case construction noise levels, the Project construction noise analysis relies on the highest noise level impacts when the equipment with the highest reference noise level is operating at the closest point from the edge of primary construction activity (Project site boundary) to each receiver location. Consistent with FTA guidance for general construction noise assessment, Table 11-1 presents the combined noise level for all equipment, assuming they operate at the same time. As shown on Table 11-2, the construction noise levels are expected to range from 52.8 to 69.0 dBA L_{eq}, and the highest construction levels are expected to range from 59.8 to 69.0 dBA L_{eq} at the nearby receiver locations. Appendix 11.1 includes the detailed CadnaA construction noise model inputs. The construction noise analysis presents a conservative approach with the combined noise-level-producing equipment for each stage of Project construction operating at the closest point from primary construction activity (property line) 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: TYPICAL 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	59.8	59.8	54.8	54.8	52.8	59.8
R2	69.0	69.0	64.0	64.0	62.0	69.0
R3	63.9	63.9	58.9	58.9	56.9	63.9
R4	65.8	65.8	60.8	60.8	58.8	65.8
R5	62.0	62.0	57.0	57.0	55.0	62.0

[1] Noise receiver locations are shown on Exhibit 11-A.
[2] Construction noise level calculations based on distance from the construction activity, which is measured from the Project site boundary to the nearest receiver locations. CadnaA construction noise model inputs are included in Appendix 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 80 dBA L_{eq} is used as a reasonable threshold to assess the daytime construction noise level impacts. The construction noise analysis shows that the nearest receiver locations will satisfy the reasonable daytime 80 dBA L_{eq} significance threshold during Project construction activities as shown on Table 11-3. Therefore, the noise impacts due to Project construction noise are considered *less than significant* at all receiver locations.

TABLE 11-3: TYPICAL CONSTRUCTION NOISE LEVEL COMPLIANCE

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})		
	Highest Construction Noise Levels[2]	Threshold[3]	Threshold Exceeded?[4]
R1	59.8	80	No
R2	69.0	80	No
R3	63.9	80	No
R4	65.8	80	No
R5	62.0	80	No

[1] Noise receiver locations are shown on Exhibit 11-A.
[2] Highest construction noise level calculations based on distance from the construction noise source activity to the nearest receiver locations as shown on Table 11-2.
[3] Construction noise level thresholds as shown on Table 4-1.
[4] Do the estimated Project construction noise levels exceed the construction noise level threshold?

11.5 CONSTRUCTION VIBRATION IMPACTS

Table 11-4 presents the expected Project related vibration levels at the nearby receiver locations. At distances ranging from 380 to 2,232 feet from Project construction activities, construction vibration velocity levels are estimated to range from 0.000 to 0.002 in/sec PPV. Based on maximum acceptable continuous vibration threshold of 0.3 PPV (in/sec) for older residential buildings, the typical Project construction vibration levels will satisfy the building damage thresholds at all receiver locations. In addition, the typical construction vibration levels at the nearest sensitive receiver locations are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating adjacent to the Project site boundaries.

TABLE 11-4: PROJECT CONSTRUCTION VIBRATION LEVELS

Receiver[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	Jackhammer	Loaded Trucks	Large bulldozer	Highest Vibration Level		
R1	2,232'	0.000	0.000	0.000	0.000	0.000	0.3	No
R2	380'	0.000	0.001	0.001	0.002	0.002	0.3	No
R3	1,011'	0.000	0.000	0.000	0.000	0.000	0.3	No
R4	717'	0.000	0.000	0.000	0.001	0.001	0.3	No
R5	1,478'	0.000	0.000	0.000	0.000	0.000	0.3	No

[1] Receiver locations are shown on Exhibit 11-A.
[2] Distance from receiver location to Project construction boundary (Project site boundary).
[3] Based on the Vibration Source Levels of Construction Equipment (Table 6-9).
[4] Caltrans Transportation and Construction Vibration Guidance Manual, April 2020, Tables 19, p. 38.
[5] Does the peak vibration exceed the acceptable vibration thresholds?
"PPV" = Peak Particle Velocity

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

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12 REFERENCES

1. **State of California.** *California Environmental Quality Act, Appendix G.* 2018.
2. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
3. **Environmental Protection Agency Office of Noise Abatement and Control.** *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* March 1974. EPA/ONAC 550/9/74-004.
4. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch.** *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* December 2011.
5. **U.S. Department of Transportation, Federal Highway Administration.** *Highway Traffic Noise in the United States, Problem and Response.* April 2000. p. 3.
6. **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.
7. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment Manual.* September 2018.
8. **Office of Planning and Research.** *State of California General Plan Guidelines.* October 2017.
9. **State of California.** *2019 California Green Building Standards Code.* January 2020.
10. **City of Victorville.** *General Plan Noise Element.* 2008.
11. —. *Municipal Code, Section 13.01.030.*
12. **California Department of Transportation.** *Transportation and Construction Vibration Guidance Manual.* April 2020.
13. **California Court of Appeal.** *Gray v. County of Madera, F053661.* 167 Cal.App.4th 1099; - Cal.Rptr.3d, October 2008.
14. **Federal Interagency Committee on Noise.** *Federal Agency Review of Selected Airport Noise Analysis Issues.* August 1992.
15. **California Department of Transportation.** *Technical Noise Supplement.* November 2009.
16. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*
17. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.
18. **California Department of Transportation Environmental Program, Office of Environmental Engineering.** *Use of California Vehicle Noise Reference Energy Mean Emission Levels (Calveno REMELs) in FHWA Highway Traffic Noise Prediction.* September 1995. TAN 95-03.
19. **California Department of Transportation.** *Traffic Noise Attenuation as a Function of Ground and Vegetation Final Report.* June 1995. FHWA/CA/TL-95/23.
20. **Urban Crossroads, Inc.** *Ottawa Business Center Traffic Analysis.* July 2021.

21. **U.S. Department of Transportation.** Crossing Inventory Form, Crossing Number 026080V. [Online] [Cited: 11 22, 2021.] https://safetydata.fra.dot.gov/OfficeofSafety/publicsite/crossing/Xingqryloc.aspx.
22. **California Department of Transportation Environmental Program.** *I-80 Davis OGAC Pavement Noise Study.* September 2001.
23. **Canadian Ministry of Transportation and Highways, Highway Environment Branch.** *Open-Graded Asphalt 'Quiet Pavement' - Assessment of Traffic Noise Reduction Performance.* November 1995.
24. **California Department of Transportation.** *Highway Design Manual, Chapter 1100 Highway Traffic Noise Abatement.* November 2017.
25. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch.** *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* December 2011.
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 Ottawa Business 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 (949) 584-3148.

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EDUCATION

Master of Science in Civil and Environmental Engineering
California Polytechnic State University, San Luis Obispo • December, 1993

Bachelor of Science in City and Regional Planning
California Polytechnic State University, San Luis Obispo • June, 1992

PROFESSIONAL REGISTRATIONS

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

PROFESSIONAL AFFILIATIONS

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

PROFESSIONAL CERTIFICATIONS

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

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APPENDIX 3.1:

CITY OF VICTORVILLE MUNICIPAL CODE

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Chapter 13.01 - NOISE CONTROL

Sections:

13.01.010 - Purpose and intent.

(a) The purpose of this chapter is to establish criteria and standards for the regulation of noise levels within the city of Victorville.

(b) The city council declares and finds that excessive noise levels are detrimental to the public health, welfare and safety and contrary to the public interest. It is the intent of this chapter to protect persons from excessive levels of noise from sources including, but not limited to; persons, animals, or fowl; automobiles, motorcycles, engines, machines, or other mechanical devices; loudspeakers, musical instruments, radios, televisions, phonographs, or other amplifying devices.

(c) This chapter includes standards for the measurement of noise levels to ensure that noise levels do not disturb and interfere with the peace, comfort or repose of the residents of the neighborhood from which the noise is emitted.

(Ord. 1962 § 2 (part), 2002)

13.01.020 - Definitions.

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

(1) "A-weighted sound level" means the sound pressure level in decibels as measured on a sound level meter using A-weighting network. The level to read is designated db(A) or dB(A).

(2) "Ambient noise level" means the all-encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding any intrusive noise.

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

(4) "Decibel" means a unit of measure of sound level noise.

(5) "Noise level" means the same as "sound level" and the terms may be used interchangeably herein.

(6) "Sound level" (noise level) in decibels is the quantity measured using the frequency weighting of A of a sound level meter as defined herein.

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

(Ord. 1962 § 2 (part), 2002)

13.01.030 - Noise measurement criteria.

Any noise level measurements made pursuant to the provisions of this chapter shall be performed using a sound level meter as defined in this chapter. The location selected for measuring exterior noise levels shall be at any point on the property line of the offender or anywhere on the affected property.

(Ord. 1962 § 2 (part), 2002)

13.01.040 - Base ambient noise levels.

All ambient noise measurements shall commence in decibels within the respective zones and times as follows:

Zone	Time	Sound Level Decibels
All residential zones	10:00pm to 7:00am	55 dB(A)
	7:00am to 10:00pm	65 dB(A)
All commercial zones	Anytime	70 dB(A)
All industrial zones	Anytime	75 dB(A)

If the ambient noise level exceeds the applicable limit as noted in the above table, the ambient noise level shall be the standard.

(Ord. 1962 § 2 (part), 2002)

13.01.050 - Noise levels prohibited.

Noise levels shall not exceed the ambient noise levels in Section 13.01.040 by the following dB(A) levels for the cumulative period of time specified:

(1) Less than 5dB(A) for a cumulative period of more than thirty minutes in any hour;

(2) Less than 10 dB(A) for a cumulative period of more than fifteen minutes in any hour;

(3) Less than 15 dB(A) for a cumulative period of more than five minutes in any hour;

(4) Less than 20 dB(A) for a cumulative period of more than one minute in any hour;

(5) 20 dB(A) or more for any period of time.

(Ord. 1962 § 2 (part), 2002)

13.01.060 - Noise source exemptions.

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

(1) All mechanical devices, apparatus or equipment used, related to or connected with emergency machinery, vehicle or work.

(2) The provisions of this regulation shall not preclude the construction, operation, maintenance and repairs of equipment, apparatus or facilities of park and recreation projects, public works projects or essential public works services and facilities, including those utilities subject to the regulatory jurisdiction of the California Public Utilities Commission.

(3) Activities conducted on the grounds of any elementary, intermediate or secondary school or college.

(4) Outdoor gatherings, public dances and shows, provided said events are conducted pursuant to a permit as required by this code.

(5) Activities conducted in public parks and public playgrounds, provided said events are conducted pursuant to a permit as required by this code.

(6) Any activity to the extent regulation thereof has been preempted by state or federal law.

(7) Traffic on any roadway or railroad right-of-way.

(8) The operation of the Southern California Logistics Airport.

(9) Construction activity on private properties that are determined by the director of building and safety to be essential to the completion of a project.

(Ord. 1962 § 2 (part), 2002)

13.01.070 - Notice and penalties.

Any person violating any of the provisions, or failing to comply with the requirements of this chapter, is guilty of a civil penalty, punishable in accordance with Chapter 1.05. In addition, in the discretion of the city attorney and based upon the specific facts and circumstances presented to him or her, any such violation may be charged as an infraction subject to the penalties contained in Section 1.04.010.

(Ord. 1962 § 2 (part), 2002)

13.01.080 - Severability.

If any provision of the ordinance codified in this chapter or the application thereof to any person or circumstance is held invalid, the remainder of the ordinance, and the application of such provision to other persons or circumstances, shall not be affected thereby.

(Ord. 1962 § 2 (part), 2002)

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APPENDIX 5.1:

STUDY AREA PHOTOS

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JN: 14035 Study Area Photos

L1_E
34, 29' 42.390000"117, 16' 53.900000"

L1_N
34, 29' 42.380000"117, 16' 53.930000"

L1_S
34, 29' 42.410000"117, 16' 53.900000"

L1_W
34, 29' 42.380000"117, 16' 53.900000"

L2_E
34, 29' 34.000000"117, 16' 45.610000"

L2_N
34, 29' 33.990000"117, 16' 45.610000"

JN: 14035 Study Area Photos

L2_S
34, 29' 34.060000"117, 16' 45.660000"

L2_W
34, 29' 34.070000"117, 16' 45.630000"

L3_E
34, 29' 33.630000"117, 17' 33.780000"

L3_N
34, 29' 33.630000"117, 17' 33.750000"

L3_S
34, 29' 33.650000"117, 17' 33.780000"

L3_W
34, 29' 33.650000"117, 17' 33.810000"

JN: 14035 Study Area Photos

L4_E
34, 29' 47.380000"117, 17' 43.670000"

L4_N
34, 29' 47.320000"117, 17' 43.700000"

L4_S
34, 29' 47.350000"117, 17' 43.670000"

L4_W
34, 29' 47.340000"117, 17' 43.670000"

L5_E
34, 30' 3.790000"117, 17' 35.460000"

L5_N
34, 30' 3.790000"117, 17' 35.460000"

JN: 14035 Study Area Photos

L5_S
34, 30' 3.790000"117, 17' 35.480000"

L5_W
34, 30' 3.790000"117, 17' 35.460000"

APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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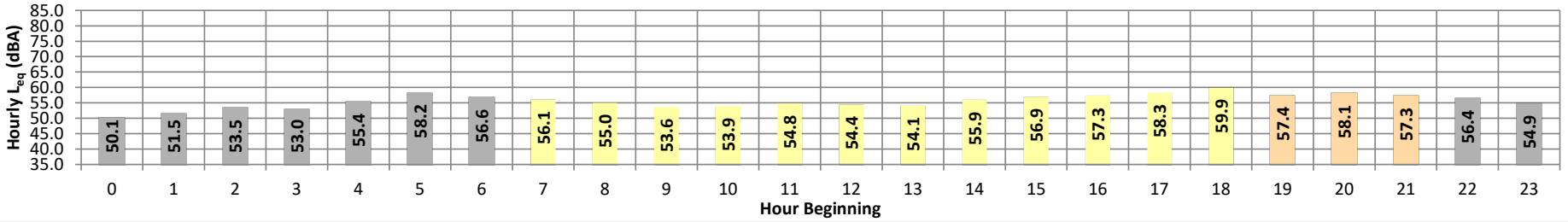
24-Hour Noise Level Measurement Summary

Date: Thursday, May 27, 2021
Project: Ottowa Business Center
Location: L1 - Located north of the Project site on Tropicana Drive near existing single-family residential home at 13758 Tropicana Drive.
Meter: Piccolo II
JN: 14035
Analyst: N. Boyko

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	50.1	57.0	44.6	56.7	56.3	54.9	53.9	50.8	48.3	45.5	45.1	44.8	50.1	10.0	60.1
	1	51.5	57.8	47.2	57.5	57.0	56.0	55.1	51.9	50.0	48.0	47.6	47.3	51.5	10.0	61.5
	2	53.5	60.6	48.9	60.3	59.9	58.6	57.4	53.3	51.7	49.8	49.4	49.0	53.5	10.0	63.5
	3	53.0	59.1	49.2	58.9	58.6	57.6	56.5	53.3	51.8	49.9	49.7	49.3	53.0	10.0	63.0
	4	55.4	61.1	51.1	60.7	60.3	59.4	58.5	56.0	54.5	51.9	51.6	51.2	55.4	10.0	65.4
	5	58.2	64.1	54.3	63.8	63.4	62.3	61.2	59.0	57.0	55.0	54.7	54.4	58.2	10.0	68.2
	6	56.6	62.1	52.9	61.7	61.3	60.3	59.7	57.3	55.7	53.6	53.3	53.0	56.6	10.0	66.6
Day	7	56.1	62.1	52.8	61.9	61.5	60.1	58.9	56.4	54.9	53.4	53.2	52.9	56.1	0.0	56.1
	8	55.0	63.2	49.3	63.0	62.6	60.7	59.1	55.0	52.7	50.2	49.8	49.4	55.0	0.0	55.0
	9	53.6	61.7	46.5	61.3	60.9	59.2	57.9	53.8	51.4	47.7	47.2	46.6	53.6	0.0	53.6
	10	53.9	61.5	47.6	61.2	60.8	59.2	57.9	54.4	52.1	48.8	48.2	47.8	53.9	0.0	53.9
	11	54.8	62.2	47.3	61.9	61.5	60.1	59.1	55.9	52.1	48.6	48.1	47.5	54.8	0.0	54.8
	12	54.4	63.6	46.9	63.1	62.3	60.4	58.9	54.2	51.3	48.1	47.6	47.1	54.4	0.0	54.4
	13	54.1	61.8	47.5	61.5	61.0	59.4	58.0	54.4	52.1	49.0	48.4	47.7	54.1	0.0	54.1
	14	55.9	65.6	48.0	65.1	64.4	61.9	60.2	55.6	52.8	49.3	48.8	48.2	55.9	0.0	55.9
	15	56.9	64.8	50.7	64.4	64.0	62.4	61.0	57.1	54.9	51.9	51.4	50.8	56.9	0.0	56.9
	16	57.3	64.3	51.7	64.0	63.6	62.2	61.0	57.5	55.7	52.9	52.4	51.9	57.3	0.0	57.3
	17	58.3	65.5	52.7	65.1	64.7	63.1	62.1	58.6	56.6	53.8	53.3	52.8	58.3	0.0	58.3
	18	59.9	68.6	53.2	68.2	67.6	66.0	64.4	59.6	57.2	54.5	54.0	53.4	59.9	0.0	59.9
Evening	19	57.4	65.3	51.8	64.9	64.3	62.7	61.4	57.6	55.4	53.1	52.6	52.1	57.4	5.0	62.4
	20	58.1	66.6	52.0	66.2	65.4	63.4	62.0	58.1	55.8	53.5	52.9	52.2	58.1	5.0	63.1
	21	57.3	65.2	52.3	64.7	64.1	62.5	61.3	57.4	55.4	53.4	53.0	52.5	57.3	5.0	62.3
Night	22	56.4	63.5	51.7	63.1	62.7	61.4	60.2	56.3	54.9	53.0	52.5	51.9	56.4	10.0	66.4
	23	54.9	64.9	49.9	63.8	62.1	58.7	57.2	54.7	53.4	51.2	50.7	50.2	54.9	10.0	64.9

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day (7am-7pm)	Min	53.6	61.5	46.5	61.2	60.8	59.2	57.9	53.8	51.3	47.7	47.2	46.6
	Max	59.9	68.6	53.2	68.2	67.6	66.0	64.4	59.6	57.2	54.5	54.0	53.4
Energy Average		56.3	Average:		63.4	62.9	61.2	59.9	56.0	53.6	50.7	50.2	49.7
Evening (7pm-10pm)	Min	57.3	65.2	51.8	64.7	64.1	62.5	61.3	57.4	55.4	53.1	52.6	52.1
	Max	58.1	66.6	52.3	66.2	65.4	63.4	62.0	58.1	55.8	53.5	53.0	52.5
Energy Average		57.6	Average:		65.2	64.6	62.9	61.6	57.7	55.5	53.3	52.8	52.3
Night (10pm-7am)	Min	50.1	57.0	44.6	56.7	56.3	54.9	53.9	50.8	48.3	45.5	45.1	44.8
	Max	58.2	64.9	54.3	63.8	63.4	62.3	61.2	59.0	57.0	55.0	54.7	54.4
Energy Average		55.1	Average:		60.7	60.2	58.8	57.7	54.7	53.0	50.9	50.5	50.1

L_{eq} (dBA)		
24-Hour	Daytime (7am-10pm)	Nighttime (10pm-7am)
56.1	56.6	55.1

24-Hour CNEL (dBA)

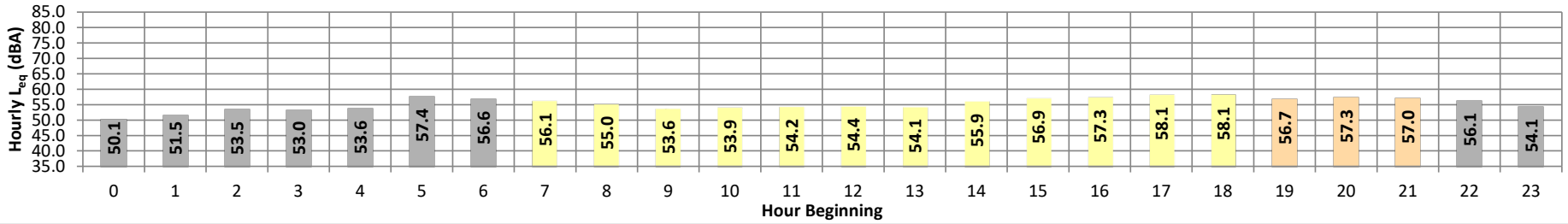
62.2

24-Hour Noise Level Measurement Summary

Date: Thursday, May 27, 2021 *Location:* L2 - Located east of the Project site on Jubilee Place near existing single-family residential home at 13432 Jubilee Place. *Meter:* Piccolo II *JN:* 14035

Project: Ottowa Business Center *Analyst:* N. Boyko

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	50.1	57.0	44.6	56.7	56.3	54.9	53.9	50.8	48.3	45.5	45.1	44.8	50.1	10.0	60.1
	1	51.5	57.8	47.2	57.5	57.0	56.0	55.1	51.9	50.0	48.0	47.6	47.3	51.5	10.0	61.5
	2	53.5	60.6	48.9	60.3	59.9	58.6	57.4	53.3	51.7	49.8	49.4	49.0	53.5	10.0	63.5
	3	53.0	59.1	49.2	58.9	58.6	57.6	56.5	53.3	51.8	49.9	49.7	49.3	53.0	10.0	63.0
	4	53.6	61.1	51.1	60.7	60.3	59.4	58.5	56.0	54.5	51.9	51.6	51.2	53.6	10.0	63.6
	5	57.4	64.1	54.3	63.8	63.4	62.3	61.2	59.0	57.0	55.0	54.7	54.4	57.4	10.0	67.4
	6	56.6	62.1	52.9	61.7	61.3	60.3	59.7	57.3	55.7	53.6	53.3	53.0	56.6	10.0	66.6
Day	7	56.1	62.1	52.8	61.9	61.5	60.1	58.9	56.4	54.9	53.4	53.2	52.9	56.1	0.0	56.1
	8	55.0	63.2	49.3	63.0	62.6	60.7	59.1	55.0	52.7	50.2	49.8	49.4	55.0	0.0	55.0
	9	53.6	61.7	46.5	61.3	60.9	59.2	57.9	53.8	51.4	47.7	47.2	46.6	53.6	0.0	53.6
	10	53.9	61.5	47.6	61.2	60.8	59.2	57.9	54.4	52.1	48.8	48.2	47.8	53.9	0.0	53.9
	11	54.2	62.2	47.3	61.9	61.5	60.1	59.1	55.9	52.1	48.6	48.1	47.5	54.2	0.0	54.2
	12	54.4	63.6	46.9	63.1	62.3	60.4	58.9	54.2	51.3	48.1	47.6	47.1	54.4	0.0	54.4
	13	54.1	61.8	47.5	61.5	61.0	59.4	58.0	54.4	52.1	49.0	48.4	47.7	54.1	0.0	54.1
	14	55.9	65.6	48.0	65.1	64.4	61.9	60.2	55.6	52.8	49.3	48.8	48.2	55.9	0.0	55.9
	15	56.9	64.8	50.7	64.4	64.0	62.4	61.0	57.1	54.9	51.9	51.4	50.8	56.9	0.0	56.9
	16	57.3	64.3	51.7	64.0	63.6	62.2	61.0	57.5	55.7	52.9	52.4	51.9	57.3	0.0	57.3
	17	58.1	65.5	52.7	65.1	64.7	63.1	62.1	58.6	56.6	53.8	53.3	52.8	58.1	0.0	58.1
	18	58.1	68.6	53.2	68.2	67.6	66.0	64.4	59.6	57.2	54.5	54.0	53.4	58.1	0.0	58.1
Evening	19	56.7	65.3	51.8	64.9	64.3	62.7	61.4	57.6	55.4	53.1	52.6	52.1	56.7	5.0	61.7
	20	57.3	66.6	52.0	66.2	65.4	63.4	62.0	58.1	55.8	53.5	52.9	52.2	57.3	5.0	62.3
	21	57.0	65.2	52.3	64.7	64.1	62.5	61.3	57.4	55.4	53.4	53.0	52.5	57.0	5.0	62.0
Night	22	56.1	63.5	51.7	63.1	62.7	61.4	60.2	56.3	54.9	53.0	52.5	51.9	56.1	10.0	66.1
	23	54.1	64.9	49.9	63.8	62.1	58.7	57.2	54.7	53.4	51.2	50.7	50.2	54.1	10.0	64.1

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day (7am-7pm)	Min	53.6	61.5	46.5	61.2	60.8	59.2	57.9	53.8	51.3	47.7	47.2	46.6
	Max	58.1	68.6	53.2	68.2	67.6	66.0	64.4	59.6	57.2	54.5	54.0	53.4
Energy Average		55.9	Average:		63.4	62.9	61.2	59.9	56.0	53.6	50.7	50.2	49.7
Evening (7pm-10pm)	Min	56.7	65.2	51.8	64.7	64.1	62.5	61.3	57.4	55.4	53.1	52.6	52.1
	Max	57.3	66.6	52.3	66.2	65.4	63.4	62.0	58.1	55.8	53.5	53.0	52.5
Energy Average		57.0	Average:		65.2	64.6	62.9	61.6	57.7	55.5	53.3	52.8	52.3
Night (10pm-7am)	Min	50.1	57.0	44.6	56.7	56.3	54.9	53.9	50.8	48.3	45.5	45.1	44.8
	Max	57.4	64.9	54.3	63.8	63.4	62.3	61.2	59.0	57.0	55.0	54.7	54.4
Energy Average		54.6	Average:		60.7	60.2	58.8	57.7	54.7	53.0	50.9	50.5	50.1

L_{eq} (dBA)		
24-Hour	*Daytime (7am-10pm)*	*Nighttime (10pm-7am)*
55.6	56.2	54.6

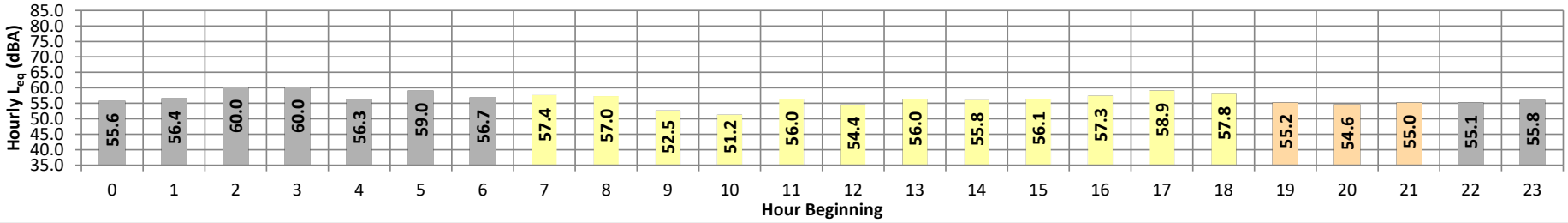
24-Hour CNEL (dBA)

61.7

24-Hour Noise Level Measurement Summary

Date: Thursday, May 27, 2021
Project: Ottowa Business Center
Location: L3 - Located east of the Project site on Bluff Crest Street near existing single-family residential home at 13284 High Mesa Street.
Meter: Piccolo II
JN: 14035
Analyst: N. Boyko

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	55.6	61.4	51.9	61.2	60.8	60.3	59.7	56.2	53.6	52.5	52.3	52.1	55.6	10.0	65.6
	1	56.4	59.3	53.9	59.1	58.9	58.4	58.2	57.2	56.2	54.6	54.3	54.0	56.4	10.0	66.4
	2	60.0	64.4	55.7	64.3	64.1	63.6	63.4	61.2	58.7	56.6	56.2	55.8	60.0	10.0	70.0
	3	60.0	64.3	56.8	64.1	64.0	63.5	63.1	61.9	59.6	57.5	57.2	56.9	60.0	10.0	70.0
	4	56.3	63.9	54.9	63.7	63.6	63.2	62.8	61.7	58.5	55.5	55.2	55.0	56.3	10.0	66.3
	5	59.0	63.3	56.6	63.1	62.9	62.3	62.0	60.2	58.6	57.2	57.0	56.7	59.0	10.0	69.0
	6	56.7	63.3	55.4	63.1	62.8	62.3	61.8	60.4	57.4	55.9	55.7	55.5	56.7	10.0	66.7
Day	7	57.4	62.5	55.9	62.2	62.0	61.5	61.3	60.2	58.1	56.6	56.4	56.1	57.4	0.0	57.4
	8	57.0	62.3	53.1	62.1	61.9	61.4	60.8	57.9	55.1	53.7	53.5	53.2	57.0	0.0	57.0
	9	52.5	57.2	49.0	57.0	56.9	56.3	55.9	53.6	51.0	49.6	49.4	49.1	52.5	0.0	52.5
	10	51.2	61.8	49.3	61.5	61.1	60.5	60.3	58.3	53.3	50.0	49.7	49.4	51.2	0.0	51.2
	11	56.0	63.9	51.0	63.7	63.5	63.0	62.5	60.6	56.0	51.9	51.5	51.1	56.0	0.0	56.0
	12	54.4	60.4	49.2	60.2	59.9	59.3	58.8	55.7	51.6	50.0	49.7	49.4	54.4	0.0	54.4
	13	56.0	60.7	50.4	60.4	60.3	59.9	59.6	57.6	54.8	51.2	50.9	50.6	56.0	0.0	56.0
	14	55.8	62.3	49.4	61.8	61.4	60.6	60.0	57.5	53.5	50.3	49.9	49.5	55.8	0.0	55.8
	15	56.1	61.4	51.3	61.0	60.7	59.9	59.2	57.1	54.7	52.5	52.1	51.5	56.1	0.0	56.1
	16	57.3	65.1	53.2	64.7	64.3	63.6	63.2	61.3	59.1	54.4	54.0	53.4	57.3	0.0	57.3
	17	58.9	65.2	53.2	64.7	64.1	62.9	62.1	59.9	57.5	54.6	54.1	53.4	58.9	0.0	58.9
	18	57.8	63.9	52.8	63.6	63.2	62.3	61.7	58.2	56.2	53.9	53.5	53.0	57.8	0.0	57.8
Evening	19	55.2	59.6	52.0	59.1	58.7	58.0	57.6	56.2	54.4	52.7	52.4	52.1	55.2	5.0	60.2
	20	54.6	58.3	52.3	57.9	57.6	56.8	56.4	55.2	54.2	53.0	52.7	52.4	54.6	5.0	59.6
	21	55.0	65.1	53.3	64.6	64.1	63.3	62.3	60.3	56.5	54.0	53.7	53.4	55.0	5.0	60.0
Night	22	55.1	62.3	52.9	62.0	61.8	61.2	60.6	59.2	56.3	53.7	53.4	53.1	55.1	10.0	65.1
	23	55.8	59.6	52.8	59.2	58.9	58.3	57.9	56.6	55.5	53.5	53.2	53.0	55.8	10.0	65.8

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day (7am-7pm)	Min	51.2	57.2	49.0	57.0	56.9	56.3	55.9	53.6	51.0	49.6	49.4	49.1
	Max	58.9	65.2	55.9	64.7	64.3	63.6	63.2	61.3	59.1	56.6	56.4	56.1
Energy Average		56.3	Average:		61.9	61.6	60.9	60.4	58.2	55.1	52.4	52.0	51.6
Evening (7pm-10pm)	Min	54.6	58.3	52.0	57.9	57.6	56.8	56.4	55.2	54.2	52.7	52.4	52.1
	Max	55.2	65.1	53.3	64.6	64.1	63.3	62.3	60.3	56.5	54.0	53.7	53.4
Energy Average		54.9	Average:		60.5	60.1	59.4	58.8	57.2	55.0	53.2	53.0	52.6
Night (10pm-7am)	Min	55.1	59.3	51.9	59.1	58.9	58.3	57.9	56.2	53.6	52.5	52.3	52.1
	Max	60.0	64.4	56.8	64.3	64.1	63.6	63.4	61.9	59.6	57.5	57.2	56.9
Energy Average		57.6	Average:		62.2	62.0	61.5	61.0	59.4	57.2	55.2	54.9	54.7

L_{eq} (dBA)		
24-Hour	*Daytime (7am-10pm)*	*Nighttime (10pm-7am)*
56.7	**56.1**	**57.6**

24-Hour CNEL (dBA)

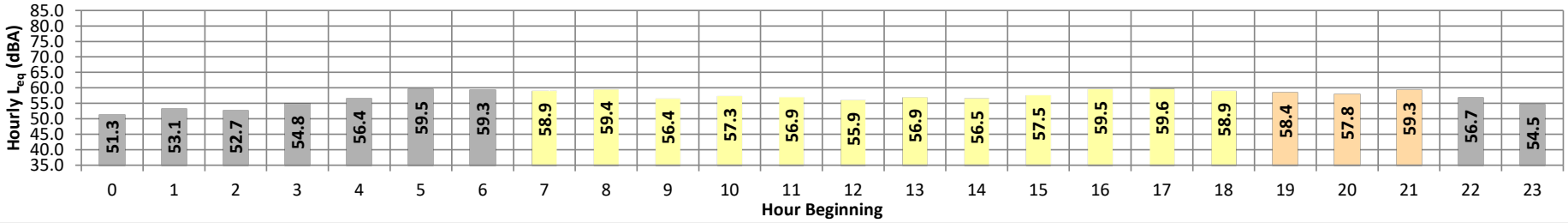
64.0

24-Hour Noise Level Measurement Summary

Date: Thursday, May 27, 2021 *Location:* L4 - Located west of the Project site on Ottawa Street near existing single-family residential home at 13291 Great Falls Avenue. *Meter:* Piccolo II *JN:* 14035

Project: Ottowa Business Center *Analyst:* N. Boyko

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	*Hour*	*L_{eq}*	*L_{max}*	*L_{min}*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*	*L_{eq}*	*Adj.*	*Adj. L_{eq}*
Night	0	51.3	60.4	45.0	60.0	59.2	56.8	55.1	51.3	48.8	46.0	45.6	45.1	51.3	10.0	61.3
	1	53.1	63.2	47.3	62.6	61.5	58.1	55.9	53.1	50.6	48.2	47.8	47.4	53.1	10.0	63.1
	2	52.7	58.5	48.2	58.2	57.8	56.7	56.0	53.5	51.4	49.1	48.7	48.3	52.7	10.0	62.7
	3	54.8	61.8	50.4	61.5	61.0	59.2	58.0	55.1	53.5	51.2	50.9	50.5	54.8	10.0	64.8
	4	56.4	65.2	51.7	64.6	63.6	60.9	59.2	56.5	54.7	52.4	52.1	51.8	56.4	10.0	66.4
	5	59.5	67.0	55.4	66.4	65.5	63.0	61.8	59.9	58.5	56.1	55.8	55.5	59.5	10.0	69.5
	6	59.3	68.8	54.0	68.2	67.3	64.2	62.3	59.1	57.3	54.8	54.4	54.1	59.3	10.0	69.3
Day	7	58.9	68.6	52.8	68.0	67.0	63.9	61.9	59.2	57.1	53.9	53.3	52.9	58.9	0.0	58.9
	8	59.4	69.9	50.8	69.4	68.4	65.6	63.3	58.7	56.3	52.2	51.5	51.0	59.4	0.0	59.4
	9	56.4	66.5	47.7	66.0	65.0	61.8	59.7	56.5	54.1	49.5	48.5	47.9	56.4	0.0	56.4
	10	57.3	69.7	46.6	69.0	67.7	63.7	60.9	55.2	52.7	48.2	47.4	46.8	57.3	0.0	57.3
	11	56.9	68.2	47.2	67.7	66.6	62.9	60.6	56.0	53.3	48.7	48.0	47.4	56.9	0.0	56.9
	12	55.9	67.0	46.0	66.6	65.7	62.8	60.6	54.4	51.7	47.5	46.8	46.2	55.9	0.0	55.9
	13	56.9	71.1	47.2	70.3	69.0	64.4	60.9	55.3	52.8	48.9	48.3	47.4	56.9	0.0	56.9
	14	56.5	72.2	49.8	71.7	70.5	66.8	64.0	57.5	54.5	51.3	50.7	50.1	56.5	0.0	56.5
	15	57.5	67.8	50.7	67.4	66.5	63.6	61.4	56.5	54.5	51.9	51.4	50.9	57.5	0.0	57.5
	16	59.5	69.5	52.8	68.9	67.8	64.4	62.5	59.3	57.4	54.2	53.6	53.0	59.5	0.0	59.5
	17	59.6	70.2	54.3	69.7	68.8	65.7	63.8	60.2	58.5	55.8	55.2	54.5	59.6	0.0	59.6
	18	58.9	69.1	51.9	68.5	67.4	64.0	61.9	58.8	56.7	53.4	52.8	52.1	58.9	0.0	58.9
Evening	19	58.4	78.7	52.0	77.6	76.1	70.6	65.9	58.7	56.1	53.1	52.7	52.2	58.4	5.0	63.4
	20	57.8	67.3	51.4	66.8	66.0	63.1	61.3	57.5	55.7	52.6	52.0	51.5	57.8	5.0	62.8
	21	59.3	71.0	51.8	70.1	69.1	65.8	63.7	58.7	55.8	52.9	52.5	52.0	59.3	5.0	64.3
Night	22	56.7	67.1	50.0	66.5	65.5	62.2	60.2	55.9	53.7	51.0	50.6	50.2	56.7	10.0	66.7
	23	54.5	72.0	49.6	71.6	70.9	66.8	62.8	55.3	53.0	50.7	50.2	49.7	54.5	10.0	64.5

Timeframe	*Hour*	*L_{eq}*	*L_{max}*	*L_{min}*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day (7am-7pm)	Min	55.9	66.5	46.0	66.0	65.0	61.8	59.7	54.4	51.7	47.5	46.8	46.2
	Max	59.6	72.2	54.3	71.7	70.5	66.8	64.0	60.2	58.5	55.8	55.2	54.5
Energy Average		58.0	Average:		68.6	67.5	64.1	61.8	57.3	55.0	51.3	50.6	50.0
Evening (7pm-10pm)	Min	57.8	67.3	51.4	66.8	66.0	63.1	61.3	57.5	55.7	52.6	52.0	51.5
	Max	59.3	78.7	52.0	77.6	76.1	70.6	65.9	58.7	56.1	53.1	52.7	52.2
Energy Average		58.5	Average:		71.5	70.4	66.5	63.6	58.3	55.9	52.9	52.4	51.9
Night (10pm-7am)	Min	51.3	58.5	45.0	58.2	57.8	56.7	55.1	51.3	48.8	46.0	45.6	45.1
	Max	59.5	72.0	55.4	71.6	70.9	66.8	62.8	59.9	58.5	56.1	55.8	55.5
Energy Average		56.2	Average:		64.4	63.6	60.9	59.0	55.5	53.5	51.1	50.7	50.3

L_{eq} (dBA)		
24-Hour	*Daytime (7am-10pm)*	*Nighttime (10pm-7am)*
57.5	**58.1**	**56.2**

24-Hour CNEL (dBA)

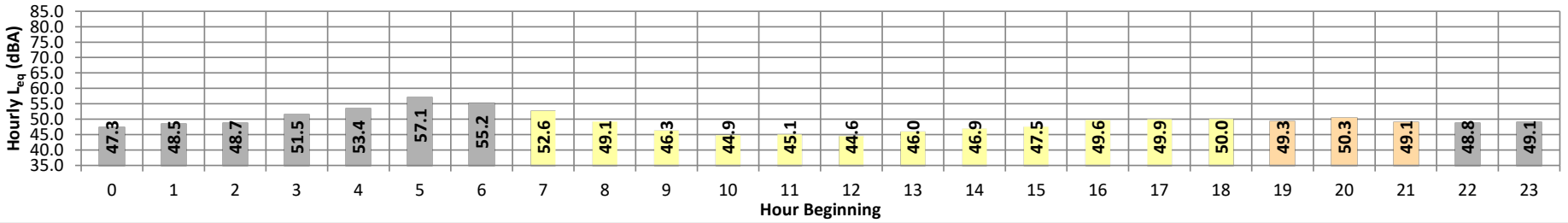
63.3

24-Hour Noise Level Measurement Summary

Date: Thursday, May 27, 2021 *Location:* L5 - Located west of the Project site on Grant Street near existing single-family residential home at 16883 Lambert Lane. *Meter:* Piccolo II *JN:* 14035

Project: Ottowa Business Center *Analyst:* N. Boyko

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	47.3	56.0	41.4	55.6	55.2	53.8	51.6	46.9	44.9	42.2	41.9	41.5	47.3	10.0	57.3
	1	48.5	53.1	45.7	52.6	52.2	51.2	50.6	48.9	47.9	46.5	46.2	45.9	48.5	10.0	58.5
	2	48.7	53.7	44.8	53.4	53.0	52.3	51.5	49.5	47.7	45.6	45.3	44.9	48.7	10.0	58.7
	3	51.5	56.1	48.2	55.9	55.6	54.8	54.2	52.2	50.8	49.0	48.7	48.3	51.5	10.0	61.5
	4	53.4	59.1	50.6	58.9	58.6	58.1	57.7	55.8	54.2	51.5	51.1	50.7	53.4	10.0	63.4
	5	57.1	63.8	53.7	63.6	63.4	62.6	61.5	58.6	56.9	54.6	54.2	53.8	57.1	10.0	67.1
	6	55.2	60.4	51.9	60.1	59.6	58.7	58.2	56.3	54.9	52.7	52.3	52.0	55.2	10.0	65.2
Day	7	52.6	56.0	50.4	55.7	55.5	54.7	54.3	53.1	52.3	51.0	50.7	50.5	52.6	0.0	52.6
	8	49.1	54.5	45.5	54.1	53.8	52.8	52.1	49.9	48.1	46.2	46.0	45.6	49.1	0.0	49.1
	9	46.3	51.8	42.0	51.3	50.8	49.8	49.1	47.1	45.5	43.0	42.6	42.1	46.3	0.0	46.3
	10	44.9	50.3	41.2	49.7	49.1	48.0	47.4	45.6	44.1	42.0	41.7	41.3	44.9	0.0	44.9
	11	45.1	58.4	41.5	57.4	56.9	55.4	54.7	51.0	45.5	42.2	41.9	41.6	45.1	0.0	45.1
	12	44.6	52.1	40.3	51.7	51.0	49.3	47.6	44.9	42.9	41.0	40.8	40.5	44.6	0.0	44.6
	13	46.0	57.6	41.5	56.9	56.1	53.9	51.8	48.4	45.9	42.9	42.5	41.7	46.0	0.0	46.0
	14	46.9	52.6	42.9	52.1	51.6	50.8	50.2	47.5	45.9	43.7	43.4	43.0	46.9	0.0	46.9
	15	47.5	53.6	44.1	53.1	52.2	50.9	50.2	48.2	46.5	44.7	44.5	44.2	47.5	0.0	47.5
	16	49.6	56.8	45.8	56.3	55.7	54.4	52.3	49.6	48.5	46.7	46.4	45.9	49.6	0.0	49.6
	17	49.9	60.8	47.0	60.2	59.1	56.9	55.5	50.7	49.6	47.9	47.5	47.1	49.9	0.0	49.9
	18	50.0	55.9	46.3	55.3	54.6	53.3	52.7	50.5	49.0	47.3	46.9	46.5	50.0	0.0	50.0
Evening	19	49.3	55.2	46.1	54.4	53.7	52.3	51.6	49.8	48.5	47.0	46.6	46.3	49.3	5.0	54.3
	20	50.3	55.7	46.8	55.0	54.3	53.2	52.6	51.0	49.7	47.8	47.4	47.0	50.3	5.0	55.3
	21	49.1	58.3	46.1	57.2	56.2	54.4	53.3	50.8	49.3	46.9	46.6	46.3	49.1	5.0	54.1
Night	22	48.8	53.8	45.9	53.3	52.9	51.9	51.2	49.4	47.9	46.6	46.4	46.0	48.8	10.0	58.8
	23	49.1	65.3	45.6	64.3	62.5	57.1	53.0	49.1	47.9	46.4	46.1	45.8	49.1	10.0	59.1

Timeframe	*Hour*	*L_{eq}*	*L_{max}*	*L_{min}*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day (7am-7pm)	Min	44.6	50.3	40.3	49.7	49.1	48.0	47.4	44.9	42.9	41.0	40.8	40.5
	Max	52.6	60.8	50.4	60.2	59.1	56.9	55.5	53.1	52.3	51.0	50.7	50.5
Energy Average		48.4	Average:		54.5	53.9	52.5	51.5	48.9	47.0	44.9	44.6	44.2
Evening (7pm-10pm)	Min	49.1	55.2	46.1	54.4	53.7	52.3	51.6	49.8	48.5	46.9	46.6	46.3
	Max	50.3	58.3	46.8	57.2	56.2	54.4	53.3	51.0	49.7	47.8	47.4	47.0
Energy Average		49.6	Average:		55.5	54.7	53.3	52.5	50.6	49.2	47.2	46.9	46.5
Night (10pm-7am)	Min	47.3	53.1	41.4	52.6	52.2	51.2	50.6	46.9	44.9	42.2	41.9	41.5
	Max	57.1	65.3	53.7	64.3	63.4	62.6	61.5	58.6	56.9	54.6	54.2	53.8
Energy Average		52.4	Average:		57.5	57.0	55.6	54.4	51.9	50.3	48.3	48.0	47.7

L_{eq} (dBA)		
24-Hour	*Daytime (7am-10pm)*	*Nighttime (10pm-7am)*
50.5	**48.7**	**52.4**

24-Hour CNEL (dBA)

58.6

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APPENDIX 7.1:

OFF-SITE TRAFFIC NOISE LEVEL CALCULATIONS

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

Scenario: E (2021) | Project Name: Ottawa Budiness Center
Road Name: Seventh Av. | Job Number: 14035
Road Segment: s/o Nisqualli Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,658	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	1,281	vehicles
Vehicle Speed:	40	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:	42.0	feet
Centerline Dist. to Observer:	42.0	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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-0.45	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	77.72	-15.50	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-18.41	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.5	64.9	63.1	57.1	65.7	66.3
Medium Trucks:	62.7	61.5	55.1	53.6	62.0	62.3
Heavy Trucks:	65.1	63.9	54.9	56.1	64.5	64.6
Vehicle Noise:	69.8	68.4	64.3	60.6	69.1	69.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	36	79	169	365
CNEL:	39	83	179	386

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

Scenario: OYC (2024) | Project Name: Ottawa Budiness Center
Road Name: Seventh Av. | Job Number: 14035
Road Segment: s/o Nisqualli Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,742	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	1,289	vehicles
Vehicle Speed:	40	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:	42.0	feet
Centerline Dist. to Observer:	42.0	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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-0.43	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	77.72	-15.47	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-18.38	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.5	64.9	63.1	57.1	65.7	66.3
Medium Trucks:	62.7	61.5	55.1	53.6	62.0	62.3
Heavy Trucks:	65.1	63.9	54.9	56.2	64.5	64.6
Vehicle Noise:	69.8	68.4	64.3	60.6	69.1	69.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	37	79	170	366
CNEL:	39	84	180	388

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

Scenario: E+P (2021) | Project Name: Ottawa Budiness Center
Road Name: Seventh Av. | Job Number: 14035
Road Segment: s/o Nisqualli Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,742	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	1,289	vehicles
Vehicle Speed:	40	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:	42.0	feet
Centerline Dist. to Observer:	42.0	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%	95.51%
Medium Trucks:	84.8%	4.9%	10.3%	2.97%
Heavy Trucks:	86.5%	2.7%	10.8%	1.52%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-0.42	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	77.72	-15.50	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-18.41	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.5	64.9	63.1	57.1	65.7	66.3
Medium Trucks:	62.7	61.5	55.1	53.6	62.0	62.3
Heavy Trucks:	65.1	63.9	54.9	56.1	64.5	64.6
Vehicle Noise:	69.8	68.4	64.3	60.6	69.1	69.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	37	79	170	366
CNEL:	39	83	180	387

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

Scenario: OYC+P (2024) | Project Name: Ottawa Budiness Center
Road Name: Seventh Av. | Job Number: 14035
Road Segment: s/o Nisqualli Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,826	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	1,296	vehicles
Vehicle Speed:	40	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:	42.0	feet
Centerline Dist. to Observer:	42.0	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%	95.51%
Medium Trucks:	84.8%	4.9%	10.3%	2.97%
Heavy Trucks:	86.5%	2.7%	10.8%	1.52%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-0.40	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	77.72	-15.47	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-18.38	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.6	64.9	63.2	57.1	65.7	66.3
Medium Trucks:	62.7	61.5	55.1	53.6	62.0	62.3
Heavy Trucks:	65.1	63.9	54.9	56.2	64.5	64.6
Vehicle Noise:	69.8	68.5	64.3	60.6	69.1	69.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	37	79	170	367
CNEL:	39	84	180	389

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

Scenario: FY (2034) | Project Name: Ottawa Budiness Center
Road Name: Seventh Av. | Job Number: 14035
Road Segment: s/o Nisqualli Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,880	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	1,677	vehicles
Vehicle Speed:	40	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:	42.0	feet
Centerline Dist. to Observer:	42.0	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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	0.72	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	77.72	-14.33	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-17.24	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.7	66.0	64.3	58.2	66.8	67.5
Medium Trucks:	63.9	62.6	56.3	54.7	63.2	63.4
Heavy Trucks:	66.2	65.1	56.1	57.3	65.7	65.8
Vehicle Noise:	71.0	69.6	65.4	61.8	70.3	70.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	44	94	203	437
CNEL:	46	100	215	462

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

Scenario: E (2021) | Project Name: Ottawa Budiness Center
Road Name: Hesperia Rd. | Job Number: 14035
Road Segment: n/o Ottawa St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	35,265	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	3,307	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	62.0	feet
Centerline Dist. to Observer:	62.0	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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.70	-0.20	-1.20	-4.70	0.000	0.000
Medium Trucks:	81.00	-12.35	-0.17	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-15.26	-0.18	-1.20	-5.32	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.5	69.9	68.1	62.1	70.7	71.3
Medium Trucks:	67.3	66.0	59.7	58.1	66.6	66.8
Heavy Trucks:	68.7	67.6	58.6	59.8	68.2	68.3
Vehicle Noise:	74.3	72.9	69.1	65.1	73.6	74.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	108	232	499	1,076
CNEL:	114	246	531	1,144

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

Scenario: FY+P (2034) | Project Name: Ottawa Budiness Center
Road Name: Seventh Av. | Job Number: 14035
Road Segment: s/o Nisqualli Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,964	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	1,684	vehicles
Vehicle Speed:	40	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:	42.0	feet
Centerline Dist. to Observer:	42.0	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%	95.50%
Medium Trucks:	84.8%	4.9%	10.3%	2.97%
Heavy Trucks:	86.5%	2.7%	10.8%	1.52%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	0.74	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	77.72	-14.33	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-17.24	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.7	66.1	64.3	58.2	66.9	67.5
Medium Trucks:	63.9	62.6	56.3	54.7	63.2	63.4
Heavy Trucks:	66.2	65.1	56.1	57.3	65.7	65.8
Vehicle Noise:	71.0	69.6	65.5	61.8	70.3	70.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	44	94	203	437
CNEL:	46	100	215	463

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

Scenario: E+P (2021) | Project Name: Ottawa Budiness Center
Road Name: Hesperia Rd. | Job Number: 14035
Road Segment: n/o Ottawa St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	35,766	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	3,354	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	62.0	feet
Centerline Dist. to Observer:	62.0	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%	95.55%
Medium Trucks:	84.8%	4.9%	10.3%	2.94%
Heavy Trucks:	86.5%	2.7%	10.8%	1.51%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.76	-0.20	-1.20	-4.70	0.000	0.000
Medium Trucks:	81.00	-12.35	-0.17	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-15.26	-0.18	-1.20	-5.32	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.6	69.9	68.2	62.1	70.8	71.4
Medium Trucks:	67.3	66.0	59.7	58.1	66.6	66.8
Heavy Trucks:	68.7	67.6	58.6	59.8	68.2	68.3
Vehicle Noise:	74.3	72.9	69.2	65.1	73.6	74.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	108	233	502	1,081
CNEL:	115	248	534	1,150

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

Scenario: OYC (2024) | *Project Name:* Ottawa Budiness Center
Road Name: Hesperia Rd. | *Job Number:* 14035
Road Segment: n/o Ottawa St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	35,767	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	3,354	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	62.0	feet
Centerline Dist. to Observer:	62.0	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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	2.76	-0.20	-1.20	*-4.70*	0.000	0.000
Medium Trucks:	81.00	-12.29	-0.17	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-15.19	-0.18	-1.20	*-5.32*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.6	69.9	68.2	62.1	70.7	71.4
Medium Trucks:	67.3	66.1	59.7	58.2	66.7	66.9
Heavy Trucks:	68.8	67.7	58.6	59.9	68.2	68.4
Vehicle Noise:	74.4	73.0	69.2	65.1	73.7	74.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	109	234	504	1,086
CNEL:	115	249	536	1,154

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

Scenario: FY (2034) | *Project Name:* Ottawa Budiness Center
Road Name: Hesperia Rd. | *Job Number:* 14035
Road Segment: n/o Ottawa St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	45,979	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	4,311	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	62.0	feet
Centerline Dist. to Observer:	62.0	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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	3.85	-0.20	-1.20	*-4.70*	0.000	0.000
Medium Trucks:	81.00	-11.20	-0.17	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-14.10	-0.18	-1.20	*-5.32*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	72.7	71.0	69.3	63.2	71.8	72.4
Medium Trucks:	68.4	67.2	60.8	59.3	67.8	68.0
Heavy Trucks:	69.9	68.8	59.7	61.0	69.3	69.5
Vehicle Noise:	75.5	74.1	70.3	66.2	74.7	75.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	128	277	596	1,284
CNEL:	136	294	633	1,365

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

Scenario: OYC+P (2024) | *Project Name:* Ottawa Budiness Center
Road Name: Hesperia Rd. | *Job Number:* 14035
Road Segment: n/o Ottawa St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	36,268	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	3,401	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	62.0	feet
Centerline Dist. to Observer:	62.0	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%	95.55%
Medium Trucks:	84.8%	4.9%	10.3%	2.95%
Heavy Trucks:	86.5%	2.7%	10.8%	1.51%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	2.82	-0.20	-1.20	*-4.70*	0.000	0.000
Medium Trucks:	81.00	-12.29	-0.17	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-15.19	-0.18	-1.20	*-5.32*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.6	70.0	68.2	62.2	70.8	71.4
Medium Trucks:	67.3	66.1	59.7	58.2	66.7	66.9
Heavy Trucks:	68.8	67.7	58.6	59.9	68.2	68.4
Vehicle Noise:	74.4	73.0	69.2	65.2	73.7	74.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	109	235	507	1,091
CNEL:	116	250	539	1,160

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

Scenario: FY+P (2034) | *Project Name:* Ottawa Budiness Center
Road Name: Hesperia Rd. | *Job Number:* 14035
Road Segment: n/o Ottawa St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	46,480	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	4,358	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	62.0	feet
Centerline Dist. to Observer:	62.0	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%	95.53%
Medium Trucks:	84.8%	4.9%	10.3%	2.95%
Heavy Trucks:	86.5%	2.7%	10.8%	1.51%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	3.90	-0.20	-1.20	*-4.70*	0.000	0.000
Medium Trucks:	81.00	-11.20	-0.17	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-14.10	-0.18	-1.20	*-5.32*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	72.7	71.1	69.3	63.3	71.9	72.5
Medium Trucks:	68.4	67.2	60.8	59.3	67.8	68.0
Heavy Trucks:	69.9	68.8	59.7	61.0	69.3	69.5
Vehicle Noise:	75.5	74.1	70.3	66.3	74.8	75.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	129	278	598	1,289
CNEL:	137	295	636	1,370

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

Scenario: E (2021) | *Project Name:* Ottawa Budiness Center
Road Name: Hesperia Rd. | *Job Number:* 14035
Road Segment: s/o Ottawa St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	35,573	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	3,336	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	62.0	feet
Centerline Dist. to Observer:	62.0	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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	2.74	-0.20	-1.20	*-4.70*	0.000	0.000
Medium Trucks:	81.00	-12.31	-0.17	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-15.22	-0.18	-1.20	*-5.32*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.5	69.9	68.2	62.1	70.7	71.3
Medium Trucks:	67.3	66.1	59.7	58.2	66.6	66.9
Heavy Trucks:	68.8	67.6	58.6	59.9	68.2	68.3
Vehicle Noise:	74.3	72.9	69.1	65.1	73.6	74.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	108	233	502	1,082
CNEL:	115	248	534	1,150

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

Scenario: OYC (2024) | *Project Name:* Ottawa Budiness Center
Road Name: Hesperia Rd. | *Job Number:* 14035
Road Segment: s/o Ottawa St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,113	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	3,480	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	62.0	feet
Centerline Dist. to Observer:	62.0	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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	2.92	-0.20	-1.20	*-4.70*	0.000	0.000
Medium Trucks:	81.00	-12.13	-0.17	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-15.03	-0.18	-1.20	*-5.32*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.7	70.1	68.3	62.3	70.9	71.5
Medium Trucks:	67.5	66.3	59.9	58.4	66.8	67.1
Heavy Trucks:	69.0	67.8	58.8	60.0	68.4	68.5
Vehicle Noise:	74.5	73.1	69.3	65.3	73.8	74.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	111	240	517	1,113
CNEL:	118	255	549	1,183

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

Scenario: E+P (2021) | *Project Name:* Ottawa Budiness Center
Road Name: Hesperia Rd. | *Job Number:* 14035
Road Segment: s/o Ottawa St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,113	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	3,480	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	62.0	feet
Centerline Dist. to Observer:	62.0	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%	94.45%
Medium Trucks:	84.8%	4.9%	10.3%	3.00%
Heavy Trucks:	86.5%	2.7%	10.8%	2.55%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	2.87	-0.20	-1.20	*-4.70*	0.000	0.000
Medium Trucks:	81.00	-12.10	-0.17	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-12.82	-0.18	-1.20	*-5.32*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.7	70.1	68.3	62.2	70.9	71.5
Medium Trucks:	67.5	66.3	59.9	58.4	66.8	67.1
Heavy Trucks:	71.2	70.0	61.0	62.3	70.6	70.7
Vehicle Noise:	75.3	73.9	69.5	66.1	74.6	74.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	125	269	579	1,248
CNEL:	132	284	612	1,318

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

Scenario: OYC+P (2024) | *Project Name:* Ottawa Budiness Center
Road Name: Hesperia Rd. | *Job Number:* 14035
Road Segment: s/o Ottawa St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	38,653	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	3,624	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	62.0	feet
Centerline Dist. to Observer:	62.0	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%	94.49%
Medium Trucks:	84.8%	4.9%	10.3%	3.00%
Heavy Trucks:	86.5%	2.7%	10.8%	2.51%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	3.05	-0.20	-1.20	*-4.70*	0.000	0.000
Medium Trucks:	81.00	-11.93	-0.17	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-12.71	-0.18	-1.20	*-5.32*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.9	70.2	68.5	62.4	71.0	71.6
Medium Trucks:	67.7	66.5	60.1	58.6	67.0	67.3
Heavy Trucks:	71.3	70.2	61.1	62.4	70.7	70.8
Vehicle Noise:	75.4	74.0	69.7	66.2	74.7	75.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	128	275	593	1,277
CNEL:	135	291	626	1,348

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

Scenario: FY (2034) | Project Name: Ottawa Budiness Center
Road Name: Hesperia Rd. | Job Number: 14035
Road Segment: s/o Ottawa St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	46,378	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	4,349	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	62.0	feet
Centerline Dist. to Observer:	62.0	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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	3.89	-0.20	-1.20	-4.70	0.000	0.000
Medium Trucks:	81.00	-11.16	-0.17	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-14.07	-0.18	-1.20	-5.32	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.7	71.1	69.3	63.3	71.9	72.5
Medium Trucks:	68.5	67.2	60.9	59.3	67.8	68.0
Heavy Trucks:	69.9	68.8	59.8	61.0	69.4	69.5
Vehicle Noise:	75.5	74.1	70.3	66.3	74.8	75.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	129	278	599	1,291
CNEL:	137	296	637	1,373

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

Scenario: E (2021) | Project Name: Ottawa Budiness Center
Road Name: Hesperia Rd. | Job Number: 14035
Road Segment: s/o Nisqualli Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,590	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	2,681	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	62.0	feet
Centerline Dist. to Observer:	62.0	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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.24	-0.20	-1.20	-4.70	0.000	0.000
Medium Trucks:	79.45	-12.80	-0.17	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-15.71	-0.18	-1.20	-5.32	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.3	67.7	65.9	59.9	68.5	69.1
Medium Trucks:	65.3	64.0	57.7	56.1	64.6	64.8
Heavy Trucks:	67.2	66.0	57.0	58.2	66.6	66.7
Vehicle Noise:	72.3	70.9	67.0	63.1	71.6	72.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	79	171	369	795
CNEL:	84	182	391	843

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

Scenario: FY+P (2034) | Project Name: Ottawa Budiness Center
Road Name: Hesperia Rd. | Job Number: 14035
Road Segment: s/o Ottawa St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	47,917	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	4,493	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	62.0	feet
Centerline Dist. to Observer:	62.0	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%	94.68%
Medium Trucks:	84.8%	4.9%	10.3%	3.00%
Heavy Trucks:	86.5%	2.7%	10.8%	2.32%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	3.99	-0.20	-1.20	-4.70	0.000	0.000
Medium Trucks:	81.00	-11.00	-0.17	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-12.12	-0.18	-1.20	-5.32	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.8	71.2	69.4	63.4	72.0	72.6
Medium Trucks:	68.6	67.4	61.0	59.5	68.0	68.2
Heavy Trucks:	71.9	70.7	61.7	63.0	71.3	71.4
Vehicle Noise:	76.2	74.8	70.6	67.0	75.5	75.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	144	311	670	1,444
CNEL:	153	329	709	1,527

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

Scenario: E+P (2021) | Project Name: Ottawa Budiness Center
Road Name: Hesperia Rd. | Job Number: 14035
Road Segment: s/o Nisqualli Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,924	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	2,712	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	62.0	feet
Centerline Dist. to Observer:	62.0	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%	95.54%
Medium Trucks:	84.8%	4.9%	10.3%	2.95%
Heavy Trucks:	86.5%	2.7%	10.8%	1.51%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.30	-0.20	-1.20	-4.70	0.000	0.000
Medium Trucks:	79.45	-12.80	-0.17	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-15.71	-0.18	-1.20	-5.32	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.4	67.7	66.0	59.9	68.5	69.1
Medium Trucks:	65.3	64.0	57.7	56.1	64.6	64.8
Heavy Trucks:	67.2	66.0	57.0	58.2	66.6	66.7
Vehicle Noise:	72.4	71.0	67.0	63.1	71.6	72.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	80	172	370	798
CNEL:	85	182	393	847

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

Scenario: OYC (2024)
Road Name: Hesperia Rd.
Road Segment: s/o Nisqualli Rd.
Project Name: Ottawa Budiness Center
Job Number: 14035

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,796	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	2,794	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	62.0	feet
Centerline Dist. to Observer:	62.0	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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.42	-0.20	-1.20	-4.70	0.000	0.000
Medium Trucks:	79.45	-12.62	-0.17	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-15.53	-0.18	-1.20	-5.32	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.5	67.9	66.1	60.0	68.7	69.3
Medium Trucks:	65.5	64.2	57.9	56.3	64.8	65.0
Heavy Trucks:	67.3	66.2	57.2	58.4	66.8	66.9
Vehicle Noise:	72.5	71.1	67.2	63.3	71.8	72.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	82	176	379	817
CNEL:	87	187	402	867

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

Scenario: FY (2034)
Road Name: Hesperia Rd.
Road Segment: s/o Nisqualli Rd.
Project Name: Ottawa Budiness Center
Job Number: 14035

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	36,984	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	3,468	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	62.0	feet
Centerline Dist. to Observer:	62.0	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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.36	-0.20	-1.20	-4.70	0.000	0.000
Medium Trucks:	79.45	-11.68	-0.17	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.59	-0.18	-1.20	-5.32	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.4	68.8	67.0	61.0	69.6	70.2
Medium Trucks:	66.4	65.2	58.8	57.3	65.7	65.9
Heavy Trucks:	68.3	67.1	58.1	59.4	67.7	67.8
Vehicle Noise:	73.4	72.1	68.1	64.2	72.7	73.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	94	203	438	943
CNEL:	100	216	465	1,001

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

Scenario: OYC+P (2024)
Road Name: Hesperia Rd.
Road Segment: s/o Nisqualli Rd.
Project Name: Ottawa Budiness Center
Job Number: 14035

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,130	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	2,825	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	62.0	feet
Centerline Dist. to Observer:	62.0	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%	95.53%
Medium Trucks:	84.8%	4.9%	10.3%	2.95%
Heavy Trucks:	86.5%	2.7%	10.8%	1.51%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.47	-0.20	-1.20	-4.70	0.000	0.000
Medium Trucks:	79.45	-12.62	-0.17	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-15.53	-0.18	-1.20	-5.32	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.5	67.9	66.2	60.1	68.7	69.3
Medium Trucks:	65.5	64.2	57.9	56.3	64.8	65.0
Heavy Trucks:	67.3	66.2	57.2	58.4	66.8	66.9
Vehicle Noise:	72.5	71.1	67.2	63.3	71.8	72.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	82	177	381	820
CNEL:	87	187	404	870

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

Scenario: FY+P (2034)
Road Name: Hesperia Rd.
Road Segment: s/o Nisqualli Rd.
Project Name: Ottawa Budiness Center
Job Number: 14035

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,318	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	3,499	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	62.0	feet
Centerline Dist. to Observer:	62.0	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%	95.52%
Medium Trucks:	84.8%	4.9%	10.3%	2.96%
Heavy Trucks:	86.5%	2.7%	10.8%	1.52%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.40	-0.20	-1.20	-4.70	0.000	0.000
Medium Trucks:	79.45	-11.68	-0.17	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.59	-0.18	-1.20	-5.32	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.5	68.8	67.1	61.0	69.6	70.3
Medium Trucks:	66.4	65.2	58.8	57.3	65.7	65.9
Heavy Trucks:	68.3	67.1	58.1	59.4	67.7	67.8
Vehicle Noise:	73.5	72.1	68.1	64.2	72.8	73.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	95	204	439	946
CNEL:	100	216	466	1,004

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

Scenario: E (2021) | Project Name: Ottawa Budiness Center
Road Name: La Mesa Rd. | Job Number: 14035
Road Segment: w/o Amargosa Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	43,020	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	4,034	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	50	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):	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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.02	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-11.03	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-13.94	0.82	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.1	70.5	68.7	62.6	71.3	71.9
Medium Trucks:	68.0	66.8	60.5	58.9	67.4	67.6
Heavy Trucks:	69.9	68.8	59.8	61.0	69.4	69.5
Vehicle Noise:	75.1	73.7	69.8	65.9	74.4	74.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	98	211	455	980
CNEL:	104	224	483	1,040

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

Scenario: OYC (2024) | Project Name: Ottawa Budiness Center
Road Name: La Mesa Rd. | Job Number: 14035
Road Segment: w/o Amargosa Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	43,188	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	4,050	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	50	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):	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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.04	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-11.01	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-13.92	0.82	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.1	70.5	68.7	62.6	71.3	71.9
Medium Trucks:	68.1	66.8	60.5	58.9	67.4	67.6
Heavy Trucks:	70.0	68.8	59.8	61.0	69.4	69.5
Vehicle Noise:	75.1	73.7	69.8	65.9	74.4	74.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	98	212	456	982
CNEL:	104	225	484	1,042

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

Scenario: E+P (2021) | Project Name: Ottawa Budiness Center
Road Name: La Mesa Rd. | Job Number: 14035
Road Segment: w/o Amargosa Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	43,187	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	4,050	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	50	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):	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%	95.50%
Medium Trucks:	84.8%	4.9%	10.3%	2.98%
Heavy Trucks:	86.5%	2.7%	10.8%	1.52%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.04	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-11.03	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-13.94	0.82	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.1	70.5	68.7	62.6	71.3	71.9
Medium Trucks:	68.0	66.8	60.5	58.9	67.4	67.6
Heavy Trucks:	69.9	68.8	59.8	61.0	69.4	69.5
Vehicle Noise:	75.1	73.7	69.8	65.9	74.4	74.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	98	211	455	981
CNEL:	104	224	483	1,041

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

Scenario: OYC+P (2024) | Project Name: Ottawa Budiness Center
Road Name: La Mesa Rd. | Job Number: 14035
Road Segment: w/o Amargosa Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	43,355	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	4,065	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	50	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):	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%	95.50%
Medium Trucks:	84.8%	4.9%	10.3%	2.98%
Heavy Trucks:	86.5%	2.7%	10.8%	1.52%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.05	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-11.01	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-13.92	0.82	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.1	70.5	68.7	62.7	71.3	71.9
Medium Trucks:	68.1	66.8	60.5	58.9	67.4	67.6
Heavy Trucks:	70.0	68.8	59.8	61.0	69.4	69.5
Vehicle Noise:	75.1	73.7	69.8	65.9	74.4	74.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	98	212	457	984
CNEL:	104	225	484	1,044

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

Scenario: FY (2034) | Project Name: Ottawa Budiness Center
Road Name: La Mesa Rd. | Job Number: 14035
Road Segment: w/o Amargosa Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	55,651	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	5,218	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	50	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):	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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	5.14	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-9.91	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-12.82	0.82	-1.20	-5.43	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:	73.2	71.6	69.8	63.7	72.4	73.0
Medium Trucks:	69.2	67.9	61.6	60.0	68.5	68.7
Heavy Trucks:	71.1	69.9	60.9	62.1	70.5	70.6
Vehicle Noise:	76.2	74.8	70.9	67.0	75.5	75.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	116	251	540	1,163
CNEL:	123	266	573	1,234

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

Scenario: E (2021) | Project Name: Ottawa Budiness Center
Road Name: Nisqualli Rd. | Job Number: 14035
Road Segment: e/o Mariposa Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	35,573	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	3,336	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	50	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):	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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.19	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-11.85	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-14.76	0.82	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.2	69.6	67.9	61.8	70.4	71.0
Medium Trucks:	67.2	66.0	59.6	58.1	66.5	66.8
Heavy Trucks:	69.1	68.0	58.9	60.2	68.5	68.7
Vehicle Noise:	74.3	72.9	68.9	65.1	73.6	73.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	86	186	401	863
CNEL:	92	197	425	916

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

Scenario: FY+P (2034) | Project Name: Ottawa Budiness Center
Road Name: La Mesa Rd. | Job Number: 14035
Road Segment: w/o Amargosa Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	55,818	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	5,234	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	50	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):	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%	95.50%
Medium Trucks:	84.8%	4.9%	10.3%	2.98%
Heavy Trucks:	86.5%	2.7%	10.8%	1.52%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	5.15	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-9.91	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-12.82	0.82	-1.20	-5.43	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:	73.2	71.6	69.8	63.8	72.4	73.0
Medium Trucks:	69.2	67.9	61.6	60.0	68.5	68.7
Heavy Trucks:	71.1	69.9	60.9	62.1	70.5	70.6
Vehicle Noise:	76.2	74.8	70.9	67.0	75.5	75.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	116	251	540	1,164
CNEL:	124	266	574	1,236

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

Scenario: E+P (2021) | Project Name: Ottawa Budiness Center
Road Name: Nisqualli Rd. | Job Number: 14035
Road Segment: e/o Mariposa Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	36,695	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	3,441	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	50	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):	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%	94.38%
Medium Trucks:	84.8%	4.9%	10.3%	3.04%
Heavy Trucks:	86.5%	2.7%	10.8%	2.58%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.28	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-11.65	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-12.36	0.82	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.3	69.7	67.9	61.9	70.5	71.1
Medium Trucks:	67.4	66.2	59.8	58.3	66.8	67.0
Heavy Trucks:	71.5	70.4	61.3	62.6	70.9	71.1
Vehicle Noise:	75.2	73.9	69.3	66.1	74.5	74.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	100	216	465	1,003
CNEL:	106	228	490	1,056

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

Scenario: OYC (2024)
Road Name: Nisqualli Rd.
Road Segment: e/o Mariposa Rd.
Project Name: Ottawa Budiness Center
Job Number: 14035

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,113	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	3,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	50	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):	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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.38	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-11.67	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-14.58	0.82	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.4	69.8	68.0	62.0	70.6	71.2
Medium Trucks:	67.4	66.2	59.8	58.3	66.7	67.0
Heavy Trucks:	69.3	68.2	59.1	60.4	68.7	68.8
Vehicle Noise:	74.5	73.1	69.1	65.2	73.7	74.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	89	191	412	888
CNEL:	94	203	437	942

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

Scenario: FY (2034)
Road Name: Nisqualli Rd.
Road Segment: e/o Mariposa Rd.
Project Name: Ottawa Budiness Center
Job Number: 14035

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	46,378	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	4,349	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	50	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):	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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.35	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-10.70	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-13.61	0.82	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.4	70.8	69.0	63.0	71.6	72.2
Medium Trucks:	68.4	67.1	60.8	59.2	67.7	67.9
Heavy Trucks:	70.3	69.1	60.1	61.3	69.7	69.8
Vehicle Noise:	75.4	74.0	70.1	66.2	74.7	75.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	103	222	478	1,030
CNEL:	109	235	507	1,093

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

Scenario: OYC+P (2024)
Road Name: Nisqualli Rd.
Road Segment: e/o Mariposa Rd.
Project Name: Ottawa Budiness Center
Job Number: 14035

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	38,235	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	3,585	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	50	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):	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%	94.43%
Medium Trucks:	84.8%	4.9%	10.3%	3.04%
Heavy Trucks:	86.5%	2.7%	10.8%	2.54%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.46	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-11.47	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-12.25	0.82	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.5	69.9	68.1	62.1	70.7	71.3
Medium Trucks:	67.6	66.4	60.0	58.5	66.9	67.2
Heavy Trucks:	71.6	70.5	61.4	62.7	71.0	71.2
Vehicle Noise:	75.4	74.0	69.5	66.2	74.7	75.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	103	221	476	1,026
CNEL:	108	233	502	1,081

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

Scenario: FY+P (2034)
Road Name: Nisqualli Rd.
Road Segment: e/o Mariposa Rd.
Project Name: Ottawa Budiness Center
Job Number: 14035

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	47,500	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	4,454	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	50	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):	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%	94.63%
Medium Trucks:	84.8%	4.9%	10.3%	3.03%
Heavy Trucks:	86.5%	2.7%	10.8%	2.34%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.41	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-10.54	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-11.66	0.82	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.5	70.8	69.1	63.0	71.6	72.2
Medium Trucks:	68.5	67.3	60.9	59.4	67.9	68.1
Heavy Trucks:	72.2	71.1	62.0	63.3	71.6	71.8
Vehicle Noise:	76.2	74.8	70.4	67.0	75.5	75.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	116	250	538	1,159
CNEL:	122	263	567	1,223

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

Scenario: E (2021) | Project Name: Ottawa Budiness Center
Road Name: Ottawa St. | Job Number: 14035
Road Segment: w/o Hesperia Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	733 vehicles
Peak Hour Percentage:	9.38%
Peak Hour Volume:	69 vehicles
Vehicle Speed:	45 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:	32.0 feet
Centerline Dist. to Observer:	32.0 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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	26.926
Medium Trucks:	26.595
Heavy Trucks:	26.628

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-13.67	3.93	-1.20	-4.51	0.000	0.000
Medium Trucks:	79.45	-28.71	4.01	-1.20	-4.86	0.000	0.000
Heavy Trucks:	84.25	-31.62	4.00	-1.20	-5.72	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:	57.5	55.9	54.1	48.1	56.7	57.3
Medium Trucks:	53.5	52.3	46.0	44.4	52.9	53.1
Heavy Trucks:	55.4	54.3	45.3	46.5	54.9	55.0
Vehicle Noise:	60.6	59.2	55.2	51.4	59.9	60.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	7	15	31	67
CNEL:	7	15	33	72

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

Scenario: OYC (2024) | Project Name: Ottawa Budiness Center
Road Name: Ottawa St. | Job Number: 14035
Road Segment: w/o Hesperia Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	817 vehicles
Peak Hour Percentage:	9.38%
Peak Hour Volume:	77 vehicles
Vehicle Speed:	45 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:	32.0 feet
Centerline Dist. to Observer:	32.0 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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	26.926
Medium Trucks:	26.595
Heavy Trucks:	26.628

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-13.19	3.93	-1.20	-4.51	0.000	0.000
Medium Trucks:	79.45	-28.24	4.01	-1.20	-4.86	0.000	0.000
Heavy Trucks:	84.25	-31.15	4.00	-1.20	-5.72	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:	58.0	56.4	54.6	48.6	57.2	57.8
Medium Trucks:	54.0	52.8	46.4	44.9	53.3	53.6
Heavy Trucks:	55.9	54.8	45.7	47.0	55.3	55.5
Vehicle Noise:	61.0	59.7	55.7	51.8	60.3	60.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	7	16	34	73
CNEL:	8	17	36	77

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

Scenario: E+P (2021) | Project Name: Ottawa Budiness Center
Road Name: Ottawa St. | Job Number: 14035
Road Segment: w/o Hesperia Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	817 vehicles
Peak Hour Percentage:	9.38%
Peak Hour Volume:	77 vehicles
Vehicle Speed:	45 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:	32.0 feet
Centerline Dist. to Observer:	32.0 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%	95.95%
Medium Trucks:	84.8%	4.9%	10.3%	2.68%
Heavy Trucks:	86.5%	2.7%	10.8%	1.37%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	26.926
Medium Trucks:	26.595
Heavy Trucks:	26.628

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-13.18	3.93	-1.20	-4.51	0.000	0.000
Medium Trucks:	79.45	-28.71	4.01	-1.20	-4.86	0.000	0.000
Heavy Trucks:	84.25	-31.62	4.00	-1.20	-5.72	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:	58.0	56.4	54.6	48.6	57.2	57.8
Medium Trucks:	53.5	52.3	46.0	44.4	52.9	53.1
Heavy Trucks:	55.4	54.3	45.3	46.5	54.9	55.0
Vehicle Noise:	60.8	59.4	55.6	51.6	60.1	60.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	7	15	33	70
CNEL:	7	16	35	74

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

Scenario: OYC+P (2024) | Project Name: Ottawa Budiness Center
Road Name: Ottawa St. | Job Number: 14035
Road Segment: w/o Hesperia Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	901 vehicles
Peak Hour Percentage:	9.38%
Peak Hour Volume:	84 vehicles
Vehicle Speed:	45 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:	32.0 feet
Centerline Dist. to Observer:	32.0 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%	95.90%
Medium Trucks:	84.8%	4.9%	10.3%	2.71%
Heavy Trucks:	86.5%	2.7%	10.8%	1.39%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	26.926
Medium Trucks:	26.595
Heavy Trucks:	26.628

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-12.75	3.93	-1.20	-4.51	0.000	0.000
Medium Trucks:	79.45	-28.24	4.01	-1.20	-4.86	0.000	0.000
Heavy Trucks:	84.25	-31.15	4.00	-1.20	-5.72	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:	58.4	56.8	55.1	49.0	57.6	58.2
Medium Trucks:	54.0	52.8	46.4	44.9	53.3	53.6
Heavy Trucks:	55.9	54.8	45.7	47.0	55.3	55.5
Vehicle Noise:	61.3	59.9	56.0	52.0	60.5	60.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	8	16	35	75
CNEL:	8	17	37	80

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

Scenario: FY (2034) | Project Name: Ottawa Budiness Center
Road Name: Ottawa St. | Job Number: 14035
Road Segment: w/o Hesperia Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	948	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	89	vehicles
Vehicle Speed:	45	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:	32.0	feet
Centerline Dist. to Observer:	32.0	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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	26.926
Medium Trucks:	26.595
Heavy Trucks:	26.628

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-12.55	3.93	-1.20	-4.51	0.000	0.000
Medium Trucks:	79.45	-27.60	4.01	-1.20	-4.86	0.000	0.000
Heavy Trucks:	84.25	-30.50	4.00	-1.20	-5.72	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:	58.6	57.0	55.3	49.2	57.8	58.4
Medium Trucks:	54.7	53.4	47.1	45.5	54.0	54.2
Heavy Trucks:	56.6	55.4	46.4	47.6	56.0	56.1
Vehicle Noise:	61.7	60.3	56.3	52.5	61.0	61.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	8	17	37	80
CNEL:	8	18	39	85

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

Scenario: E (2021) | Project Name: Ottawa Budiness Center
Road Name: Nisqualli Rd. | Job Number: 14035
Road Segment: w/o Hesperia Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,891	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	1,490	vehicles
Vehicle Speed:	45	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:	42.0	feet
Centerline Dist. to Observer:	42.0	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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.31	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-15.35	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-18.26	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.6	67.0	65.2	59.2	67.8	68.4
Medium Trucks:	64.6	63.3	57.0	55.4	63.9	64.1
Heavy Trucks:	66.5	65.3	56.3	57.5	65.9	66.0
Vehicle Noise:	71.6	70.2	66.3	62.4	70.9	71.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	48	104	224	483
CNEL:	51	110	238	512

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

Scenario: FY+P (2034) | Project Name: Ottawa Budiness Center
Road Name: Ottawa St. | Job Number: 14035
Road Segment: w/o Hesperia Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,032	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	97	vehicles
Vehicle Speed:	45	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:	32.0	feet
Centerline Dist. to Observer:	32.0	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%	95.85%
Medium Trucks:	84.8%	4.9%	10.3%	2.74%
Heavy Trucks:	86.5%	2.7%	10.8%	1.41%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	26.926
Medium Trucks:	26.595
Heavy Trucks:	26.628

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-12.16	3.93	-1.20	-4.51	0.000	0.000
Medium Trucks:	79.45	-27.60	4.01	-1.20	-4.86	0.000	0.000
Heavy Trucks:	84.25	-30.50	4.00	-1.20	-5.72	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	59.0	57.4	55.6	49.6	58.2	58.8
Medium Trucks:	54.7	53.4	47.1	45.5	54.0	54.2
Heavy Trucks:	56.6	55.4	46.4	47.6	56.0	56.1
Vehicle Noise:	61.9	60.5	56.6	52.7	61.2	61.6

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

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

Scenario: E+P (2021) | Project Name: Ottawa Budiness Center
Road Name: Nisqualli Rd. | Job Number: 14035
Road Segment: w/o Hesperia Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,097	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	1,603	vehicles
Vehicle Speed:	45	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:	42.0	feet
Centerline Dist. to Observer:	42.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.15%
Medium Trucks:	84.8%	4.9%	10.3%	3.08%
Heavy Trucks:	86.5%	2.7%	10.8%	3.77%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.10	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-14.90	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-14.02	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.8	67.2	65.4	59.4	68.0	68.6
Medium Trucks:	65.0	63.8	57.4	55.9	64.4	64.6
Heavy Trucks:	70.7	69.6	60.5	61.8	70.1	70.3
Vehicle Noise:	73.5	72.2	67.1	64.4	72.9	73.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	65	140	302	651
CNEL:	68	147	317	682

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

Scenario: OYC (2024) | *Project Name:* Ottawa Budiness Center
Road Name: Nisqualli Rd. | *Job Number:* 14035
Road Segment: w/o Hesperia Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,097	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	1,603	vehicles
Vehicle Speed:	45	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:	42.0	feet
Centerline Dist. to Observer:	42.0	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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	0.01	1.64	-1.20	*-4.60*	0.000	0.000
Medium Trucks:	79.45	-15.04	1.68	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-17.94	1.67	-1.20	*-5.53*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.9	67.3	65.5	59.5	68.1	68.7
Medium Trucks:	64.9	63.7	57.3	55.8	64.2	64.4
Heavy Trucks:	66.8	65.6	56.6	57.9	66.2	66.3
Vehicle Noise:	71.9	70.5	66.6	62.7	71.2	71.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	51	109	235	507
CNEL:	54	116	250	538

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

Scenario: FY (2034) | *Project Name:* Ottawa Budiness Center
Road Name: Nisqualli Rd. | *Job Number:* 14035
Road Segment: w/o Hesperia Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,557	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	1,928	vehicles
Vehicle Speed:	45	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:	42.0	feet
Centerline Dist. to Observer:	42.0	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%	95.48%
Medium Trucks:	84.8%	4.9%	10.3%	2.99%
Heavy Trucks:	86.5%	2.7%	10.8%	1.53%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	0.81	1.64	-1.20	*-4.60*	0.000	0.000
Medium Trucks:	79.45	-14.24	1.68	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-17.14	1.67	-1.20	*-5.53*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.7	68.1	66.3	60.3	68.9	69.5
Medium Trucks:	65.7	64.5	58.1	56.6	65.0	65.2
Heavy Trucks:	67.6	66.4	57.4	58.7	67.0	67.1
Vehicle Noise:	72.7	71.3	67.4	63.5	72.0	72.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	57	124	266	573
CNEL:	61	131	282	608

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

Scenario: OYC+P (2024) | *Project Name:* Ottawa Budiness Center
Road Name: Nisqualli Rd. | *Job Number:* 14035
Road Segment: w/o Hesperia Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,303	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	1,716	vehicles
Vehicle Speed:	45	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:	42.0	feet
Centerline Dist. to Observer:	42.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	93.30%
Medium Trucks:	84.8%	4.9%	10.3%	3.07%
Heavy Trucks:	86.5%	2.7%	10.8%	3.62%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	0.21	1.64	-1.20	*-4.60*	0.000	0.000
Medium Trucks:	79.45	-14.61	1.68	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-13.90	1.67	-1.20	*-5.53*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.1	67.5	65.7	59.7	68.3	68.9
Medium Trucks:	65.3	64.1	57.7	56.2	64.6	64.9
Heavy Trucks:	70.8	69.7	60.6	61.9	70.3	70.4
Vehicle Noise:	73.7	72.4	67.4	64.6	73.1	73.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	67	145	312	672
CNEL:	70	152	327	705

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

Scenario: FY+P (2034) | *Project Name:* Ottawa Budiness Center
Road Name: Nisqualli Rd. | *Job Number:* 14035
Road Segment: w/o Hesperia Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	21,762	vehicles
Peak Hour Percentage:	9.38%	
Peak Hour Volume:	2,041	vehicles
Vehicle Speed:	45	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:	42.0	feet
Centerline Dist. to Observer:	42.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	93.65%
Medium Trucks:	84.8%	4.9%	10.3%	3.06%
Heavy Trucks:	86.5%	2.7%	10.8%	3.29%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	0.98	1.64	-1.20	*-4.60*	0.000	0.000
Medium Trucks:	79.45	-13.88	1.68	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-13.57	1.67	-1.20	*-5.53*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.9	68.3	66.5	60.4	69.1	69.7
Medium Trucks:	66.0	64.8	58.5	56.9	65.4	65.6
Heavy Trucks:	71.2	70.0	61.0	62.2	70.6	70.7
Vehicle Noise:	74.3	73.0	68.1	65.1	73.6	73.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	73	157	339	730
CNEL:	77	165	356	767

APPENDIX 10.1:

CADNAA OPERATIONAL NOISE MODEL INPUTS

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14035 - Ottawa Business Center

CadnaA Noise Prediction Model: 14035_02.cna
Date: 01.11.21
Analyst: S. Shami

Calculation Configuration

Configuration	
Parameter	Value
General	
Country	(user defined)
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 (RLS-90)	
Strictly acc. to RLS-90	
Railways (FTA/FRA)	
Aircraft (???)	
Strictly acc. to AzB	

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R1	43.9	42.9	49.4	65.0	55.0	0.0				5.00	a	6247697.83	2491568.99	5.00
RECEIVERS		R2	51.6	50.6	57.1	65.0	55.0	0.0				5.00	a	6250723.72	2489345.64	5.00
RECEIVERS		R3	47.0	46.1	52.5	65.0	55.0	0.0				5.00	a	6251473.61	2488334.72	5.00
RECEIVERS		R4	49.0	48.1	54.5	65.0	55.0	0.0				5.00	a	6247342.60	2488363.88	5.00
RECEIVERS		R5	45.4	44.5	50.9	65.0	55.0	0.0				5.00	a	6246611.40	2489503.41	5.00

Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			K0	Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night				X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(dB)	(ft)		(ft)	(ft)	(ft)
POINTSOURCE		TRASH01	89.0	89.0	89.0	Lw	89.0		150.00	0.00	90.00	0.0	5.00	a	6250078.18	2488641.35	5.00
POINTSOURCE		TRASH02	89.0	89.0	89.0	Lw	89.0		150.00	0.00	90.00	0.0	5.00	a	6248421.14	2488634.03	5.00
POINTSOURCE		TRASH03	89.0	89.0	89.0	Lw	89.0		150.00	0.00	90.00	0.0	5.00	a	6248403.63	2489175.49	5.00
POINTSOURCE		AC01	88.9	88.9	88.9	Lw	88.9		900.00	0.00	540.00	0.0	5.00	g	6250193.49	2488696.28	5.00
POINTSOURCE		AC02	88.9	88.9	88.9	Lw	88.9		900.00	0.00	540.00	0.0	5.00	g	6248303.50	2488685.97	5.00
POINTSOURCE		PARKING01	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	0.0	5.00	a	6250165.56	2488512.50	5.00
POINTSOURCE		PARKING02	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	0.0	5.00	a	6248233.63	2488675.35	5.00
POINTSOURCE		PARKING03	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	0.0	5.00	a	6248235.00	2488755.64	5.00
POINTSOURCE		PARKING04	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	0.0	5.00	a	6248236.59	2488848.92	5.00
POINTSOURCE		PARKING05	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	0.0	5.00	a	6248238.30	2488949.29	5.00
POINTSOURCE		PARKING06	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	0.0	5.00	a	6248240.05	2489052.02	5.00

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			K0	Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night				X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(dB)	(ft)		(ft)	(ft)	(ft)
POINTSOURCE		PARKING07	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	0.0	5.00	a	6248239.31	2489147.71	5.00

Line Source(s)

Name	M.	ID	Result. PWL			Result. PWL'			Lw / Li			Operating Time			Moving Pt. Src				Height
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	Number			Speed	
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	Day	Evening	Night	(mph)	(ft)
LINESOURCE		TRUCK01	93.2	93.2	93.2	68.0	68.0	68.0	Lw	93.2									8
LINESOURCE		TRUCK02	93.2	93.2	93.2	68.4	68.4	68.4	Lw	93.2									8
LINESOURCE		TRUCK03	93.2	93.2	93.2	75.0	75.0	75.0	Lw	93.2									8
LINESOURCE		TRUCK04	93.2	93.2	93.2	76.6	76.6	76.6	Lw	93.2									8

Name	Height			Coordinates			
	Begin		End	x	y	z	Ground
	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
LINESOURCE	8.00	a		6250012.01	2488448.29	8.00	0.00
				6250253.03	2488447.23	8.00	0.00
				6250266.15	2488731.66	8.00	0.00
				6250187.50	2489245.61	8.00	0.00
				6250144.32	2489245.25	8.00	0.00
LINESOURCE	8.00	a		6248371.44	2489257.70	8.00	0.00
				6248185.65	2489256.10	8.00	0.00
				6248171.81	2488442.18	8.00	0.00
LINESOURCE	8.00	a		6248173.64	2488549.77	8.00	0.00
				6248388.77	2488550.98	8.00	0.00
LINESOURCE	8.00	a		6250109.09	2488586.10	8.00	0.00
				6250259.40	2488585.31	8.00	0.00

Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL''			Lw / Li			Operating Time			Height
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	(ft)
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	
AREASOURCE		DOCK01	111.5	111.5	111.5	66.9	66.9	66.9	Lw	111.5		900.00	0.00	540.00	8
AREASOURCE		DOCK02	111.5	111.5	111.5	67.2	67.2	67.2	Lw	111.5		900.00	0.00	540.00	8

Name	Height			Coordinates			
	Begin		End	x	y	z	Ground
	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
AREASOURCE	8.00	a		6248369.36	2489151.63	8.00	0.00
				6248370.34	2489208.69	8.00	0.00
				6248373.11	2489331.52	8.00	0.00
				6250006.65	2489340.34	8.00	0.00
				6250002.47	2489274.22	8.00	0.00
				6250145.02	2489273.83	8.00	0.00
				6250142.24	2489160.86	8.00	0.00
AREASOURCE	8.00	a		6248389.64	2488656.72	8.00	0.00
				6250109.14	2488664.19	8.00	0.00
				6250109.06	2488544.05	8.00	0.00
				6249833.32	2488542.56	8.00	0.00
				6249833.10	2488484.47	8.00	0.00
				6248388.16	2488477.34	8.00	0.00

Barrier(s)

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height			Coordinates			
			left	right		horz.	vert.	Begin		End	x	y	z	Ground
					(ft)	(ft)	(ft)	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
BARRIERTEMP		0						8.00	a		6248388.60	2488530.41	8.00	0.00
											6248388.16	2488477.34	8.00	0.00
											6248584.98	2488478.31	8.00	0.00

Building(s)

Name	M.	ID	RB	Residents	Absorption	Height		Coordinates			
						Begin		x	y	z	Ground
						(ft)		(ft)	(ft)	(ft)	(ft)
BUILDING		BUILDING00001	x	0		0.00	a	6248281.16	2489209.02	0.00	0.00
								6248370.34	2489208.69	0.00	0.00
								6248369.36	2489151.63	0.00	0.00
								6250159.64	2489160.96	0.00	0.00
								6250222.04	2488775.83	0.00	0.00
								6250220.74	2488664.67	0.00	0.00
								6248274.72	2488656.22	0.00	0.00

APPENDIX 11.1:

CADNAA CONSTRUCTION NOISE MODEL INPUTS

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14035 - Ottawa Business Center

CadnaA Noise Prediction Model: 14035_03 - Construction.cna
Date: 01.11.21
Analyst: S. Shami

Calculation Configuration

Configuration	
Parameter	Value
General	
Country	(user defined)
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 (RLS-90)	
Strictly acc. to RLS-90	
Railways (FTA/FRA)	
Aircraft (???)	
Strictly acc. to AzB	

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R1	59.8	59.8	66.5	65.0	55.0	0.0				5.00	a	6247697.83	2491568.99	5.00
RECEIVERS		R2	69.0	69.0	75.6	65.0	55.0	0.0				5.00	a	6250723.72	2489345.64	5.00
RECEIVERS		R3	63.9	63.9	70.5	65.0	55.0	0.0				5.00	a	6251473.61	2488334.72	5.00
RECEIVERS		R4	65.8	65.8	72.4	65.0	55.0	0.0				5.00	a	6247342.60	2488363.88	5.00
RECEIVERS		R5	62.0	62.0	68.6	65.0	55.0	0.0				5.00	a	6246611.40	2489503.41	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)	
SITEBOUNDARY		CONSTRUCTION	132.1	132.1	132.1	79.0	79.0	79.0	Lw''	79					8

Name	Height				Coordinates			
	Begin		End		x	y	z	Ground
	(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
SITEBOUNDARY	8.00	a			6248076.37	2489369.26	8.00	0.00
					6250335.82	2489380.73	8.00	0.00
					6250465.71	2488416.04	8.00	0.00
					6249995.73	2488413.34	8.00	0.00
					6250012.81	2488438.04	8.00	0.00
					6250010.85	2488463.05	8.00	0.00

Name	Height		Coordinates			
	Begin	End	x	y	z	Ground
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
			6250004.12	2488486.96	8.00	0.00
			6249990.20	2488507.43	8.00	0.00
			6249966.59	2488518.53	8.00	0.00
			6249946.43	2488522.45	8.00	0.00
			6249915.41	2488517.03	8.00	0.00
			6249896.11	2488501.89	8.00	0.00
			6249882.71	2488483.08	8.00	0.00
			6249871.76	2488468.99	8.00	0.00
			6249853.68	2488455.03	8.00	0.00
			6249811.95	2488449.79	8.00	0.00
			6248055.81	2488441.64	8.00	0.00