5200 Sheila Street

NOISE IMPACT ANALYSIS

CITY OF COMMERCE

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OCTOBER 6, 2020

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
ANSI	American National Standards Institute
Calveno	California Vehicle Noise
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
Hz	Hertz
INCE	Institute of Noise Control Engineering
L_{eq}	Equivalent continuous (average) sound level
mph	Miles per hour
OPR	Office of Planning and Research
PPV	Peak particle velocity
Project	5200 Sheila Street
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 potential noise impacts and the necessary noise mitigation measures, if any, for the proposed 5200 Sheila Street development ("Project"). The Project site is located at 5200 Sheila Street in the City of Commerce and will consist of a single 114,898 square foot warehouse building to be constructed in a single phase by the year 2022. At the time this noise analysis was prepared, the future tenants of the proposed Project were unknown, and therefore, this noise study includes a conservative analysis of the proposed Project uses. This study has been prepared to satisfy applicable City of Commerce standards and thresholds of significance based on guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

OFF-SITE TRAFFIC NOISE ANALYSIS

Traffic generated by the operation of the Project will influence the traffic noise levels in surrounding off-site areas. To quantify the off-site traffic noise increases on the surrounding off-site areas, the changes in traffic noise levels on seven study-area roadway segments were calculated using the transportation related twenty-four hour community noise equivalent levels (CNEL) based on the change in the average daily traffic (ADT) volumes. The traffic noise levels provided in this analysis are based on the traffic forecasts found in the *5200 Sheila Street Focused Traffic Assessment* prepared by Urban Crossroads, Inc. (2) To assess the off-site noise level impacts associated with the proposed Project, noise contour boundaries were developed for Existing 2020, and Opening Year Cumulative 2022 conditions. The analysis shows that the Project-related traffic noise level increases under all with Project traffic scenarios are considered *less than significant* impacts at receiving land uses adjacent to the study area roadway segments.

OPERATIONAL NOISE ANALYSIS

Using reference noise levels to represent the expected noise sources from the 5200 Sheila Street site, the operational analysis estimates the Project-related stationary-source noise hourly average L_{eq} levels at nearby sensitive receiver locations. The typical activities associated with the proposed 5200 Sheila Street are anticipated to include loading dock activity, entry gate & truck movements, roof-top air conditioning units, and trash enclosure activity. The operational noise analysis shows that the Project will satisfy the City of Commerce stationary-source exterior daytime, evening and nighttime noise level standards by land use at all nearby receiver locations. Therefore, the Project-related operational noise level impacts are considered *less than significant*.

OPERATIONAL VIBRATION ANALYSIS

The operation of the Project site will include heavy trucks moving on site to and from the loading dock areas. Truck vibration levels are dependent on vehicle characteristics, load, speed, and pavement conditions. According to the FTA *Transit Noise Impact and Vibration Assessment,* (3 p. 113) trucks rarely create vibration that exceeds 70 VdB (unless there are bumps due to frequent potholes in the road). Trucks transiting on site will be travelling at very low speeds so it is

expected that delivery truck vibration impacts will satisfy the FTA *Transit Noise and Vibration Impact Assessment Manual* maximum acceptable vibration criteria 78 VdB, and therefore, will be *less than significant*.

CONSTRUCTION NOISE ANALYSIS

Using sample reference noise levels to represent the planned construction activities of the 5200 Sheila Street site, this analysis estimates the Project-related construction noise levels at nearby sensitive receiver locations. Since the City of Commerce General Plan and Municipal Codes do not identify specific construction noise level thresholds, an hourly average L_{eq} threshold is identified based on the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* for noise sensitive residential use. The Project-related short-term construction noise levels are expected to range from 62.5 to 73.4 dBA L_{eq} and will satisfy the 80 dBA L_{eq} construction noise level threshold at all receiver locations. Therefore, based on the results of this analysis, all nearby sensitive receiver locations will experience *less than significant* impacts due to Project construction noise levels.

CONSTRUCTION VIBRATION ANALYSIS

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. Based on this analysis it is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. This analysis shows the highest construction vibration levels are estimated at 72.9 VdB, which is below the FTA *Transit Noise and Vibration Impact Assessment* maximum acceptable vibration criteria of 78 VdB for daytime residential uses at all receiver locations. Therefore, the Project-related vibration impacts are considered *less than significant* during the construction activities at the Project site. Moreover, the impacts at the site of the closest sensitive receivers are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating adjacent to the Project site perimeter.

SUMMARY OF CEQA SIGNIFICANCE FINDINGS

The results of this 5200 Sheila Street 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 required mitigation measures.

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Off-Site Traffic Noise	7	*Less Than Significant*	-
Operational Noise	9	*Less Than Significant*	-
Operational Vibration		*Less Than Significant*	-
Construction Noise	10	*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 5200 Sheila Street ("Project"). This noise study briefly describes the proposed Project, provides information regarding noise fundamentals, describes the local regulatory setting, provides the study methods and procedures for transportation related CNEL traffic noise analysis, and evaluates the future exterior noise environment. In addition, this study includes an analysis of the potential Project-related long-term stationary-source operational noise and short-term construction noise and vibration impacts.

1.1 SITE LOCATION

The proposed 5200 Sheila Street site is located in the City of Commerce, as shown on Exhibit 1-A. Two office buildings currently exist on the Project site. Existing land uses near the site includes a mix of industrial and commercial land uses. The nearest noise-sensitive residential receivers are located north of Washington Boulevard.

1.2 PROJECT DESCRIPTION

The proposed Project consists of a single 114,898 square foot warehouse building as shown on Exhibit 1-B. For purposes of this assessment, the use for the building is assumed to be 40 percent general light industrial and 60 percent warehousing use. The Project is anticipated to be constructed in one phase by the year 2022. At the time this noise analysis was prepared, the future tenants of the proposed Project are unknown. The on-site Project-related noise sources are expected to include: loading dock activity, entry gate & truck movements, roof-top air conditioning units, and trash enclosure activity. This noise analysis is intended to describe noise level impacts associated with the expected typical operational activities at the Project site. To present a conservative approach, 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. (4) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA

at approximately 100 feet, which can cause serious discomfort. (5) 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 commonly used figure is the equivalent level (L_{eq}). Equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period (typically one hour) and is commonly used to describe the "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 sound appears louder. CNEL does not represent the actual sound level heard at any time, but rather represents the total sound exposure. The City of Commerce 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. (4)

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. (6)

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. (4)

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 FHWA does not consider the planting of vegetation to be a noise abatement measure. (6)

2.3.5 REFLECTION

Field studies conducted by the FHWA have shown that the reflection from barriers and buildings does not substantially increase noise levels. (6) If all the noise striking a structure was reflected back to a given receiving point, the increase would be theoretically limited to 3 dBA. Further, not all the acoustical energy is reflected back to same point. Some of the energy would go over the structure, some is reflected to points other than the given receiving point, some is scattered by ground coverings (e.g., grass and other plants), and some is blocked by intervening structures and/or obstacles (e.g., the noise source itself). Additionally, some of the reflected energy is lost due to the longer path that the noise must travel. FHWA measurements made to quantify reflective increases in traffic noise have not shown an increase of greater than 1-2 dBA; an increase that is not perceptible to the average human ear.

2.4 NOISE CONTROL

Noise control is the process of obtaining an acceptable noise environment for an observation point or receiver by controlling the noise source, transmission path, receiver, or all three. This

concept is known as the source-path-receiver concept. In general, noise control measures can be applied to these three elements.

2.5 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by up to 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receiver. Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source. (6)

2.6 LAND USE COMPATIBILITY WITH NOISE

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

2.7 COMMUNITY RESPONSE TO NOISE

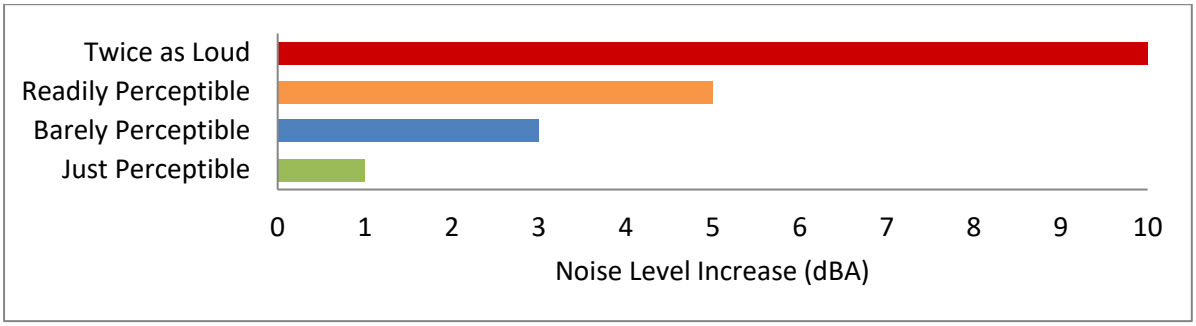
Community responses to noise may range from registering a complaint by telephone or letter, to initiating court action, depending upon everyone's susceptibility to noise and personal attitudes about noise. Several factors are related to the level of community annoyance including:

- 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.

Approximately ten percent of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints will occur. Twenty-five percent of the population will not complain even in very severe noise environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. (8) Surveys have shown that about ten percent of the people exposed to traffic noise of 60 dBA will report being highly annoyed with the noise, and each increase of one dBA is associated with approximately two percent more people being highly annoyed. When traffic noise exceeds 60 dBA or aircraft noise exceeds 55 dBA, people may begin to complain. (8) 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 are considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (6)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



2.8 EXPOSURE TO HIGH NOISE LEVELS

The Occupational Safety and Health Administration (OSHA) sets legal limits on noise exposure in the workplace. The permissible exposure limit (PEL) for a worker over an eight-hour day is 90 dBA. The OSHA standard uses a 5 dBA exchange rate. This means that when the noise level is increased by 5 dBA, the amount of time a person can be exposed to a certain noise level to receive the same dose is cut in half. The National Institute for Occupational Safety and Health (NIOSH) has recommended that all worker exposures to noise should be controlled below a level equivalent to 85 dBA for eight hours to minimize occupational noise induced hearing loss. NIOSH also recommends a 3 dBA exchange rate so that every increase by 3 dBA doubles the amount of the noise and halves the recommended amount of exposure time. (9)

OSHA has implemented requirements to protect all workers in general industry (e.g. the manufacturing and the service sectors) for employers to implement a Hearing Conservation Program where workers are exposed to a time weighted average noise level of 85 dBA or higher over an eight-hour work shift. Hearing Conservation Programs require employers to measure noise levels, provide free annual hearing exams and free hearing protection, provide training, and conduct evaluations of the adequacy of the hearing protectors in use unless changes to tools, equipment and schedules are made so that they are less noisy and worker exposure to noise is less than the 85 dBA. This noise study does not evaluate the noise exposure of workers within a project or construction site based on CEQA requirements, and instead, evaluates Project-related operational and construction noise levels at the nearby sensitive receiver locations in the Project study area.

2.9 VIBRATION

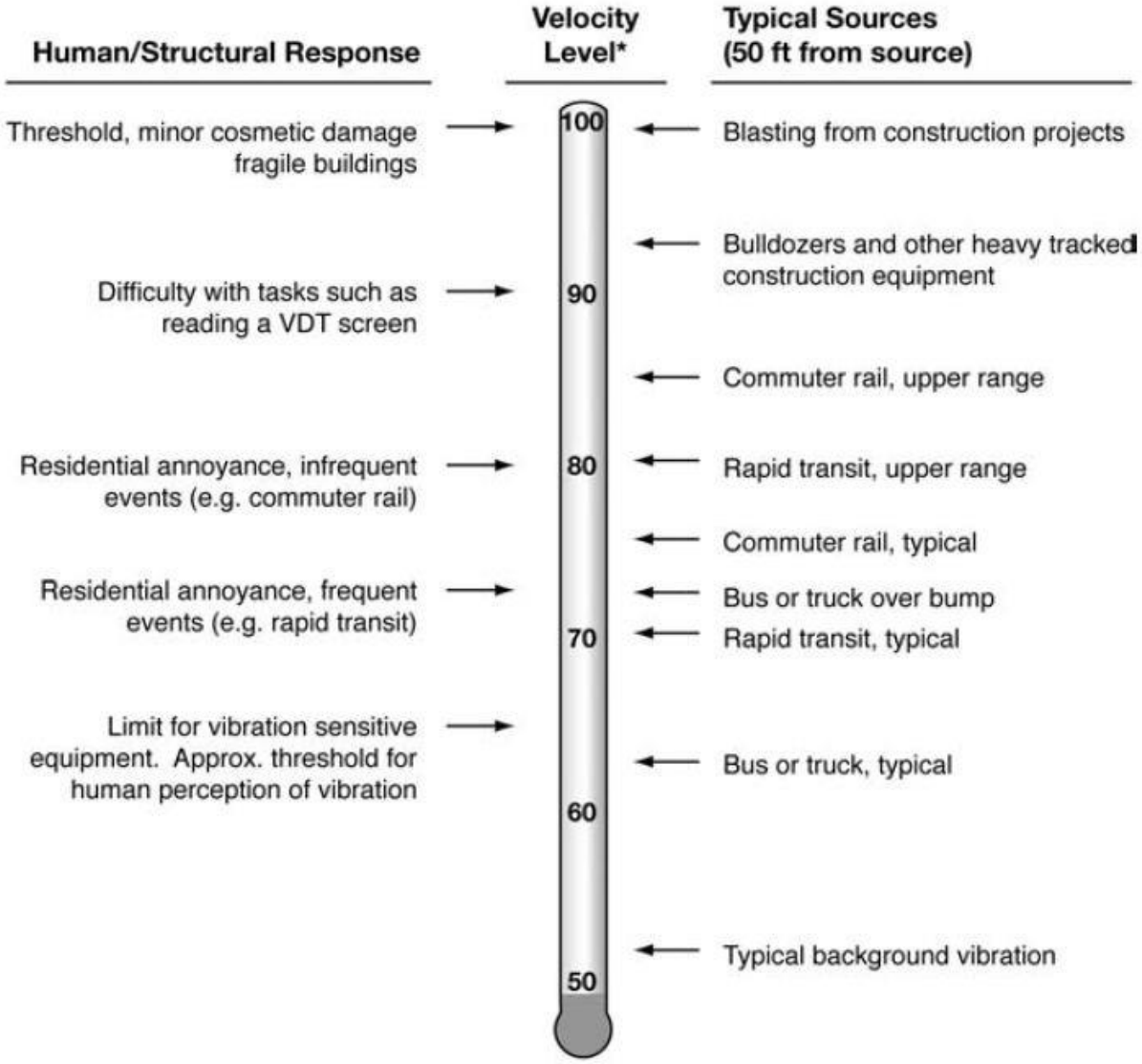
Per the Federal Transit Administration (FTA) *Transit Noise Impact and Vibration Assessment* (3), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural 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 Impact and Vibration Assessment.

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3 REGULATORY SETTING

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

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

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

3.2 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. (11) These noise standards are applied to new construction in California for controlling interior noise levels resulting from exterior noise sources. The regulations specify that acoustical studies must be prepared when non-residential structures are developed in areas where the exterior noise levels exceed 65 dBA CNEL, such as within a noise contour of an airport, freeway, railroad, and other areas where noise contours are not readily available. If the development falls within an airport or freeway 65 dBA CNEL noise contour, the combined sound transmission class (STC) rating of the wall and roof-ceiling assemblies must be at least 50. For those developments in areas where noise contours are not readily available and the noise level exceeds 65 dBA L_{eq} for any hour of operation, a wall and roof-ceiling combined STC rating of 45, and exterior windows with a minimum STC rating of 40 are required (Section 5.507.4.1).

3.3 CITY OF COMMERCE GENERAL PLAN SAFETY ELEMENT

The City of Commerce has adopted a Safety Element of the General Plan on January 2008 to control and abate environmental noise, and to protect the citizens from excessive exposure to noise. (12) The Safety Element includes those issues mandated by the State for consideration in noise elements. and specifies the maximum allowable exterior noise levels for new developments impacted by transportation noise sources such as arterial roads, freeways, airports and railroads.

In addition, the Safety Element identifies several polices to minimize the impacts of excessive noise levels throughout the community and establishes noise level requirements for all land uses. To protect City of Commerce residents from excessive noise, the Safety Element contains the following policies related to the Project:

- Safety Policy 6.1. *The city of Commerce will ensure that residents are protected from harmful and irritating noise sources to the greatest extent possible.*
- Safety Policy 6.3. *The city of Commerce will continue to enforce the existing city's noise control ordinance.*
- Safety Policy 6.4. *The city of Commerce will incorporate noise considerations into land use planning decisions.*
- Safety Policy 6.5. *The city of Commerce will prohibit noise-intensive land uses adjacent to or near residential areas, schools, convalescent homes, and other noise-sensitive receptors.*
- Safety Policy 6.7*. The city of Commerce will require additional landscaping in industrial and commercial projects to help reduce noise impacts through increased setbacks.*
- Safety Policy 6.8*. The city of Commerce will evaluate and implement measures to control stationary non-transportation noise impacts.*

To ensure noise-sensitive land uses are protected from high levels of noise the City of Commerce has developed its own land use compatibility standards, based on recommended parameters from the Governor's Office of Planning and Research (OPR) (10). Table 7-1 of the Safety Element identifies standards to evaluate noise and land use compatibility. The City's Land Use Compatibility standards use the CNEL noise descriptor and are intended to be applicable for land use designations exposed to noise levels generated by transportation related sources. These guidelines indicate the compatibility of noise-sensitive land uses in areas subject to noise levels of 55 to 80 dB CNEL. Residential uses are normally unacceptable in areas exceeding 70 dB CNEL; and conditionally acceptable between 55-70 dB CNEL for low-density single-family dwelling units, duplexes, and mobile homes, and between 60-70 dB CNEL for multiple-family units. Schools, libraries, hospitals, and nursing homes are treated as noise-sensitive land uses, requiring acoustical studies within areas exceeding 60 dB CNEL. Commercial/professional office buildings and industrial land uses are normally unacceptable in areas exceeding 75 dB CNEL and are conditionally acceptable within 67 to 78 dB CNEL (for commercial/professional offices only).

To control stationary noise sources from Industrial, commercial, and manufacturing facilities that may affect sensitive land uses, Safety Policy 6.3 requires that City continue to enforce the noise control ordinance. The City's Noise Control Ordinance, together with the General Plan, establishes exterior noise standards for a wide range of land uses in the city.

3.4 OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as 5200 Sheila Street Project, stationary-source (operational) noise such as the expected loading dock activity, entry gate & truck movements, roof-top air conditioning units, and trash enclosure activity are typically evaluated against standards established under a jurisdiction's Municipal

Code. Section 19.19.060 of the City of Commerce Municipal Code contains the exterior noise level standards for residential, commercial, and industrial land uses as shown on Table 3-1.

TABLE 3-1: OPERATIONAL NOISE STANDARDS

City	Land Use	Exterior Noise Level Standards (dBA Leq)[3]		
		Daytime	Evening	Nighttime
Commerce[1]	Residential	55	50	45
	Commercial	65	65	55
	Industrial	70	70	70

[1] City of Commerce Municipal Code, Section 19.19.060 Noise (Appendix 3.1).
[2] Leq represents a steady state sound level containing the same total energy as a time varying signal over a given period. "Daytime" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

For the noise sensitive residential land uses, the Municipal Code identifies a noise level standard of 55 dBA L_{eq}, during the daytime hours of 7:00 a.m. to 10:00 p.m., 50 dBA L_{eq} during the evening hours of 7:00 p.m. to 10:00 p.m. and 45 dBA L_{eq} during the nighttime hour of 10:00 p.m. to 7:00 a.m. (13) For commercial uses the municipal codes identifies a daytime noise level limit of 65 dBA L_{eq} and a nighttime noise level limit of 55 dBA L_{eq}. For industrial uses the municipal codes identifies a noise level limit of 70 dBA L_{eq} anytime. The City of Commerce Development Code Performance Standards for noise are included in Appendix 3.1.

3.5 CONSTRUCTION NOISE STANDARDS

To control noise impacts associated with the construction of the proposed Project, the City of Commerce Municipal Code has established limits to the hours of operation. Section 19.19.160(K)(3) indicates that no person or organization within 500 feet of a residential zone *shall operate equipment or perform any outside construction or repair work on buildings, structures, or projects, or operate any pile driver, steam shovel, pneumatic hammer, derrick, steam, electric hoist, or other construction type device between the hours of ten p.m. and seven a.m., unless a permit has been obtained from the city.* Neither the General Plan nor 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*.

To evaluate whether the Project will generate potentially significant construction noise levels at off-site sensitive receiver locations, a construction-related noise level threshold is adopted from the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual.* (3) The FTA criteria recognizes that project construction noise criteria should consider the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use. Therefore, this analysis relies on the FTA construction noise level guidelines that can be considered as reasonable criteria for assessment. For noise sensitive residential use, the FTA establishes an absolute daytime noise level limit of 80 dBA L_{eq}.

3.6 VIBRATION STANDARDS

To analyze vibration impacts originating from the operation and construction of the 5200 Sheila Street, vibration-generating activities are appropriately evaluated against standards established under a City's Municipal Code, if such standards exist. However, the City of Commerce does not identify specific vibration level limits and instead relies on the Federal Transit Administration (FTA) methodology. The FTA *Transit Noise and Vibration Impact Assessment Manual* methodology provides guidelines for the maximum-acceptable vibration criteria for different types of land uses. These guidelines allow 90 VdB for industrial (workshop) use, 84 VdB for office use and 78 VdB for daytime residential uses and 72 VdB for nighttime uses in buildings where people normally sleep.

4 SIGNIFICANCE CRITERIA

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

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

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

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

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

4.1 CEQA GUIDELINES NOT FURTHER ANALYZED

The Project site is not located within two miles of a public airport or within an airport land use plan. The closest airport major airport is the Los Angeles International Airport located over 13 miles west 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 Guideline C.

4.2 NOISE-SENSITIVE RECEIVERS

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Guidelines described above at the closest sensitive receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing ambient noise levels, and the location of noise-sensitive receivers to determine if a noise increase represents a significant adverse environmental impact. This approach recognizes *that there is no single noise increase that renders the noise impact significant.* (15) Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding human reactions of annoyance and dissatisfaction. 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) (16) developed guidance to be used for the assessment of project-generated increases

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

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

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 (6 p. 9) and Caltrans (17 p. 2_48).

4.3 NON-NOISE-SENSITIVE RECEIVERS

The City of Commerce General Plan Safety Element, Table 7-1, *Noise and Land use Compatibility Standards* was used to establish the satisfactory noise levels of significance for non-noise-sensitive land uses in the Project study area. To determine if Project-related traffic noise level increases are significant at off-site non-noise-sensitive land uses, a *readily perceptible* 5 dBA and *barely perceptible* 3 dBA criteria were used. When the without Project noise levels at the non-noise-sensitive land uses are below the *normally acceptable* 70 dBA CNEL compatibility criteria, a *readily perceptible* 5 dBA or greater noise level increase is considered a significant impact. When the without Project noise levels are greater than the *normally acceptable* 70 dBA CNEL land use compatibility criteria, a *barely perceptible* 3 dBA or greater noise level increase is considered a significant impact since the noise level criteria is already exceeded.

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.

OFF-SITE TRAFFIC NOISE

- When the noise levels at existing and future noise-sensitive land uses (e.g. residential, etc.):
    - are less than 60 dBA CNEL and the Project creates a *readily perceptible* 5 dBA CNEL or greater Project-related noise level increase; or
    - range from 60 to 65 dBA CNEL and the Project creates a *barely perceptible* 3 dBA CNEL or greater Project-related noise level increase; or
    - already exceed 65 dBA CNEL, and the Project creates a community noise level increase of greater than 1.5 dBA CNEL (FICON, 1992).
- When the noise levels at existing and future non-noise-sensitive land uses (e.g., commercial, industrial):
    - are less than the City of Commerce General Plan Safety Element, Table 7-1, *normally acceptable* 70 dBA CNEL and the Project creates a *readily perceptible* 5 dBA CNEL or greater Project related noise level increase; or
    - are greater than the City of Commerce General Plan Safety Element, Table 7-1, *normally acceptable* 70 dBA CNEL and the Project creates a *barely perceptible* 3 dBA CNEL or greater Project noise level increase.

OPERATIONAL NOISE & VIBRATION

- If Project-related operational (stationary-source) noise levels exceed an exterior noise level of 55 dBA Leq, during the daytime hours of 7:00 a.m. to 10:00 p.m., 50 dBA Leq during the evening hours of 7:00 p.m. to 10:00 p.m. and 45 dBA Leq during the nighttime hour of 10:00 p.m. to 7:00 a.m. (13) For commercial uses the municipal codes identifies a daytime noise level limit of 65 dBA Leq and a nighttime noise level limit of 55 dBA Leq. For industrial uses the municipal codes identifies a noise level limit of 70 dBA Leq anytime. (City of Commerce Municipal Code, 19.19.060)
- If the existing ambient noise levels at the nearby noise-sensitive receivers near the Project site:
    - are less than 60 dBA L_{eq} and the Project creates a *readily perceptible* 5 dBA L_{eq} or greater Project-related noise level increase; or
    - range from 60 to 65 dBA L_{eq} and the Project creates a *barely perceptible* 3 dBA L_{eq} or greater Project-related noise level increase; or
    - already exceed 65 dBA L_{eq} and the Project creates a community noise level increase of greater than 1.5 dBA L_{eq} (FICON, 1992).

CONSTRUCTION NOISE & VIBRATION

- If Project-related construction activities take place outside the permitted hours of 7:00 a.m. to 10:00 p.m. (City of Commerce Municipal Code, 19.19.060).

- If Project-related construction activities create noise levels which exceed the 80 dBA L_{eq} acceptable noise level threshold at the nearby sensitive receiver locations (FTA Transit Noise and Vibration Impact Assessment Manual).
- If Project generated operational vibration levels exceed the FTA's acceptable vibration thresholds of 78 VdB for daytime residential use and buildings where people normally sleep. (FTA Transit Noise and Vibration Impact Assessment Manual).

TABLE 4-1: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Receiving Land Use	Condition(s)	Significance Criteria	
			Daytime	Nighttime
Off-Site Traffic	Noise-Sensitive[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	
	Non-Noise-Sensitive[1,2]	If ambient is < 70 dBA CNEL	≥ 5 dBA CNEL Project increase	
		If ambient is > 70 dBA CNEL	≥ 3 dBA CNEL Project increase	
Operational	Residential	Exterior Noise Level Standards[3]	55 dBA L_{eq}	45 dBA L_{eq}
	Commercial	Exterior Noise Level Standards[3]	65 dBA L_{eq}	55 dBA L_{eq}
	Industrial	Exterior Noise Level Standards[3]	70 dBA L_{eq}	70 dBA L_{eq}
	Noise-Sensitive[1]	If ambient is < 60 dBA L_{eq}	≥ 5 dBA L_{eq} Project increase	
		If ambient is 60 - 65 dBA L_{eq}	≥ 3 dBA L_{eq} Project increase	
		If ambient is > 65 dBA L_{eq}	≥ 1.5 dBA L_{eq} Project increase	
	Non-Noise-Sensitive[1,2]	If ambient is < 70 dBA L_{eq}	≥ 5 dBA L_{eq} Project increase	
		If ambient is > 70 dBA L_{eq}	≥ 3 dBA L_{eq} Project increase	
Construction	Noise-Sensitive	Permitted between 7:00 a.m. to 10:00 p.m.[3]		
		Noise Level Threshold[4]	80 dBA L_{eq}	n/a
		Vibration Level Threshold[4]	78 VdB	n/a

[1] FICON, 1992.
[2] City of Commerce General Plan Safety Element, Table 7-1
[3] City of Commerce Municipal Code, Section 19.19.060 Noise (Appendix 3.1).
[4] Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual.
"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 four locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Wednesday, February 19, 2020. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (18)

5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing 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*. (4) 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*. (3)

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. (3) 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 average or equivalent sound levels (L_{eq}). The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. Table 5-1 identifies the hourly daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) noise levels at each noise level measurement location. Appendix 5.2 provides a summary of the existing hourly ambient noise levels described below:

- Location L1 represents the noise levels north of the Project site on Cowlin Avenue near existing single-family residential homes. The noise level measurements collected show an overall 24-hour exterior noise level of 72.0 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 67.3 dBA L_{eq} with an average evening noise level of 65.7 dBA L_{eq} and an average nighttime noise level of 65.0 dBA L_{eq}.
- Location L2 represents the noise levels north of the Project site on Sheila Street near the Ross Health Care Clinic. The noise level measurements collected show an overall 24-hour exterior noise level of 87.7 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 82.8 dBA L_{eq} with an average evening noise level of 80.6 dBA L_{eq} and an average nighttime noise level of 80.8 dBA L_{eq}.
- Location L3 represents the noise levels northeast of the Project site on Wilma Avenue near existing single-family residential homes. The noise level measurements collected show an overall 24-hour exterior noise level of 66.7 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 62.8 dBA L_{eq} with an average evening noise level of 60.5 dBA L_{eq} and an average nighttime noise level of 59.4 dBA L_{eq}.
- Location L4 represents the noise levels northeast of the Project site on East Washington Boulevard next to Inclusion Services Adult Day Program. The noise level measurements collected show an overall 24-hour exterior noise level of 79.1 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 74.3 dBA L_{eq} with an average evening noise level of 72.0 dBA L_{eq} and an average nighttime noise level of 72.1 dBA L_{eq}.

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

The background ambient noise levels in the Project study area are dominated by the transportation-related noise associated in addition to background industrial land use activities. This includes the auto and heavy truck activities on study area roadway segments near the noise level measurement locations. The 24-hour existing noise level measurement results are shown on Table 5-1.

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

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]			CNEL
		Daytime	Evening	Nighttime	
L1	Located north of the Project site on Cowlin Avenue near existing single-family residential homes.	67.3	65.7	65.0	72.0
L2	Located north of the Project site on Sheila Street near the Ross Health Care Clinic.	82.8	80.6	80.8	87.7
L3	Located northeast of the Project site on Wilma Avenue near existing single-family residential homes.	62.8	60.5	59.4	66.7
L4	Located northeast of the Project site on East Washington Boulevard next to Inclusion Services Adult Day Program.	74.3	72.0	72.1	79.1

[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.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS

6 METHODS AND PROCEDURES

The following section outlines the methods and procedures used to model and analyze the future traffic noise environment. Consistent with the City of Commerce General Plan *Noise and Land Use Compatibility Standards*, all transportation related noise levels are presented in terms of the 24-hour CNEL's.

6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The expected roadway noise level increases from vehicular traffic were calculated by Urban Crossroads, Inc. using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (19) The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). In California the national REMELs are substituted with the California Vehicle Noise (Calveno) Emission Levels. (20) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period. Research conducted by Caltrans has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model used in this analysis. (21)

6.2 OFF-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

Table 6-1 presents the roadway parameters used to assess the Project's off-site dBA CNEL transportation noise impacts. Table 6-1 identifies the seven study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the City of Commerce General Plan Circulation Element, and the posted vehicle speeds. The ADT volumes used in this study area presented on Table 6-2 are based on the *5200 Sheila Street Focused Traffic Assessment*, prepared by Urban Crossroads, Inc. for the following traffic scenarios under both without and with Project alternatives: Existing 2020, and Opening Year Cumulative (OYC). (2) This analysis relies on a comparative analysis of the off-site traffic noise impacts, without and with project ADT traffic volumes from the Project traffic study.

TABLE 6-1: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	Receiving Land Use[1]	Distance from Centerline to Receiving Land Use (Feet)[2]	Vehicle Speed (mph)[3]
1	Ralph Lieberman Av.	n/o Sheila St.	CM	40'	40
2	Ralph Lieberman Av.	s/o Sheila St.	CM/I	40'	40
3	Ralph Lieberman Av.	s/o Dwy. 2	CM	40'	40
4	Sheila St.	w/o Dwy. 1	CM/I	40'	40
5	Sheila St.	e/o Dwy. 1	CM/I	40'	40
6	Sheila St.	e/o Ralph Lieberman Av.	CM/I	40'	40
7	Sheila St.	e/o Dwy. 3	CM/I	40'	40

[1] City of Commerce General Plan Land Use Map.
[2] Distance to receiving land use is based upon the right-of-way distances.
[3] 5200 Sheila Street Focused Traffic Assessment.
"CM"= Commercial Manufacturing; "I"= Industrial.

TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic Volumes[1]			
			Existing		Opening Year	
			Without Project	With Project	Without Project	With Project
1	Ralph Lieberman Av.	n/o Sheila St.	4,117	4,176	4,241	4,301
2	Ralph Lieberman Av.	s/o Sheila St.	7,430	7,503	8,052	8,125
3	Ralph Lieberman Av.	s/o Dwy. 2	7,430	7,607	8,052	8,229
4	Sheila St.	w/o Dwy. 1	7,430	7,707	8,052	8,330
5	Sheila St.	e/o Dwy. 1	7,430	7,696	8,052	8,319
6	Sheila St.	e/o Ralph Lieberman Av.	4,214	4,287	4,740	4,812
7	Sheila St.	e/o Dwy. 3	4,214	4,229	4,740	4,755

[1] 5200 Sheila Street Focused Traffic Assessment.

To quantify the off-site noise levels, the Project related truck trips were added to the heavy truck category in the FHWA noise prediction model. The addition of the Project related truck trips increases the percentage of heavy trucks in the vehicle mix. This approach recognizes that the FHWA noise prediction model is significantly influenced by the number of heavy trucks in the vehicle mix.

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

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

TABLE 6-4: WITHOUT PROJECT VEHICLE MIX

Classification	Total % Traffic Flow			Total
	Autos	Medium Trucks	Heavy Trucks	
All Segments	90.95%	2.38%	6.67%	100.00%

Based on an existing vehicle count taken at Atlantic Boulevard and Sheila Street (5200 Sheila Street Focused Traffic Assessment., Urban Crossroads, Inc.). Vehicle mix percentage values rounded to the nearest one-hundredth.

TABLE 6-5: EXISTING 2020 WITH PROJECT VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Ralph Lieberman Av.	n/o Sheila St.	91.08%	2.35%	6.57%	100.00%
2	Ralph Lieberman Av.	s/o Sheila St.	90.47%	2.46%	7.07%	100.00%
3	Ralph Lieberman Av.	s/o Dwy. 2	90.60%	2.43%	6.97%	100.00%
4	Sheila St.	w/o Dwy. 1	90.58%	2.42%	7.00%	100.00%
5	Sheila St.	e/o Dwy. 1	90.71%	2.40%	6.89%	100.00%
6	Sheila St.	e/o Ralph Lieberman Av.	90.10%	2.53%	7.37%	100.00%
7	Sheila St.	e/o Dwy. 3	90.98%	2.37%	6.65%	100.00%

[1] 5200 Sheila Street Focused Traffic Assessment, Urban Crossroads, Inc.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

TABLE 6-6: OYC 2022WITH PROJECT VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Ralph Lieberman Av.	n/o Sheila St.	91.08%	2.35%	6.58%	100.00%
2	Ralph Lieberman Av.	s/o Sheila St.	90.50%	2.46%	7.04%	100.00%
3	Ralph Lieberman Av.	s/o Dwy. 2	90.62%	2.43%	6.95%	100.00%
4	Sheila St.	w/o Dwy. 1	90.60%	2.42%	6.98%	100.00%
5	Sheila St.	e/o Dwy. 1	90.72%	2.40%	6.88%	100.00%
6	Sheila St.	e/o Ralph Lieberman Av.	90.20%	2.51%	7.30%	100.00%
7	Sheila St.	e/o Dwy. 3	90.98%	2.37%	6.65%	100.00%

[1] 5200 Sheila Street Focused Traffic Assessment, Urban Crossroads, Inc.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

6.3 VIBRATION ASSESSMENT

This analysis focuses on the potential ground-borne vibration associated with operational traffic and construction activities. Ground-borne vibration levels from automobile traffic are generally overshadowed by vibration generated by heavy trucks that roll over the same uneven roadway surfaces. However, due to the rapid drop-off rate of ground-borne vibration and the short duration of the associated events, vehicular traffic-induced ground-borne vibration is rarely perceptible beyond the roadway right-of-way, and rarely results in vibration levels that cause damage to buildings in the vicinity. 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 6-7. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the potential Project construction vibration levels using the following vibration assessment methods defined by the FTA. To describe the human response (annoyance) associated with vibration impacts the FTA provides the following equation: $L_{VdB}(D) = L_{VdB}(25\text{ ft}) - 30\log(D/25)$

TABLE 6-7: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment	Vibration Decibels (VdB) at 25 feet
Small bulldozer	58
Jackhammer	79
Loaded Trucks	86
Large bulldozer	87

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

7 OFF-SITE TRANSPORTATION NOISE IMPACTS

To assess the off-site transportation CNEL noise level impacts associated with the proposed Project, noise contours were developed based on the *5200 Sheila Street Focused Traffic Assessment*. (2) Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway.

7.1 TRAFFIC NOISE CONTOURS

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

Tables 7-1 through 7-4 present a summary of the exterior dBA CNEL traffic noise levels without barrier attenuation. Roadway segments are analyzed from the without Project to the with Project conditions in each of the following timeframes: Existing 2020, Opening Year Cumulative (OYC) 2022. Appendix 7.1 includes a summary of the dBA CNEL traffic noise level contours for each of the traffic scenarios.

TABLE 7-1: EXISTING 2020 WITHOUT PROJECT NOISE CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Ralph Lieberman Av.	n/o Sheila St.	CM	68.8	RW	71	154
2	Ralph Lieberman Av.	s/o Sheila St.	CM/I	71.3	49	106	228
3	Ralph Lieberman Av.	s/o Dwy. 2	CM	71.3	49	106	228
4	Sheila St.	w/o Dwy. 1	CM/I	71.3	49	106	228
5	Sheila St.	e/o Dwy. 1	CM/I	71.3	49	106	228
6	Sheila St.	e/o Ralph Lieberman Av.	CM/I	68.9	RW	73	156
7	Sheila St.	e/o Dwy. 3	CM/I	68.9	RW	73	156

[1] Sources: City of Commerce General Plan Land Use Map.
[2] The CNEL is calculated at the boundary of the right-of-way of the receiving adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road. "CM"= Commercial Manufacturing; "I"= Industrial.

TABLE 7-2: EXISTING 2020 WITH PROJECT NOISE CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Ralph Lieberman Av.	n/o Sheila St.	CM	68.8	RW	72	154
2	Ralph Lieberman Av.	s/o Sheila St.	CM/I	71.6	51	110	236
3	Ralph Lieberman Av.	s/o Dwy. 2	CM	71.6	51	110	237
4	Sheila St.	w/o Dwy. 1	CM/I	71.6	52	111	239
5	Sheila St.	e/o Dwy. 1	CM/I	71.6	51	110	237
6	Sheila St.	e/o Ralph Lieberman Av.	CM/I	69.3	RW	77	166
7	Sheila St.	e/o Dwy. 3	CM/I	68.9	RW	73	156

[1] Sources: City of Commerce General Plan Land Use Map.
[2] The CNEL is calculated at the boundary of the right-of-way of the receiving adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road. "CM"= Commercial Manufacturing; "I"= Industrial.

TABLE 7-3: OYC 2022 WITHOUT PROJECT NOISE CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Ralph Lieberman Av.	n/o Sheila St.	CM	68.9	RW	73	157
2	Ralph Lieberman Av.	s/o Sheila St.	CM/I	71.7	52	112	241
3	Ralph Lieberman Av.	s/o Dwy. 2	CM	71.7	52	112	241
4	Sheila St.	w/o Dwy. 1	CM/I	71.7	52	112	241
5	Sheila St.	e/o Dwy. 1	CM/I	71.7	52	112	241
6	Sheila St.	e/o Ralph Lieberman Av.	CM/I	69.4	RW	78	169
7	Sheila St.	e/o Dwy. 3	CM/I	69.4	RW	78	169

[1] Sources: City of Commerce General Plan Land Use Map.
[2] The CNEL is calculated at the boundary of the right-of-way of the receiving adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road. "CM"= Commercial Manufacturing; "I"= Industrial.

TABLE 7-4: OYC 2022 WITH PROJECT NOISE CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Ralph Lieberman Av.	n/o Sheila St.	CM	68.9	RW	73	157
2	Ralph Lieberman Av.	s/o Sheila St.	CM/I	71.9	54	115	249
3	Ralph Lieberman Av.	s/o Dwy. 2	CM	71.9	54	116	249
4	Sheila St.	w/o Dwy. 1	CM/I	72.0	54	117	251
5	Sheila St.	e/o Dwy. 1	CM/I	71.9	54	116	249
6	Sheila St.	e/o Ralph Lieberman Av.	CM/I	69.7	RW	83	178
7	Sheila St.	e/o Dwy. 3	CM/I	69.4	RW	78	169

[1] Sources: City of Commerce General Plan Land Use Map.
[2] The CNEL is calculated at the boundary of the right-of-way of the receiving adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road. "CM"= Commercial Manufacturing; "I"= Industrial.

7.2 EXISTING 2020 PROJECT TRAFFIC NOISE LEVEL INCREASES

An analysis of existing traffic noise levels plus traffic noise generated by the proposed Project has been included in this report to fully analyze all the existing traffic scenarios identified in the *5200 Sheila Street Focused Traffic Assessment* prepared by Urban Crossroads, Inc. This condition is provided solely for informational purposes and will not occur, since the Project will not be fully developed and occupied under Existing conditions. Therefore, no mitigation measures are considered to reduce the Existing Plus Project traffic noise level increases. The future OYC traffic noise conditions that include all cumulative projects are used to determine the significance of the Project off-site traffic noise level increases on the study area roadway segments. Table 7-1 shows the Existing without Project conditions CNEL noise levels. The Existing without Project exterior noise levels are expected to range from 68.8 to 71.3 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing with Project conditions will range from 68.8 to 71.6 dBA CNEL. Table 7-5 shows that the Project off-site traffic noise level impacts will range from 0.0 to 0.4 dBA CNEL.

7.3 OYC 2022 PROJECT TRAFFIC NOISE LEVEL INCREASES

Table 7-3 presents the OYC without Project conditions CNEL noise levels. The OYC without Project exterior noise levels are expected to range from 68.9 to 71.7 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-4 shows that the OYC with Project conditions will range from 68.9 to 72.0 dBA CNEL. Table 7-6 shows that the Project off-site traffic noise level increases will range from 0.0 to 0.4 dBA CNEL. Based on the significance criteria for the off-site traffic noise presented in Table 4-1, land uses adjacent to the study area roadway segments would experience *less than significant* noise level increases due to Project-related traffic noise levels.

TABLE 7-5: EXISTING 2020 WITH PROJECT TRAFFIC NOISE LEVEL INCREASES

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]			Noise-Sensitive Land Use?	Incremental Noise Level Increase Threshold[3]	
				No Project	With Project	Project Addition		Limit	Exceeded?
1	Ralph Lieberman Av.	n/o Sheila St.	CM	68.8	68.8	0.0	No	5.0	No
2	Ralph Lieberman Av.	s/o Sheila St.	CM/I	71.3	71.6	0.2	No	3.0	No
3	Ralph Lieberman Av.	s/o Dwy. 2	CM	71.3	71.6	0.2	No	3.0	No
4	Sheila St.	w/o Dwy. 1	CM/I	71.3	71.6	0.3	No	3.0	No
5	Sheila St.	e/o Dwy. 1	CM/I	71.3	71.6	0.3	No	3.0	No
6	Sheila St.	e/o Ralph Lieberman Av.	CM/I	68.9	69.3	0.4	No	5.0	No
7	Sheila St.	e/o Dwy. 3	CM/I	68.9	68.9	0.0	No	5.0	No

[1] City of Commerce General Plan Land Use Map.

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

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

TABLE 7-8: OYC 2022 WITH PROJECT TRAFFIC NOISE INCREASES

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]			Noise-Sensitive Land Use?	Incremental Noise Level Increase Threshold[3]	
				No Project	With Project	Project Addition		Limit	Exceeded?
1	Ralph Lieberman Av.	n/o Sheila St.	CM	68.9	68.9	0.0	No	5.0	No
2	Ralph Lieberman Av.	s/o Sheila St.	CM/I	71.7	71.9	0.2	No	3.0	No
3	Ralph Lieberman Av.	s/o Dwy. 2	CM	71.7	71.9	0.2	No	3.0	No
4	Sheila St.	w/o Dwy. 1	CM/I	71.7	72.0	0.3	No	3.0	No
5	Sheila St.	e/o Dwy. 1	CM/I	71.7	71.9	0.2	No	3.0	No
6	Sheila St.	e/o Ralph Lieberman Av.	CM/I	69.4	69.7	0.4	No	5.0	No
7	Sheila St.	e/o Dwy. 3	CM/I	69.4	69.4	0.0	No	5.0	No

[1] City of Commerce General Plan Land Use Map.

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

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

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8 SENSITIVE RECEIVER LOCATIONS

To assess the potential for long-term operational and short-term construction noise impacts, the following sensitive receiver locations, as shown on Exhibit 8-A, were identified as representative locations for analysis. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. 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 the existing noise sensitive residence at 5101 E Washington Boulevard, approximately 729 feet northwest of the Project site. Since there are no private outdoor living areas (backyards) facing the Project site, receiver R1 is placed at the residential building façade. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents the commerce corner commercial center at 2470 S Atlantic Boulevard, approximately 74 feet north of the Project site. Receiver R2 is placed at the building façade of this non-noise sensitive land use. 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 2415 Wilma Avenue approximately 540 feet north of the Project site. Since there are no private outdoor living areas (backyards) facing the Project site, receiver R3 is placed at the residential building façade. A 24-hour noise measurement near this location, L3, is used to describe the existing ambient noise environment.

R4: Location R4 represents the existing noise sensitive Inclusion Services Adult Day Program at 5261 E Washington Boulevard, approximately 457 feet northeast of the Project site. Since there are no private outdoor living areas (backyards) facing the Project site, receiver R4 is placed at the residential building façade. A 24-hour noise measurement near this location, L4, is used to describe the existing ambient noise environment.

R5: Location R5 represents the existing office building at 2500 S Atlantic Boulevard, approximately 142 feet west of the Project site. Receiver R5 is placed at the building façade. A 24-hour noise measurement near this location, L2, is used to describe the existing ambient noise environment.

EXHIBIT 8-A: SENSITIVE RECEIVER LOCATIONS

9 OPERATIONAL NOISE IMPACTS

This section analyzes the potential stationary-source operational noise impacts at the nearby receiver locations, identified in Section 8, resulting from the operation of the proposed 5200 Sheila Street Project. Exhibit 9-A identifies the representative noise source locations used to assess the operational noise levels.

9.1 OPERATIONAL NOISE SOURCES

At the time this noise analysis was prepared the future tenants of the proposed Project were unknown. Therefore, 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 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: loading dock activity, entry gate & truck movements, roof-top air conditioning units, and trash enclosure activity.

9.2 REFERENCE NOISE LEVELS

To estimate the Project operational noise impacts, reference noise level measurements were collected from similar types of activities to represent the noise levels expected with the development of the proposed Project. This section provides a detailed description of the reference noise level measurements shown on Table 9-1 used to estimate the Project operational noise impacts. It is important to note that the following projected noise levels assume the worst-case noise environment with the loading dock activity, entry gate & truck movements, roof-top air conditioning units, and trash enclosure activity all operating continuously. These sources of noise activity will likely vary throughout the day.

EXHIBIT 9-A: OPERATIONAL NOISE SOURCE LOCATIONS

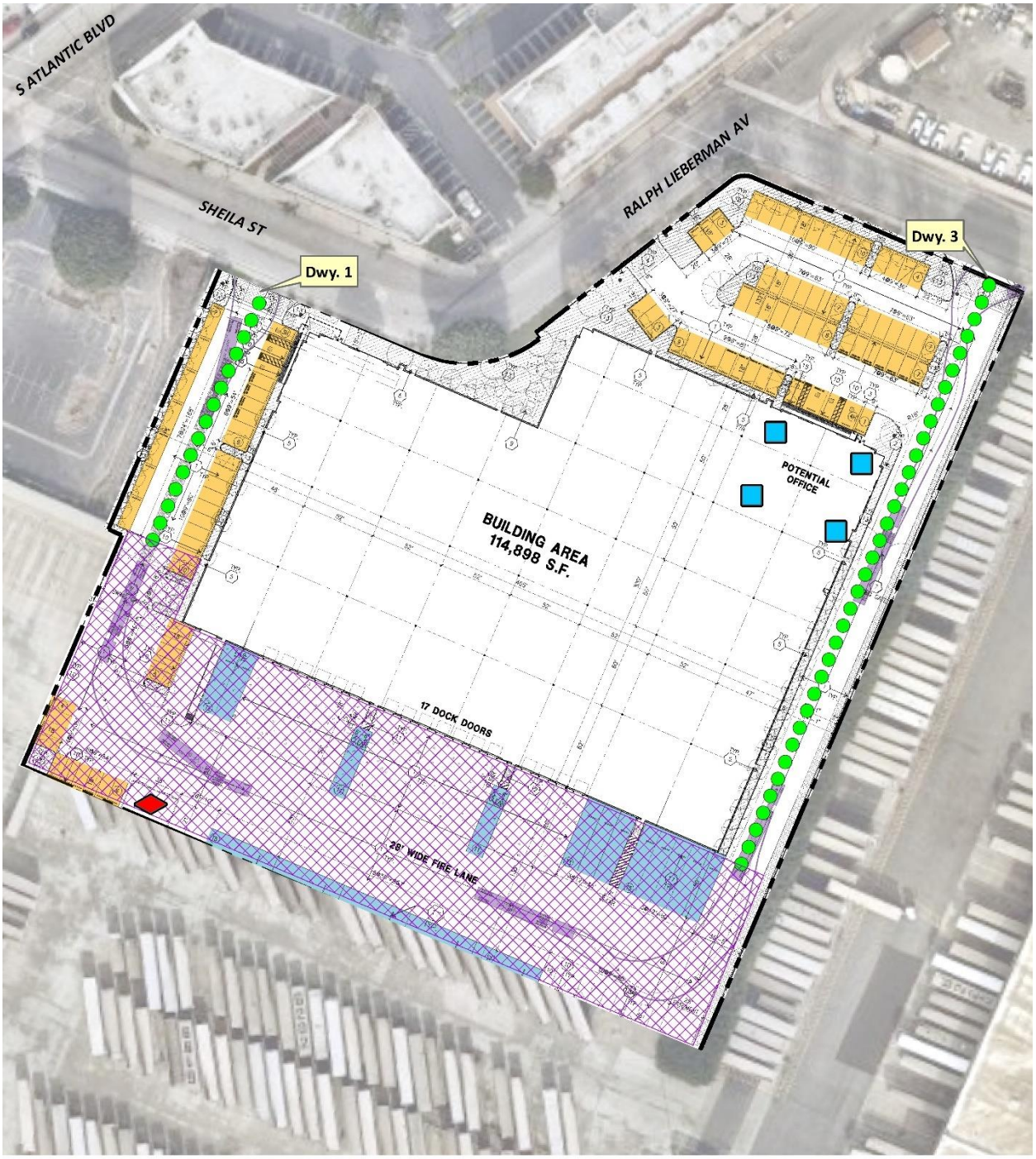

TABLE 9-1: REFERENCE NOISE LEVEL MEASUREMENTS

Noise Source	Duration (hh:mm:ss)	Ref. Distance (Feet)	Noise Source Height (Feet)	Min./Hour[5]		Reference Noise Level (dBA L_{eq})		Sound Power Level (dBA)[6]
				Day	Night	@ Ref. Dist.	@ 50 Feet	
Loading Dock Activity[1]	00:15:00	30'	8'	60	60	67.2	62.8	103.4
Entry Gate & Truck Movements[2]	00:15:00	20'	8'	-[7]	-[7]	64.0	58.0	89.7
Roof-Top Air Conditioning Units[3]	96:00:00	5'	5'	39	28	77.2	57.2	88.9
Trash Enclosure Activity[4]	00:00:32	5'	5'	5	5	77.3	57.3	94.0

[1] As measured by Urban Crossroads, Inc. at the Motivational Fulfillment & Logistics Services distribution facility in the City of Chino.
[2] As measured by Urban Crossroads, Inc. at the Nature's Best Distribution Facility in the City of Chino.
[3] As measured by Urban Crossroads, Inc. at the Santee Walmart located at 170 Town Center Parkway.
[4] As measured by Urban Crossroads, Inc. at a commercial and office park trash enclosure in the City of Costa Mesa.
[5] 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.
[6] 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.
[7] Entry Gate & Truck Movements are calculate based on the number of events by time of day (See Table 9-2).

9.2.1 MEASUREMENT PROCEDURES

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

9.2.2 LOADING DOCK ACTIVITY

Short-term reference noise level measurements were collected at the Motivational Fulfillment & Logistics Services distribution facility located at 6810 Bickmore Avenue in the City of Chino. The noise level measurements represent the typical weekday dry goods logistics warehouse operation in a single building with a loading dock area on the western side of the building façade. Up to ten trucks were observed in the loading dock area including a combination of tractor trailer semi-trucks, two-axle delivery trucks, and background forklift operations. The unloading/docking activity noise level measurement was taken over a fifteen-minute period and represents multiple noise sources taken from the center of loading dock activities generating a reference noise level of 62.8 dBA L_{eq} at a uniform reference distance of 50 feet. At this measurement location, the noise sources associated with employees unloading a docked truck container included the squeaking of the truck's shocks when weight was removed from the truck, employees playing music over a radio, as well as a forklift horn and backup alarm. In addition, during the noise level measurement a truck entered the loading dock area and proceeded to reverse and dock in a

nearby loading bay, adding truck engine, idling, air brakes noise, in addition to on-going idling of an already docked truck.

9.2.3 ENTRY GATE & TRUCK MOVEMENTS

An entry gate and truck movements reference noise level measurement were taken at the southern entry gate of the Motivational Fulfillment & Logistics Services distribution facility located at 6810 Bickmore Avenue in the City of Chino over a 15-minute period and represents multiple noise sources producing a reference noise level of 58.0 dBA Leq at 50 feet. The noise sources included at this measurement location account for the rattling and squeaking during normal opening and closing operations, the gate closure equipment, truck engines idling outside the entry gate, truck movements through the entry gate, and background truck court activities and forklift backup alarm noise.

Consistent with the *5200 Sheila Street Trip Generation Assessment* prepared by Urban Crossroads, Inc., the Project is expected to generate a total of approximately expected to generate a total of approximately 352 trip-ends per day (actual vehicles) and includes 54 truck trip-ends per day. (2) This noise study relies on the actual Project trips (as opposed to the passenger car equivalents) to accurately account for the effect of individual truck trips on the study area roadway network. Using the estimated number of truck trips in combination with time of day vehicle splits, the number of entry gate and truck movements were calculated. As shown on Table 9-2, this information is then used to calculate the entry gate and truck movements operational noise source activity based on the number of events by time of day.

TABLE 9-2: ENTRY GATE & TRUCK MOVEMENTS BY LOCATION

Entry Gate & Truck Movement Location[1]	Total Project Truck Trips[2]	Trip Dist.[3]	Truck Trips by Location[4]	Time of Day Vehicle Splits[5]			Truck Movements[6]		
				Day	Evening	Night	Day	Evening	Night
Driveway 1	54	50%	27	86.50%	2.70%	10.80%	23	1	3
Driveway 3		50%	27	86.50%	2.70%	10.80%	23	1	3

[1] Driveway locations as shown on the Site Plan Exhibit 9-A.
[2] Total Project truck trips according to Table 4 of the 5200 Sheila Street Focused Traffic Assessment.
[3] Project truck trip distribution according to Exhibit 5 of the 5200 Sheila Street Focused Traffic Assessment.
[4] Calculated trip trucks per location represents the product of the total project truck trips by and the trip distribution.
[5] Heavy truck time of day vehicle splits as shown on Table 6-3.
[6] Calculated time of day entry gate and truck movements by location.

9.2.4 ROOF-TOP AIR CONDITIONING UNITS

To assess the noise levels created by the roof-top air conditioning units within the planned commercial retail land uses within the Project site, reference noise levels measurements were taken at the Santee Walmart. Located at 170 Town Center Parkway in the City of Santee, the noise level measurements describe a single mechanical roof-top air conditioning unit on the roof of the existing Walmart store. The reference noise level represents a Lennox SCA120 series 10-ton model packaged air conditioning unit. At 5 feet from the roof-top air conditioning unit, the exterior noise levels were measured at 77.2 dBA L_{eq}. 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 units are estimated to operate for and average 39 minutes per hour during the daytime hours, and 28 minutes per hour during the nighttime hours. These operating conditions reflect peak summer cooling requirements with measured temperatures approaching 96 degrees Fahrenheit (°F) with average daytime temperatures of 82°F. For this noise analysis, the air conditioning units are expected to be located on the roof of the Project buildings. The noise attenuation provided by the existing parapet wall is not reflected in this reference noise level measurement.

9.2.5 TRASH ENCLOSURE ACTIVITY

To describe the noise levels associated with a trash enclosure, Urban Crossroads collected a reference noise level measurement at an existing commercial and office park trash enclosure within a parking lot on the northeast corner of Baker Street and Red Hill Avenue. The measured reference noise level at the uniform 50-foot reference distance is 57.3 dBA L_{eq} for the trash enclosure activity. The trash enclosure activity noise levels include two metal gates opening and closing, metal scraping against concrete floor sounds, dumpster movement on metal wheels, trash dropping into the metal dumpster, and background parking lot vehicle movements. Noise associated with trash enclosure activities is conservatively expected to occur for 5 minutes per hour.

9.3 CADNAA NOISE PREDICTION MODEL

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

Using the ISO 9613 protocol, CadnaA will calculate the distance from each noise source to the noise receiver locations, using the ground absorption, distance, and barrier/building attenuation inputs to provide a summary of noise level at each receiver and the partial noise level contributions by noise source. Consistent with the ISO 9613 protocol, the CadnaA noise prediction model relies on the reference sound power level (PWL) 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 (PWL) are connected to the sound source and are independent of distance. Sound pressure levels vary substantially with distance from the source and diminish as a result of intervening obstacles and barriers, air absorption, wind, and other factors. Sound power is the acoustical energy emitted by the sound source and is an absolute value that is not affected by the environment.

The operational noise level calculations provided in this noise study account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. Hard site conditions are used in the operational noise analysis which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source. A default ground attenuation

factor of 1.0 was used in the CadnaA noise analysis to account for hard site conditions. Appendix 9.1 includes the detailed noise model inputs used to estimate the Project operational noise levels presented in this section.

9.4 PROJECT OPERATIONAL NOISE LEVELS

Using the reference noise levels to represent the proposed Project operations that include loading dock activity, entry gate & truck movements, roof-top air conditioning units, and trash enclosure activity, 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. Tables 9-3 shows the Project operational noise levels during the daytime hours of 7:00 a.m. to 7:00 p.m. The daytime hourly noise levels at the off-site receiver locations are expected to range from 39.7 to 54.6 dBA L_{eq}.

TABLE 9-3: DAYTIME PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1,2]	Operational Noise Levels by Receiver Location (dBA Leq)				
	R1	R2	R3	R4	R5
Loading Dock Activity	40.6	32.6	35.8	38.1	54.5
Entry Gate & Truck Movements	28.0	37.6	31.0	31.7	37.1
Roof-Top Air Conditioning Units	33.0	34.5	36.2	38.0	29.5
Trash Enclosure Activity	26.3	11.0	6.2	6.9	35.8
Total (All Noise Sources)	**41.6**	**40.2**	**39.7**	**41.5**	**54.6**

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

Table 9-4 shows the Project operational noise levels during the evening hours of 7:00 p.m. to 10:00 p.m. The evening hourly noise levels at the off-site receiver locations are expected to range from 36.9 to 54.6 dBA L_{eq}.

TABLE 9-4: EVENING PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1,2]	Operational Noise Levels by Receiver Location (dBA Leq)				
	R1	R2	R3	R4	R5
Loading Dock Activity	40.6	32.6	35.8	38.1	54.5
Entry Gate & Truck Movements	14.4	24.0	17.4	18.1	23.4
Roof-Top Air Conditioning Units	33.0	34.5	36.2	38.0	29.5
Trash Enclosure Activity	26.3	11.0	6.2	6.9	35.8
Total (All Noise Sources)	**41.4**	**36.9**	**39.0**	**41.1**	**54.6**

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

Table 9-5 shows the Project operational noise levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. The nighttime hourly noise levels at the off-site receiver locations are expected to range from 36.6 to 54.6 dBA L_{eq}. The differences between the daytime and nighttime noise levels is largely related to the duration of noise activity (Table 9-1).

TABLE 9-5: NIGHTTIME PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1,2]	Operational Noise Levels by Receiver Location (dBA Leq)				
	R1	R2	R3	R4	R5
Loading Dock Activity	40.6	32.6	35.8	38.1	54.5
Entry Gate & Truck Movements	19.1	28.8	22.2	22.9	28.2
Roof-Top Air Conditioning Units	31.6	33.0	34.7	36.5	28.1
Trash Enclosure Activity	26.3	11.0	6.2	6.9	35.8
Total (All Noise Sources)	**41.3**	**36.6**	**38.4**	**40.5**	**54.6**

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

9.5 PROJECT OPERATIONAL NOISE LEVEL COMPLIANCE

To demonstrate compliance with local noise regulations, the Project-only operational noise levels are evaluated against exterior noise level thresholds based on the City of Commerce exterior noise level standards at nearby noise-sensitive receiver locations. The Project operational noise levels vary based on distance from the source to each receiver locations. In addition, the noise level calculations on Tables 9-3 to 9-5 do not account for any intervening structures that would further reduce the estimated Project operational noise levels. Table 9-6 shows the operational noise levels associated with 5200 Sheila Street Project will satisfy the City of Commerce daytime, evening and nighttime exterior noise level standards by land use at all nearby receiver locations. Therefore, the operational noise impacts are considered *less than significant* at the nearby noise-sensitive receiver locations.

TABLE 9-6: OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	Land Use	Project Operational Noise Levels (dBA Leq)[2]			Noise Level Standards (dBA Leq)[3]			Noise Level Standards Exceeded?[4]		
		Day	Eve.	Night	Day	Eve.	Night	Day	Eve.	Night
R1	Residential	41.6	41.4	41.3	55	50	45	No	No	No
R2	Commercial	40.2	36.9	36.6	65	65	55	No	No	No
R3	Residential	39.7	39.0	38.4	55	50	45	No	No	No
R4	Residential	41.5	41.1	40.5	55	50	45	No	No	No
R5	Commercial	54.6	54.6	54.6	65	65	55	No	No	No

[1] See Exhibit 8-A for the receiver locations.
[2] Proposed Project operational noise levels as shown on Tables 9-3, 9-4 and 9-5.
[3] Exterior noise level standards for residential land use, as shown on Table 4-1.
[4] Do the estimated Project operational noise source activities exceed the noise level standards?
"Day" = 7:00 a.m. to 7:00 p.m.; "Eve." = 7:00 p.m. to 10:00 p.m.; "Night" = 10:00 p.m. to 7:00 a.m.

9.6 PROJECT OPERATIONAL NOISE LEVEL INCREASES

To describe the Project operational noise level increases, the Project operational noise levels are combined with the existing ambient noise levels measurements for the nearby receiver locations 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. (4) 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 describe 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, evening and nighttime ambient conditions are presented on Tables 9-7, 9-8 and 9-9, respectively. As indicated on Tables 9-7, 9-8 and 9-9, the Project will not generate any measurable daytime, evening or nighttime operational noise level increases at the nearby receiver locations. Project-related operational noise level increases will satisfy the operational noise level increase significance criteria presented in Table 4-1. Therefore, the incremental Project operational noise level increase is considered *less than significant* at all receiver locations.

9.7 OPERATIONAL VIBRATION IMPACTS

The operation of the Project site will include heavy trucks moving on site to and from the loading dock areas. Truck vibration levels are dependent on vehicle characteristics, load, speed, and pavement conditions. According to the FTA *Transit Noise Impact and Vibration Assessment,* (3 p. 113) trucks rarely create vibration that exceeds 70 VdB (unless there are bumps due to frequent potholes in the road). Trucks transiting on site will be travelling at very low speeds so it is expected that delivery truck vibration impacts will satisfy the FTA *Transit Noise and Vibration Impact Assessment Manual* maximum acceptable vibration criteria 78 VdB, and therefore, will be *less than significant*.

TABLE 9-7: 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]	Noise Sensitive Land Use?	Increase Criteria[7]	Increase Criteria Exceeded?[7]
R1	41.6	L1	67.3	67.3	0.0	Yes	1.5	No
R2	40.2	L2	82.8	82.8	0.0	No	3.0	No
R3	39.7	L3	62.8	62.8	0.0	Yes	3.0	No
R4	41.5	L4	74.3	74.3	0.0	Yes	1.5	No
R5	54.6	L2	82.8	82.8	0.0	Yes	1.5	No

[1] See Exhibit 8-A for the receiver locations.
[2] Total Project daytime operational noise levels as shown on Table 9-3.
[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 increase criteria as shown on Table 4-1.

TABLE 9-8: EVENING 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]	Noise Sensitive Land Use?	Increase Criteria[7]	Increase Criteria Exceeded?[7]
R1	41.4	L1	65.7	65.7	0.0	Yes	1.5	No
R2	36.9	L2	80.6	80.6	0.0	No	3.0	No
R3	39.0	L3	60.5	60.5	0.0	Yes	3.0	No
R4	41.1	L4	72.0	72.0	0.0	Yes	1.5	No
R5	54.6	L2	80.6	80.6	0.0	Yes	1.5	No

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

TABLE 9-9: NIGHTTIME OPERATIONAL NOISE LEVEL INCREASES

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Noise Sensitive Land Use?	Increase Criteria[7]	Increase Criteria Exceeded?[7]
R1	41.3	L1	65.0	65.0	0.0	Yes	1.5	No
R2	36.6	L2	80.8	80.8	0.0	No	3.0	No
R3	38.4	L3	59.4	59.4	0.0	Yes	5.0	No
R4	40.5	L4	72.1	72.1	0.0	Yes	1.5	No
R5	54.6	L2	80.8	80.8	0.0	Yes	1.5	No

[1] See Exhibit 8-A for the receiver locations.
[2] Total Project nighttime operational noise levels as shown on Table 9-4.
[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 increase criteria as shown on Table 4-1.

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10 CONSTRUCTION IMPACTS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 10-A shows the construction noise source locations in relation to the nearby sensitive receiver locations previously described in Section 8.

10.1 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 is expected to occur in the following stages for the Project:

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

This construction noise analysis was prepared using reference noise level measurements taken by Urban Crossroads, Inc. to describe the typical construction activity noise levels for each stage of Project construction. The construction reference noise level measurements represent a list of typical construction activity noise levels. Noise levels generated by heavy construction equipment can range from approximately 68 dBA to more than 80 dBA when measured at 50 feet. However, these noise levels diminish with distance from the construction site at a rate of 6 dBA per doubling of distance. For example, a noise level of 80 dBA measured at 50 feet from the noise source to the receiver would be reduced to 74 dBA at 100 feet from the source to the receiver, and would be further reduced to 68 dBA at 200 feet from the source to the receiver.

10.2 CONSTRUCTION REFERENCE NOISE LEVELS

To describe the Project construction noise levels, measurements were collected for similar activities at several construction sites. Table 10-1 provides a summary of the construction reference noise level measurements. Since the reference noise levels were collected at varying distances of 30 feet and 50 feet, all construction noise level measurements presented on Table 10-1 have been adjusted for consistency to describe a uniform reference distance of 50 feet.

EXHIBIT 10-A: CONSTRUCTION NOISE SOURCE LOCATIONS

TABLE 10-1: CONSTRUCTION REFERENCE NOISE LEVELS

Construction Stage	Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})	Highest Reference Noise Level (dBA L_{eq})
Demolition	Demolition Activity	67.9	71.9
	Backhoe	64.2	
	Water Truck Pass-By & Backup Alarm	71.9	
Site Preparation	Scraper, Water Truck, & Dozer Activity	75.3	75.3
	Backhoe	64.2	
	Water Truck Pass-By & Backup Alarm	71.9	
Grading	Rough Grading Activities	73.5	73.5
	Water Truck Pass-By & Backup Alarm	71.9	
	Construction Vehicle Maintenance Activities	67.5	
Building Construction	Foundation Trenching	68.2	71.6
	Framing	62.3	
	Concrete Mixer Backup Alarms & Air Brakes	71.6	
Paving	Concrete Mixer Truck Movements	71.2	71.2
	Concrete Paver Activities	65.6	
	Concrete Mixer Pour & Paving Activities	65.9	
Architectural Coating	Air Compressors	65.2	65.2
	Generator	64.9	
	Crane	62.3	

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.

10.3 CONSTRUCTION NOISE ANALYSIS

Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the Project construction noise level impacts at the nearby sensitive receiver locations were completed. To assess the worst-case construction noise levels, the Project construction noise analysis relies on the highest noise level impacts when the equipment with the highest reference noise level is operating at the closest point from the edge of primary construction activity (Project site boundary) to each receiver location. As shown on Table 10-2, the construction noise levels are expected to range from 62.5 to 73.4 dBA L_{eq} at the nearby receiver locations. Appendix 10.1 includes the detailed CadnaA construction noise model inputs.

TABLE 10-2: CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})						
	Demolition	Site Preparation	Grading	Building Construction	Paving	Architectural Coating	Highest Levels[2]
R1	59.1	62.5	60.7	58.8	58.4	52.4	62.5
R2	70.0	73.4	71.6	69.7	69.3	63.3	73.4
R3	60.2	63.6	61.8	59.9	59.5	53.5	63.6
R4	60.6	64.0	62.2	60.3	59.9	53.9	64.0
R5	66.5	69.9	68.1	66.2	65.8	59.8	69.9

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Construction noise level calculations based on distance from the project site boundaries (construction activity area) to nearby receiver locations. CadnaA construction noise model inputs are included in Appendix 10.1.

10.4 CONSTRUCTION NOISE LEVEL COMPLIANCE

To evaluate whether the Project will generate potentially significant short-term noise levels at nearby receiver locations, the FTA construction-related noise level threshold of 80 dBA L_{eq} for noise sensitive residential use is used as the acceptable thresholds to assess construction noise level impacts. The construction noise analysis shows that the nearby receiver locations will satisfy the 80 dBA L_{eq} significance threshold during Project construction activities as shown on Table 10-3. Therefore, the noise impacts due to Project construction noise is considered *less than significant* at all receiver locations.

TABLE 10-3: CONSTRUCTION NOISE LEVEL COMPLIANCE

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})		
	Highest Construction Noise Levels[2]	Threshold[3]	Threshold Exceeded?[4]
R1	62.5	80	No
R2	73.4	80	No
R3	63.6	80	No
R4	64.0	80	No
R5	69.9	80	No

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

10.5 CONSTRUCTION VIBRATION IMPACTS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. The proposed Project's construction activities most likely to cause vibration impacts are:

- Heavy Construction Equipment: Although all heavy mobile construction equipment has the potential of causing at least some perceptible vibration while operating close to buildings, the vibration is usually short-term and is not of sufficient magnitude to cause building damage.
- Trucks: Trucks hauling building materials to construction sites can be sources of vibration intrusion if the haul routes pass through residential neighborhoods on streets with bumps or potholes. Repairing the bumps and potholes generally eliminates the problem.

Ground-borne vibration levels resulting from construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration (FTA). Construction activities that would have the potential to generate low levels of ground-borne vibration within the Project site include grading. Using the vibration source level of construction equipment provided on Table 6-5 and the construction vibration assessment methodology published by the FTA, it is possible to estimate the Project vibration impacts.

Table 10-4 presents the expected Project related vibration levels at the nearby receiver locations. At distances ranging from 74 feet to 728 feet from Project construction activities (at the Project site boundary), construction vibration levels are estimated to range from 43.1 to 72.9 VdB and will remain below the FTA Transit Noise and Vibration Impact Assessment Manual maximum acceptable vibration criteria of 78 VdB for daytime residential uses at all receiver locations. Therefore, the Project-related vibration impacts are considered *less than significant* during the construction activities at the Project site.

TABLE 10-4: PROJECT CONSTRUCTION VIBRATION LEVELS

Receiver Location [1]	Distance to Construction Activity (Feet)	Receiver Vibration Levels (VdB)[2]					Threshold VdB[3]	Threshold Exceeded? [4]
		Small Bulldozer	Jack-hammer	Loaded Trucks	Large Bulldozer	Highest Vibration Levels		
R1	728'	14.1	35.1	42.1	43.1	43.1	78	No
R2	74'	43.9	64.9	71.9	72.9	72.9	78	No
R3	540'	18.0	39.0	46.0	47.0	47.0	78	No
R4	457'	20.1	41.1	48.1	49.1	49.1	78	No
R5	142'	35.4	56.4	63.4	64.4	64.4	78	No

[1] Noise receiver locations are shown on Exhibit 8-A.
[2] Based on the Vibration Source Levels of Construction Equipment included on Table 6-7.
[3] Source: FTA Transit Noise and Vibration Impact Assessment maximum acceptable vibration criteria.
[4] Does the vibration level exceed the maximum acceptable vibration threshold?

Moreover, the vibration levels reported at the 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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11 REFERENCES

1. **State of California.** *California Environmental Quality Act, Appendix G.* 2018.
2. **Urban Crossroads, Inc.** *5200 Sheila Street Focused Traffic Assessment.* April 2020.
3. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment.* September 2018.
4. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
5. **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.
6. **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.
7. **U.S. Department of Transportation, Federal Highway Administration.** *Highway Traffic Noise in the United States, Problem and Response.* April 2000. p. 3.
8. **U.S. Environmental Protection Agency Office of Noise Abatement and Control.** *Noise Effects Handbook-A Desk Reference to Health and Welfare Effects of Noise.* October 1979 (revised July 1981). EPA 550/9/82/106.
9. **Occupational Safety and Health Administration.** *Standard 29 CRF, Part 1910.*
10. **Office of Planning and Research.** *State of California General Plan Guidlines.* 2018.
11. **State of California.** *2016 California Green Building Standards Code.* January 2017.
12. **City of Commerce.** *General Plan Safety Element.* January 2008.
13. —. *Municipal Code Section 19.19.060.*
14. **California Court of Appeal.** *Gray v. County of Madera, F053661.* 167 Cal.App.4th 1099; - Cal.Rptr.3d, October 2008.
15. **Federal Interagency Committee on Noise.** *Federal Agency Review of Selected Airport Noise Analysis Issues.* August 1992.
16. **California Department of Transportation.** *Technical Noise Supplement.* November 2009.
17. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*
18. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.
19. **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.
20. **California Department of Transportation.** *Traffic Noise Attenuation as a Function of Ground and Vegetation Final Report.* June 1995. FHWA/CA/TL-95/23.

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12 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed 5200 Sheila Street 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) 336-5979.

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(949) 336-5979
blawson@urbanxroads.com

EDUCATION

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

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

PROFESSIONAL REGISTRATIONS

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

PROFESSIONAL AFFILIATIONS

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

PROFESSIONAL CERTIFICATIONS

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

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APPENDIX 3.1:

CITY OF COMMERCE MUNICIPAL CODE

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19.19.160 - Noise.

A. It is the policy of the city to prohibit unnecessary, excessive, and annoying noises from all sources subject to its police power, as certain noise levels are detrimental to the health and welfare of individuals. Therefore, any individual or organization that creates, maintains, causes, or allows to be created, caused, or maintained, any noise or vibration in a manner prohibited by or not in conformity with the provisions of this subsection, shall be considered to be creating a public nuisance and shall be punishable as such.

B. Any sound level measurement made pursuant to the provisions of this subsection shall be measured with a sound level meter using the "A" weighting scale at slow response or at a fast response for impulsive sounds.

C. Precise noise measurements shall be taken throughout the city at specified locations. These measurements shall be established as the ambient levels for the areas in which the measurements are taken. The ambient levels established by the precise measurements shall be published periodically and utilized for determinations of violations of this subsection.

D. The location selected for measuring exterior noise levels shall be at any point on the receptor property, and at least four feet above the ground and five feet from the nearest structure or wall. Interior noise measurements shall be made within the receptor dwelling unit, at a point at least four feet from the wall, ceiling, or floor nearest the noise source with windows and doors closed.

E. No person shall, at any location within the city, create nor allow the creation of noise on property owned, leased, occupied, or otherwise controlled by such person, that causes the noise level when measured on any property to exceed the ambient noise level or the noise standards set forth in Table 19.19.160A, whichever is greater.

F. Increases in permitted noise levels prescribed in Table 19.19.160A may be permitted in accordance with the standards outline in Table 19.19.160B.

Table 19.19.160A
Noise Standards

Zone	Time	Allowable Noise Level - dbA
Residential	7 a.m. - 7 p.m. (day)	55
Residential	7 p.m. - 10 p.m. (evening)	50
Residential	10 p.m. - 7 a.m. (night)	45
Commercial	7 a.m. - 10 p.m. (day/evening)	65
Commercial	10 p.m. - 7 a.m. (night)	55
Industrial	Anytime	70

Table 19.19.160B
Permitted Increases in Noise Levels

Permitted Increase (dbA)	Duration of Increase (cumulative minutes/hour)
5	15
10	5
15	1
20	Less than one minute

G. If the receptor property of a noise is located on the boundary between two different noise zones, the lower noise level standard applicable to the quieter zone shall apply.

H. If a noise source is continuous and cannot be reasonably discontinued for sufficient time in which to determine the ambient noise level, the measured noise level obtained while the source is in operation shall be compared directly to the noise level standards in Table 19.19.160B.

I. No person shall, at any location within the city, create any noise, nor shall any person allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person that causes the noise level when measured within any receptor dwelling unit to exceed the noise standards outlined in Table 19.19.160C.

Table 19.19.160C
Permitted Increases in Interior Noise Levels

Allowable (dbA)	Time (cumulative minutes per hour)
45	Anytime
+5	1 minute
10	Less than one minute

J. In the event the ambient noise level exceeds the noise standards set forth in Table 19.19.160C, the levels in the allowable column shall be increased to reflect the actual ambient noise level.

K. The following acts, or the causing thereof, are declared to be in violation of this subsection:

1. No person shall, within any residential zone in the city, use or operate any radio receiving set, musical instrument, phonograph, tape player, compact disk player, television set, or other machine or device that produces, reproduces, or amplifies sound, between the hours of ten p.m. and seven a.m. such that it exceeds the exterior noise standards set forth in subsection L of this section.

2. No person shall create any noise on any street, sidewalk, or public place adjacent to any school, institution of learning, or church while the same is in use or adjacent to any hospital, that exceeds the interior noise standards set forth in subsection L of this section.

3. No person or organization within any residential zone, or within a radius of five hundred feet of a residential zone, shall operate equipment or perform any outside construction or repair work on buildings, structures, or projects, or operate any pile driver, steam shovel, pneumatic hammer, derrick, steam, electric hoist, or other construction type device between the hours of ten p.m. and seven a.m., unless a permit has been obtained from the city.

4. No person within any residential zone shall repair, rebuild, or test any motor vehicle between the hours of ten p.m. and seven a.m. in a manner that exceeds the noise levels set forth in subsection L of this section.

5. No person or organization shall use or operate for any noncommercial purpose any loudspeaker, public address system, or similar device between the hours of ten p.m. and seven a.m. in a manner that exceeds the noise levels set forth in subsection L of this section.

6. No person or organization shall use or operate for any commercial purpose any loudspeaker, public address system, or similar device in a manner that creates noise in any residential zone in excess of the noise levels set forth in subsection L of this section.

7. Loading, unloading, opening, closing, or other handling of boxes, crates, containers, building materials, garbage cans, or similar objects between the hours of ten p.m. and seven a.m. in such a manner as to cause noise in excess of the noise standards in any residential zone is unlawful.

L. The city shall order an immediate halt to any sound that exposes any person to continuous sound levels in excess of those shown in Table 19.19.160D or Table 19.19.160E. Within ten working days following issuance of such an order, the community development director or his designee may apply to the appropriate court for an injunction to replace the order. No order shall be issued if the only persons exposed to sound levels in excess of those listed in Table 19.19.160D and Table 19.19.160E are exposed as a result of trespass; invitation upon private property by the person causing or permitting the sound; or employment by the person or a contractor of the person causing or permitting the sound.

Table 19.19.160D
Continuous Sound Levels
(Measured at 50 feet)

Sound Level Limit (dbA)	Duration
90	8 hours
95	4 hours
100	2 hours
105	1 hour
110	30 minutes

Table 19.19.160E
Impulsive Sound Levels
(Measured at 50 feet)

Sound Level Limit (dbA)	Number of Repetitions (per 24-hour period)
145	1
135	10
125	100

M. Any person subject to an order pursuant to this section shall comply with such order until the sound is brought into compliance with the order, as determined by the noise control officer; or a judicial order has superseded the noise control officer order.

(Ord. 544 § 1(part), 2000).

19.19.180 - Vibration.

Vibration may disturb the conduct of certain activities and create discomfort for some individuals. To minimize the disturbance and inconvenience from vibrations, the following performance standards shall apply to all uses:

A. No use shall cause or create ground vibration that is harmful or injurious to the use or development of surrounding properties.

B. No person or use shall create, maintain, or cause ground vibration that is perceptible without instruments to a person of normal sensitivity at any point on a property that is adjacent to the property of the vibration source.

(Ord. 544 § 1(part), 2000).

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APPENDIX 5.1:

STUDY AREA PHOTOS

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JN:13055 Noise Level Measurement Photos

L1_E
34, 0' 12.730000"118, 10' 4.990000"

L1_N
34, 0' 8.610000"118, 9' 55.710000"

L1_S
34, 0' 12.740000"118, 10' 4.960000"

L1_W
34, 0' 12.740000"118, 10' 4.990000"

L2_E
34, 0' 6.400000"118, 10' 6.010000"

L2_N
33, 59' 44.340000"118, 10' 8.150000"

JN:13055 Noise Level Measurement Photos

L2_S
34, 0' 6.610000"118, 10' 6.120000"

L2_W
34, 0' 6.400000"118, 10' 6.010000"

L3_L
34, 0' 10.670000"118, 9' 57.900000"

L3_N
34, 0' 10.680000"118, 9' 57.880000"

L3_S
34, 0' 10.680000"118, 9' 57.900000"

L3_W
34, 0' 10.660000"118, 9' 57.900000"

JN:13055 Noise Level Measurement Photos

L4_E
34, 0' 8.760000"118, 9' 55.620000"

L4_N
34, 0' 10.990000"118, 9' 57.770000"

L4_S
34, 0' 8.800000"118, 9' 55.320000"

L4_W
34, 0' 8.760000"118, 9' 55.650000"

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APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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24-Hour Noise Level Measurement Summary

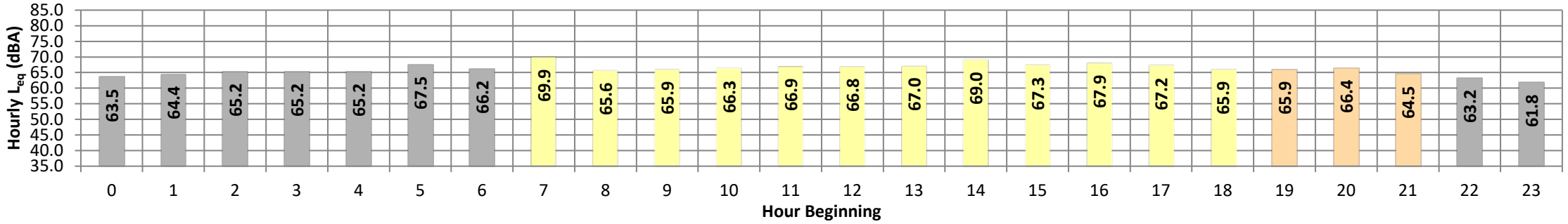
Date: Wednesday, February 19, 2020
Project: Commerce Logistic Center

Location: L1 - Located north of the Projec site on Cowlin Avenue near existing single-family residential homes.

Meter: Piccolo I

JN: 13055
Analyst: P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	63.5	82.7	43.0	71.0	70.0	68.0	67.0	64.0	60.0	53.0	50.0	46.0	63.5	10.0	73.5
	1	64.4	84.8	46.5	72.0	71.0	69.0	68.0	64.0	61.0	54.0	52.0	49.0	64.4	10.0	74.4
	2	65.2	79.6	47.4	72.0	72.0	70.0	69.0	65.0	62.0	57.0	55.0	50.0	65.2	10.0	75.2
	3	65.2	77.2	52.0	72.0	71.0	70.0	69.0	66.0	62.0	57.0	55.0	53.0	65.2	10.0	75.2
	4	65.2	81.6	52.1	73.0	71.0	70.0	69.0	65.0	62.0	57.0	56.0	54.0	65.2	10.0	75.2
	5	67.5	88.3	53.3	76.0	74.0	72.0	71.0	67.0	64.0	59.0	58.0	55.0	67.5	10.0	77.5
	6	66.2	80.0	54.4	73.0	72.0	70.0	69.0	66.0	64.0	59.0	58.0	57.0	66.2	10.0	76.2
Day	7	69.9	93.0	54.8	80.0	76.0	71.0	70.0	67.0	64.0	59.0	58.0	56.0	69.9	0.0	69.9
	8	65.6	82.6	54.9	73.0	72.0	70.0	69.0	66.0	63.0	59.0	57.0	56.0	65.6	0.0	65.6
	9	65.9	77.9	55.1	73.0	72.0	70.0	69.0	66.0	63.0	59.0	57.0	56.0	65.9	0.0	65.9
	10	66.3	81.8	55.0	74.0	73.0	71.0	70.0	66.0	63.0	59.0	58.0	57.0	66.3	0.0	66.3
	11	66.9	87.1	55.0	75.0	74.0	71.0	70.0	66.0	63.0	59.0	58.0	56.0	66.9	0.0	66.9
	12	66.8	82.6	56.2	74.0	73.0	71.0	70.0	67.0	64.0	60.0	59.0	57.0	66.8	0.0	66.8
	13	67.0	82.8	56.7	75.0	73.0	71.0	70.0	67.0	64.0	60.0	59.0	58.0	67.0	0.0	67.0
	14	69.0	91.5	57.8	76.0	75.0	73.0	71.0	68.0	65.0	61.0	60.0	59.0	69.0	0.0	69.0
	15	67.3	82.4	56.4	75.0	73.0	71.0	70.0	68.0	65.0	61.0	60.0	58.0	67.3	0.0	67.3
	16	67.9	85.7	57.4	76.0	74.0	72.0	71.0	68.0	65.0	60.0	60.0	58.0	67.9	0.0	67.9
	17	67.2	88.0	57.6	75.0	73.0	71.0	70.0	67.0	64.0	61.0	60.0	59.0	67.2	0.0	67.2
	18	65.9	81.8	55.5	74.0	73.0	70.0	69.0	66.0	63.0	59.0	58.0	57.0	65.9	0.0	65.9
Evening	19	65.9	87.7	54.5	75.0	73.0	70.0	68.0	65.0	62.0	58.0	57.0	56.0	65.9	5.0	70.9
	20	66.4	87.0	51.8	74.0	72.0	70.0	69.0	65.0	62.0	58.0	57.0	55.0	66.4	5.0	71.4
	21	64.5	82.9	52.2	73.0	71.0	69.0	68.0	64.0	61.0	56.0	55.0	53.0	64.5	5.0	69.5
Night	22	63.2	84.2	51.2	71.0	70.0	67.0	66.0	63.0	60.0	55.0	54.0	52.0	63.2	10.0	73.2
	23	61.8	77.4	50.3	70.0	69.0	67.0	65.0	62.0	58.0	53.0	52.0	51.0	61.8	10.0	71.8

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	65.6	77.9	54.8	73.0	72.0	70.0	69.0	66.0	63.0	59.0	57.0	56.0
	Max	69.9	93.0	57.8	80.0	76.0	73.0	71.0	68.0	65.0	61.0	60.0	59.0
Energy Average		67.3	Average:		75.0	73.4	71.0	69.9	66.8	63.8	59.8	58.7	57.3
Evening	Min	64.5	82.9	51.8	73.0	71.0	69.0	68.0	64.0	61.0	56.0	55.0	53.0
	Max	66.4	87.7	54.5	75.0	73.0	70.0	69.0	65.0	62.0	58.0	57.0	56.0
Energy Average		65.7	Average:		74.0	72.0	69.7	68.3	64.7	61.7	57.3	56.3	54.7
Night	Min	61.8	77.2	43.0	70.0	69.0	67.0	65.0	62.0	58.0	53.0	50.0	46.0
	Max	67.5	88.3	54.4	76.0	74.0	72.0	71.0	67.0	64.0	59.0	58.0	57.0
Energy Average		65.0	Average:		72.2	71.1	69.2	68.1	64.7	61.4	56.0	54.4	51.9

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
66.4	67.0	65.0

24-Hour CNEL (dBA)

72.0

24-Hour Noise Level Measurement Summary

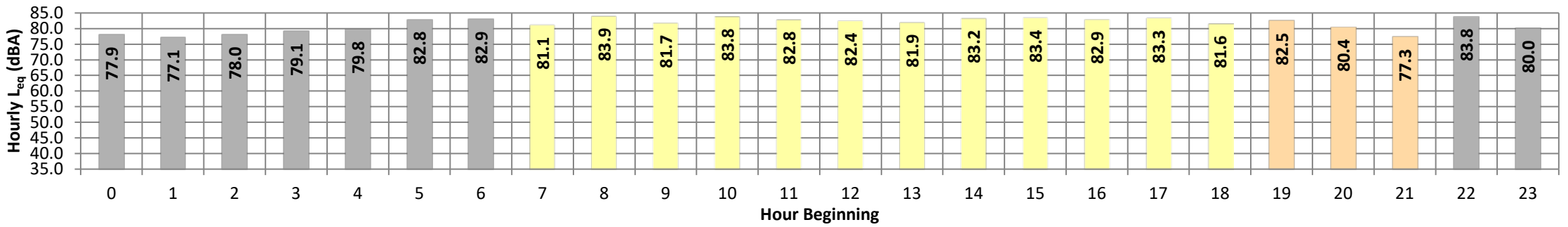
Date: Wednesday, February 19, 2020
Project: Commerce Logistic Center

Location: L2 - Located north of the Project site aon Sheila Street near the Ross Health Care Clinic.

Meter: Piccolo I

JN: 13055
Analyst: P. Mara

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	77.9	94.4	63.5	88.0	86.0	82.0	80.0	77.0	74.0	69.0	66.0	64.0	77.9	10.0	87.9
	1	77.1	94.1	65.1	88.0	86.0	82.0	80.0	76.0	73.0	68.0	67.0	66.0	77.1	10.0	87.1
	2	78.0	100.5	66.5	87.0	84.0	81.0	80.0	77.0	74.0	69.0	68.0	67.0	78.0	10.0	88.0
	3	79.1	93.9	67.6	88.0	86.0	84.0	82.0	79.0	76.0	71.0	70.0	69.0	79.1	10.0	89.1
	4	79.8	100.3	68.0	90.0	88.0	84.0	82.0	78.0	75.0	71.0	71.0	69.0	79.8	10.0	89.8
	5	82.8	100.0	72.2	92.0	89.0	88.0	87.0	81.0	78.0	74.0	74.0	73.0	82.8	10.0	92.8
	6	82.9	105.2	72.3	92.0	90.0	86.0	84.0	80.0	78.0	75.0	74.0	73.0	82.9	10.0	92.9
Day	7	81.1	96.5	70.5	90.0	88.0	86.0	84.0	80.0	78.0	74.0	73.0	72.0	81.1	0.0	81.1
	8	83.9	102.5	71.4	96.0	93.0	89.0	86.0	81.0	78.0	74.0	73.0	72.0	83.9	0.0	83.9
	9	81.7	98.6	70.3	91.0	89.0	86.0	85.0	81.0	78.0	75.0	74.0	72.0	81.7	0.0	81.7
	10	83.8	97.5	71.7	92.0	91.0	89.0	88.0	83.0	79.0	75.0	74.0	73.0	83.8	0.0	83.8
	11	82.8	106.0	74.2	92.0	89.0	86.0	85.0	82.0	79.0	76.0	76.0	75.0	82.8	0.0	82.8
	12	82.4	98.2	73.0	91.0	89.0	87.0	85.0	82.0	80.0	76.0	75.0	74.0	82.4	0.0	82.4
	13	81.9	97.7	73.0	90.0	88.0	86.0	85.0	81.0	79.0	76.0	75.0	74.0	81.9	0.0	81.9
	14	83.2	103.0	73.0	92.0	90.0	88.0	86.0	82.0	79.0	76.0	75.0	74.0	83.2	0.0	83.2
	15	83.4	98.3	73.8	93.0	91.0	88.0	86.0	82.0	80.0	76.0	76.0	75.0	83.4	0.0	83.4
	16	82.9	103.8	72.6	93.0	90.0	87.0	85.0	81.0	79.0	76.0	75.0	74.0	82.9	0.0	82.9
	17	83.3	105.7	73.8	92.0	90.0	87.0	85.0	82.0	79.0	76.0	75.0	74.0	83.3	0.0	83.3
	18	81.6	97.5	74.8	90.0	89.0	85.0	84.0	81.0	79.0	76.0	76.0	75.0	81.6	0.0	81.6
Evening	19	82.5	105.1	70.5	93.0	89.0	85.0	84.0	80.0	78.0	74.0	73.0	72.0	82.5	5.0	87.5
	20	80.4	104.6	70.3	88.0	86.0	84.0	82.0	79.0	76.0	74.0	73.0	71.0	80.4	5.0	85.4
	21	77.3	96.6	68.3	87.0	85.0	81.0	80.0	76.0	74.0	71.0	70.0	69.0	77.3	5.0	82.3
Night	22	83.8	101.9	69.1	90.0	88.0	88.0	87.0	86.0	77.0	72.0	72.0	70.0	83.8	10.0	93.8
	23	80.0	95.6	68.8	89.0	88.0	86.0	83.0	79.0	76.0	73.0	72.0	70.0	80.0	10.0	90.0

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	81.1	96.5	70.3	90.0	88.0	85.0	84.0	80.0	78.0	74.0	73.0	72.0
	Max	83.9	106.0	74.8	96.0	93.0	89.0	88.0	83.0	80.0	76.0	76.0	75.0
Energy Average		82.8	Average:		91.8	89.8	87.0	85.3	81.5	78.9	75.5	74.8	73.7
Evening	Min	77.3	96.6	68.3	87.0	85.0	81.0	80.0	76.0	74.0	71.0	70.0	69.0
	Max	82.5	105.1	70.5	93.0	89.0	85.0	84.0	80.0	78.0	74.0	73.0	72.0
Energy Average		80.6	Average:		89.3	86.7	83.3	82.0	78.3	76.0	73.0	72.0	70.7
Night	Min	77.1	93.9	63.5	87.0	84.0	81.0	80.0	76.0	73.0	68.0	66.0	64.0
	Max	83.8	105.2	72.3	92.0	90.0	88.0	87.0	86.0	78.0	75.0	74.0	73.0
Energy Average		80.8	Average:		89.3	87.2	84.6	82.8	79.2	75.7	71.3	70.4	69.0

L_{eq} (dBA)

24-Hour	*Daytime*	*Nighttime*
81.9	**82.4**	**80.8**

24-Hour CNEL (dBA)

87.7

24-Hour Noise Level Measurement Summary

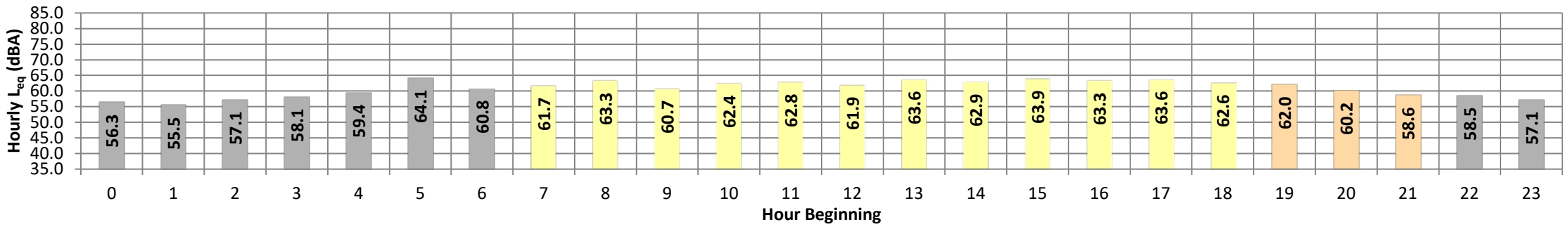
Date: Wednesday, February 19, 2020
Project: Commerce Logistic Center

Location: L3 - Located northeast of the Project site on Wilma Avenue near existing single-family residential homes.

Meter: Piccolo I

JN: 13055
Analyst: P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	56.3	76.1	43.9	66.0	65.0	63.0	61.0	54.0	49.0	45.0	45.0	44.0	56.3	10.0	66.3
	1	55.5	70.4	43.6	65.0	64.0	62.0	60.0	54.0	49.0	45.0	45.0	44.0	55.5	10.0	65.5
	2	57.1	73.9	44.5	67.0	65.0	63.0	62.0	56.0	50.0	46.0	46.0	45.0	57.1	10.0	67.1
	3	58.1	77.4	44.7	67.0	65.0	63.0	62.0	57.0	52.0	47.0	46.0	45.0	58.1	10.0	68.1
	4	59.4	80.7	46.4	70.0	68.0	64.0	62.0	58.0	54.0	48.0	47.0	47.0	59.4	10.0	69.4
	5	64.1	83.0	48.3	76.0	74.0	69.0	66.0	61.0	58.0	52.0	51.0	49.0	64.1	10.0	74.1
	6	60.8	77.8	47.5	70.0	67.0	65.0	64.0	61.0	58.0	52.0	51.0	48.0	60.8	10.0	70.8
Day	7	61.7	86.5	48.3	72.0	69.0	64.0	63.0	59.0	56.0	52.0	51.0	49.0	61.7	0.0	61.7
	8	63.3	79.5	46.8	72.0	71.0	71.0	68.0	61.0	57.0	52.0	50.0	48.0	63.3	0.0	63.3
	9	60.7	81.2	47.5	69.0	67.0	65.0	64.0	60.0	57.0	52.0	51.0	50.0	60.7	0.0	60.7
	10	62.4	83.9	48.4	72.0	69.0	65.0	64.0	60.0	57.0	52.0	51.0	49.0	62.4	0.0	62.4
	11	62.8	83.9	50.8	73.0	71.0	68.0	65.0	61.0	58.0	54.0	53.0	52.0	62.8	0.0	62.8
	12	61.9	80.3	50.5	69.0	67.0	66.0	65.0	62.0	59.0	54.0	53.0	52.0	61.9	0.0	61.9
	13	63.6	82.6	51.9	73.0	70.0	68.0	66.0	62.0	59.0	55.0	54.0	53.0	63.6	0.0	63.6
	14	62.9	77.3	53.5	70.0	69.0	67.0	66.0	63.0	60.0	56.0	55.0	54.0	62.9	0.0	62.9
	15	63.9	84.5	53.3	73.0	70.0	68.0	66.0	63.0	61.0	56.0	55.0	54.0	63.9	0.0	63.9
	16	63.3	82.3	52.8	72.0	70.0	67.0	66.0	63.0	60.0	56.0	55.0	53.0	63.3	0.0	63.3
	17	63.6	85.5	54.3	72.0	70.0	67.0	66.0	63.0	61.0	56.0	55.0	55.0	63.6	0.0	63.6
	18	62.6	82.4	51.4	71.0	69.0	66.0	65.0	62.0	59.0	54.0	53.0	52.0	62.6	0.0	62.6
Evening	19	62.0	84.5	50.7	71.0	69.0	66.0	65.0	61.0	57.0	53.0	52.0	51.0	62.0	5.0	67.0
	20	60.2	82.8	50.0	68.0	66.0	65.0	63.0	60.0	57.0	52.0	52.0	51.0	60.2	5.0	65.2
	21	58.6	74.5	46.1	68.0	67.0	64.0	63.0	58.0	54.0	49.0	48.0	47.0	58.6	5.0	63.6
Night	22	58.5	75.1	46.7	67.0	66.0	64.0	63.0	58.0	54.0	50.0	49.0	47.0	58.5	10.0	68.5
	23	57.1	76.0	45.1	67.0	65.0	63.0	61.0	56.0	51.0	48.0	47.0	46.0	57.1	10.0	67.1

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	60.7	77.3	46.8	69.0	67.0	64.0	63.0	59.0	56.0	52.0	50.0	48.0
	Max	63.9	86.5	54.3	73.0	71.0	71.0	68.0	63.0	61.0	56.0	55.0	55.0
Energy Average		62.8	Average:		71.5	69.3	66.8	65.3	61.6	58.7	54.1	53.0	51.8
Evening	Min	58.6	74.5	46.1	68.0	66.0	64.0	63.0	58.0	54.0	49.0	48.0	47.0
	Max	62.0	84.5	50.7	71.0	69.0	66.0	65.0	61.0	57.0	53.0	52.0	51.0
Energy Average		60.5	Average:		69.0	67.3	65.0	63.7	59.7	56.0	51.3	50.7	49.7
Night	Min	55.5	70.4	43.6	65.0	64.0	62.0	60.0	54.0	49.0	45.0	45.0	44.0
	Max	64.1	83.0	48.3	76.0	74.0	69.0	66.0	61.0	58.0	52.0	51.0	49.0
Energy Average		59.4	Average:		68.3	66.6	64.0	62.3	57.2	52.8	48.1	47.4	46.1

L_{eq} (dBA)

24-Hour	*Daytime*	*Nighttime*
61.5	**62.4**	**59.4**

24-Hour CNEL (dBA)

66.7

24-Hour Noise Level Measurement Summary

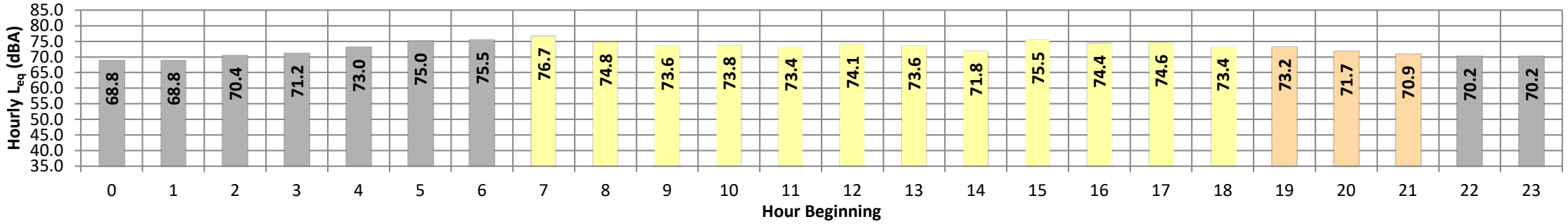
Date: Wednesday, February 19, 2020
Project: Commerce Logistic Center

Location: L4 - Located northeast of the Project site on East Washington Boulevard next to Inclusion Services Adult Day Program.

Meter: Piccolo I

JN: 13055
Analyst: P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	68.8	89.6	46.1	79.0	78.0	75.0	74.0	67.0	58.0	51.0	50.0	47.0	68.8	10.0	78.8
	1	68.8	86.9	44.5	80.0	78.0	75.0	73.0	66.0	58.0	48.0	47.0	45.0	68.8	10.0	78.8
	2	70.4	84.8	44.7	81.0	80.0	77.0	75.0	69.0	60.0	50.0	48.0	46.0	70.4	10.0	80.4
	3	71.2	85.9	45.9	81.0	80.0	78.0	76.0	71.0	64.0	51.0	50.0	47.0	71.2	10.0	81.2
	4	73.0	93.8	48.1	82.0	80.0	78.0	77.0	73.0	68.0	54.0	52.0	49.0	73.0	10.0	83.0
	5	75.0	87.5	50.5	82.0	81.0	80.0	79.0	76.0	72.0	61.0	58.0	54.0	75.0	10.0	85.0
	6	75.5	88.2	50.5	83.0	82.0	80.0	79.0	76.0	72.0	61.0	58.0	53.0	75.5	10.0	85.5
Day	7	76.7	102.0	51.1	84.0	82.0	80.0	79.0	76.0	73.0	62.0	59.0	54.0	76.7	0.0	76.7
	8	74.8	94.5	49.3	83.0	81.0	79.0	78.0	75.0	71.0	59.0	55.0	52.0	74.8	0.0	74.8
	9	73.6	92.3	49.5	82.0	80.0	79.0	78.0	74.0	70.0	58.0	56.0	53.0	73.6	0.0	73.6
	10	73.8	96.7	49.2	82.0	81.0	78.0	77.0	74.0	70.0	58.0	55.0	52.0	73.8	0.0	73.8
	11	73.4	90.3	51.7	82.0	81.0	79.0	77.0	74.0	70.0	59.0	56.0	53.0	73.4	0.0	73.4
	12	74.1	97.1	50.3	82.0	80.0	78.0	77.0	75.0	70.0	59.0	56.0	53.0	74.1	0.0	74.1
	13	73.6	94.2	51.9	82.0	80.0	78.0	77.0	73.0	69.0	59.0	57.0	55.0	73.6	0.0	73.6
	14	71.8	88.6	53.9	80.0	78.0	76.0	75.0	72.0	69.0	61.0	58.0	55.0	71.8	0.0	71.8
	15	75.5	92.2	53.4	86.0	85.0	81.0	79.0	75.0	71.0	61.0	58.0	55.0	75.5	0.0	75.5
	16	74.4	88.9	54.4	82.0	80.0	79.0	78.0	75.0	72.0	60.0	57.0	55.0	74.4	0.0	74.4
	17	74.6	94.8	54.2	82.0	81.0	79.0	78.0	75.0	71.0	62.0	59.0	56.0	74.6	0.0	74.6
	18	73.4	94.0	52.3	81.0	80.0	78.0	77.0	73.0	70.0	60.0	57.0	54.0	73.4	0.0	73.4
Evening	19	73.2	97.9	52.3	82.0	80.0	78.0	76.0	72.0	67.0	58.0	55.0	53.0	73.2	5.0	78.2
	20	71.7	91.5	52.4	81.0	79.0	77.0	76.0	72.0	67.0	57.0	55.0	54.0	71.7	5.0	76.7
	21	70.9	86.1	48.8	81.0	79.0	77.0	75.0	70.0	64.0	53.0	52.0	50.0	70.9	5.0	75.9
Night	22	70.2	89.2	50.4	80.0	78.0	76.0	75.0	70.0	63.0	54.0	52.0	51.0	70.2	10.0	80.2
	23	70.2	91.8	49.6	80.0	79.0	76.0	74.0	68.0	61.0	53.0	52.0	51.0	70.2	10.0	80.2

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	71.8	88.6	49.2	80.0	78.0	76.0	75.0	72.0	69.0	58.0	55.0	52.0
	Max	76.7	102.0	54.4	86.0	85.0	81.0	79.0	76.0	73.0	62.0	59.0	56.0
Energy Average		74.3	Average:		82.3	80.8	78.7	77.5	74.3	70.5	59.8	56.9	53.9
Evening	Min	70.9	86.1	48.8	81.0	79.0	77.0	75.0	70.0	64.0	53.0	52.0	50.0
	Max	73.2	97.9	52.4	82.0	80.0	78.0	76.0	72.0	67.0	58.0	55.0	54.0
Energy Average		72.0	Average:		81.3	79.3	77.3	75.7	71.3	66.0	56.0	54.0	52.3
Night	Min	68.8	84.8	44.5	79.0	78.0	75.0	73.0	66.0	58.0	48.0	47.0	45.0
	Max	75.5	93.8	50.5	83.0	82.0	80.0	79.0	76.0	72.0	61.0	58.0	54.0
Energy Average		72.1	Average:		80.9	79.6	77.2	75.8	70.7	64.0	53.7	51.9	49.2

L_{eq} (dBA)		
24-Hour	*Daytime*	*Nighttime*
73.3	**73.9**	**72.1**

24-Hour CNEL (dBA)
79.1

APPENDIX 7.1:

OFF-SITE TRAFFIC NOISE CONTOURS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Ralph Lieberman Av.
Road Segment: n/o Sheila St.
Project Name: 5200 Sheila Street
Job Number: 13055

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,117 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	343 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.95%
Medium Trucks:	84.8%	4.9%	10.3%	2.38%
Heavy Trucks:	86.5%	2.7%	10.8%	6.67%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-6.39	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-22.21	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-17.73	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.0	60.9	59.1	53.1	61.7	62.3
Medium Trucks:	57.4	56.7	50.3	48.8	57.3	57.5
Heavy Trucks:	67.2	66.5	57.5	58.8	67.1	67.2
Vehicle Noise:	68.7	67.9	61.7	60.1	68.5	68.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	32	69	148	320
CNEL:	33	71	154	331

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Ralph Lieberman Av.
Road Segment: s/o Sheila St.
Project Name: 5200 Sheila Street
Job Number: 13055

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	7,430 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	619 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.95%
Medium Trucks:	84.8%	4.9%	10.3%	2.38%
Heavy Trucks:	86.5%	2.7%	10.8%	6.67%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-3.82	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-19.65	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-15.17	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.5	63.4	61.7	55.6	64.2	64.8
Medium Trucks:	60.0	59.3	52.9	51.4	59.8	60.1
Heavy Trucks:	69.7	69.1	60.1	61.3	69.7	69.8
Vehicle Noise:	71.2	70.5	64.3	62.7	71.1	71.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	47	102	220	474
CNEL:	49	106	228	491

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Ralph Lieberman Av.
Road Segment: s/o Dwy. 2
Project Name: 5200 Sheila Street
Job Number: 13055

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	7,430 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	619 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.95%
Medium Trucks:	84.8%	4.9%	10.3%	2.38%
Heavy Trucks:	86.5%	2.7%	10.8%	6.67%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-3.82	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-19.65	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-15.17	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.5	63.4	61.7	55.6	64.2	64.8
Medium Trucks:	60.0	59.3	52.9	51.4	59.8	60.1
Heavy Trucks:	69.7	69.1	60.1	61.3	69.7	69.8
Vehicle Noise:	71.2	70.5	64.3	62.7	71.1	71.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	47	102	220	474
CNEL:	49	106	228	491

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Sheila St.
Road Segment: w/o Dwy. 1
Project Name: 5200 Sheila Street
Job Number: 13055

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	7,430 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	619 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.95%
Medium Trucks:	84.8%	4.9%	10.3%	2.38%
Heavy Trucks:	86.5%	2.7%	10.8%	6.67%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-3.82	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-19.65	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-15.17	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.5	63.4	61.7	55.6	64.2	64.8
Medium Trucks:	60.0	59.3	52.9	51.4	59.8	60.1
Heavy Trucks:	69.7	69.1	60.1	61.3	69.7	69.8
Vehicle Noise:	71.2	70.5	64.3	62.7	71.1	71.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	47	102	220	474
CNEL:	49	106	228	491

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Sheila St.
Road Segment: e/o Dwy. 1

Project Name: 5200 Sheila Street
Job Number: 13055

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	7,430 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	619 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.95%
Medium Trucks:	84.8%	4.9%	10.3%	2.38%
Heavy Trucks:	86.5%	2.7%	10.8%	6.67%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-3.82	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-19.65	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-15.17	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.5	63.4	61.7	55.6	64.2	64.8
Medium Trucks:	60.0	59.3	52.9	51.4	59.8	60.1
Heavy Trucks:	69.7	69.1	60.1	61.3	69.7	69.8
Vehicle Noise:	71.2	70.5	64.3	62.7	71.1	71.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	47	102	220	474
CNEL:	49	106	228	491

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Sheila St.
Road Segment: e/o Ralph Lieberman Av.

Project Name: 5200 Sheila Street
Job Number: 13055

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,214 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	351 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.95%
Medium Trucks:	84.8%	4.9%	10.3%	2.38%
Heavy Trucks:	86.5%	2.7%	10.8%	6.67%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-6.28	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-22.11	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-17.63	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.1	61.0	59.2	53.2	61.8	62.4
Medium Trucks:	57.5	56.8	50.4	48.9	57.4	57.6
Heavy Trucks:	67.3	66.6	57.6	58.9	67.2	67.3
Vehicle Noise:	68.8	68.0	61.8	60.2	68.6	68.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	32	70	151	325
CNEL:	34	73	156	337

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Sheila St.
Road Segment: e/o Dwy. 3

Project Name: 5200 Sheila Street
Job Number: 13055

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,214 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	351 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.95%
Medium Trucks:	84.8%	4.9%	10.3%	2.38%
Heavy Trucks:	86.5%	2.7%	10.8%	6.67%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-6.28	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-22.11	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-17.63	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.1	61.0	59.2	53.2	61.8	62.4
Medium Trucks:	57.5	56.8	50.4	48.9	57.4	57.6
Heavy Trucks:	67.3	66.6	57.6	58.9	67.2	67.3
Vehicle Noise:	68.8	68.0	61.8	60.2	68.6	68.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	32	70	151	325
CNEL:	34	73	156	337

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Ralph Lieberman Av.
Road Segment: n/o Sheila St.

Project Name: 5200 Sheila Street
Job Number: 13055

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,176 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	348 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	91.08%
Medium Trucks:	84.8%	4.9%	10.3%	2.35%
Heavy Trucks:	86.5%	2.7%	10.8%	6.57%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-6.32	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-22.21	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-17.73	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.0	60.9	59.2	53.1	61.7	62.3
Medium Trucks:	57.4	56.7	50.3	48.8	57.3	57.5
Heavy Trucks:	67.2	66.5	57.5	58.8	67.1	67.2
Vehicle Noise:	68.7	67.9	61.8	60.1	68.6	68.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	32	69	149	320
CNEL:	33	72	154	332

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Ralph Lieberman Av.
Road Segment: s/o Sheila St.
Project Name: 5200 Sheila Street
Job Number: 13055

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	7,503 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	625 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.47%
Medium Trucks:	84.8%	4.9%	10.3%	2.46%
Heavy Trucks:	86.5%	2.7%	10.8%	7.07%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-3.80	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-19.45	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-14.87	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.6	63.5	61.7	55.6	64.3	64.9
Medium Trucks:	60.2	59.5	53.1	51.6	60.0	60.2
Heavy Trucks:	70.0	69.4	60.4	61.6	70.0	70.1
Vehicle Noise:	71.5	70.7	64.4	62.9	71.3	71.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	49	106	228	491
CNEL:	51	110	236	509

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Ralph Lieberman Av.
Road Segment: s/o Dwy. 2
Project Name: 5200 Sheila Street
Job Number: 13055

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	7,607 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	634 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.60%
Medium Trucks:	84.8%	4.9%	10.3%	2.43%
Heavy Trucks:	86.5%	2.7%	10.8%	6.97%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-3.74	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-19.45	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-14.87	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.6	63.5	61.8	55.7	64.3	64.9
Medium Trucks:	60.2	59.5	53.1	51.6	60.0	60.2
Heavy Trucks:	70.0	69.4	60.4	61.6	70.0	70.1
Vehicle Noise:	71.5	70.7	64.5	62.9	71.3	71.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	49	106	228	492
CNEL:	51	110	237	510

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Sheila St.
Road Segment: w/o Dwy. 1
Project Name: 5200 Sheila Street
Job Number: 13055

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	7,707 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	642 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.58%
Medium Trucks:	84.8%	4.9%	10.3%	2.42%
Heavy Trucks:	86.5%	2.7%	10.8%	7.00%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-3.68	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-19.41	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-14.80	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.7	63.6	61.8	55.8	64.4	65.0
Medium Trucks:	60.2	59.5	53.1	51.6	60.1	60.3
Heavy Trucks:	70.1	69.5	60.4	61.7	70.0	70.2
Vehicle Noise:	71.5	70.8	64.5	63.0	71.4	71.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	50	107	231	497
CNEL:	52	111	239	515

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Sheila St.
Road Segment: e/o Dwy. 1
Project Name: 5200 Sheila Street
Job Number: 13055

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	7,696 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	641 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.71%
Medium Trucks:	84.8%	4.9%	10.3%	2.40%
Heavy Trucks:	86.5%	2.7%	10.8%	6.89%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-3.68	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-19.45	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-14.87	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.7	63.6	61.8	55.8	64.4	65.0
Medium Trucks:	60.2	59.5	53.1	51.6	60.0	60.2
Heavy Trucks:	70.0	69.4	60.4	61.6	70.0	70.1
Vehicle Noise:	71.5	70.7	64.5	62.9	71.4	71.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	49	106	229	493
CNEL:	51	110	237	511

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project | Project Name: 5200 Sheila Street
Road Name: Sheila St. | Job Number: 13055
Road Segment: e/o Ralph Lieberman Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,287 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	357 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.10%
Medium Trucks:	84.8%	4.9%	10.3%	2.53%
Heavy Trucks:	86.5%	2.7%	10.8%	7.37%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-6.25	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-21.77	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-17.12	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.1	61.0	59.2	53.2	61.8	62.4
Medium Trucks:	57.9	57.1	50.8	49.2	57.7	57.9
Heavy Trucks:	67.8	67.2	58.1	59.4	67.7	67.8
Vehicle Noise:	69.2	68.4	62.1	60.6	69.0	69.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	35	74	160	345
CNEL:	36	77	166	358

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project | Project Name: 5200 Sheila Street
Road Name: Sheila St. | Job Number: 13055
Road Segment: e/o Dwy. 3

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,229 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	352 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.98%
Medium Trucks:	84.8%	4.9%	10.3%	2.37%
Heavy Trucks:	86.5%	2.7%	10.8%	6.65%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-6.27	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-22.11	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-17.63	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.1	61.0	59.2	53.2	61.8	62.4
Medium Trucks:	57.5	56.8	50.4	48.9	57.4	57.6
Heavy Trucks:	67.3	66.6	57.6	58.9	67.2	67.3
Vehicle Noise:	68.8	68.0	61.8	60.2	68.6	68.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	32	70	151	325
CNEL:	34	73	156	337

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC | Project Name: 5200 Sheila Street
Road Name: Ralph Lieberman Av. | Job Number: 13055
Road Segment: n/o Sheila St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,241 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	353 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.95%
Medium Trucks:	84.8%	4.9%	10.3%	2.38%
Heavy Trucks:	86.5%	2.7%	10.8%	6.67%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-6.26	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-22.08	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-17.60	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.1	61.0	59.2	53.2	61.8	62.4
Medium Trucks:	57.5	56.8	50.5	48.9	57.4	57.6
Heavy Trucks:	67.3	66.7	57.6	58.9	67.2	67.4
Vehicle Noise:	68.8	68.1	61.8	60.3	68.7	68.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	33	70	151	326
CNEL:	34	73	157	338

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC | Project Name: 5200 Sheila Street
Road Name: Ralph Lieberman Av. | Job Number: 13055
Road Segment: s/o Sheila St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,052 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	671 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.95%
Medium Trucks:	84.8%	4.9%	10.3%	2.38%
Heavy Trucks:	86.5%	2.7%	10.8%	6.67%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-3.47	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-19.30	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-14.82	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.9	63.8	62.0	56.0	64.6	65.2
Medium Trucks:	60.3	59.6	53.3	51.7	60.2	60.4
Heavy Trucks:	70.1	69.5	60.4	61.7	70.0	70.1
Vehicle Noise:	71.6	70.8	64.6	63.0	71.5	71.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	50	108	232	500
CNEL:	52	112	241	518

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: Ralph Lieberman Av.
Road Segment: s/o Dwy. 2

Project Name: 5200 Sheila Street
Job Number: 13055

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,052 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	671 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.95%
Medium Trucks:	84.8%	4.9%	10.3%	2.38%
Heavy Trucks:	86.5%	2.7%	10.8%	6.67%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-3.47	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-19.30	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-14.82	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.9	63.8	62.0	56.0	64.6	65.2
Medium Trucks:	60.3	59.6	53.3	51.7	60.2	60.4
Heavy Trucks:	70.1	69.5	60.4	61.7	70.0	70.1
Vehicle Noise:	71.6	70.8	64.6	63.0	71.5	71.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	50	108	232	500
CNEL:	52	112	241	518

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: Sheila St.
Road Segment: w/o Dwy. 1

Project Name: 5200 Sheila Street
Job Number: 13055

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,052 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	671 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.95%
Medium Trucks:	84.8%	4.9%	10.3%	2.38%
Heavy Trucks:	86.5%	2.7%	10.8%	6.67%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-3.47	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-19.30	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-14.82	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.9	63.8	62.0	56.0	64.6	65.2
Medium Trucks:	60.3	59.6	53.3	51.7	60.2	60.4
Heavy Trucks:	70.1	69.5	60.4	61.7	70.0	70.1
Vehicle Noise:	71.6	70.8	64.6	63.0	71.5	71.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	50	108	232	500
CNEL:	52	112	241	518

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: Sheila St.
Road Segment: e/o Dwy. 1

Project Name: 5200 Sheila Street
Job Number: 13055

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,052 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	671 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.95%
Medium Trucks:	84.8%	4.9%	10.3%	2.38%
Heavy Trucks:	86.5%	2.7%	10.8%	6.67%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-3.47	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-19.30	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-14.82	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.9	63.8	62.0	56.0	64.6	65.2
Medium Trucks:	60.3	59.6	53.3	51.7	60.2	60.4
Heavy Trucks:	70.1	69.5	60.4	61.7	70.0	70.1
Vehicle Noise:	71.6	70.8	64.6	63.0	71.5	71.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	50	108	232	500
CNEL:	52	112	241	518

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: Sheila St.
Road Segment: e/o Ralph Lieberman Av.

Project Name: 5200 Sheila Street
Job Number: 13055

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,740 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	395 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.95%
Medium Trucks:	84.8%	4.9%	10.3%	2.38%
Heavy Trucks:	86.5%	2.7%	10.8%	6.67%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-5.77	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-21.60	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-17.12	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.6	61.5	59.7	53.7	62.3	62.9
Medium Trucks:	58.0	57.3	51.0	49.4	57.9	58.1
Heavy Trucks:	67.8	67.2	58.1	59.4	67.7	67.8
Vehicle Noise:	69.3	68.5	62.3	60.7	69.1	69.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	35	76	163	351
CNEL:	36	78	169	364

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: Sheila St.
Road Segment: e/o Dwy. 3
Project Name: 5200 Sheila Street
Job Number: 13055

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,740 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	395 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.95%
Medium Trucks:	84.8%	4.9%	10.3%	2.38%
Heavy Trucks:	86.5%	2.7%	10.8%	6.67%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-5.77	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-21.60	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-17.12	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.6	61.5	59.7	53.7	62.3	62.9
Medium Trucks:	58.0	57.3	51.0	49.4	57.9	58.1
Heavy Trucks:	67.8	67.2	58.1	59.4	67.7	67.8
Vehicle Noise:	69.3	68.5	62.3	60.7	69.1	69.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	35	76	163	351
CNEL:	36	78	169	364

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC + Project 2020
Road Name: Ralph Lieberman Av.
Road Segment: n/o Sheila St.
Project Name: 5200 Sheila Street
Job Number: 13055

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,301 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	358 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	91.08%
Medium Trucks:	84.8%	4.9%	10.3%	2.35%
Heavy Trucks:	86.5%	2.7%	10.8%	6.58%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-6.19	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-22.08	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-17.60	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.2	61.1	59.3	53.2	61.9	62.5
Medium Trucks:	57.5	56.8	50.5	48.9	57.4	57.6
Heavy Trucks:	67.3	66.7	57.6	58.9	67.2	67.4
Vehicle Noise:	68.8	68.1	61.9	60.3	68.7	68.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	33	70	152	327
CNEL:	34	73	157	339

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC + Project 2020
Road Name: Ralph Lieberman Av.
Road Segment: s/o Sheila St.
Project Name: 5200 Sheila Street
Job Number: 13055

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,125 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	677 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.50%
Medium Trucks:	84.8%	4.9%	10.3%	2.46%
Heavy Trucks:	86.5%	2.7%	10.8%	7.04%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-3.45	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-19.12	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-14.55	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.9	63.8	62.0	56.0	64.6	65.2
Medium Trucks:	60.5	59.8	53.4	51.9	60.3	60.6
Heavy Trucks:	70.4	69.7	60.7	61.9	70.3	70.4
Vehicle Noise:	71.8	71.1	64.8	63.3	71.7	71.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	52	111	240	517
CNEL:	54	115	249	535

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC + Project 2020
Road Name: Ralph Lieberman Av.
Road Segment: s/o Dwy. 2
Project Name: 5200 Sheila Street
Job Number: 13055

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,229 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	686 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.62%
Medium Trucks:	84.8%	4.9%	10.3%	2.43%
Heavy Trucks:	86.5%	2.7%	10.8%	6.95%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-3.39	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-19.12	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-14.55	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.0	63.9	62.1	56.0	64.7	65.3
Medium Trucks:	60.5	59.8	53.4	51.9	60.3	60.6
Heavy Trucks:	70.4	69.7	60.7	61.9	70.3	70.4
Vehicle Noise:	71.8	71.1	64.8	63.3	71.7	71.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	52	112	240	518
CNEL:	54	116	249	536

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC + Project 2020 | Project Name: 5200 Sheila Street
Road Name: Sheila St. | Job Number: 13055
Road Segment: w/o Dwy. 1

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,330 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	694 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.60%
Medium Trucks:	84.8%	4.9%	10.3%	2.42%
Heavy Trucks:	86.5%	2.7%	10.8%	6.98%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-3.34	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-19.08	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-14.48	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.0	63.9	62.2	56.1	64.7	65.3
Medium Trucks:	60.6	59.8	53.5	51.9	60.4	60.6
Heavy Trucks:	70.4	69.8	60.8	62.0	70.4	70.5
Vehicle Noise:	71.9	71.1	64.8	63.3	71.7	72.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	52	113	243	523
CNEL:	54	117	251	542

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC + Project 2020 | Project Name: 5200 Sheila Street
Road Name: Sheila St. | Job Number: 13055
Road Segment: e/o Dwy. 1

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,319 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	693 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.72%
Medium Trucks:	84.8%	4.9%	10.3%	2.40%
Heavy Trucks:	86.5%	2.7%	10.8%	6.88%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-3.34	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-19.12	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-14.55	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.0	63.9	62.2	56.1	64.7	65.3
Medium Trucks:	60.5	59.8	53.4	51.9	60.3	60.6
Heavy Trucks:	70.4	69.7	60.7	61.9	70.3	70.4
Vehicle Noise:	71.8	71.1	64.8	63.3	71.7	71.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	52	112	241	518
CNEL:	54	116	249	537

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC + Project 2020 | Project Name: 5200 Sheila Street
Road Name: Sheila St. | Job Number: 13055
Road Segment: e/o Ralph Lieberman Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,812 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	401 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.20%
Medium Trucks:	84.8%	4.9%	10.3%	2.51%
Heavy Trucks:	86.5%	2.7%	10.8%	7.30%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-5.74	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-21.30	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-16.67	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.6	61.5	59.7	53.7	62.3	62.9
Medium Trucks:	58.3	57.6	51.3	49.7	58.2	58.4
Heavy Trucks:	68.2	67.6	58.6	59.8	68.2	68.3
Vehicle Noise:	69.6	68.9	62.5	61.1	69.5	69.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	37	80	172	371
CNEL:	38	83	178	384

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC + Project 2020 | Project Name: 5200 Sheila Street
Road Name: Sheila St. | Job Number: 13055
Road Segment: e/o Dwy. 3

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,755 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	396 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	52 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.98%
Medium Trucks:	84.8%	4.9%	10.3%	2.37%
Heavy Trucks:	86.5%	2.7%	10.8%	6.65%

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:	30.806
Medium Trucks:	30.517
Heavy Trucks:	30.545

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-5.76	3.05	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-21.60	3.11	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-17.12	3.11	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.6	61.5	59.7	53.7	62.3	62.9
Medium Trucks:	58.0	57.3	51.0	49.4	57.9	58.1
Heavy Trucks:	67.8	67.2	58.1	59.4	67.7	67.8
Vehicle Noise:	69.3	68.5	62.3	60.7	69.2	69.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	35	76	163	351
CNEL:	36	78	169	364

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APPENDIX 9.1:

CADNAA OPERATIONAL NOISE MODEL INPUTS

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13055

CadnaA Noise Prediction Model: 13055.cna
Date: 06.10.20
Analyst: B. Lawson

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	0.00
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	Evening	Night	CNEL	Day	Evening	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R1	41.6	41.4	41.3	48.0	55.0	50.0	45.0	0.0				5.00	a	5980009.64	2314189.40	5.00
RECEIVERS		R2	40.2	36.9	36.6	43.9	65.0	65.0	55.0	0.0				5.00	a	5980274.39	2313494.96	5.00
RECEIVERS		R3	39.6	39.0	38.4	45.3	55.0	50.0	45.0	0.0				5.00	a	5980893.97	2313960.45	5.00
RECEIVERS		R4	41.5	41.1	40.5	47.3	55.0	50.0	45.0	0.0				5.00	a	5981040.41	2313747.60	5.00
RECEIVERS		R5	54.7	54.6	54.6	61.3	65.0	65.0	55.0	0.0				5.00	a	5979926.43	2313359.42	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	94.0	94.0	94.0	Lw	94		60.00	15.00	45.00	0.0	5.00	a	5980086.00	2313105.81	5.00
POINTSOURCE		AC01	88.9	88.9	88.9	Lw	88.9		468.00	117.00	252.00	0.0	5.00	g	5980515.66	2313361.44	46.00
POINTSOURCE		AC02	88.9	88.9	88.9	Lw	88.9		468.00	117.00	252.00	0.0	5.00	g	5980499.31	2313318.05	46.00
POINTSOURCE		AC03	88.9	88.9	88.9	Lw	88.9		468.00	117.00	252.00	0.0	5.00	g	5980574.76	2313340.06	46.00
POINTSOURCE		AC04	88.9	88.9	88.9	Lw	88.9		468.00	117.00	252.00	0.0	5.00	g	5980557.16	2313293.52	46.00

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		DWY_1	81.0	67.3	72.1	63.3	49.7	54.5	PWL-Pt	89.7					23.0	1.0	3.0	6.2	8
LINESOURCE		DWY_3	84.6	71.0	75.7	63.3	49.7	54.5	PWL-Pt	89.7					23.0	1.0	3.0	6.2	8

Name	Height			Coordinates			
	Begin		End	x	y	z	Ground
	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
LINESOURCE	8.00	a		5980087.25	2313287.02	8.00	0.00
				5980165.41	2313460.79	8.00	0.00
LINESOURCE	8.00	a		5980491.63	2313063.93	8.00	0.00
				5980664.05	2313466.45	8.00	0.00

Area Source(s)

ID	Result. PWL			Result. PWL''			Lw / Li		Operating Time			Moving Pt. Src			Height
	Day	Evening	Night	Day	Evening	Night	Type	Value	Day	Special	Night	Number			
	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			(min)	(min)	(min)	Day	Evening	Night	(ft)
DOCK	103.4	103.4	103.4	65.5	65.5	65.5	Lw	103.4							8

Name	Height			Coordinates			
	Begin		End	x	y	z	Ground
	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
AREASOURCE	8.00	a		5980507.48	2313057.09	8.00	0.00
				5980459.06	2312940.14	8.00	0.00
				5980001.92	2313134.44	8.00	0.00
				5980070.46	2313293.52	8.00	0.00
				5980120.77	2313274.03	8.00	0.00
				5980101.90	2313231.90	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)

Building(s)

Name	M.	ID	RB	Residents	Absorption	Height		Coordinates			
						Begin		x	y	z	Ground
						(ft)		(ft)	(ft)	(ft)	(ft)
BUILDING		BUILDING00001	x	0		41.00	a	5980382.35	2313435.63	41.00	0.00
								5980591.11	2313347.60	41.00	0.00
								5980475.41	2313075.33	41.00	0.00
								5980109.45	2313232.53	41.00	0.00
								5980192.45	2313431.23	41.00	0.00
								5980351.54	2313365.84	41.00	0.00

APPENDIX 10.1:

CADNAA CONSTRUCTION NOISE MODEL INPUTS

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13055

CadnaA Noise Prediction Model: 13055_Construction.cna
Date: 06.10.20
Analyst: B. Lawson

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	0.00
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	Evening	Night	CNEL	Day	Evening	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R1	62.5	62.5	62.5	69.1	55.0	50.0	45.0	0.0				5.00	a	5980009.64	2314189.40	5.00
RECEIVERS		R2	73.4	73.4	73.4	80.1	65.0	65.0	55.0	0.0				5.00	a	5980274.39	2313494.96	5.00
RECEIVERS		R3	63.6	63.6	63.6	70.2	55.0	50.0	45.0	0.0				5.00	a	5980893.97	2313960.45	5.00
RECEIVERS		R4	64.0	64.0	64.0	70.7	55.0	50.0	45.0	0.0				5.00	a	5981040.41	2313747.60	5.00
RECEIVERS		R5	69.9	69.9	69.9	76.6	65.0	65.0	55.0	0.0				5.00	a	5979926.43	2313359.42	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)

Line Source(s)

Name	M.	ID	Result. PWL			Result. PWL'			Lw / Li			Operating Time			Moving Pt. Src				Height
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	Number			Speed	
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	Day	Evening	Night	(mph)	(ft)

Name	Height				Coordinates					
	Begin		End		x	y	z	Ground		
	(ft)		(ft)		(ft)	(ft)	(ft)	(ft)		

Area Source(s)

ID	Result. PWL			Result. PWL''			Lw / Li		Operating Time			Moving Pt. Src			Height
	Day	Evening	Night	Day	Evening	Night	Type	Value	Day	Special	Night	Number			
	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			(min)	(min)	(min)	Day	Evening	Night	(ft)
SITEBOUNDARY00001	118.9	118.9	118.9	75.3	75.3	75.3	Lw''	75.3							8

Name	Height			Coordinates			
	Begin		End	x	y	z	Ground
	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
SITEBOUNDARY	8.00	a		5980688.28	2313460.96	8.00	0.00
				5980465.41	2312936.37	8.00	0.00
				5979994.94	2313132.29	8.00	0.00
				5980062.31	2313290.63	8.00	0.00
				5980053.57	2313294.93	8.00	0.00
				5980130.49	2313474.56	8.00	0.00
				5980256.45	2313422.34	8.00	0.00
				5980271.64	2313416.04	8.00	0.00
				5980288.00	2313411.27	8.00	0.00
				5980298.94	2313410.05	8.00	0.00
				5980312.65	2313410.83	8.00	0.00
				5980328.19	2313414.13	8.00	0.00
				5980339.48	2313418.99	8.00	0.00
				5980352.20	2313427.34	8.00	0.00
				5980349.42	2313431.16	8.00	0.00
				5980486.75	2313538.46	8.00	0.00
				5980490.04	2313540.02	8.00	0.00
				5980493.52	2313540.19	8.00	0.00
				5980498.20	2313540.02	8.00	0.00
				5980504.28	2313537.24	8.00	0.00
				5980533.62	2313525.09	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)

Building(s)

Name	M.	ID	RB	Residents	Absorption	Height	Coordinates				
						Begin	x	y	z	Ground	
						(ft)	(ft)	(ft)	(ft)	(ft)	