East End and County Industrial

NOISE IMPACT ANALYSIS

CITY OF CHINO

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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
L_{max}	Maximum level measured over the time interval
L_{min}	Minimum level measured over the time interval
mph	Miles per hour
OPR	Office of Planning and Research
PPV	Peak particle velocity
Project	East End and County Industrial
REMEL	Reference Energy Mean Emission Level
RMS	Root-mean-square
VdB	Vibration Decibels

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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 East End and County Industrial development ("Project"). The Project site is located on the northwest corner of East End Avenue and County Road in the City of Chino. The Project is proposed to consist of 212,251 square feet of High-Cube Fulfillment Center Warehouse use (within Building 1) and 55,534 square feet of Industrial Park use (within Buildings 2-4).

The Project is anticipated to be constructed in a single phase by the year 2021. 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 Chino 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 7 study-area roadway segments were calculated based on the change in the average daily traffic (ADT) volumes. The traffic noise levels provided in this analysis are based on the traffic forecasts found in the *East End and County Industrial Traffic Impact Analysis* 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 2019 and Opening Year Cumulative 2021 traffic 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 land uses adjacent to the study area roadway segments.

OPERATIONAL NOISE ANALYSIS

Using reference noise levels to represent the expected noise sources from the East End and County Industrial site, this analysis estimates the Project-related stationary-source noise levels at nearby sensitive receiver locations. The typical activities associated with the proposed East End and County Industrial are anticipated to include loading dock activities, entry gate and truck movements, roof-top air conditioning units, parking lot vehicle movements and trash enclosure activity. The operational noise analysis shows that the Project-related stationary-source noise levels at all receiver locations will satisfy the daytime and nighttime exterior noise level standards. Further, this analysis demonstrates that the Project operational noise levels will not contribute a long-term operational noise level impact to the existing ambient noise environment at any of the sensitive receiver locations. Therefore, the operational noise level impacts associated with the proposed 24-hour seven days per week Project activities, such as the loading dock activities, entry gate and truck movements, roof-top air conditioning units, parking lot vehicle movements and trash enclosure activity, are considered *less than significant* with mitigation.

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) trucks rarely create vibration that exceeds 0.003 in/sec RMS (4) (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 at nearby homes will satisfy the 0.05 in/sec RMS vibration threshold of the City of Chino, and therefore, will be *less than significant*.

CONSTRUCTION NOISE ANALYSIS

Construction-related noise impacts are expected to create temporary and intermittent high-level noise conditions at receivers surrounding the Project site. Using sample reference noise levels to represent the planned construction activities of the East End and County Industrial site, this analysis estimates the Project-related construction noise levels at nearby sensitive receiver locations. The Project-related short-term construction noise levels including those generated by both daytime and nighttime concrete pouring activity, are expected to range from 51.6 to 64.5 dBA L_{eq} at nearby noise sensitive receiver locations R1 and R2 and will satisfy the City of Chino 65 dBA L_{eq}. 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. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. At distances ranging from 71 to 469 feet from Project construction activity, construction vibration velocity levels are expected to approach 0.0132 in/sec RMS at nearby noise sensitive receiver locations R1 and R2. Based on the City of Chino vibration standards, the Project construction vibration levels satisfy the 0.05 in/sec RMS threshold at nearby sensitive residential receiver locations R1 and R2 and are, therefore considered *less than significant.*

SUMMARY CEQA SIGNIFICANCE FINDINGS

The results of this East End and County Industrial 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. (5). Table ES-1 shows the findings of significance for each potential noise and/or vibration impact 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 East End and County Industrial ("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 traffic noise analysis, and evaluates the future exterior noise environment. In addition, this study includes an analysis of the potential Project-related long-term operational and short-term construction noise and vibration impacts.

1.1 SITE LOCATION

The proposed East End and County Industrial site is located on the northwest corner of East End Avenue and County Road, in the City of Chino, as shown on Exhibit 1-A. The Project site is currently occupied by existing structures on the southernly portion of the site. All existing structures and asphalt/concrete within the Project site will be demolished.

Existing land uses near the site include residential homes located east and south of the Project site, industrial facilities located to the north and south, and the Sunwest Tropical Nursey located adjacent to the Project's western border. State Route 60 (SR-60) is located approximately 105 feet south of the Project site. The Los Angeles / Ontario International Airport (LA/ONT) is located approximately 6.2 miles northeast of the Project site and the Chino Airport is located approximately 5.7 miles southeast of the Project site.

1.2 PROJECT DESCRIPTION

The development of the proposed Project is to consist of 212,251 square feet of High-Cube Fulfillment Center Warehouse use (within Building 1) and 55,534 square feet of Industrial Park use (within Buildings 2-4), as shown on Exhibit 1-B. For the purposes of this analysis, the Project is proposed to be developed in a single phase with an anticipated Opening Year of 2021.

At the time this noise analysis was prepared, the future tenants of the proposed Project were unknown. The on-site Project-related noise sources are expected to include: loading dock activities, entry gate and truck movements, roof-top air conditioning units, parking lot vehicle movements 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.

Per the *East End and County Industrial Traffic Impact Analysis* (TIA) prepared by Urban Crossroads, Inc. the Project is expected to generate a total of approximately 642 two-way vehicular trips per day (321 inbound and 321 outbound) which includes 106 two-way truck trips per day (53 inbound and 53 outbound). (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.

EXHIBIT 1-A: LOCATION MAP

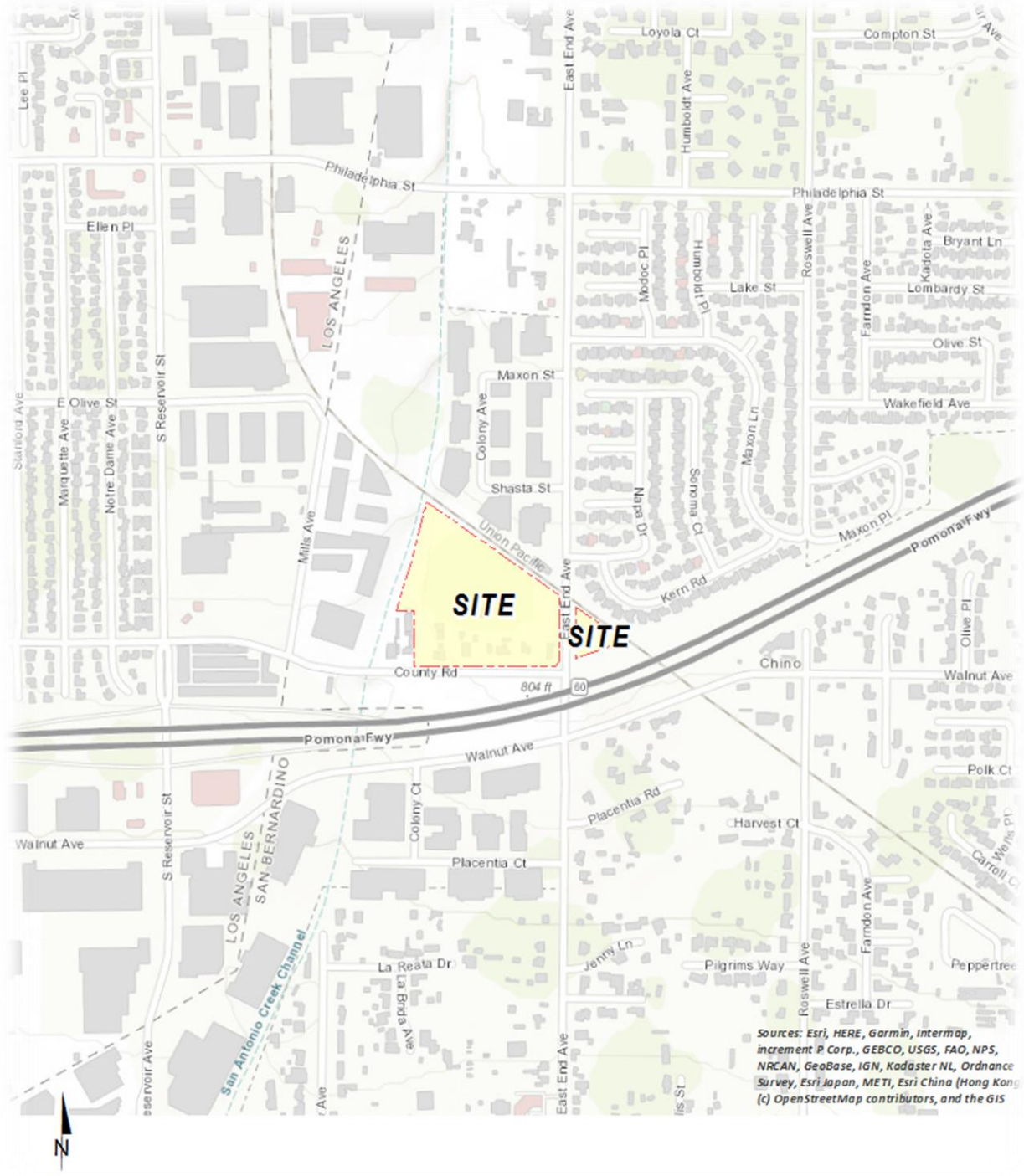

EXHIBIT 1-B: SITE PLAN

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2 FUNDAMENTALS

Noise has been 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		

2.1 RANGE OF NOISE

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. (6) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA at approximately 100 feet, which can cause serious discomfort. (7) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.2 NOISE DESCRIPTORS

Environmental noise descriptors are generally based on averages, rather than instantaneous, noise levels. The most 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 and is commonly used to describe the "average" noise levels within the environment.

To describe the time-varying character of environmental noise, the statistical or percentile noise descriptors L_{50}, L_{25}, L_8 and L_2, are commonly used. The percentile noise descriptors are the noise levels equaled or exceeded during 50 percent, 25 percent, 8 percent and 2 percent of a stated time. Sound levels associated with the L_2 and L_8 typically describe transient or short-term events, while levels associated with the L_{50} describe the steady state (or median) noise conditions. The City of Chino relies on the percentile noise levels to describe the stationary source noise level limits. While the L_{50} describes the noise levels occurring 50 percent of the time, the L_{eq} accounts for the total energy (average) observed for the entire hour.

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 Chino 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. (6)

2.3.2 GROUND ABSORPTION

The propagation path of noise from a highway to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 ft. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver such as soft dirt, grass, or scattered bushes and trees), an excess ground attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance from a line source. (8)

2.3.3 ATMOSPHERIC EFFECTS

Receivers located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects. (6)

2.3.4 SHIELDING

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

2.4 NOISE CONTROL

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

2.5 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by up to 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or

receiver. Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source. (8)

2.6 LAND USE COMPATIBILITY WITH NOISE

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development, so too can the mismanagement of noise impacts impair the economic health and growth potential of a community by reducing the area's desirability as a place to live, shop and work. For this reason, land use compatibility with the noise environment is an important consideration in the planning and design process. The FHWA encourages State and Local government to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway, or that the developments are planned, designed, and constructed in such a way that noise impacts are minimized. (9)

2.7 COMMUNITY RESPONSE TO NOISE

Community responses to noise 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. Another twenty-five percent of the population will not complain even in very severe noise environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. (10) Surveys have shown that about ten percent of the people exposed to traffic noise of 60 dBA will report being highly annoyed with the noise, and each increase of one dBA is associated with approximately two percent more people being highly annoyed. When traffic noise exceeds 60 dBA or aircraft noise exceeds 55 dBA, people may begin to complain. (10) Despite this variability in behavior on an individual level, the population can be expected to exhibit the following responses to changes in noise levels as shown on Exhibit 2-B. A change of 3 dBA are considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (8)

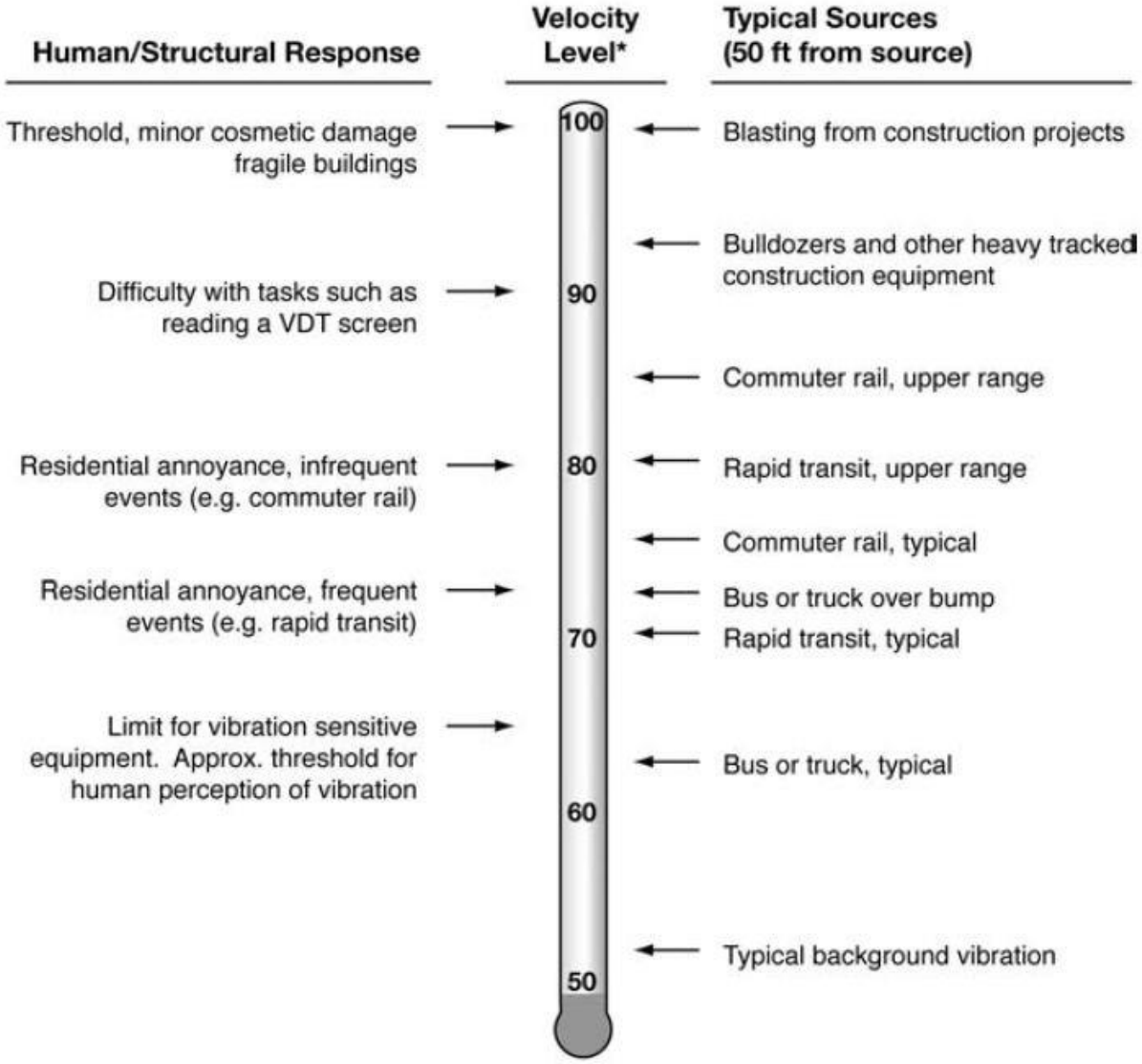
2.8 VIBRATION

Per the Federal Transit Administration (FTA) *Transit Noise Impact and Vibration Assessment*, vibration is the periodic oscillation of a medium or object. (3) 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.

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). (11) 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. (12) 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 CHINO GENERAL PLAN NOISE ELEMENT

The City of Chino has adopted a Noise Element of the General Plan (13) to minimize problems from intrusive sound and to ensure that development does not expose people to unacceptable noise levels. The Noise Element specifies the maximum exterior and interior noise levels for new developments impacted by transportation noise sources such as arterial roads, freeways, airports, and railroads. In addition, the Noise Element identifies noise polices designed to

protect, create, and maintain an environment free from noise that may jeopardize the health or welfare of sensitive receivers, or degrade quality of life. To protect Chino residents from unacceptable noise levels, the Noise Element contains the following three objectives:

N-1.1. Ensure appropriate exterior and interior noise levels for existing and new land uses;
N-1.2 Reduce noise impacts from transportation;
N-1.3 Control sources of construction noise.

The noise policies specified in the City of Chino Noise Element provide the guidelines necessary to satisfy these objectives. To ensure the appropriate exterior and interior noise levels for existing and new land uses (N-1.1), Table N-3 of the City of Chino General Plan Noise Element, identifies a maximum allowable exterior noise level of 65 dBA CNEL and an interior noise level limit of 45 dBA CNEL for new residential developments impacted by transportation noise sources such as arterial roads, freeways, airports, railroads, and warehousing uses.

The City of Chino General Plan Noise Element does not identify criteria to assess the impacts associated with exterior off-site transportation-related noise impacts at non-noise-sensitive uses, such as industrial, and therefore, the Office of Planning and Research (OPR) land use/noise compatibility criteria, found in Figure 2 of the *General Plan Guidelines, Appendix C: Noise Element Guidelines* criteria can be used to assess potential impacts at adjacent land uses. The *normally acceptable* exterior noise level for non-noise-sensitive land use, such as industrial use, is 70 dBA CNEL. Noise levels greater than 70 dBA CNEL are considered *conditionally acceptable* per the *Land Use Compatibility Criteria*. (14)

3.4 OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as the East End and County Industrial, operational noise that may include loading dock activities, entry gate and truck movements, roof-top air conditioning units, parking lot vehicle movements and trash enclosure activity are typically evaluated against standards established under a City's Municipal Code.

The City of Chino Noise Ordinance included in the Municipal Code (Chapter 9.40) establishes the maximum permissible noise level that may intrude into a neighbor's property. The Noise Ordinance (Section 9.40.040) establishes the exterior noise level criteria for residential properties affected by stationary noise sources. While the Municipal Code identifies noise zones for commercial (Zone II), manufacturing and industrial properties (Zone III), it only establishes exterior noise standards for residential property (Section 9.40.030).

For residential properties (Noise Zone 1), the exterior noise level shall not exceed 55 dBA during daytime hours (7:00 a.m. to 10:00 p.m.) and shall not exceed 50 dBA during the nighttime hours (10:00 p.m. to 7:00 a.m.) for more than 30 minutes in any hour. (15) These standards shall apply for a cumulative period of 30 minutes in any hour, as well as the standard plus 5 dBA cannot be exceeded for a cumulative period of more than 15 minutes in any hour, or the standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour, or the standard plus 15 dBA for a cumulative period of more than 1 minute in any hour, or the standard plus 20 dBA for any

period of time. The City of Chino Municipal Code operational noise level standards are shown on Table 3-1 and included in Appendix 3.1.

TABLE 3-1: OPERATIONAL NOISE STANDARDS

City	Land Use	Time Period	Exterior Noise Level Standards[1]				
			L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
Chino[2]	Residential	Daytime	55	60	65	70	75
		Nighttime	50	55	60	65	70

[1] The percent noise level is the level exceeded "n" percent of the time during the measurement period. L50 is the noise level exceeded 50% of the time.
[2] Source: City of Chino Municipal Code, Section 9.40.040 (Appendix 3.1).
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

3.5 CONSTRUCTION NOISE STANDARDS

The City of Chino has set restrictions to control noise impacts associated with construction activities throughout the City. Section 9.40.060(D) of the City's Noise Ordinance indicates that noise sources associated with construction, repair, remodeling, or grading of any real property, are exempt from the provisions of the noise ordinance, provided the construction activities take place between the hours of 7:00 a.m. and 8:00 p.m. Monday through Saturday, with no construction allowed on Sundays and Federal holidays (Section 15.44.030), and provided the noise levels exceeding 65 dBA when measured on residential property do not endanger the public health, welfare and safety. (16) The City can authorize construction activities to occur outside of the hours specified above.

Although construction noise may not pose an immediate a health risk or damage human hearing, it has the potential to adversely affect people's quality of life. Noise annoys, awakens, angers, and frustrates noise-sensitive individuals. It disrupts communication and affects performance capabilities. Noise is one of the biological stressors associated with everyday life. Thus, the numerous effects of noise combine to detract from the quality of people's lives and the environment. (17) In addition, acceptance of temporary construction noise varies with the individual. For this reason, and to present a conservative evaluation of construction noise effects in this report, the numerical noise standard of 65 dBA (with higher noise level allowances for short bursts of louder noise) established in the City of Chino Municipal Code, Section 9.40.060(D) *Special Provisions*, is used in this analysis to determine the significance of construction noise on noise-sensitive receivers.

The reference construction noise limit of 65 dBA L_{eq} provides an acceptable numerical threshold for determining the relative significance of Project construction noise levels at nearby residential receivers. Note that pursuant to the City of Chino Municipal Code, Section 9.40.060(D), the noise limit of 65 dBA is the noise standard for a cumulative period of more than thirty minutes in any hour (L_{50}). In addition, the Municipal Code allows for short bursts or periods of increased construction-related noise as follows:

- 70 dBA for a cumulative period of no more than fifteen minutes in any hour (L_{25});
- 75 dBA for a cumulative period of no more than five minutes in any hour (L_8);
- 80 dBA for a cumulative period of more than one minute in any hour (L_2);
- Noise levels greater than 85 dBA experienced at a sensitive receiver for any period (L_{max}).

For the purposes of this analysis, the 65 dBA L_{eq} threshold is used to represent a single numerical average threshold to assess the potential construction noise level impacts at nearby sensitive receivers. While the L_{50} describes the median noise levels occurring 50 percent of the time, the L_{eq} accounts for the total energy (average) observed for the entire hour during construction activities.

Mobile construction equipment will operate throughout the Project site and will not remain stationary, and therefore, the stationary-source noise level limits of Section 9.40.040 of the City of Chino Municipal Code are not applied to Project construction noise levels. Moreover, since the City of Chino specifically identifies a 65 dBA exterior noise level limit for construction noise, the previously identified Municipal Code stationary-source noise level limits described in Section 3.4 for operational noise are not used in the evaluation of potential construction noise impacts.

3.6 VIBRATION STANDARDS

The City of Chino Noise Ordinance Section 9.40.060(D) states that vibration created by construction activities are exempt from provisions of the Ordinance, if any construction-source vibration does not endanger the public health, welfare, and safety. Therefore, to determine if the vibration levels due to construction will endanger the public health, welfare, and safety of nearby sensitive receiver locations, the operational vibration level standard of 0.05 inches per second (RMS) is used per Section 9.40.110 of the City of Chino Municipal Code.

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 Chino 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 Los Angeles / Ontario International Airport (LA/ONT) is located approximately 6.2 miles northeast of the Project site and the Chino Airport is located approximately 5.7 miles southeast of the Project site. 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.* (18) 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) (19) developed guidance to be used for the assessment of project-generated increases in noise levels that consider the ambient noise level. The FICON recommendations are based on

studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics, such as the average-daily noise level (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. (18) For example, if the ambient noise environment is quiet (<60 dBA) and the new noise source greatly increases the noise levels, an impact may occur if the noise criteria may be exceeded. Therefore, for this analysis, FICON identifies a *readily perceptible* 5 dBA or greater project-related noise level increase is considered a significant impact when the noise criteria for a given land use is exceeded. Per the FICON, in areas where the without project noise levels range from 60 to 65 dBA, a 3 dBA *barely perceptible* noise level increase appears to be appropriate for most people. When the without project noise levels already exceed 65 dBA, any increase in community noise louder than 1.5 dBA or greater is considered a significant impact if the noise criteria for a given land use is exceeded, since it likely contributes to an existing noise exposure exceedance. Table 4-1 below provides a summary of the potential noise impact significance criteria, based on guidance from FICON.

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

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

Federal Interagency Committee on Noise (FICON), 1992.

4.3 NON-NOISE-SENSITIVE RECEIVERS

Since the City of Chino General Plan Noise Element does not identify criteria to assess the impacts associated with exterior off-site transportation-related noise impacts at the Project land use, the OPR land use/noise compatibility criteria, found in Figure 2 of the *General Plan Guidelines, Appendix C: Noise Element Guidelines* is used to determine potential impacts at adjacent land uses. The *normally acceptable* exterior noise level for non-noise-sensitive land use, such as industrial use, is 70 dBA CNEL. Noise levels greater than 70 dBA CNEL are considered *conditionally acceptable* per the *Land Use Compatibility Criteria*. (14)

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 are 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. The noise level increases used to determine significant impacts for non-noise-sensitive land uses is generally consistent with the FICON noise level increase thresholds for noise-sensitive land uses but instead rely on the OPR land use/noise compatibility criteria, found in Figure 2 of the *General Plan Guidelines, Appendix C: Noise Element Guidelines* *normally acceptable* 70 dBA CNEL exterior noise level criteria.

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 4-2 shows the significance criteria summary matrix.

OFF-SITE TRAFFIC NOISE

- When the noise levels at existing and future noise-sensitive land uses (e.g. residential, 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. industrial, etc.):
    - are less than the OPR General Plan Guidelines, Figure 2, *normally acceptable* 70 dBA and the Project creates a *readily perceptible* 5 dBA or greater Project-related noise level increase; or
    - are greater than the OPR General Plan Guidelines, Figure 2, *normally acceptable* 70 dBA and the Project creates a *barely perceptible* 3 dBA or greater Project-related noise level increase.

OPERATIONAL NOISE & VIBRATION

- If Project-related operational (stationary-source) noise levels exceed the exterior noise level standards for sensitive residential land uses in the City of Chino, as shown on Table 3-1.
- If the existing ambient noise levels at the nearby noise-sensitive receivers near the Project site:
    - are less than 60 dBA Leq and the Project creates a readily perceptible 5 dBA Leq or greater Project-related noise level increase; or
    - range from 60 to 65 dBA Leq and the Project creates a barely perceptible 3 dBA Leq or greater Project-related noise level increase; or
    - already exceed 65 dBA Leq and the Project creates a community noise level increase of greater than 1.5 dBA Leq (FICON, 1992).
- If short-term project generated construction source vibration levels could exceed the vibration standard of 0.05 inch/sec RMS at noise-sensitive receiver locations (Sections 9.40.060(D) and 9.40.110 of the City of Chino Municipal Code).

CONSTRUCTION NOISE & VIBRATION

- If Project-related construction activities create noise levels during the approved hours at sensitive residential receiver locations which exceed the construction noise level limit of 65 dBA L_{eq} (City of Chino Municipal Code, Section 9.40.060(D)).
- If short-term project generated construction source vibration levels could exceed the vibration standard of 0.05 inch/sec RMS at noise-sensitive receiver locations (Sections 9.40.060(D) and 9.40.110 of the City of Chino Municipal Code).

TABLE 4-2: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Receiving Land Use	Condition(s)	Significance Criteria	
			Daytime	Nighttime
Off-Site	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[2]	if ambient is < 70 dBA CNEL	≥ 5 dBA CNEL Project increase	
		if ambient is > 70 dBA CNEL	≥ 3 dBA CNEL Project increase	
Operational[3]	Noise-Sensitive[1]	Exterior Noise Level Standards	See Table 3-1.	
		if ambient is < 60 dBA L_{eq}	≥ 5 dBA L_{eq} Project increase	
		if ambient is 60 - 65 dBA L_{eq}	≥ 3 dBA L_{eq} Project increase	
		if ambient is > 65 dBA L_{eq}	≥ 1.5 dBA L_{eq} Project increase	
Construction	Noise-Sensitive[1]	Noise Level Threshold[4]	65 dBA Leq	n/a
		Vibration Level Threshold[5]	0.05 in/sec RMS	n/a

[1] Source: FICON, 1992.
[2] Based on the land use compatibility criteria found in the Office of Planning and Research General Plan Guidelines, Figure 2.
[3] Source: City of Chino Municipal Code, Section 9.40.040 (Appendix 3.1).
[4] Source: City of Chino Municipal Code, Section 9.40.060(D).
[5] Source: City of Chino Municipal Code, Sections 9.40.060(D) and 9.40.110.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.; "n/a" = construction activities are not planned during the nighttime hours; "RMS" = Root-mean-square velocity.

5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, 24-hour noise level measurements were taken at three 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, October 30th, 2019. 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. (20)

5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site. Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent every part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (6) Further, FTA guidance states, t*hat it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community*. (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 project site on East End Avenue near railroad tracks and across existing residential homes. The noise levels at this location consist primarily of traffic noise from East End Avenue and the Pomona Freeway. The noise level measurements collected show an overall 24-hour exterior noise level of 73.3 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 65.7 dBA L_{eq} with an average nighttime noise level of 66.9 dBA L_{eq}.
- Location L2 represents the noise levels southeast of the project site on Walnut Avenue near existing residential homes. The ambient noise levels at this location account for traffic on Walnut Avenue and the nearby Pomona Freeway. The noise level measurements collected show an overall 24-hour exterior noise level of 86.7 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 81.1 dBA L_{eq} with an average nighttime noise level of 79.8 dBA L_{eq}.
- Location L4 represents the noise levels next to the western boundary of the Project site off County Road near the near the existing Sunwest Tropical nursery. The noise level measurements collected show an overall 24-hour exterior noise level of 67.7 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 61.9 dBA L_{eq} with an average nighttime noise level of 60.9 dBA L_{eq}. The noise levels at this location consist primarily of traffic noise from County Road and Pomona Freeway.

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 with surface streets and the Pomona Freeway. 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	Nighttime	
L1	Located north of project site on East End Avenue near railroad tracks and across existing residential homes.	65.7	66.9	73.3
L2	Located southeast of the project site on Walnut Avenue near existing residential homes.	81.1	79.8	86.7
L3	Located next to western boundary of the Project site off County Road near the existing Sunwest Tropical nursery.	61.9	60.9	67.7

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

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.

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. (21) The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). In California the national REMELs are substituted with the California Vehicle Noise (Calveno) Emission Levels. (22) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period. Research conducted by Caltrans has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model used in this analysis. (23)

6.2 OFF-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

Table 6-1 presents the roadway parameters used to assess the Project's off-site transportation noise impacts. Table 6-1 identifies the 7 study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the City of Chino General Plan Circulation Element, and the posted vehicle speeds. The ADT volumes used in this study are presented on Table 6-2 are based on the *East End and County Industrial Traffic Impact Analysis*, prepared by Urban Crossroads, Inc. for the following traffic scenarios under both Without and With Placentia Street Interchange alternatives: Existing (2019) and Opening Year Cumulative (2021) conditions. (2)

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)
1	Reservoir St.	n/o Country Rd.	Light Industrial/Residential	50'	40
2	Reservoir St.	s/o Country Rd.	Light Industrial/Residential	50'	40
3	East End Av.	n/o Country Rd.	Light Industrial/Residential	44'	45
4	East End Av.	s/o Country Rd.	Light Industrial/Residential	44'	45
5	Country Rd.	w/o Reservoir St.	Residential	30'	35
6	Country Rd.	e/o Reservoir St.	General Industrial	30'	35
7	Country Rd.	w/o East End Av.	General Industrial	30'	35

[1] Source: City of Chino General Plan Map, City of Pomona Zoning Map and Google Earth Aerial Imagery.
[2] Distance to adjacent receiving land use is based upon the right-of-way distances for each functional roadway classification provided in the General Plan Circulation Element.

TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic Volumes[1]			
			Existing 2019		Opening Year Cumulative (2021)	
			Without Project	With Project	Without Project	With Project
1	Reservoir St.	n/o Country Rd.	22,026	22,080	23,108	23,162
2	Reservoir St.	s/o Country Rd.	25,931	26,202	27,180	27,452
3	East End Av.	n/o Country Rd.	10,383	10,517	10,852	10,986
4	East End Av.	s/o Country Rd.	9,926	10,082	10,367	10,523
5	Country Rd.	w/o Reservoir St.	4,153	4,180	4,321	4,348
6	Country Rd.	e/o Reservoir St.	4,286	4,638	4,469	4,821
7	Country Rd.	w/o East End Av.	3,257	3,413	3,398	3,555

[1] Source: East End and County Industrial Traffic Impact Analysis, Urban Crossroads, Inc.

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 *Traffic Impact Analysis*. Using the Project truck trips in combination with the Project trip distribution, Urban Crossroads, Inc. calculated the number of additional Project truck trips and vehicle mix

percentages for each of the study area roadway segments. Table 6-4 shows the traffic flow by vehicle type (vehicle mix) used for all without Project traffic scenarios, and Tables 6-5 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[1]			Total of Time of Day Splits
	Daytime	Evening	Nighttime	
Autos	71.11%	10.94%	17.95%	100.00%
Medium Trucks	73.64%	7.72%	18.64%	100.00%
Heavy Trucks	75.56%	6.69%	17.75%	100.00%

Based on an existing 24-hour vehicle count taken on County Road west of East End Avenue (10/29/2019).
Vehicle mix percentage values rounded to the nearest one-hundredth.
"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	91.42%	4.64%	3.94%	100.00%

Based on an existing 24-hour vehicle count taken on County Road west of East End Avenue (10/29/2019). Vehicle mix percentage values rounded to the nearest one-hundredth.

TABLE 6-5: EXISTING WITH PROJECT VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Reservoir St.	n/o Country Rd.	91.44%	4.63%	3.93%	100.00%
2	Reservoir St.	s/o Country Rd.	91.19%	4.71%	4.11%	100.00%
3	East End Av.	n/o Country Rd.	91.53%	4.58%	3.89%	100.00%
4	East End Av.	s/o Country Rd.	91.33%	4.65%	4.02%	100.00%
5	Country Rd.	w/o Reservoir St.	91.48%	4.61%	3.91%	100.00%
6	Country Rd.	e/o Reservoir St.	90.26%	4.93%	4.81%	100.00%
7	Country Rd.	w/o East End Av.	90.99%	4.72%	4.29%	100.00%

[1] Source: East End and County Traffic Impact Analysis, Urban Crossroads, Inc.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

TABLE 6-6: OPENING YEAR CUMULATIVE (2021) WITH PROJECT VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Reservoir St.	n/o Country Rd.	91.44%	4.63%	3.93%	100.00%
2	Reservoir St.	s/o Country Rd.	91.20%	4.71%	4.11%	100.01%
3	East End Av.	n/o Country Rd.	91.52%	4.58%	3.89%	100.00%
4	East End Av.	s/o Country Rd.	91.34%	4.65%	4.02%	100.00%
5	Country Rd.	w/o Reservoir St.	91.47%	4.61%	3.91%	100.00%
6	Country Rd.	e/o Reservoir St.	90.30%	4.93%	4.81%	100.04%
7	Country Rd.	w/o East End Av.	91.01%	4.72%	4.29%	100.02%

[1] Source: East End and County Traffic Impact Analysis, 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 vehicular 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. The FTA provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

TABLE 6-7: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

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

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, September 2018.

7 OFF-SITE TRANSPORTATION NOISE IMPACTS

To assess the off-site transportation CNEL noise level impacts associated with development of the proposed Project, noise contours were developed based on *East End and County Industrial Traffic Impact Analysis*. (2) Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway. Noise contours were developed for the following traffic scenarios:

- Existing Conditions Without / With Project: This scenario refers to the existing present-day noise conditions without and with the proposed Project.
- Opening Year Cumulative 2021 Without / With the Project: This scenario refers to Opening Year Cumulative noise conditions without and with the proposed Project. This scenario includes all cumulative projects identified in the Traffic Impact Analysis.

7.1 TRAFFIC NOISE CONTOURS

To quantify the Project's traffic noise impacts on the surrounding areas, the changes in traffic noise levels on roadway segments surrounding the Project were calculated based on the changes in the average daily traffic volumes.

Noise contours were used to assess the Project's incremental traffic-related noise level increase at receiving land uses adjacent to roadways conveying Project traffic. The noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70, 65, and 60 dBA 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 and 7-4 present a summary of the exterior traffic noise levels, without barrier attenuation, for the 7 study area roadway segments analyzed from the without Project to the with Project conditions under Existing 2019, and Opening Year Cumulative 2021 traffic conditions. Appendix 7.1 includes a summary of the traffic noise level contours for each of the traffic scenarios.

TABLE 7-1: EXISTING 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	Reservoir St.	n/o Country Rd.	Light Industrial/Residential	73.6	86	186	401
2	Reservoir St.	s/o Country Rd.	Light Industrial/Residential	74.3	96	207	447
3	East End Av.	n/o Country Rd.	Light Industrial/Residential	72.3	63	135	291
4	East End Av.	s/o Country Rd.	Light Industrial/Residential	72.1	61	131	282
5	Country Rd.	w/o Reservoir St.	Residential	68.1	RW	49	105
6	Country Rd.	e/o Reservoir St.	General Industrial	68.3	RW	50	107
7	Country Rd.	w/o East End Av.	General Industrial	67.1	RW	41	89

[1] Source: City of Chino General Plan Land Use Map and Google Earth Aerial Imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-2: EXISTING WITH PROJECT 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	Reservoir St.	n/o Country Rd.	Light Industrial/Residential	73.6	86	186	401
2	Reservoir St.	s/o Country Rd.	Light Industrial/Residential	74.4	98	212	457
3	East End Av.	n/o Country Rd.	Light Industrial/Residential	72.3	63	135	292
4	East End Av.	s/o Country Rd.	Light Industrial/Residential	72.2	62	133	287
5	Country Rd.	w/o Reservoir St.	Residential	68.1	RW	49	105
6	Country Rd.	e/o Reservoir St.	General Industrial	69.2	RW	57	122
7	Country Rd.	w/o East End Av.	General Industrial	67.5	RW	44	95

[1] Source: City of Chino General Plan Land Use Map and Google Earth Aerial Imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-3: OPENING YEAR CUMULATIVE 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	Reservoir St.	n/o Country Rd.	Light Industrial/Residential	73.8	89	192	414
2	Reservoir St.	s/o Country Rd.	Light Industrial/Residential	74.5	99	214	461
3	East End Av.	n/o Country Rd.	Light Industrial/Residential	72.5	65	139	300
4	East End Av.	s/o Country Rd.	Light Industrial/Residential	72.3	63	135	291
5	Country Rd.	w/o Reservoir St.	Residential	68.3	RW	50	107
6	Country Rd.	e/o Reservoir St.	General Industrial	68.5	RW	51	110
7	Country Rd.	w/o East End Av.	General Industrial	67.3	RW	42	91

[1] Source: City of Chino General Plan Land Use Map and Google Earth Aerial Imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-4: OPENING YEAR CUMULATIVE 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	Reservoir St.	n/o Country Rd.	Light Industrial/Residential	73.8	89	192	414
2	Reservoir St.	s/o Country Rd.	Light Industrial/Residential	74.6	102	219	471
3	East End Av.	n/o Country Rd.	Light Industrial/Residential	72.5	65	140	301
4	East End Av.	s/o Country Rd.	Light Industrial/Residential	72.4	64	137	295
5	Country Rd.	w/o Reservoir St.	Residential	68.3	RW	50	108
6	Country Rd.	e/o Reservoir St.	General Industrial	69.3	RW	58	125
7	Country Rd.	w/o East End Av.	General Industrial	67.7	RW	45	97

[1] Source: City of Chino General Plan Land Use Map and Google Earth Aerial Imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

7.2 EXISTING 2019 PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

An analysis of Existing 2019 traffic noise levels plus traffic noise generated by the proposed Project has been included in this report. However, the analysis of existing traffic noise levels plus traffic noise generated by the proposed Project scenario will not actually occur since the Project would not be fully constructed and operational until Year 2021 cumulative conditions.

Table 7-1 shows the Existing 2019 without Project conditions CNEL noise levels. The Existing 2019 without Project exterior noise levels are expected to range from 67.1 to 74.3 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing 2019 with Project conditions range from 67.5 to 74.4 dBA CNEL. Table 7-5 shows that the Project off-site traffic noise level increases range from 0.0 to 0.9 dBA CNEL on the study area roadway segments.

7.3 OPENING YEAR CUMULATIVE 2021 PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-3 presents the Opening Year Cumulative 2021 without Project conditions CNEL noise levels. The Opening Year Cumulative 2021 without Project exterior noise levels are expected to range from 67.3 to 74.5 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography.

Table 7-4 shows the Opening Year Cumulative 2021 with Project conditions range from 67.7 to 74.6 dBA CNEL. Table 7-6 shows that the Project off-site traffic noise level increases range from 0.0 to 0.9 dBA CNEL. Based on the significance criteria for off-site traffic noise presented in Table 4-2, land uses adjacent to the study area roadway segments would experience *less than significant* noise level impacts due to unmitigated Project-related traffic noise levels.

TABLE 7-5: EXISTING 2019 WITH PROJECT TRAFFIC NOISE LEVEL INCREASES

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]			Noise Sensitive Land Use?	Exterior Noise Standard	Incremental Noise Level Increase Threshold[3]	
				No Project	With Project	Project Addition			Limit	Exceeded?
1	Reservoir St.	n/o Country Rd.	Light Industrial/Residential	73.6	73.6	0.0	Yes	65	1.5	No
2	Reservoir St.	s/o Country Rd.	Light Industrial/Residential	74.3	74.4	0.1	Yes	65	1.5	No
3	East End Av.	n/o Country Rd.	Light Industrial/Residential	72.3	72.3	0.0	Yes	65	1.5	No
4	East End Av.	s/o Country Rd.	Light Industrial/Residential	72.1	72.2	0.1	Yes	65	1.5	No
5	Country Rd.	w/o Reservoir St.	Residential	68.1	68.1	0.0	Yes	65	1.5	No
6	Country Rd.	e/o Reservoir St.	General Industrial	68.3	69.2	0.9	No	70	5.0	No
7	Country Rd.	w/o East End Av.	General Industrial	67.1	67.5	0.4	No	70	5.0	No

[1] Source: City of Chino General Plan Land Use Map and Google Earth Aerial Imagery.
[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 4-2)?

TABLE 7-6: OPENING YEAR CUMULATIVE 2021 WITH PROJECT TRAFFIC NOISE LEVEL INCREASES

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]			Noise Sensitive Land Use?	Exterior Noise Standard	Incremental Noise Level Increase Threshold[3]	
				No Project	With Project	Project Addition			Limit	Exceeded?
1	Reservoir St.	n/o Country Rd.	Light Industrial/Residential	73.8	73.8	0.0	Yes	65	1.5	No
2	Reservoir St.	s/o Country Rd.	Light Industrial/Residential	74.5	74.6	0.1	Yes	65	1.5	No
3	East End Av.	n/o Country Rd.	Light Industrial/Residential	72.5	72.5	0.0	Yes	65	1.5	No
4	East End Av.	s/o Country Rd.	Light Industrial/Residential	72.3	72.4	0.1	Yes	65	1.5	No
5	Country Rd.	w/o Reservoir St.	Residential	68.3	68.3	0.0	Yes	65	1.5	No
6	Country Rd.	e/o Reservoir St.	General Industrial	68.5	69.3	0.9	No	70	5.0	No
7	Country Rd.	w/o East End Av.	General Industrial	67.3	67.7	0.4	No	70	5.0	No

[1] Source: City of Chino General Plan Land Use Map and Google Earth Aerial Imagery.
[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 4-2)?

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.

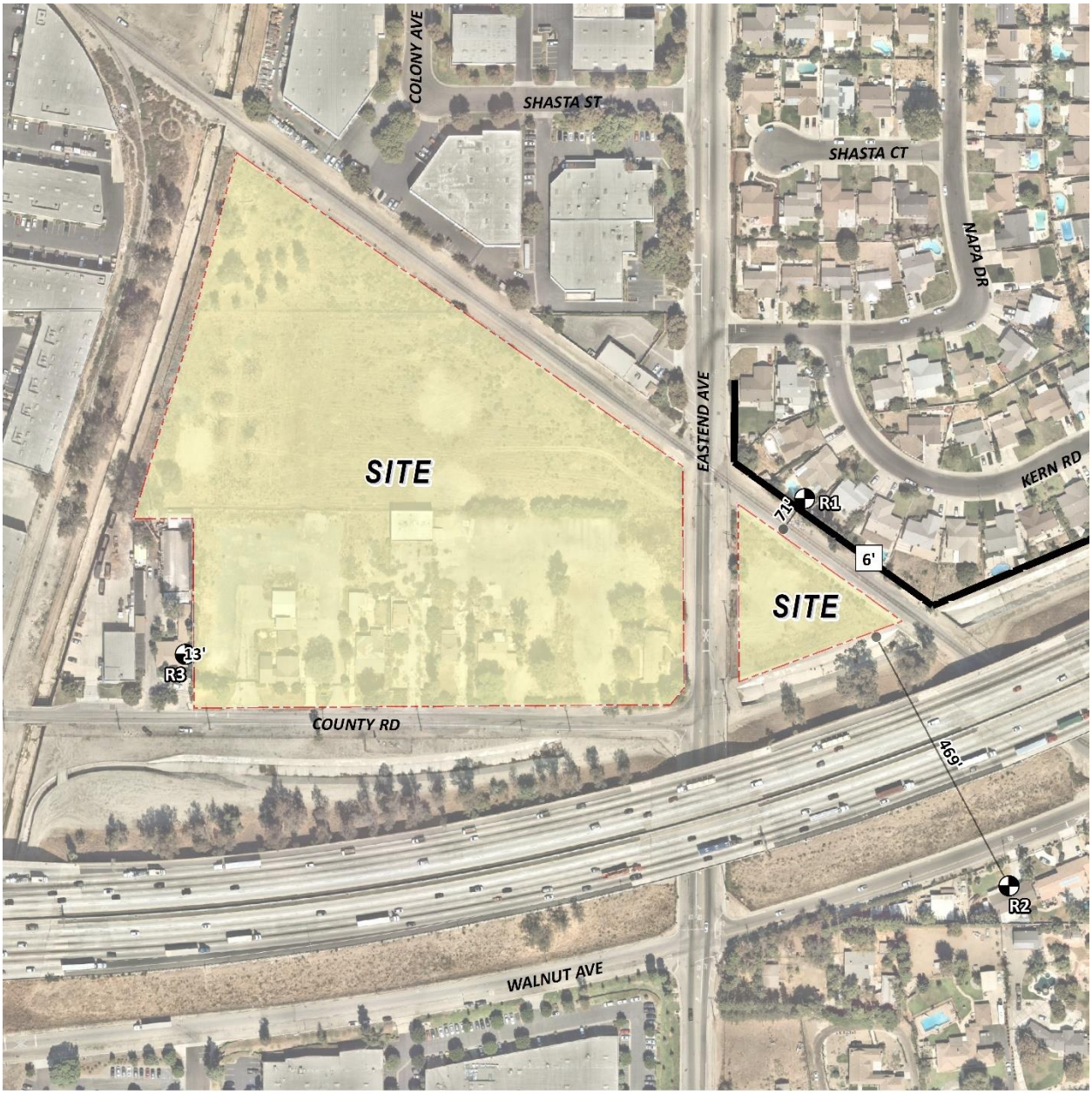
Receiver locations are located in outdoor living areas (e.g., backyards) at 10 feet from any existing or proposed barriers or at the building façade, whichever is closer to the Project site, based on FHWA guidance, and consistent with additional guidance provided by Caltrans and the FTA, as previously described in Section 5.2. Sensitive receiver locations in the Project study area include nearby residential uses R1 and R2, as described below. 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.

R1: Located approximately 71 feet northeast of the Project site, R1 represents an existing noise sensitive residential home east of East End Avenue. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents an existing noise sensitive residential home located roughly 469 feet southeast of the Project site, on the south side of Walnut Avenue. A 24-hour noise measurement was taken near this location, L2, to describe the existing ambient noise environment.

R3: Location R3 represents the non-noise sensitive Sunwest Tropical Nursey located approximately 13 feet west of the Project site. A 24-hour noise measurement near this location, L3, is used to describe the existing ambient noise environment.

EXHIBIT 8-A: SENSITIVE RECEIVER LOCATIONS



LEGEND:

- Receiver Locations
- Distance from receiver to Project site boundary (in feet)
- 6' Existing Barrier Height (in feet)
- Existing Barrier

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 East End and County Industrial Project. Exhibit 9-A identifies the 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 high-cube cold storage warehouse use 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 high-cube cold storage 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 activities, entry gate and truck movements, roof-top air conditioning units, parking lot vehicle movements and trash enclosure activity.

9.2 REFERENCE NOISE LEVELS

Since the future tenants of the proposed Project are unknown, the Project's operational noise levels were estimated based on reference noise level measurements of similar operational activities. The reference noise levels are intended to describe the expected operational noise sources that may include loading dock activities, entry gate and truck movements, roof-top air conditioning units, parking lot vehicle movements and trash enclosure activity. To estimate the Project off-site operational noise impacts associated with the East End and County Industrial, the following reference noise level measurements were collected from existing logistics warehouse operations containing similar operational noise sources. Table 9-1 presents the hourly average L_{eq} noise levels and the percentile L_n noise levels to demonstrate compliance with the City of Chino operational noise level limits.

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. (20)

EXHIBIT 9-A: OPERATIONAL NOISE SOURCE LOCATIONS

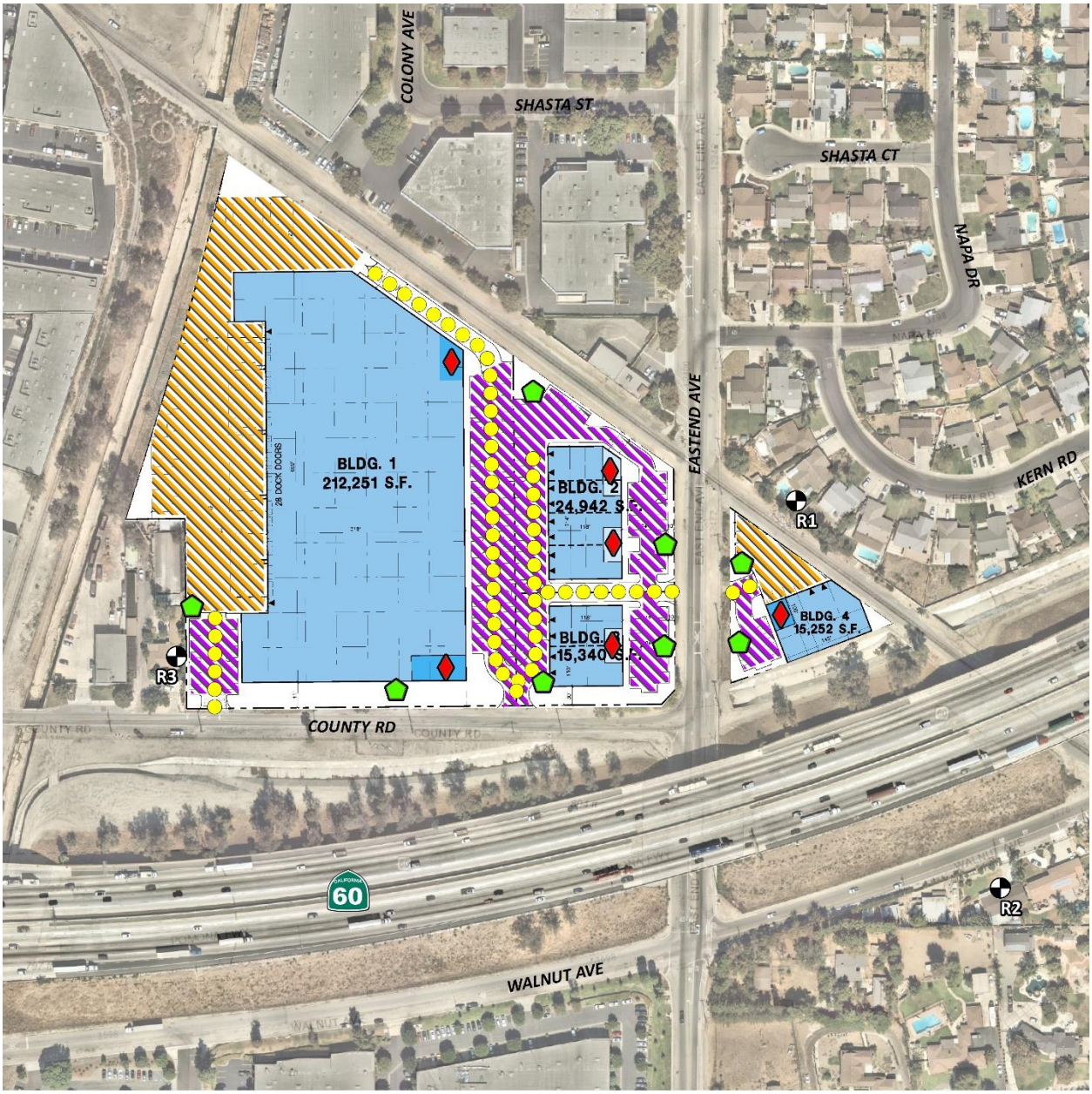


TABLE 9-1: REFERENCE NOISE LEVEL MEASUREMENTS

Noise Source	Duration (hh:mm:ss)	Ref. Distance (Feet)	Noise Source Height (Feet)	Min./Hour[4]		Reference Noise Level (dBA L_{eq})		Sound Power Level (dBA)[5]	Percentile Reference Noise Levels at 50 Feet (dBA)				
				Day	Night	@ Ref. Dist.	@ 50 Feet		L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
Loading Dock Activities[1]	00:15:00	30'	8'	60	60	67.2	62.8	103.4	59.8	62.8	67.4	71.2	75.6
Entry Gate & Truck Movements[1]	00:15:00	20'	8'	60	60	64.0	58.0	91.6	53.0	56.1	61.7	67.3	73.1
Roof-Top Air Conditioning Units[2]	96:00:00	5'	5'	39	28	77.2	57.2	88.9	54.4	56.1	57.4	57.7	58.2
Parking Lot Vehicle Movements[3]	01:00:00	10'	5'	60	60	52.2	41.7	79.0	38.5	39.5	44.5	50.5	61.4
Trash Enclosure Activities[4]	00:00:32	5'	5'	20	20	77.3	62.3	94.0	54.0	60.0	67.0	72.0	73.5

[1] Reference noise level measurements were collected from the existing operations of the Motivational Fulfillment & Logistics Services distribution facility located at 6810 Bickmore Avenue in the City of Chino.
[2] As measured by Urban Crossroads, Inc. at the Santee Walmart located at 170 Town Center Parkway.
[3] As measured by Urban Crossroads, Inc. on at the Panasonic Avionics Corporation parking lot in the City of Lake Forest.
[4] As measured by Urban Crossroads, Inc. on 5/3/2018 at trash enclosure in a parking lot 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.

9.2.2 LOADING DOCK ACTIVITIES

Short-term reference noise level measurements were collected on Wednesday, January 7th, 2015, by Urban Crossroads, Inc. 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, of roughly 285,000 square feet, 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, and 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 over a 15-minute period and represents multiple noise sources producing a reference noise level of 56.0 dBA L_{eq} 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.

9.2.4 ROOF-TOP AIR CONDITIONING UNITS

To assess the noise levels created by the roof-top air conditioning units at the planned Project site, reference noise levels measurements were taken at the Santee Walmart on July 27th, 2015. 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.

9.2.5 PARKING LOT VEHICLE MOVEMENTS (AUTOS)

To determine the noise levels associated with parking lot vehicle movements, Urban Crossroads collected reference noise level measurements over a 24-hour period on May 17th, 2017 at the parking lot for the Panasonic Avionics Corporation in the City of Lake Forest. The peak hour of activity measured over the 24-hour noise level measurement period occurred between 12:00 p.m. to 1:00 p.m., or the typical lunch hour for employees working in the area. The measured reference noise level at 50 feet from parking lot vehicle movements was measured at 41.7 dBA L_{eq}. The parking lot noise levels are mainly due to cars pulling in and out of spaces during peak lunch hour activity and employees talking. Noise associated with parking lot vehicle movements is expected during the typical operating hours for the entire hour (60 minutes).

9.2.6 TRASH ENCLOSURE ACTIVITY

To describe the noise levels associated with a trash enclosure, Urban Crossroads collected a reference noise level measurement on May 3rd, 2018 at an existing commercial and office park trash enclosure within a parking lot on the northeast corner of Baker Street and Red Hill Avenue. The measured reference noise level at the uniform 50-foot reference distance is 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 20 minutes per hour.

9.4 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 the noise level of multiple types of noise sources and calculates the noise levels at any location using the spatially accurate Project site plan and includes the effects of topography, buildings, and multiple barriers in its calculations using the latest standards to predict outdoor noise impacts. Appendix 9.1 includes the detailed noise model inputs used to estimate the Project operational noise levels presented in this section. Using the spatially accurate Project site plan and flown aerial imagery from Nearmap, a CadnaA noise prediction model of the Project study area was developed. The noise model provides a three-dimensional representation of the Project study area using the following key data inputs:

- Ground absorption;
- Multiple reflections at buildings and barriers;
- Reference noise level sources by type (area, point, etc.) and noise source height;
- Multiple noise receiver locations and heights;
- Topography and earthen berms;
- Barrier and building heights.

Using the ISO 9613 protocol, the CadnaA noise prediction model 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 calculations at each receiver location and the partial noise level contributions by noise source. The reference sound power level (PWL) for the highest noise source expected at the Project site was input into the CadnaA noise prediction model. 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 6.0 dBA for each doubling of distance from a point source, based on existing conditions in the Project study area.

9.5 PROJECT OPERATIONAL NOISE LEVELS

Using the reference noise levels to represent the proposed Project operations that include loading dock activities, entry gate and truck movements, roof-top air conditioning units, parking lot vehicle movements 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. Table 9-2 shows the Project operational noise levels during the daytime hours of 7:00 a.m. to 10:00 p.m. The daytime hourly noise levels at the off-site receiver locations are expected to range from 33.9 to 48.1 dBA L_{50}.

Tables 9-3 shows the Project operational noise levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. The nighttime hourly noise levels at the off-site receiver locations are expected to range from 32.6 to 47.1 dBA L_{50}. Appendix 9.1 includes the detailed noise model inputs used to estimate the unmitigated Project operational noise levels presented in this section.

TABLE 9-2: DAYTIME PROJECT OPERATIONAL NOISE LEVELS

Receiver Location[1]	Land Use[2]	Noise Sources[3]	Hourly Operational Noise Levels (dBA)[4]					
			Leq (Average)	L_{50} (30 mins)	L_{25} (15 mins)	L_{8} (5 mins)	L_{2} (1 min)	L_{max} (Anytime)
R1	SFR	Loading Dock Activities	48.3	47.8	49.1	50.1	51.9	58.8
		Entry Gate & Truck Movements	17.8	12.8	15.9	21.5	27.1	32.9
		Roof-Top Air Conditioning Units	39.7	36.9	38.6	39.9	40.2	40.7
		Parking Lot Vehicle Movements	29.8	21.5	27.5	34.5	39.5	41.0
		Trash Enclosure Activities	41.5	33.2	39.2	46.2	51.2	52.7
		Combined Noise Level:	**48.9**	**48.1**	**49.5**	**50.5**	**52.2**	**58.9**
R2	SFR	Loading Dock Activities	33.3	32.8	34.1	35.1	36.9	43.8
		Entry Gate & Truck Movements	16.3	11.3	14.4	20.0	25.6	31.4
		Roof-Top Air Conditioning Units	30.1	27.3	29.0	30.3	30.6	31.1
		Parking Lot Vehicle Movements	16.4	8.1	14.1	21.1	26.1	27.6
		Trash Enclosure Activities	28.5	20.2	26.2	33.2	38.2	39.7
		Combined Noise Level:	**35.1**	**33.9**	**35.3**	**36.4**	**38.1**	**44.3**
R3	GI	Loading Dock Activities	46.4	45.9	47.2	48.2	50.0	56.9
		Entry Gate & Truck Movements	19.7	14.7	17.8	23.4	29.0	34.8
		Roof-Top Air Conditioning Units	30.8	28.0	29.7	31.0	31.3	31.8
		Parking Lot Vehicle Movements	45.7	37.4	43.4	50.4	55.4	56.9
		Trash Enclosure Activities	38.8	30.5	36.5	43.5	48.5	50.0
		Combined Noise Level:	**46.5**	**46.0**	**47.3**	**48.3**	**50.1**	**56.9**

[1] See Exhibit 9-A for the receiver and noise source locations.
[2] City of Chino General Plan Land Use Map. "SFR" = Single-Family Residential; "GI" = General Industrial.
[3] Reference noise sources as shown on Table 9-1.
[4] Operational noise model inputs are provided in Appendix 9.1.

TABLE 9-3: NIGHTTIME PROJECT OPERATIONAL NOISE LEVELS

Receiver Location[1]	Land Use[2]	Noise Sources[3]	Hourly Operational Noise Levels (dBA)[4]					
			Leq (Average)	L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
R1	SFR	Loading Dock Activities	47.3	46.8	48.1	49.1	50.9	57.8
		Entry Gate & Truck Movements	17.8	12.8	15.9	21.5	27.1	32.9
		Roof-Top Air Conditioning Units	37.3	34.5	36.2	37.5	37.8	38.3
		Parking Lot Vehicle Movements	28.8	20.5	26.5	33.5	38.5	40.0
		Trash Enclosure Activities	40.5	32.2	38.2	45.2	50.2	51.7
		Combined Noise Level:	**47.7**	**47.1**	**48.4**	**49.4**	**51.1**	**57.9**
R2	SFR	Loading Dock Activities	32.3	31.8	33.1	34.1	35.9	42.8
		Entry Gate & Truck Movements	16.3	11.3	14.4	20.0	25.6	31.4
		Roof-Top Air Conditioning Units	27.7	24.9	26.6	27.9	28.2	28.7
		Parking Lot Vehicle Movements	15.4	7.1	13.1	20.1	25.1	26.6
		Trash Enclosure Activities	27.6	19.3	25.3	32.3	37.3	38.8
		Combined Noise Level:	**33.7**	**32.6**	**34.0**	**35.2**	**36.9**	**43.3**
R3	GI	Loading Dock Activities	45.4	44.9	46.2	47.2	49.0	55.9
		Entry Gate & Truck Movements	19.7	14.7	17.8	23.4	29.0	34.8
		Roof-Top Air Conditioning Units	28.4	25.6	27.3	28.6	28.9	29.4
		Parking Lot Vehicle Movements	44.7	36.4	42.4	49.4	54.4	55.9
		Trash Enclosure Activities	37.9	29.6	35.6	42.6	47.6	49.1
		Combined Noise Level:	**45.5**	**45.0**	**46.3**	**47.3**	**49.1**	**55.9**

[1] See Exhibit 9-A for the receiver and noise source locations.
[2] City of Chino General Plan Land Use Map. "SFR" = Single-Family Residential; "GI" = General Industrial.
[3] Reference noise sources as shown on Table 9-1.
[4] Operational noise model inputs are provided in Appendix 9.1.

9.4 PROJECT OPERATIONAL NOISE LEVEL COMPLIANCE

To demonstrate compliance with local noise regulations, the Project-only operational noise levels are evaluated against exterior noise level thresholds based on the City of Chino exterior noise level standards at nearby noise-sensitive receiver locations. Tables 9-4 shows that the daytime operational noise levels associated with East End and County Industrial Project will satisfy the noise level thresholds at all nearby receiver locations. Therefore, the daytime operational noise impacts are considered *less than significant* at the nearby noise-sensitive receiver locations.

TABLE 9-4: DAYTIME OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	Land Use[2]	Noise Level at Receiver Locations (dBA)[3]					Threshold Exceeded?[4]
		Leq (Average)	L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_{max} (<1 min)	
Daytime Threshold	**Residential**	**n/a**	**55**	**60**	**65**	**70**	**See Table 3-1**
	Other	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	
R1	SFR	48.9	48.1	49.5	50.5	58.9	No
R2	SFR	35.1	33.9	35.3	36.4	44.3	No
R3	GI	46.5	46.0	47.3	48.3	56.9	No

[1] See Exhibit 9-A for the receiver and noise source locations.
[2] City of Chino General Plan Land Use Map. "SFR" = Single-Family Residential; "GI" = General Industrial.
[3] Estimated Daytime Project stationary source noise levels as shown on Table 9-2.
[4] Do the estimated Project operational noise source activities exceed the noise level standards?
"Daytime" = 7:00 a.m. to 10:00 p.m.

Tables 9-5 shows that the nighttime operational noise levels associated with East End and County Industrial Project will satisfy the noise level thresholds at all nearby receiver locations. Therefore, the nighttime operational noise impacts are considered *less than significant* at the nearby noise-sensitive receiver locations.

TABLE 9-5: NIGHTTIME OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	Land Use[2]	Noise Level at Receiver Locations (dBA)[3]					Threshold Exceeded?[4]
		Leq (Average)	L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_{max} (<1 min)	
Nighttime Threshold	**Residential**	**n/a**	**50**	**55**	**60**	**65**	**See Table 3-1**
	Other	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	
R1	SFR	47.7	47.1	48.4	49.4	51.1	No
R2	SFR	33.7	32.6	34.0	35.2	36.9	No
R3	GI	45.5	45.0	46.3	47.3	49.1	No

[1] See Exhibit 9-A for the receiver and noise source locations.
[2] City of Chino General Plan Land Use Map. "SFR" = Single-Family Residential; "GI" = General Industrial.
[3] Estimated Nighttime Project stationary source noise levels as shown on Table 9-3.
[4] Do the estimated Project operational noise source activities exceed the noise level standards?
"Nighttime" = 10:00 p.m. to 7:00 a.m.

9.5 PROJECT OPERATIONAL NOISE LEVEL CONTRIBUTIONS

To describe the Project operational noise level contributions, 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. (6) Instead, they must be logarithmically added using the following base equation:

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

Where "SPL1," "SPL2," etc. are equal to the sound pressure levels being combined, or in this case, the Project-operational and existing ambient noise levels. The difference between the combined Project and ambient noise levels describe the Project noise level contributions to the existing ambient noise environment. Noise levels that would be experienced at receiver locations when Project-source noise is added to the daytime and nighttime ambient conditions are presented on Tables 9-6 and 9-7, respectively. As indicated on Tables 9-6 and 9-7, the Project will generate an unmitigated daytime and nighttime operational noise level increases ranging from 0.0 to 0.1 dBA L_{eq} at the nearby receiver locations. Project-related operational noise level contributions will satisfy the operational noise level increase significance criteria presented in Table 4-2, the increases at the sensitive receiver locations will be *less than significant.*

TABLE 9-6: DAYTIME PROJECT OPERATIONAL NOISE LEVEL CONTRIBUTIONS

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]	Incremental Threshold[7]	Incremental Threshold Exceeded?[7]
R1	48.9	L1	65.7	65.8	0.1	1.5	No
R2	35.1	L2	81.1	81.1	0.0	1.5	No
R3	46.5	L3	61.9	62.0	0.1	3.0	No

[1] See Exhibit 9-A for the sensitive receiver locations.
[2] Combined total daytime Project operational noise levels (dBA Leq) as shown on Table 9-2.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed daytime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] Significance Criteria as defined in Section 4.

TABLE 9-7: NIGHTTIME OPERATIONAL NOISE LEVEL CONTRIBUTIONS

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]	Incremental Threshold[7]	Incremental Threshold Exceeded?[7]
R1	47.7	L1	66.9	67.0	0.1	1.5	No
R2	33.7	L2	79.8	79.8	0.0	1.5	No
R3	45.5	L3	60.9	61.0	0.1	3.0	No

[1] See Exhibit 9-A for the sensitive receiver locations.
[2] Combined total nighttime Project operational noise levels (dBA Leq) as shown on Table 9-3.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed nighttime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] Significance Criteria as defined in Section 4.

9.6 REFLECTION

Field studies conducted by the FHWA have shown that the reflection from barriers and buildings does not substantially increase noise levels. (24) 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.

9.7 OPERATIONAL VIBRATION IMPACTS

To assess the potential vibration impacts from truck haul trips associated with operational activities the City of Chino threshold for vibration of 0.05 in/sec RMS is used. Truck vibration levels are dependent on vehicle characteristics, load, speed, and pavement conditions. According to the FTA *Transit Noise Impact and Vibration Assessment,* (3) trucks rarely create vibration that exceeds 70 VdB or 0.003 in/sec RMS (4) (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 at nearby homes will satisfy the City of Chino vibration threshold of 0.05 in/sec RMS, and therefore, will be *less than significant*.

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, based on the *East End and County Industrial Air Quality Impact Analysis* for the Project: (25)

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

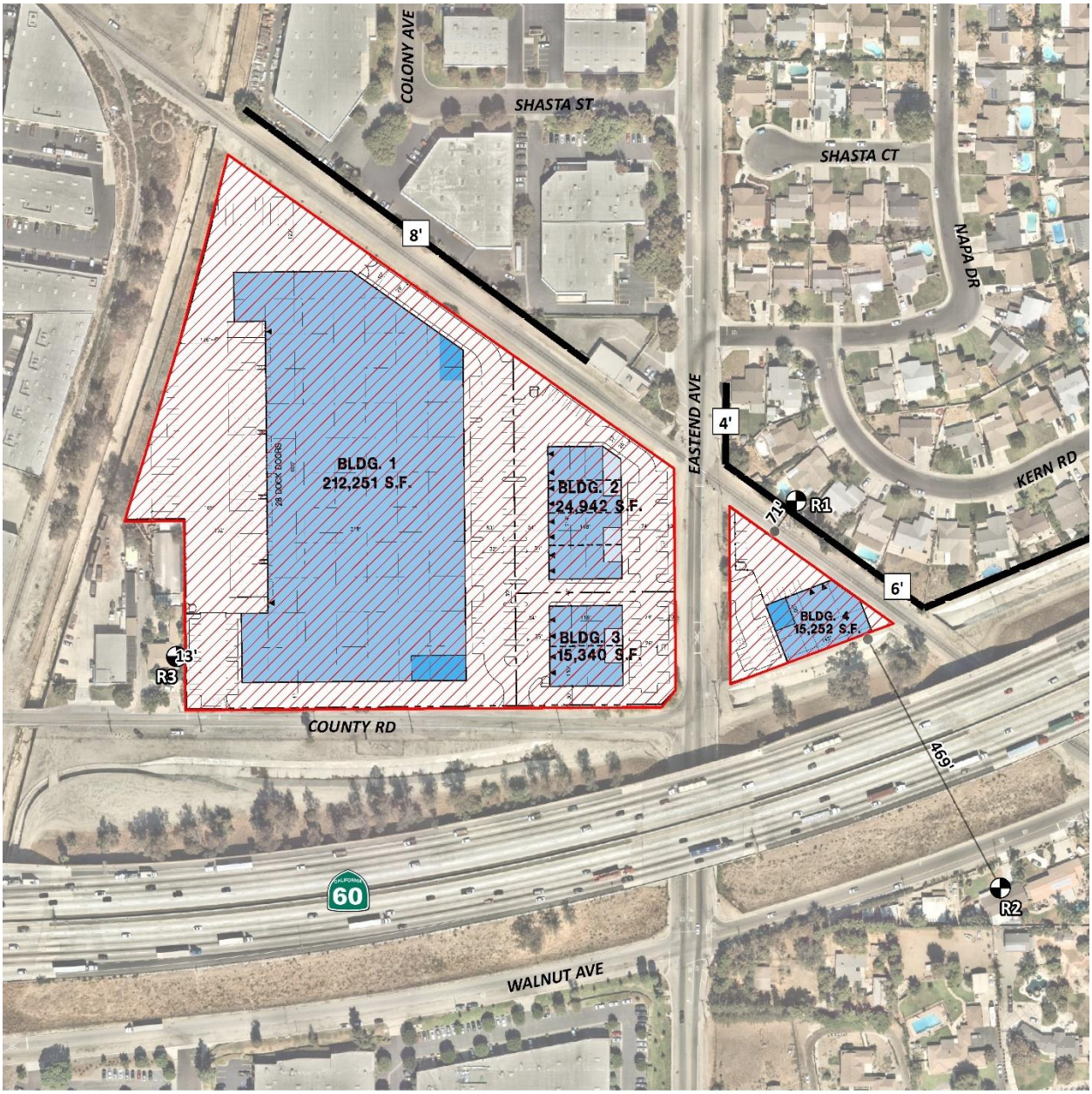
This construction noise analysis was prepared using reference noise level measurements taken by Urban Crossroads, Inc. to describe the typical construction activity noise levels for each stage of Project construction. The construction reference noise level measurements represent typical construction noise levels when multiple pieces of equipment are operating simultaneously at the construction site.

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 PROJECT CONSTRUCTION NOISE LEVELS

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. Appendix 10.1 includes the detailed CadnaA construction noise model inputs.

EXHIBIT 10-A: CONSTRUCTION NOISE SOURCE LOCATIONS



LEGEND:

- Receiver Locations
- 8' Existing Barrier Height (in feet)
- Existing Barrier
- Construction Activity

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 LEVEL COMPLIANCE

To evaluate whether the Project will generate potentially significant short-term noise levels at nearby receiver locations, the City of Chino has identified a construction-related noise level threshold of 65 dBA L_{eq} for noise sensitive residential receiver locations R1 and R2. The City of Chino does not identify any construction noise level thresholds for non-residential receiver locations such as R3.

10.3.1 PROJECT CONSTRUCTION ACTIVITY

The construction noise analysis shows that the highest construction noise levels will occur when construction activities take place at the closest point from primary Project construction activity to each of the nearby receiver locations. As shown on Table 10-2, the unmitigated construction noise levels are expected to range from 51.6 to 64.3 dBA L_{eq} at the nearby noise sensitive residential receiver locations R1 and R2. The construction noise levels at the non-noise sensitive receiver location R3 are estimated at 73.3 dBA $L_{eq.}$ The construction noise analysis shows that the noise sensitive residential receiver locations R1 and R2 will satisfy the 65 dBA L_{eq} significance

threshold during Project construction activities. Therefore, the noise impacts due to Project construction noise is considered *less than significant* at all noise sensitive receiver locations.

TABLE 10-2: PROJECT SITE CONTRUCTION NOISE LEVELS

Receiver Location[1]	Land Use[2]	Construction Noise Levels (dBA L_{eq})		
		Highest Construction Noise Levels[3]	Threshold[4]	Threshold Exceeded?[5]
R1	SFR	64.3	65	No
R2	SFR	51.6	65	No
R3	GI	73.3	n/a	No

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] City of Chino General Plan Land Use Map. "SFR" = Single-Family Residential; "GI" = General Industrial.
[3] 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.
[4] Construction noise level thresholds as shown on Table 4-2.
[5] Do the estimated Project construction noise levels exceed the construction noise level threshold?

10.3.2 PROJECT CONCRETE POUR ACTIVITY

It is our understanding that nighttime concrete pouring activities may occur as a part of Project construction activities. The paving stage construction noise levels, previously presented on Table 10-1, are based on nighttime concrete pouring activity reference noise level measurements. The paving stage construction noise levels are estimated to result in concrete pouring noise levels ranging from 47.5 to 60.2 dBA L_{eq} at the nearby noise sensitive residential receiver locations R1 and R2 as shown on Table 10-3. The concrete pouring construction noise level at the non-noise sensitive receiver location R3 is estimated at 69.2 dBA $L_{eq.}$ The concrete pouring construction noise analysis shows that the noise sensitive residential receiver locations R1 and R2 will satisfy the 65 dBA L_{eq} significance threshold during concrete pouring activities. Therefore, the noise impacts due to daytime or nighttime concrete pouring activity is considered *less than significant*.

TABLE 10-3: PROJECT CONCRETE POUR CONTRUCTION NOISE LEVELS

Receiver Location[1]	Land Use[2]	Construction Noise Levels (dBA L_{eq})		
		Concrete Pour Noise Levels[3]	Threshold[4]	Threshold Exceeded?[5]
R1	SFR	60.2	65	No
R2	SFR	47.5	65	No
R3	GI	69.2	n/a	No

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] City of Chino General Plan Land Use Map. "SFR" = Single-Family Residential; "GI" = General Industrial.
[3] Concrete pouring 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.
[4] Construction noise level thresholds as shown on Table 4-2.
[5] Do the estimated Project construction noise levels exceed the construction noise level threshold?

10.4 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 6-7 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 each of the sensitive receiver locations based on the City of Chino 0.05 in/sec RMS threshold for vibration.

At distances ranging from 71 to 469 feet from Project construction activity, construction vibration velocity levels are expected to approach 0.0132 in/sec RMS at nearby noise sensitive receiver locations R1 and R2, as shown on Table 10-4. The City of Chino does not identify any vibration thresholds for non-residential receiver locations such as R3. Based on the City of Chino vibration standards, the Project construction vibration levels satisfy the 0.05 in/sec RMS threshold at nearby noise sensitive receiver locations R1 and R2 and are, therefore considered *less than significant.*

Further, vibration levels at the site of the closest sensitive receiver are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating simultaneously adjacent to the Project site perimeter. Moreover, construction at the Project site will be restricted to daytime hours consistent with City requirements thereby eliminating potential vibration impacts during the sensitive nighttime hours.

TABLE 10-4: PROJECT CONSTRUCTION VIBRATION LEVELS

Receiver[1]	Land Use[2]	Distance to Const. Activity (Feet)	Receiver PPV Levels (in/sec)[3]					RMS Velocity Levels (in/sec)[4]	Threshold[5]	Threshold Exceeded?[6]
			Small Bulldozer	Jack-hammer	Loaded Trucks	Large Bulldozer	Peak Vibration			
R1	SFR	71'	0.0006	0.0073	0.0159	0.0186	0.0186	0.0132	0.05	No
R2	SFR	469'	0.0000	0.0004	0.0009	0.0011	0.0011	0.0008	0.05	No
R3	GI	13'	0.0080	0.0933	0.2027	0.2373	0.2373	0.1685	n/a	No

[1] Receiver locations are shown on Exhibit 10-A.
[2] City of Chino General Plan Land Use Map. "SFR" = Single-Family Residential; "GI" = General Industrial.
[3] Based on the Vibration Source Levels of Construction Equipment included on Table 6-7.
[4] Vibration levels in PPV are converted to RMS velocity using a 0.71 conversion factor identified in the Caltrans Transportation and Construction Vibration Guidance Manual, September 2013.
[5] Source: City of Chino Municipal Code, Sections 9.40.060(D) and 9.40.110.
[6] Does the vibration level exceed the maximum acceptable vibration threshold?

11 REFERENCES

1. **State of California.** *California Environmental Quality Act, Appendix G.* 2018.
2. **Urban Crossroads, Inc.** *East End County Industrial Traffic Impact Analysis.* November 2019.
3. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment.* September 2018.
4. **California Department of Transportation.** *Transportation and Construction Vibration Guidance Manual.* September 2019.
5. **State of California.** *California Environmental Quality Act, Appendix G.* 2018.
6. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
7. **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.
8. **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.
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10. **U.S. Environmental Protection Agency Office of Noise Abatement and Control.** *Noise Effects Handbook-A Desk Reference to Health and Welfare Effects of Noise.* October 1979 (revised July 1981). EPA 550/9/82/106.
11. **Office of Planning and Research.** *State of California General Plan Guidelines.* October 2017.
12. **State of California.** *2016 California Green Building Standards Code.* January 2017.
13. **City of Chino.** *General Plan Noise Element.* July 2010.
14. **Office of Planning and Research.** *State of California General Plan Guidelines.* October 2003.
15. **City of Chino.** *Municipal Code, Chapter 9.40 - Noise, and Section 20.09.050 Airport Overlay District.*
16. **City of Ontario.** *Municipal Code, Title 5, Chapter 29 - Noise.*
17. **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.
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20. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*
21. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.

22. **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.

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

24. **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.* June, 1995.

25. **Urban Crossroads, Inc.** *East End and County Industrial Air Quality Impact Analysis.* January 2020.

12 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed East End and County Industrial 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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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 CHINO MUNICIPAL CODE

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Chapter 9.40 - NOISE*

Sections:

9.40.010 - Definitions.

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

"Agricultural property" means a parcel of real property which is undeveloped for any use other than agricultural purposes.

"Ambient noise level" means the all-encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding the alleged offensive noise, at the location and approximate time at which a comparison with the alleged offensive noise is to be made.

"A-weighted sound level" means the total sound level meter with a reference pressure of twenty micro-pascals using the A-weighted network (scale) at slow response. The unit of measurement shall be defined as dBA.

"Commercial property" means a parcel of real property which is developed and used as either in or part or in whole for commercial purposes.

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

"Decibel (dB)" means a unit which denotes the ratio between two quantities which are proportional to power: the number of decibels corresponding to the ratio of two amounts of power is ten times the logarithm to the base ten of this ratio.

"Director of community development" means the director of community development of the city of Chino or his/her duly authorized deputy.

"Dwelling unit" means a single unit providing complete independent living facilities for one or more persons including permanent provisions for living, sleeping, eating, cooking and sanitation.

"Emergency machinery, vehicle, work or alarm" means any machinery, vehicle, work or alarm used, employed, performed or operated in an effort to protect, provide or restore safety conditions in the community or for the citizenry, or work by private or public utilities when restoring utility service.

"Fixed noise source" means a stationary device which creates sounds while fixed or motionless including but not limited to residential, agricultural, industrial and commercial machinery and equipment, pumps, fans, compressors, air conditioners and refrigeration equipment.

"Grading" means any excavating of filling of earth material or any combination thereof conducted at a site to prepare said site for construction or other improvements thereon.

"Hertz (Hz)" means the unit which describes the frequency of a function periodic in time which is the reciprocal of the period.

"Health care institution" means any hospital, convalescent home or other similar facility excluding residential.

"Impulsive noise" means a noise of short duration usually less than one second and of high intensity, with an abrupt onset and rapid decay.

"Industrial property" means a parcel of real property which is developed and used either in part or in whole for manufacturing purposes.

"Intruding noise level" means the total sound level, in decibels, created, caused, maintained or originating from an alleged offensive source at a specified location while the alleged offensive source is in operation.

"Licensed" means the issuance of a formal license or permit by the appropriate jurisdictional authority, or where no permits or licenses are issued, the sanctioning of the activity by the jurisdiction as noted in public record.

"Major roadway" means any street, avenue, boulevard or highway used for motor vehicle traffic which is owned or controlled by a public government entity.

"Mobile noise source" means any noise source other than a fixed noise source.

"Person" means a person, firm, association, co-partnership, joint venture, corporation or any entity, public or private in nature.

"Residential property" means a parcel of real property which is developed and used either in part or in whole for residential purposes, other than transient uses such as hotels and motels, and residential care facilities.

"Simple tone noise" means a noise characterized by a predominant frequency or frequencies so that other frequencies cannot be readily distinguished. If measured, simple tone noise shall exist if the one-third octave band sound pressure levels in the band with the tone exceeds the arithmetic average of the sound pressure levels of the two continuous one-third octave bands as follows: 5 dB for frequencies of 500 Hertz (Hz) and above or; by 15 dB for frequencies less than equal to 125 Hz.

"Sound level meter" means an instrument meeting American National Standard Institute's Standard S1.4-1971 or most recent revision thereof for Type 2 sound level meters or an instrument and the associated recording and analyzing equipment which will provide equivalent data.

"Sound pressure level" of a sound, in decibels, means twenty times the logarithm to the base 10 of the ratio of the pressure of the sound to a reference pressure shall be explicitly stated.

"Vibration" means any movement of the earth, ground or other similar surface created by a temporal and spacial oscillation device or equipment located upon, affixed in conjunction with that surface.

(Ord. 95-10 § 1 (part), 1995.)

9.40.020 - Decibel measurement criteria.

Any decibel measurement made pursuant to the provisions of this chapter shall be based on a reference sound pressure of twenty micro-pascals as measured with a sound level meter using the A-weighted network (scale) at slow response.

(Ord. 95-10 § 1 (part), 1995.)

9.40.030 - Designated noise zones.

The properties hereinafter described are assigned to the following noise zones:

Noise Zone I: All single-, double- and multiple-family residential properties.

Noise Zone II: All commercial properties.

Noise Zone III: All manufacturing or industrial properties.

(Ord. 95-10 § 1 (part), 1995.)

9.40.040 - Exterior noise standards.

The following noise standards, unless otherwise specifically indicated, shall apply to all residential property with a designated noise zone:

These criteria are given in terms of allowable noise levels for a given period of time at the residential property boundary. Higher noise levels are permitted during the day (seven a.m. to ten p.m.) than the night (ten p.m. to seven a.m.). The table below shows the acceptable levels at residential land uses during the daytime and nighttime.

City of Chino Exterior Noise Ordinance

Criteria for Residential Properties (Zone 1)

Maximum Time of Exposure	Noise		
Metric	Noise Level Not to Exceed		
		7 am—10 pm	10 pm—7 am
30 min/hr	L50	55 dBA	50 dBA
15 min/hr	L25	60 dBA	55 dBA
5 min/hr	L8.3	65 dBA	60 dBA
1 min/hr	L1.7	70 dBA	65 dBA
Any period of time	Lmax	75 dBA	70 dBA

Each of the noise limits specified here shall be reduced by five dBA for impulse or simple tone noises, or for noises consisting of speech or music; provided, however, that if the ambient noise level exceeds the resulting standard, the ambient shall be the standard.

It is unlawful for any person at any location within the incorporated area of the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level when measured on any other property, to exceed:

A. The noise standard for a cumulative period of more than thirty minutes in any hour; or

B. The noise standard plus five dBA for a cumulative period of more than fifteen minutes in any hour; or

C. The noise standard plus ten dBA for a cumulative period of more than five minutes in any hour; or

D. The noise standard plus fifteen dBA for a cumulative period of more than one minute in any hour; or

E. The noise standard plus twenty dBA for any period of time.

In the event the ambient noise level exceeds any of the first four noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

If the measurement location is on boundary between two different noise zones, the lower noise level standard applicable to the noise zone shall apply.

If the intruding noise source is continuous and cannot be reasonably discontinued or stopped for a time period whereby the ambient noise level can be determined, the measured noise level obtained while the source is in operation shall be compared directly to the allowable noise level standards as specified respective to the measurement location's designated land use and for the time of the day the noise level is measured.

A. The reasonableness of temporarily discontinuing the noise generation by an intruding noise source shall be determined by the director or his/her duly authorized deputy for the purpose of establishing the existing ambient noise level at the measurement location.

(Ord. 95-10 § 1 (part), 1995.)

9.40.050 - Interior noise standards.

The following noise standard, unless otherwise specifically indicated, shall apply to all residential property within all noise zones:

Each of the noise limits specified above shall be reduced by five dBA for impulse or simple tone noises or for noises consisting of speech or music provided, however, if the ambient noise level exceeds the resulting standard, the ambient shall be the standard.

It is unlawful for any person at any location within the incorporated area of the city to create any noise or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such a person which causes the noise level when measured within any other residential dwelling unit in any noise zone to exceed:

A. The noise standard for cumulative period of more than five minutes in any hour; or

B. The noise standard plus 5 dBA for a cumulative period of more than one minute in any hour; or

C. The noise standard plus ten dBA for any period of time.

In the event the ambient noise level exceeds any of the first two noise limit categories above, the noise standard applicable to said category shall be increased to reflect the maximum ambient noise level.

If the measurement location is on a boundary between two different noise zones, the lower noise level standard applicable to the noise zone shall apply.

If the intruding noise source is continuous and cannot reasonably be discontinued or stopped for a time period whereby the ambient noise level can be determined; the same procedures specified in Section 9.40.040(E), shall be deemed proper to enforce the provisions of this section.

(Ord. 95-10 § 1 (part), 1995.)

9.40.060 - Special provisions.

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

A. Activities conducted on public parks, public playgrounds and public or private school grounds including school athletic and school entertainment events that are conducted under the sanction of the school or which a license or permit has been duly issued pursuant to any provision of the city code;

B. Occasional outdoor gatherings, public dances, show, sporting and entertainment events, provided said events are conducted pursuant to a permit or license issued by the appropriate jurisdiction relative to the staging of said events. Such permits and licenses may restrict noise;

C. Any mechanical device, apparatus or equipment used, related to or connected with emergency machinery, vehicle, work or warning alarm or bell, provided the sounding of any bell or alarm on any building or motor vehicle shall terminate its operation within thirty minutes in any hour of its being activated;

D. Noise sources associated with or vibration created by construction, repair, remodeling or grading of any real property or during authorized seismic surveys, provided said activities do not take place outside the hours for construction as defined in Section 15.44.030 of this code, and provided the noise standard of sixty-five dBA plus the limits specified in Section 9.40.040(B) as measured on residential property and any vibration created does not endanger the public health, welfare and safety;

E. All mechanical devices, apparatus or equipment associated with agriculture operations provided:

1. Operations do not take place between eight p.m. and seven a.m. on weekdays, including Saturday, or at any time Sunday or a Federal holiday, or

2. Such operations and equipment are utilized for the protection of salvage of agricultural crops during periods of potential or actual frost damage or other adverse weather conditions, or

3. Such operations and equipment are associated with agricultural pest control through pesticide application, provided the application is made in accordance with permits issued by or regulations enforced by the California Department of Agriculture,

4. Noise sources associated with the maintenance of real property, provided said activities take place between the hours of seven a.m. to eight p.m. on any day except Sunday, or between the hours of nine a.m. and eight p.m. on Sunday,

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

NOTE: Preemption may include motor vehicle, aircraft in flight, and railroad noise regulations.

(Ord. 2004-23 § 59, 2004; Ord. 95-10 § 1 (part), 1995.)

9.40.070 - Schools, churches, libraries, health care institutions—Special provisions.

It shall be deemed unlawful for any person to create any noise which causes the noise level at any school, hospital or similar health care institution, church or library while the same is in use, to exceed the noise standards specified in Section 9.40.040 prescribed for the assigned noise zone level, unreasonably interferes with the use of such institutions, or which unreasonably disturbs or annoys patients in a hospital, convalescent home or other similar health care institutions, provided conspicuous signs are displayed in three separate locations within one-tenth-mile of the institution or facility indicating a quiet zone.

(Ord. 95-10 § 1 (part), 1995.)

9.40.080 - Air conditioning and refrigeration—Special provisions.

Until January 1, 1996, the noise standards enumerated in Section 9.40.040 and 9.40.050 shall be increased five dBA where the alleged intruding noise source is an air conditioning or refrigeration system or associated equipment which was installed prior to the effective date of the ordinance codified in this chapter.

(Ord. 95-10 § 1 (part), 1995.)

9.40.090 - Noise sources generated on publicly owned property.

Notwithstanding any other provision of this code and in addition thereto, it is unlawful for any person to permit or cause any noise, sound, music or program to be emitted from any radio, tape player, tape recorder, record player, television outdoors, or any other mode on or in any publicly owned property, park or place when such noise, sound, music or program is audible to a person of normal hearing sensitivity one hundred feet from said radio, tape player, tape recorder, record player or television.

A. As used herein, "a person of normal hearing sensitivity" means a person who has a hearing threshold level of between zero decibels and twenty-five decibels HL averaged over the frequencies 500, 1,000 and 2,000 Hertz.

B. Notwithstanding any other provision of this code, any person violating this section shall be guilty of an infraction and upon conviction thereof, is punishable by a fine not exceeding fifty dollars, for a first violation; a fine not exceeding one hundred dollars for a second violation of this section within one year; a fine not exceeding two hundred fifty dollars for each additional violation of this section within one year. A person who violates the provisions of this section shall be deemed to be guilty of a separate offense for each day, or portion thereof, during which the violation continues or is repeated.

C. Notwithstanding any other provision of this code, no citation or notice to appear shall be issued or criminal complaint shall be filed for a violation of this section unless the offending party is first given a verbal or written notification of violation by any peace officer, public officer, park ranger or other person charged with enforcing this section and the offending party given an opportunity to correct said violation.

D. This section shall not apply to broadcasting from any aircraft, vehicle or stationary sound amplifying equipment or to the use of radios, tape players, tape recorders, record players or televisions in the course of an assembly or festival for which a license has been issued or a parade for which a permit has been issued pursuant to or any other activity, assembly or function for which a permit or license has been duly issued pursuant to any provision of the city code.

(Ord. 95-10 § 1 (part), 1995.)

9.40.100 - Noise level measurement.

The location selected for measuring exterior noise levels shall be made within the affected residential unit. The measurements shall be made at a point at least four feet from the wall, ceiling or floor nearest the noise source with windows in an open position depending on the normal seasonal ventilation requirements.

(Ord. 95-10 § 1 (part), 1995.)

9.40.110 - Vibration.

Notwithstanding other sections of this chapter, it is unlawful for any person to create, maintain or cause any ground vibration which is perceptible without instruments at any point on any affected property adjoining the property on which the vibration source is located. For the purpose of this chapter, the perception threshold shall be presumed to be more than 0.05 inches per second RMS vertical velocity.

(Ord. 95-10 § 1 (part), 1995.)

9.40.120 - Proposed developments.

Each department whose duty it is to review and approve new projects or changes to existing projects that result or may result in the creation of noise shall consult with the director prior to any such approval. If at any time the director of community development has reason to believe that a standard, regulation, action, proposed standard, regulation or action of any department respecting noise does not conform to the provisions as specified in this chapter, the director may request such department to consult with them on the advisability of revising such standard or regulation to obtain uniformity.

(Ord. 95-10 § 1 (part), 1995.)

9.40.130 - Variance procedure.

The variance procedure process shall remain as specified in the city's zoning code (Title 20).

(Ord. 95-10 § 1 (part), 1995.)

9.40.140 - Planning commission.

The planning commission shall evaluate all applications for variance from the requirements of this chapter and may grant said variances with respect to time for compliance, subject to such terms, conditions and requirements as it may deem reasonable to achieve maximum compliance with the provisions of this chapter. Said terms, conditions and requirements may include, but shall not be limited to, limitation on noise levels and operating hours. Each such variance shall set forth in detail the approved method of achieving maximum compliance and a time schedule for its accomplishment. In its determinations, the commission shall consider the following:

A. The magnitude of nuisance caused by the offensive noise;

B. The uses of property within the area of impingement by the noise;

C. The time factors related to study, design, financing and construction of remedial work;

D. The economic factors related to age and useful life of the equipment;

E. The general public interest, welfare and safety.

Any variance granted by the commission shall be by resolution and shall be transmitted to the director of community development for enforcement. Any violation of the terms of said variance shall be unlawful.

The planning commission may require additional acoustical studies based on the individual circumstances of each case. Such studies must be performed by a person qualified in acoustical engineering with the state of California.

Meetings of the planning commission shall be held at the call of the secretary and at such times and locations as the commission shall determine. All such meetings shall be open to the public.

(Ord. 95-10 § 1 (part), 1995.)

9.40.150 - Appeals.

The appeal procedure process shall remain as specified in the city's zoning code (Title 20).

(Ord. 95-10 § 1 (part), 1995.)

9.40.160 - Prima facie violation.

Any noise exceeding the noise level standard as specified in Section 9.40.040 and 9.40.050 or vibration exceeding the standard as specified in Section 9.40.110 of this chapter, shall be deemed to be prima facie evidence of a violation of the provisions of this chapter.

(Ord. 95-10 § 1 (part), 1995.)

9.40.170 - Violations/misdemeanors.

Any persons violating any of the provisions of this chapter shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined in an amount not to exceed an amount as specified by city council resolution, or be imprisoned in the Jail for a period not to exceed six months or by both such fine and imprisonment. Each day such violation is committed or permitted to continue shall constitute a separate offense and shall be punishable as such.

(Ord. 95-10 § 1 (part), 1995.)

9.40.180 - Violations/additional remedies— Injunctions.

As an additional remedy, the operation or maintenance of any device, instrument, vehicle or machinery in violation of any provisions of this chapter which operation or maintenance causes or creates sound levels or vibration exceeding the allowable standards as specified in this chapter shall be deemed and is hereby declared to be a public nuisance and may be subject to abatement summarily by a restraining order or injunction issued by a court of competent jurisdiction.

Any violation of this chapter is declared to be a public nuisance and may be abated in accordance with law. The expense of this chapter is declared to be public nuisance and may be by resolution of the city council declared to be a lien against the property on which such nuisance is maintained, and such lien shall be made a personal obligation of the property owner.

(Ord. 95-10 § 1 (part), 1995.)

9.40.190 - Manner of enforcement.

The director is directed to enforce the provisions of this chapter and is authorized and may cite at his/her discretion, any person without a warrant who has reasonable cause to believe that such person has committed a misdemeanor in his/her presence.

No person shall interfere with, oppose or resist any authorized person charged with the enforcement of this chapter while such person is engaged in the performance of his/her duty.

Violations of this chapter shall be prosecuted in the same manner as other misdemeanor violations pursuant to Chapter 1.12; provided, however, that in the event of an initial violation of the provisions of this chapter, a written notice shall be given the alleged violator which specifies the time by which the condition shall be corrected or an application for variance shall be received by the event the cause of the violation has been removed, the condition abated or fully corrected within the time period specified in the written notice.

In the event the alleged violated cannot be located in order to serve the notice of intention to prosecute, the notice as required herein shall be deemed to be given upon mailing such notice to registered or certified mail to the alleged violator at his last known address or at the place where the violation occurred in which event the specified time period for abating the violation or applying for a variance shall commence at the date of the day following the mailing of such notice. Subsequent violations of the same offense shall result in the immediate filing of a misdemeanor complaint.

(Ord. 95-10 § 1 (part), 1995.)

9.40.200 - Delay in implementation—Fixed noise sources.

None of the provisions of this chapter shall apply to a fixed sound source during the period commencing the effective date of this chapter and terminating one-hundred eighty days thereafter.

(Ord. 95-10 § 1 (part), 1995.)

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APPENDIX 5.1:

STUDY AREA PHOTOS

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JN: 12829 Study Area Photos

L1_E
34, 1' 38.790000", 117, 43' 27.800000"

L1_N
34, 1' 39.730000", 117, 43' 26.750000"

L1_S
34, 1' 38.780000", 117, 43' 27.740000"

L1_W
34, 1' 38.820000", 117, 43' 27.880000"

L2_E
34, 1' 31.010000", 117, 43' 24.580000"

L2_N
34, 1' 30.990000", 117, 43' 24.610000"

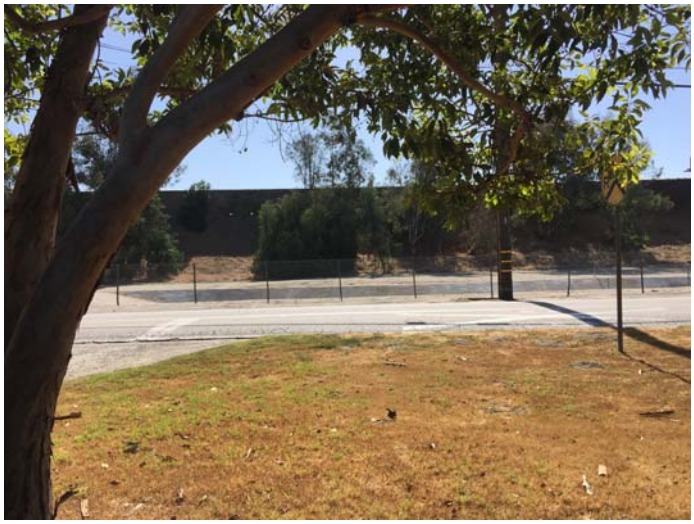
JN: 12829 Study Area Photos

L2_S
34, 1' 30.990000", 117, 43' 24.580000"

L2_W
34, 1' 31.010000", 117, 43' 24.580000"

L3_E
34, 1' 34.480000", 117, 43' 36.810000"

L3_N
34, 1' 34.540000", 117, 43' 36.810000"



L3_S
34, 1' 34.500000", 117, 43' 36.810000"

L3_W
34, 1' 34.500000", 117, 43' 36.810000"

APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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24-Hour Noise Level Measurement Summary

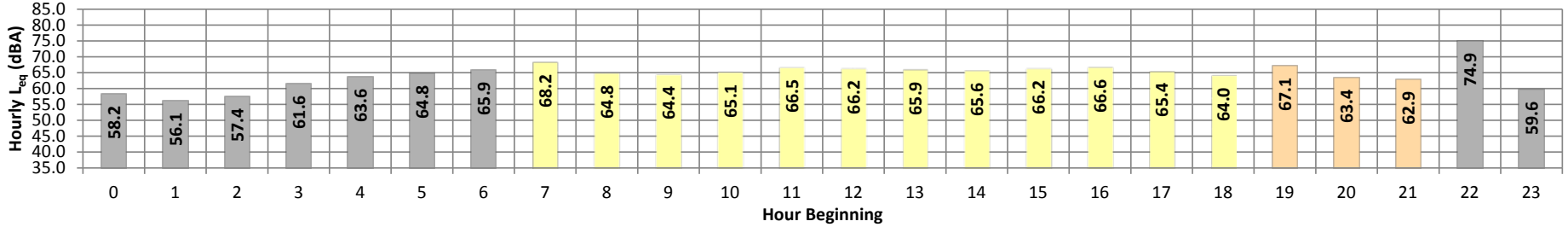
Date: Wednesday, October 30, 2019
Project: East End and Country Industrial

Location: L1 - Located north of project site on East End Avenue near railroad tracks and across existing residential homes.

Meter: Piccolo I

JN: 12829
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	58.2	73.1	49.1	67.0	64.0	62.0	61.0	58.0	56.0	52.0	51.0	50.0	58.2	10.0	68.2
	1	56.1	75.6	49.2	62.0	60.0	58.0	57.0	56.0	54.0	52.0	51.0	50.0	56.1	10.0	66.1
	2	57.4	72.9	51.2	65.0	63.0	60.0	59.0	57.0	56.0	53.0	53.0	52.0	57.4	10.0	67.4
	3	61.6	73.3	55.4	68.0	67.0	64.0	64.0	62.0	60.0	57.0	57.0	56.0	61.6	10.0	71.6
	4	63.6	82.4	54.1	71.0	69.0	67.0	66.0	64.0	62.0	56.0	55.0	54.0	63.6	10.0	73.6
	5	64.8	81.7	56.2	74.0	72.0	69.0	67.0	64.0	62.0	59.0	58.0	57.0	64.8	10.0	74.8
	6	65.9	85.5	56.6	74.0	72.0	70.0	68.0	65.0	63.0	59.0	58.0	57.0	65.9	10.0	75.9
Day	7	68.2	93.6	53.7	76.0	73.0	71.0	70.0	67.0	65.0	59.0	58.0	55.0	68.2	0.0	68.2
	8	64.8	80.9	53.3	72.0	71.0	69.0	68.0	65.0	62.0	58.0	57.0	56.0	64.8	0.0	64.8
	9	64.4	80.2	54.9	73.0	71.0	68.0	67.0	64.0	61.0	58.0	57.0	56.0	64.4	0.0	64.4
	10	65.1	80.1	55.1	73.0	71.0	69.0	68.0	65.0	63.0	60.0	59.0	58.0	65.1	0.0	65.1
	11	66.5	80.6	58.9	73.0	72.0	70.0	69.0	66.0	65.0	62.0	61.0	60.0	66.5	0.0	66.5
	12	66.2	82.8	58.1	74.0	71.0	69.0	68.0	66.0	64.0	61.0	61.0	60.0	66.2	0.0	66.2
	13	65.9	83.1	58.9	73.0	71.0	69.0	68.0	66.0	64.0	62.0	61.0	60.0	65.9	0.0	65.9
	14	65.6	83.4	57.8	74.0	71.0	69.0	68.0	65.0	63.0	60.0	60.0	59.0	65.6	0.0	65.6
	15	66.2	80.7	56.6	74.0	73.0	70.0	69.0	66.0	64.0	60.0	59.0	57.0	66.2	0.0	66.2
	16	66.6	84.7	56.9	75.0	73.0	70.0	69.0	66.0	64.0	59.0	59.0	58.0	66.6	0.0	66.6
	17	65.4	86.7	56.4	73.0	71.0	69.0	68.0	65.0	63.0	59.0	58.0	57.0	65.4	0.0	65.4
	18	64.0	82.0	53.9	72.0	70.0	68.0	67.0	64.0	61.0	57.0	57.0	55.0	64.0	0.0	64.0
Evening	19	67.1	87.4	56.2	77.0	74.0	69.0	67.0	64.0	61.0	59.0	58.0	57.0	67.1	5.0	72.1
	20	63.4	83.8	54.6	72.0	69.0	66.0	65.0	62.0	60.0	58.0	57.0	56.0	63.4	5.0	68.4
	21	62.9	83.1	53.7	72.0	69.0	66.0	65.0	62.0	60.0	57.0	56.0	55.0	62.9	5.0	67.9
Night	22	74.9	103.8	51.9	73.0	69.0	66.0	64.0	61.0	59.0	56.0	55.0	54.0	74.9	10.0	84.9
	23	59.6	77.8	51.4	68.0	66.0	63.0	62.0	59.0	57.0	54.0	53.0	52.0	59.6	10.0	69.6

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	64.0	80.1	53.3	72.0	70.0	68.0	67.0	64.0	61.0	57.0	57.0	55.0
	Max	68.2	93.6	58.9	76.0	73.0	71.0	70.0	67.0	65.0	62.0	61.0	60.0
Energy Average		65.9	Average:		73.5	71.5	69.3	68.3	65.4	63.3	59.6	58.9	57.6
Evening	Min	62.9	83.1	53.7	72.0	69.0	66.0	65.0	62.0	60.0	57.0	56.0	55.0
	Max	67.1	87.4	56.2	77.0	74.0	69.0	67.0	64.0	61.0	59.0	58.0	57.0
Energy Average		64.9	Average:		73.7	70.7	67.0	65.7	62.7	60.3	58.0	57.0	56.0
Night	Min	56.1	72.9	49.1	62.0	60.0	58.0	57.0	56.0	54.0	52.0	51.0	50.0
	Max	74.9	103.8	56.6	74.0	72.0	70.0	68.0	65.0	63.0	59.0	58.0	57.0
Energy Average		66.9	Average:		69.1	66.9	64.3	63.1	60.7	58.8	55.3	54.6	53.6

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
66.2	65.7	66.9

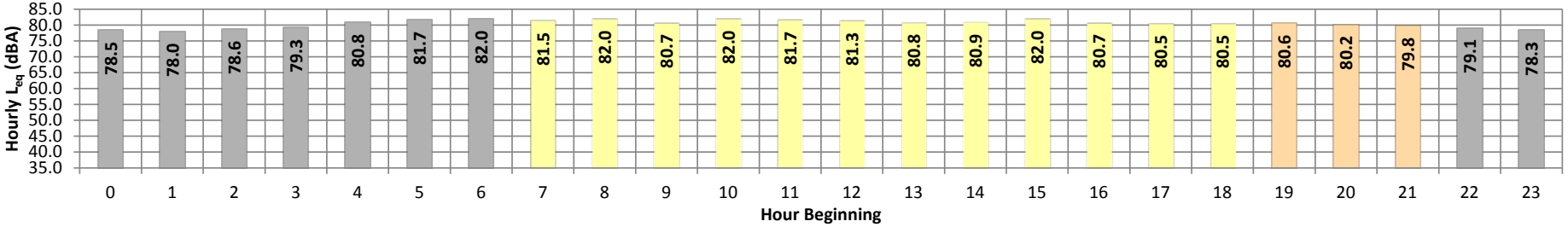
24-Hour CNEL (dBA)

73.3

24-Hour Noise Level Measurement Summary

Date: Wednesday, October 30, 2019
Project: East End and Country Industrial
Location: L2 - Located southeast of the project site on Walnut Avenue near existing residential homes.
Meter: Piccolo I
JN: 12829
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	78.5	95.3	64.2	85.0	84.0	83.0	82.0	79.0	76.0	71.0	70.0	68.0	78.5	10.0	88.5
	1	78.0	95.9	65.9	85.0	84.0	82.0	81.0	78.0	76.0	71.0	70.0	69.0	78.0	10.0	88.0
	2	78.6	91.8	66.7	85.0	84.0	82.0	82.0	79.0	77.0	72.0	71.0	70.0	78.6	10.0	88.6
	3	79.3	92.2	68.0	85.0	84.0	83.0	82.0	80.0	78.0	74.0	73.0	71.0	79.3	10.0	89.3
	4	80.8	90.8	72.3	86.0	85.0	84.0	83.0	81.0	79.0	77.0	76.0	75.0	80.8	10.0	90.8
	5	81.7	97.3	72.9	87.0	86.0	85.0	84.0	82.0	80.0	78.0	77.0	76.0	81.7	10.0	91.7
	6	82.0	96.4	72.9	87.0	86.0	85.0	84.0	82.0	81.0	78.0	78.0	76.0	82.0	10.0	92.0
Day	7	81.5	101.3	73.1	87.0	86.0	84.0	84.0	82.0	80.0	77.0	77.0	75.0	81.5	0.0	81.5
	8	82.0	98.9	71.2	87.0	86.0	85.0	84.0	82.0	81.0	78.0	77.0	75.0	82.0	0.0	82.0
	9	80.7	102.6	71.1	88.0	85.0	83.0	83.0	80.0	79.0	76.0	75.0	74.0	80.7	0.0	80.7
	10	82.0	103.3	71.4	88.0	87.0	85.0	84.0	82.0	80.0	77.0	76.0	74.0	82.0	0.0	82.0
	11	81.7	101.0	70.4	87.0	86.0	85.0	84.0	82.0	80.0	77.0	76.0	74.0	81.7	0.0	81.7
	12	81.3	104.8	70.9	87.0	86.0	84.0	83.0	81.0	80.0	76.0	76.0	74.0	81.3	0.0	81.3
	13	80.8	103.2	70.8	87.0	86.0	84.0	83.0	81.0	79.0	76.0	75.0	73.0	80.8	0.0	80.8
	14	80.9	103.2	71.1	87.0	86.0	84.0	83.0	81.0	79.0	76.0	75.0	73.0	80.9	0.0	80.9
	15	82.0	107.2	70.3	88.0	86.0	84.0	83.0	81.0	79.0	76.0	75.0	73.0	82.0	0.0	82.0
	16	80.7	103.4	69.3	87.0	86.0	84.0	83.0	81.0	79.0	76.0	75.0	73.0	80.7	0.0	80.7
	17	80.5	101.0	70.2	86.0	85.0	84.0	83.0	81.0	79.0	76.0	75.0	73.0	80.5	0.0	80.5
	18	80.5	105.7	70.0	86.0	85.0	83.0	82.0	80.0	78.0	75.0	74.0	73.0	80.5	0.0	80.5
Evening	19	80.6	107.0	69.3	86.0	85.0	83.0	83.0	80.0	78.0	75.0	74.0	72.0	80.6	5.0	85.6
	20	80.2	99.3	69.9	86.0	85.0	84.0	83.0	81.0	79.0	75.0	74.0	73.0	80.2	5.0	85.2
	21	79.8	104.8	67.6	86.0	85.0	83.0	82.0	80.0	78.0	74.0	72.0	71.0	79.8	5.0	84.8
Night	22	79.1	99.6	66.6	86.0	85.0	83.0	82.0	79.0	77.0	73.0	72.0	70.0	79.1	10.0	89.1
	23	78.3	93.8	65.4	85.0	84.0	83.0	82.0	79.0	76.0	71.0	70.0	68.0	78.3	10.0	88.3

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	80.5	98.9	69.3	86.0	85.0	83.0	82.0	80.0	78.0	75.0	74.0	73.0
	Max	82.0	107.2	73.1	88.0	87.0	85.0	84.0	82.0	81.0	78.0	77.0	75.0
Energy Average		81.3	Average:		87.1	85.8	84.1	83.3	81.2	79.4	76.3	75.5	73.7
Evening	Min	79.8	99.3	67.6	86.0	85.0	83.0	82.0	80.0	78.0	74.0	72.0	71.0
	Max	80.6	107.0	69.9	86.0	85.0	84.0	83.0	81.0	79.0	75.0	74.0	73.0
Energy Average		80.2	Average:		86.0	85.0	83.3	82.7	80.3	78.3	74.7	73.3	72.0
Night	Min	78.0	90.8	64.2	85.0	84.0	82.0	81.0	78.0	76.0	71.0	70.0	68.0
	Max	82.0	99.6	72.9	87.0	86.0	85.0	84.0	82.0	81.0	78.0	78.0	76.0
Energy Average		79.8	Average:		85.7	84.7	83.3	82.4	79.9	77.8	73.9	73.0	71.4

L_{eq} (dBA)

24-Hour	*Daytime*	*Nighttime*
80.6	**81.1**	**79.8**

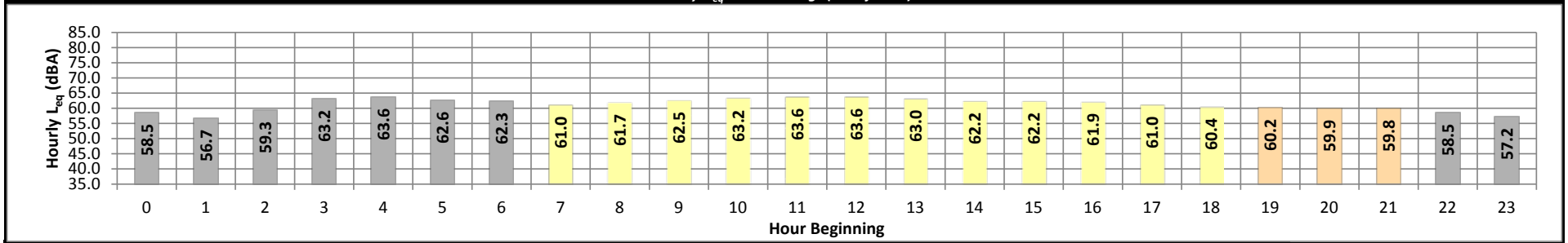
24-Hour CNEL (dBA)

86.7

24-Hour Noise Level Measurement Summary

Date: Wednesday, October 30, 2019
Project: East End and Country Industrial
Location: L3 - Located next to western boundary of the Project site off County Road near existing nursery.
Meter: Piccolo I
JN: 12829
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	58.5	71.8	51.3	65.0	63.0	61.0	60.0	59.0	57.0	54.0	54.0	53.0	58.5	10.0	68.5
	1	56.7	64.4	50.5	60.0	60.0	59.0	58.0	57.0	56.0	54.0	53.0	52.0	56.7	10.0	66.7
	2	59.3	70.3	52.2	64.0	63.0	62.0	62.0	60.0	58.0	55.0	54.0	53.0	59.3	10.0	69.3
	3	63.2	72.8	57.5	68.0	67.0	66.0	65.0	64.0	62.0	60.0	59.0	58.0	63.2	10.0	73.2
	4	63.6	75.5	55.1	69.0	68.0	67.0	66.0	65.0	62.0	58.0	57.0	56.0	63.6	10.0	73.6
	5	62.6	79.7	55.6	68.0	66.0	65.0	65.0	63.0	61.0	59.0	58.0	57.0	62.6	10.0	72.6
	6	62.3	82.3	57.3	68.0	67.0	65.0	64.0	62.0	61.0	59.0	58.0	57.0	62.3	10.0	72.3
Day	7	61.0	74.2	53.7	68.0	67.0	64.0	64.0	61.0	59.0	56.0	55.0	54.0	61.0	0.0	61.0
	8	61.7	72.0	57.2	67.0	66.0	64.0	63.0	62.0	61.0	59.0	58.0	58.0	61.7	0.0	61.7
	9	62.5	86.3	55.4	69.0	67.0	65.0	64.0	61.0	60.0	58.0	57.0	56.0	62.5	0.0	62.5
	10	63.2	77.1	56.5	69.0	68.0	66.0	65.0	63.0	62.0	60.0	59.0	58.0	63.2	0.0	63.2
	11	63.6	76.9	57.8	69.0	67.0	66.0	65.0	64.0	62.0	60.0	60.0	59.0	63.6	0.0	63.6
	12	63.6	75.0	58.1	69.0	68.0	66.0	66.0	64.0	62.0	60.0	60.0	59.0	63.6	0.0	63.6
	13	63.0	72.6	57.5	67.0	66.0	65.0	64.0	63.0	62.0	60.0	60.0	58.0	63.0	0.0	63.0
	14	62.2	71.1	55.4	66.0	66.0	64.0	64.0	62.0	61.0	59.0	59.0	58.0	62.2	0.0	62.2
	15	62.2	73.8	56.7	69.0	67.0	65.0	64.0	62.0	61.0	59.0	58.0	58.0	62.2	0.0	62.2
	16	61.9	72.9	56.7	67.0	66.0	65.0	64.0	62.0	61.0	59.0	58.0	57.0	61.9	0.0	61.9
	17	61.0	73.9	55.9	67.0	65.0	64.0	63.0	61.0	60.0	58.0	57.0	56.0	61.0	0.0	61.0
	18	60.4	71.7	54.8	65.0	64.0	63.0	62.0	60.0	59.0	57.0	56.0	55.0	60.4	0.0	60.4
Evening	19	60.2	76.0	55.0	66.0	64.0	62.0	62.0	60.0	59.0	57.0	57.0	56.0	60.2	5.0	65.2
	20	59.9	76.5	53.6	66.0	64.0	62.0	61.0	60.0	58.0	57.0	56.0	55.0	59.9	5.0	64.9
	21	59.8	72.3	54.4	66.0	64.0	62.0	62.0	60.0	58.0	56.0	56.0	55.0	59.8	5.0	64.8
Night	22	58.5	70.8	50.7	64.0	63.0	61.0	60.0	59.0	57.0	55.0	55.0	54.0	58.5	10.0	68.5
	23	57.2	73.9	49.8	63.0	62.0	60.0	59.0	57.0	56.0	53.0	53.0	52.0	57.2	10.0	67.2

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	60.4	71.1	53.7	65.0	64.0	63.0	62.0	60.0	59.0	56.0	55.0	54.0
	Max	63.6	86.3	58.1	69.0	68.0	66.0	66.0	64.0	62.0	60.0	60.0	59.0
Energy Average		62.3	Average:		67.7	66.4	64.8	64.0	62.1	60.8	58.8	58.1	57.2
Evening	Min	59.8	72.3	53.6	66.0	64.0	62.0	61.0	60.0	58.0	56.0	56.0	55.0
	Max	60.2	76.5	55.0	66.0	64.0	62.0	62.0	60.0	59.0	57.0	57.0	56.0
Energy Average		60.0	Average:		66.0	64.0	62.0	61.7	60.0	58.3	56.7	56.3	55.3
Night	Min	56.7	64.4	49.8	60.0	60.0	59.0	58.0	57.0	56.0	53.0	53.0	52.0
	Max	63.6	82.3	57.5	69.0	68.0	67.0	66.0	65.0	62.0	60.0	59.0	58.0
Energy Average		60.9	Average:		65.4	64.3	62.9	62.1	60.7	58.9	56.3	55.7	54.7

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
61.6	61.9	60.9

24-Hour CNEL (dBA)

67.7

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APPENDIX 7.1:

OFF-SITE TRAFFIC NOISE CONTOURS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2019) | Project Name: East End and County Indu
Road Name: Reservoir St. | Job Number: 12829
Road Segment: n/o Country Rd.

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	22,026 vehicles	Autos:	15
Peak Hour Percentage:	8.64%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	1,903 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	40 mph	**Vehicle Mix**	
Near/Far Lane Distance:	36 feet		
Site Data			
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	50.0 feet		
Centerline Dist. to Observer:	50.0 feet		
Barrier Distance to Observer:	0.0 feet		
Observer Height (Above Pad):	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		

VehicleType	Day	Evening	Night	Daily
Autos:	71.1%	10.9%	18.0%	91.42%
Medium Trucks:	73.6%	7.7%	18.6%	4.64%
Heavy Trucks:	75.6%	6.7%	17.8%	3.94%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.915
Medium Trucks:	46.726
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	1.08	0.31	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-11.87	0.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-12.58	0.34	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.7	65.1	63.0	60.3	67.7	68.1
Medium Trucks:	65.0	63.5	59.7	58.8	66.1	66.4
Heavy Trucks:	69.6	68.2	63.7	63.1	70.5	70.8
Vehicle Noise:	72.3	70.8	67.2	65.9	73.3	73.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	83	178	384	827
CNEL:	86	186	401	863

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2019) | Project Name: East End and County Indu
Road Name: Reservoir St. | Job Number: 12829
Road Segment: s/o Country Rd.

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	25,931 vehicles	Autos:	15
Peak Hour Percentage:	8.64%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	2,240 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	40 mph	**Vehicle Mix**	
Near/Far Lane Distance:	36 feet		
Site Data			
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	50.0 feet		
Centerline Dist. to Observer:	50.0 feet		
Barrier Distance to Observer:	0.0 feet		
Observer Height (Above Pad):	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		

VehicleType	Day	Evening	Night	Daily
Autos:	71.1%	10.9%	18.0%	91.42%
Medium Trucks:	73.6%	7.7%	18.6%	4.64%
Heavy Trucks:	75.6%	6.7%	17.8%	3.94%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.915
Medium Trucks:	46.726
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	1.79	0.31	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-11.16	0.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-11.87	0.34	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.4	65.8	63.7	61.0	68.4	68.8
Medium Trucks:	65.7	64.2	60.4	59.5	66.8	67.1
Heavy Trucks:	70.3	68.9	64.4	63.8	71.2	71.5
Vehicle Noise:	73.0	71.5	67.9	66.6	74.0	74.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	92	199	428	922
CNEL:	96	207	447	963

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2019) | Project Name: East End and County Indu
Road Name: East End Av. | Job Number: 12829
Road Segment: n/o Country Rd.

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	10,383 vehicles	Autos:	15
Peak Hour Percentage:	8.64%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	897 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph	**Vehicle Mix**	
Near/Far Lane Distance:	36 feet		
Site Data			
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	44.0 feet		
Centerline Dist. to Observer:	44.0 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		

VehicleType	Day	Evening	Night	Daily
Autos:	71.1%	10.9%	18.0%	91.42%
Medium Trucks:	73.6%	7.7%	18.6%	4.64%
Heavy Trucks:	75.6%	6.7%	17.8%	3.94%

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:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.70	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	79.45	-15.64	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-16.35	1.31	-1.20	-5.50	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:	65.8	64.2	62.1	59.5	66.8	67.2
Medium Trucks:	63.9	62.4	58.7	57.7	65.0	65.3
Heavy Trucks:	68.0	66.6	62.1	61.6	69.0	69.2
Vehicle Noise:	71.0	69.5	66.0	64.7	72.0	72.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	60	129	279	600
CNEL:	63	135	291	627

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2019) | Project Name: East End and County Indu
Road Name: East End Av. | Job Number: 12829
Road Segment: s/o Country Rd.

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	9,926 vehicles	Autos:	15
Peak Hour Percentage:	8.64%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	858 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph	**Vehicle Mix**	
Near/Far Lane Distance:	36 feet		
Site Data			
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	44.0 feet		
Centerline Dist. to Observer:	44.0 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		

VehicleType	Day	Evening	Night	Daily
Autos:	71.1%	10.9%	18.0%	91.42%
Medium Trucks:	73.6%	7.7%	18.6%	4.64%
Heavy Trucks:	75.6%	6.7%	17.8%	3.94%

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:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.89	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	79.45	-15.84	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-16.55	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.6	64.0	61.9	59.3	66.7	67.0
Medium Trucks:	63.7	62.2	58.5	57.5	64.8	65.1
Heavy Trucks:	67.8	66.4	61.9	61.4	68.8	69.0
Vehicle Noise:	70.8	69.3	65.8	64.5	71.8	72.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	58	125	270	582
CNEL:	61	131	282	608

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2019) | Project Name: East End and County Indu
Road Name: Country Rd. | Job Number: 12829
Road Segment: w/o Reservoir St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,153 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	359 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 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:	71.1%	10.9%	18.0%	91.42%
Medium Trucks:	73.6%	7.7%	18.6%	4.64%
Heavy Trucks:	75.6%	6.7%	17.8%	3.94%

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:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	-5.59	3.26	-1.20	-4.49	0.000	0.000
Medium Trucks:	75.75	-18.53	3.33	-1.20	-4.86	0.000	0.000
Heavy Trucks:	81.57	-19.24	3.32	-1.20	-5.77	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.8	59.1	57.0	54.4	61.8	62.2
Medium Trucks:	59.3	57.9	54.1	53.1	60.5	60.7
Heavy Trucks:	64.4	63.1	58.6	58.0	65.4	65.7
Vehicle Noise:	66.9	65.4	61.7	60.5	67.9	68.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	22	47	100	216
CNEL:	23	49	105	225

Saturday, January 4, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2019) | Project Name: East End and County Indu
Road Name: Country Rd. | Job Number: 12829
Road Segment: e/o Reservoir St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,286 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	370 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 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:	71.1%	10.9%	18.0%	91.42%
Medium Trucks:	73.6%	7.7%	18.6%	4.64%
Heavy Trucks:	75.6%	6.7%	17.8%	3.94%

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:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	-5.45	3.26	-1.20	-4.49	0.000	0.000
Medium Trucks:	75.75	-18.40	3.33	-1.20	-4.86	0.000	0.000
Heavy Trucks:	81.57	-19.11	3.32	-1.20	-5.77	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.9	59.3	57.2	54.5	61.9	62.3
Medium Trucks:	59.5	58.0	54.2	53.3	60.6	60.9
Heavy Trucks:	64.6	63.2	58.7	58.2	65.6	65.8
Vehicle Noise:	67.0	65.5	61.8	60.6	68.0	68.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	22	48	102	221
CNEL:	23	50	107	230

Saturday, January 4, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2019) | Project Name: East End and County Indu
Road Name: Country Rd. | Job Number: 12829
Road Segment: w/o East End Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,257 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	281 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 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:	71.1%	10.9%	18.0%	91.42%
Medium Trucks:	73.6%	7.7%	18.6%	4.64%
Heavy Trucks:	75.6%	6.7%	17.8%	3.94%

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:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	-6.64	3.26	-1.20	-4.49	0.000	0.000
Medium Trucks:	75.75	-19.59	3.33	-1.20	-4.86	0.000	0.000
Heavy Trucks:	81.57	-20.30	3.32	-1.20	-5.77	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	59.7	58.1	56.0	53.4	60.7	61.1
Medium Trucks:	58.3	56.8	53.0	52.1	59.4	59.7
Heavy Trucks:	63.4	62.0	57.5	57.0	64.4	64.6
Vehicle Noise:	65.8	64.3	60.6	59.4	66.8	67.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	18	40	85	184
CNEL:	19	41	89	192

Saturday, January 4, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project | Project Name: East End and County Indu
Road Name: Reservoir St. | Job Number: 12829
Road Segment: n/o Country Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,080 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	1,908 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	71.1%	10.9%	18.0%	91.44%
Medium Trucks:	73.6%	7.7%	18.6%	4.63%
Heavy Trucks:	75.6%	6.7%	17.8%	3.93%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.915
Medium Trucks:	46.726
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	1.09	0.31	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-11.87	0.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-12.58	0.34	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.7	65.1	63.0	60.3	67.7	68.1
Medium Trucks:	65.0	63.5	59.7	58.8	66.1	66.4
Heavy Trucks:	69.6	68.2	63.7	63.1	70.5	70.8
Vehicle Noise:	72.3	70.8	67.2	65.9	73.3	73.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	83	178	384	827
CNEL:	86	186	401	864

Saturday, January 4, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Reservoir St.
Road Segment: s/o Country Rd.
Project Name: East End and County Indu
Job Number: 12829

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,202 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	2,264 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	71.1%	10.9%	18.0%	91.19%
Medium Trucks:	73.6%	7.7%	18.6%	4.71%
Heavy Trucks:	75.6%	6.7%	17.8%	4.11%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.915
Medium Trucks:	46.726
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	1.82	0.31	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-11.05	0.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-11.64	0.34	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.4	65.8	63.7	61.1	68.5	68.8
Medium Trucks:	65.8	64.3	60.5	59.6	66.9	67.2
Heavy Trucks:	70.5	69.1	64.6	64.1	71.5	71.7
Vehicle Noise:	73.1	71.7	68.0	66.8	74.1	74.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	94	203	438	944
CNEL:	98	212	457	985

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: East End Av.
Road Segment: n/o Country Rd.
Project Name: East End and County Indu
Job Number: 12829

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,517 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	909 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 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:	71.1%	10.9%	18.0%	91.53%
Medium Trucks:	73.6%	7.7%	18.6%	4.58%
Heavy Trucks:	75.6%	6.7%	17.8%	3.89%

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:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.64	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	79.45	-15.64	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-16.35	1.31	-1.20	-5.50	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:	65.9	64.3	62.2	59.5	66.9	67.3
Medium Trucks:	63.9	62.4	58.7	57.7	65.0	65.3
Heavy Trucks:	68.0	66.6	62.1	61.6	69.0	69.2
Vehicle Noise:	71.0	69.6	66.0	64.7	72.0	72.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	60	130	279	602
CNEL:	63	135	292	629

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: East End Av.
Road Segment: s/o Country Rd.
Project Name: East End and County Indu
Job Number: 12829

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,082 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	871 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 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:	71.1%	10.9%	18.0%	91.33%
Medium Trucks:	73.6%	7.7%	18.6%	4.65%
Heavy Trucks:	75.6%	6.7%	17.8%	4.02%

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:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.83	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	79.45	-15.76	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-16.40	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.7	64.1	62.0	59.3	66.7	67.1
Medium Trucks:	63.8	62.3	58.5	57.6	64.9	65.2
Heavy Trucks:	68.0	66.6	62.1	61.5	68.9	69.2
Vehicle Noise:	70.9	69.5	65.9	64.6	71.9	72.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	59	128	275	592
CNEL:	62	133	287	619

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Country Rd.
Road Segment: w/o Reservoir St.
Project Name: East End and County Indu
Job Number: 12829

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,180 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	361 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 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:	71.1%	10.9%	18.0%	91.48%
Medium Trucks:	73.6%	7.7%	18.6%	4.61%
Heavy Trucks:	75.6%	6.7%	17.8%	3.91%

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:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	-5.56	3.26	-1.20	-4.49	0.000	0.000
Medium Trucks:	75.75	-18.53	3.33	-1.20	-4.86	0.000	0.000
Heavy Trucks:	81.57	-19.24	3.32	-1.20	-5.77	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.8	59.2	57.1	54.4	61.8	62.2
Medium Trucks:	59.3	57.9	54.1	53.1	60.5	60.7
Heavy Trucks:	64.4	63.1	58.6	58.0	65.4	65.7
Vehicle Noise:	66.9	65.4	61.7	60.5	67.9	68.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	22	47	100	216
CNEL:	23	49	105	226

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Country Rd.
Road Segment: e/o Reservoir St.
Project Name: East End and County Indu
Job Number: 12829

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,638 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	401 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 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:	71.1%	10.9%	18.0%	90.26%
Medium Trucks:	73.6%	7.7%	18.6%	4.93%
Heavy Trucks:	75.6%	6.7%	17.8%	4.81%

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:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	-5.16	3.26	-1.20	-4.49	0.000	0.000
Medium Trucks:	75.75	-17.78	3.33	-1.20	-4.86	0.000	0.000
Heavy Trucks:	81.57	-17.90	3.32	-1.20	-5.77	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.2	59.6	57.5	54.8	62.2	62.6
Medium Trucks:	60.1	58.6	54.8	53.9	61.2	61.5
Heavy Trucks:	65.8	64.4	59.9	59.4	66.8	67.0
Vehicle Noise:	67.9	66.4	62.6	61.5	68.9	69.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	25	54	117	253
CNEL:	26	57	122	264

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Country Rd.
Road Segment: w/o East End Av.
Project Name: East End and County Indu
Job Number: 12829

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,413 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	295 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 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:	71.1%	10.9%	18.0%	90.99%
Medium Trucks:	73.6%	7.7%	18.6%	4.72%
Heavy Trucks:	75.6%	6.7%	17.8%	4.29%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	-6.46	3.26	-1.20	-4.49	0.000	0.000
Medium Trucks:	75.75	-19.31	3.33	-1.20	-4.86	0.000	0.000
Heavy Trucks:	81.57	-19.73	3.32	-1.20	-5.77	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	59.9	58.3	56.2	53.5	60.9	61.3
Medium Trucks:	58.6	57.1	53.3	52.4	59.7	59.9
Heavy Trucks:	64.0	62.6	58.1	57.5	64.9	65.2
Vehicle Noise:	66.2	64.8	61.0	59.9	67.2	67.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	20	42	91	196
CNEL:	20	44	95	204

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2021)
Road Name: Reservoir St.
Road Segment: n/o Country Rd.
Project Name: East End and County Indu
Job Number: 12829

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,108 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	1,997 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	71.1%	10.9%	18.0%	91.42%
Medium Trucks:	73.6%	7.7%	18.6%	4.64%
Heavy Trucks:	75.6%	6.7%	17.8%	3.94%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.915
Medium Trucks:	46.726
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	1.29	0.31	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-11.66	0.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-12.37	0.34	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.9	65.3	63.2	60.5	67.9	68.3
Medium Trucks:	65.2	63.7	59.9	59.0	66.3	66.6
Heavy Trucks:	69.8	68.4	63.9	63.3	70.7	71.0
Vehicle Noise:	72.5	71.0	67.4	66.1	73.5	73.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	85	184	396	854
CNEL:	89	192	414	891

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2021)
Road Name: Reservoir St.
Road Segment: s/o Country Rd.
Project Name: East End and County Indu
Job Number: 12829

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,180 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	2,348 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	71.1%	10.9%	18.0%	91.42%
Medium Trucks:	73.6%	7.7%	18.6%	4.64%
Heavy Trucks:	75.6%	6.7%	17.8%	3.94%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.915
Medium Trucks:	46.726
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	1.99	0.31	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-10.95	0.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-11.66	0.34	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.6	66.0	63.9	61.2	68.6	69.0
Medium Trucks:	65.9	64.4	60.6	59.7	67.0	67.3
Heavy Trucks:	70.5	69.1	64.6	64.1	71.4	71.7
Vehicle Noise:	73.2	71.7	68.1	66.8	74.2	74.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	95	205	442	952
CNEL:	99	214	461	993

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2021)
Road Name: East End Av.
Road Segment: n/o Country Rd.
Project Name: East End and County Indu
Job Number: 12829

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,852 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	938 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 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:	71.1%	10.9%	18.0%	91.42%
Medium Trucks:	73.6%	7.7%	18.6%	4.64%
Heavy Trucks:	75.6%	6.7%	17.8%	3.94%

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:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.51	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	79.45	-15.45	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-16.16	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.0	64.4	62.3	59.7	67.0	67.4
Medium Trucks:	64.1	62.6	58.8	57.9	65.2	65.5
Heavy Trucks:	68.2	66.8	62.3	61.8	69.2	69.4
Vehicle Noise:	71.2	69.7	66.2	64.8	72.2	72.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	62	133	287	618
CNEL:	65	139	300	646

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2021)
Road Name: East End Av.
Road Segment: s/o Country Rd.
Project Name: East End and County Indu
Job Number: 12829

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,367 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	896 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 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:	71.1%	10.9%	18.0%	91.42%
Medium Trucks:	73.6%	7.7%	18.6%	4.64%
Heavy Trucks:	75.6%	6.7%	17.8%	3.94%

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:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.71	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	79.45	-15.65	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-16.36	1.31	-1.20	-5.50	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:	65.8	64.2	62.1	59.5	66.8	67.2
Medium Trucks:	63.9	62.4	58.6	57.7	65.0	65.3
Heavy Trucks:	68.0	66.6	62.1	61.6	69.0	69.2
Vehicle Noise:	71.0	69.5	66.0	64.6	72.0	72.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	60	129	278	600
CNEL:	63	135	291	626

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2021)
Road Name: Country Rd.
Road Segment: w/o Reservoir St.
Project Name: East End and County Indu
Job Number: 12829

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,321 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	373 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 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:	71.1%	10.9%	18.0%	91.42%
Medium Trucks:	73.6%	7.7%	18.6%	4.64%
Heavy Trucks:	75.6%	6.7%	17.8%	3.94%

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:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	-5.41	3.26	-1.20	-4.49	0.000	0.000
Medium Trucks:	75.75	-18.36	3.33	-1.20	-4.86	0.000	0.000
Heavy Trucks:	81.57	-19.07	3.32	-1.20	-5.77	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.0	59.3	57.2	54.6	62.0	62.3
Medium Trucks:	59.5	58.0	54.3	53.3	60.6	60.9
Heavy Trucks:	64.6	63.2	58.7	58.2	65.6	65.8
Vehicle Noise:	67.0	65.6	61.9	60.7	68.0	68.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	22	48	103	222
CNEL:	23	50	107	231

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2021)
Road Name: Country Rd.
Road Segment: e/o Reservoir St.
Project Name: East End and County Indu
Job Number: 12829

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,469 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	386 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 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:	71.1%	10.9%	18.0%	91.42%
Medium Trucks:	73.6%	7.7%	18.6%	4.64%
Heavy Trucks:	75.6%	6.7%	17.8%	3.94%

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:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	-5.27	3.26	-1.20	-4.49	0.000	0.000
Medium Trucks:	75.75	-18.21	3.33	-1.20	-4.86	0.000	0.000
Heavy Trucks:	81.57	-18.92	3.32	-1.20	-5.77	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.1	59.5	57.4	54.7	62.1	62.5
Medium Trucks:	59.7	58.2	54.4	53.5	60.8	61.0
Heavy Trucks:	64.8	63.4	58.9	58.4	65.7	66.0
Vehicle Noise:	67.2	65.7	62.0	60.8	68.2	68.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	23	49	105	227
CNEL:	24	51	110	237

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2021) | Project Name: East End and County Indu
Road Name: Country Rd. | Job Number: 12829
Road Segment: w/o East End Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,398 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	294 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 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:	71.1%	10.9%	18.0%	91.42%
Medium Trucks:	73.6%	7.7%	18.6%	4.64%
Heavy Trucks:	75.6%	6.7%	17.8%	3.94%

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:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	-6.46	3.26	-1.20	-4.49	0.000	0.000
Medium Trucks:	75.75	-19.40	3.33	-1.20	-4.86	0.000	0.000
Heavy Trucks:	81.57	-20.11	3.32	-1.20	-5.77	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	59.9	58.3	56.2	53.5	60.9	61.3
Medium Trucks:	58.5	57.0	53.2	52.3	59.6	59.8
Heavy Trucks:	63.6	62.2	57.7	57.2	64.6	64.8
Vehicle Noise:	66.0	64.5	60.8	59.6	67.0	67.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	19	41	88	189
CNEL:	20	42	91	197

Saturday, January 4, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2021) + Project | Project Name: East End and County Indu
Road Name: Reservoir St. | Job Number: 12829
Road Segment: n/o Country Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,162 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	2,001 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	71.1%	10.9%	18.0%	91.44%
Medium Trucks:	73.6%	7.7%	18.6%	4.63%
Heavy Trucks:	75.6%	6.7%	17.8%	3.93%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.915
Medium Trucks:	46.726
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	1.30	0.31	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-11.66	0.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-12.37	0.34	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.9	65.3	63.2	60.6	67.9	68.3
Medium Trucks:	65.2	63.7	59.9	59.0	66.3	66.6
Heavy Trucks:	69.8	68.4	63.9	63.3	70.7	71.0
Vehicle Noise:	72.5	71.0	67.4	66.1	73.5	73.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	85	184	397	854
CNEL:	89	192	414	892

Saturday, January 4, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2021) + Project | Project Name: East End and County Indu
Road Name: Reservoir St. | Job Number: 12829
Road Segment: s/o Country Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,452 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	2,372 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	71.1%	10.9%	18.0%	91.20%
Medium Trucks:	73.6%	7.7%	18.6%	4.70%
Heavy Trucks:	75.6%	6.7%	17.8%	4.10%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.915
Medium Trucks:	46.726
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	2.02	0.31	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-10.85	0.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-11.45	0.34	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.6	66.0	63.9	61.3	68.7	69.0
Medium Trucks:	66.0	64.5	60.7	59.8	67.1	67.4
Heavy Trucks:	70.7	69.3	64.8	64.3	71.7	71.9
Vehicle Noise:	73.3	71.9	68.2	67.0	74.3	74.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	97	210	451	973
CNEL:	102	219	471	1,015

Saturday, January 4, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2021) + Project | Project Name: East End and County Indu
Road Name: East End Av. | Job Number: 12829
Road Segment: n/o Country Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,986 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	949 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 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:	71.1%	10.9%	18.0%	91.52%
Medium Trucks:	73.6%	7.7%	18.6%	4.58%
Heavy Trucks:	75.6%	6.7%	17.8%	3.89%

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:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.45	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	79.45	-15.45	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-16.16	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.1	64.5	62.3	59.7	67.1	67.5
Medium Trucks:	64.1	62.6	58.8	57.9	65.2	65.5
Heavy Trucks:	68.2	66.8	62.3	61.8	69.2	69.4
Vehicle Noise:	71.2	69.7	66.2	64.9	72.2	72.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	62	134	288	620
CNEL:	65	140	301	648

Saturday, January 4, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2021) + Project
Road Name: East End Av.
Road Segment: s/o Country Rd.
Project Name: East End and County Indu
Job Number: 12829

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,523 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	909 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 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:	71.1%	10.9%	18.0%	91.34%
Medium Trucks:	73.6%	7.7%	18.6%	4.65%
Heavy Trucks:	75.6%	6.7%	17.8%	4.01%

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:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.64	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	79.45	-15.58	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-16.21	1.31	-1.20	-5.50	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:	65.9	64.3	62.1	59.5	66.9	67.3
Medium Trucks:	64.0	62.5	58.7	57.8	65.1	65.4
Heavy Trucks:	68.1	66.8	62.3	61.7	69.1	69.4
Vehicle Noise:	71.1	69.6	66.1	64.7	72.1	72.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	61	131	283	609
CNEL:	64	137	295	637

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2021) + Project
Road Name: Country Rd.
Road Segment: w/o Reservoir St.
Project Name: East End and County Indu
Job Number: 12829

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,348 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	376 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 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:	71.1%	10.9%	18.0%	91.47%
Medium Trucks:	73.6%	7.7%	18.6%	4.61%
Heavy Trucks:	75.6%	6.7%	17.8%	3.92%

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:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	-5.39	3.26	-1.20	-4.49	0.000	0.000
Medium Trucks:	75.75	-18.36	3.33	-1.20	-4.86	0.000	0.000
Heavy Trucks:	81.57	-19.07	3.32	-1.20	-5.77	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.0	59.3	57.2	54.6	62.0	62.4
Medium Trucks:	59.5	58.0	54.3	53.3	60.6	60.9
Heavy Trucks:	64.6	63.2	58.7	58.2	65.6	65.8
Vehicle Noise:	67.0	65.6	61.9	60.7	68.0	68.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	22	48	103	222
CNEL:	23	50	108	232

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2021) + Project
Road Name: Country Rd.
Road Segment: e/o Reservoir St.
Project Name: East End and County Indu
Job Number: 12829

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,821 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	417 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 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:	71.1%	10.9%	18.0%	90.30%
Medium Trucks:	73.6%	7.7%	18.6%	4.92%
Heavy Trucks:	75.6%	6.7%	17.8%	4.77%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	-4.99	3.26	-1.20	-4.49	0.000	0.000
Medium Trucks:	75.75	-17.63	3.33	-1.20	-4.86	0.000	0.000
Heavy Trucks:	81.57	-17.76	3.32	-1.20	-5.77	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.4	59.7	57.6	55.0	62.4	62.8
Medium Trucks:	60.3	58.8	55.0	54.0	61.4	61.6
Heavy Trucks:	65.9	64.6	60.0	59.5	66.9	67.1
Vehicle Noise:	68.0	66.6	62.8	61.7	69.0	69.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	26	56	120	259
CNEL:	27	58	125	270

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2021) + Project
Road Name: Country Rd.
Road Segment: w/o East End Av.
Project Name: East End and County Indu
Job Number: 12829

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,555 vehicles
Peak Hour Percentage:	8.64%
Peak Hour Volume:	307 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 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:	71.1%	10.9%	18.0%	91.01%
Medium Trucks:	73.6%	7.7%	18.6%	4.72%
Heavy Trucks:	75.6%	6.7%	17.8%	4.27%

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:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	-6.28	3.26	-1.20	-4.49	0.000	0.000
Medium Trucks:	75.75	-19.14	3.33	-1.20	-4.86	0.000	0.000
Heavy Trucks:	81.57	-19.57	3.32	-1.20	-5.77	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.1	58.4	56.3	53.7	61.1	61.5
Medium Trucks:	58.7	57.3	53.5	52.5	59.9	60.1
Heavy Trucks:	64.1	62.8	58.2	57.7	65.1	65.3
Vehicle Noise:	66.4	64.9	61.2	60.0	67.4	67.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	20	43	93	201
CNEL:	21	45	97	210

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APPENDIX 9.1:

CADNAA OPERATIONAL NOISE MODEL INPUTS

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13154

CadnaA Noise Prediction Model
12829_03.cna
Date:
05.01.20
Analyst:
B. Lawson

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
R1		R1	0.0	0.0	0.0	55.0	50.0	0.0				5.00	a	6115127.28	2320527.52	5.00
R2		R2	0.0	0.0	0.0	55.0	50.0	0.0				5.00	a	6115459.93	2319896.52	5.00
R3		R3	0.0	0.0	0.0	0.0	0.0	0.0		x	Total	5.00	a	6114118.67	2320250.94	5.00

Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night						X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(ft^2)		(min)	(min)	(min)	(dB)	(Hz)		(ft)		(ft)	(ft)	(ft)
POINTSOURCE		AC01	88.9	88.9	88.9	Lw	88.9		0.0	0.0	0.0				585.00	0.00	252.00	0.0	500	(none)	5.00	g	6114565.39	2320753.75	796.21
POINTSOURCE		AC02	88.9	88.9	88.9	Lw	88.9		0.0	0.0	0.0				585.00	0.00	252.00	0.0	500	(none)	5.00	g	6114556.23	2320255.65	796.21
POINTSOURCE		AC03	88.9	88.9	88.9	Lw	88.9		0.0	0.0	0.0				585.00	0.00	252.00	0.0	500	(none)	5.00	g	6114827.26	2320292.27	800.34
POINTSOURCE		AC04	88.9	88.9	88.9	Lw	88.9		0.0	0.0	0.0				585.00	0.00	252.00	0.0	500	(none)	5.00	g	6114829.09	2320458.92	800.34
POINTSOURCE		AC05	88.9	88.9	88.9	Lw	88.9		0.0	0.0	0.0				585.00	0.00	252.00	0.0	500	(none)	5.00	g	6114823.60	2320576.12	800.34
POINTSOURCE		AC06	88.9	88.9	88.9	Lw	88.9		0.0	0.0	0.0				585.00	0.00	252.00	0.0	500	(none)	5.00	g	6115101.95	2320341.72	798.24
POINTSOURCE		TRASH01	94.0	94.0	94.0	Lw	94		0.0	0.0	0.0				300.00	0.00	180.00	0.0	500	(none)	5.00	r	6114698.54	2320706.16	775.34
POINTSOURCE		TRASH02	94.0	94.0	94.0	Lw	94		0.0	0.0	0.0				300.00	0.00	180.00	0.0	500	(none)	5.00	r	6114913.82	2320457.03	775.34
POINTSOURCE		TRASH03	94.0	94.0	94.0	Lw	94		0.0	0.0	0.0				300.00	0.00	180.00	0.0	500	(none)	5.00	r	6114912.08	2320291.23	775.34
POINTSOURCE		TRASH04	94.0	94.0	94.0	Lw	94		0.0	0.0	0.0				300.00	0.00	180.00	0.0	500	(none)	5.00	r	6115038.82	2320426.65	785.49
POINTSOURCE		TRASH05	94.0	94.0	94.0	Lw	94		0.0	0.0	0.0				300.00	0.00	180.00	0.0	500	(none)	5.00	r	6115034.48	2320297.31	771.63
POINTSOURCE		TRASH06	94.0	94.0	94.0	Lw	94		0.0	0.0	0.0				300.00	0.00	180.00	0.0	500	(none)	5.00	r	6114715.03	2320233.07	775.34
POINTSOURCE		TRASH07	94.0	94.0	94.0	Lw	94		0.0	0.0	0.0				300.00	0.00	180.00	0.0	500	(none)	5.00	r	6114142.99	2320356.34	774.96
POINTSOURCE		TRASH08	94.0	94.0	94.0	Lw	94		0.0	0.0	0.0				300.00	0.00	180.00	0.0	500	(none)	5.00	r	6114475.45	2320220.05	775.34

Line Source(s)

Name	M.	ID	Result. PWL			Result. PWL'			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Moving Pt. Src			
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night				Number			Speed
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(ft^2)		(min)	(min)	(min)	(dB)	(Hz)		Day	Evening	Night	(mph)
LINESOURCE		DWY1	82.4	72.4	75.9	65.7	55.7	59.3	PWL-Pt	89.7		0.0	0.0	0.0							0.0	500	(none)	40.0	4.0	9.0	6.2
LINESOURCE		DWY2	88.2	78.4	82.4	62.5	52.7	56.7	PWL-Pt	89.7		0.0	0.0	0.0							0.0	500	(none)	19.0	2.0	5.0	6.2
LINESOURCE		DWY3	79.0	68.2	73.0	60.5	49.7	54.5	PWL-Pt	89.7		0.0	0.0	0.0							0.0	500	(none)	12.0	1.0	3.0	6.2
LINESOURCE		DWY4	70.7	61.1	64.1	59.3	49.7	52.7	PWL-Pt	89.7		0.0	0.0	0.0							0.0	500	(none)	9.0	1.0	2.0	6.2
LINESOURCE		DWY5	73.2	63.4	67.4	62.5	52.7	56.7	PWL-Pt	89.7		0.0	0.0	0.0							0.0	500	(none)	19.0	2.0	5.0	6.2

Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL''			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Moving Pt. Src		
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night				Number		
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(ft^2)		(min)	(min)	(min)	(dB)	(Hz)		Day	Evening	Night
AREASOURCE		PARKING01	79.0	79.0	79.0	49.3	49.3	49.3	Lw	79		0.0	0.0	0.0				900.00	0.00	540.00	0.0	500	(none)			
AREASOURCE		PARKING02	79.0	79.0	79.0	41.6	41.6	41.6	Lw	79		0.0	0.0	0.0				900.00	0.00	540.00	0.0	500	(none)			
AREASOURCE		PARKING03	79.0	79.0	79.0	46.6	46.6	46.6	Lw	79		0.0	0.0	0.0				900.00	0.00	540.00	0.0	500	(none)			
AREASOURCE		PARKING04	79.0	79.0	79.0	51.6	51.6	51.6	Lw	79		0.0	0.0	0.0				900.00	0.00	540.00	0.0	500	(none)			
AREASOURCE		PARKING05	79.0	79.0	79.0	54.5	54.5	54.5	Lw	79		0.0	0.0	0.0				900.00	0.00	540.00	0.0	500	(none)			

Name	M.	ID	Result. PWL			Result. PWL''			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Moving Pt. Src		
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night				Number		
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(ft²)		(min)	(min)	(min)	(dB)	(Hz)		Day	Evening	Night
AREASOURCE		PARKING06	79.0	79.0	79.0	51.5	51.5	51.5	Lw	79		0.0	0.0	0.0				900.00	0.00	540.00	0.0	500	(none)			
AREASOURCE		LOADING01	103.4	103.4	103.4	63.5	63.5	63.5	Lw	103.4		0.0	0.0	0.0				900.00	0.00	540.00	0.0	500	(none)			
AREASOURCE		LOADING02	103.4	103.4	103.4	73.7	73.7	73.7	Lw	103.4		0.0	0.0	0.0				900.00	0.00	540.00	0.0	500	(none)			

Barrier(s)

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height			
			left	right		horz.	vert.	Begin		End	
					(ft)	(ft)	(ft)	(ft)		(ft)	
BARRIERS		BARRIERS00001						4.00	a		
BARRIERS		BARRIERS00002						6.00	a		
BARRIERS		BARRIERS00003						6.00	a		
BARRIERS		BARRIERS00004						8.00	a		

Building(s)

Name	M.	ID	RB	Residents	Absorption	Height	
						Begin	
						(ft)	
BUILDING		BUILDING00001	x	0		25.00	r
BUILDING		BUILDING00002	x	0		25.00	r
BUILDING		BUILDING00003	x	0		25.00	r
BUILDING		BUILDING00004	x	0		25.00	r
BUILDING		BUILDING00005	x	0		25.00	r
BUILDING		BUILDING00006	x	0		25.00	r
BUILDING		BUILDING00007	x	0		25.00	r
BUILDING		BUILDING00008	x	0		25.00	r
BUILDING		BUILDING00009	x	0		25.00	r
BUILDING		BUILDING00010	x	0		15.00	r
BUILDING		BUILDING00011	x	0		15.00	r
BUILDING		BUILDING00012	x	0		15.00	r
BUILDING		BUILDING00013	x	0		15.00	r
BUILDING		BUILDING00014	x	0		15.00	r
BUILDING		BUILDING00015	x	0		15.00	r
BUILDING		BUILDING00016	x	0		15.00	r
BUILDING		BUILDING00017	x	0		15.00	r
BUILDING		BUILDING00018	x	0		15.00	r
BUILDING		BUILDING00019	x	0		25.00	r
BUILDING		BUILDING00020	x	0		25.00	r
BUILDING		BUILDING00021	x	0		25.00	r
BUILDING		BUILDING00022	x	0		25.00	r
BUILDING		BUILDING00023	x	0		25.00	r
BUILDING		BUILDING00024	x	0		15.00	r
BUILDING		BUILDING00025	x	0		15.00	r
BUILDING		BUILDING00026	x	0		25.00	r
BUILDING		BUILDING00027	x	0		25.00	r

APPENDIX 10.1:

CADNAA CONSTRUCTION NOISE MODEL INPUTS

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12829

CadnaA Noise Prediction Model
12829_05_Construction.cna
Date:
05.01.20
Analyst:
B. Lawson

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
R1		R1	64.2	64.2	70.9	55.0	50.0	0.0				5.00	r	6115127.28	2320527.52	775.34
R2		R2	51.6	51.6	58.2	55.0	50.0	0.0				5.00	r	6115459.93	2319896.52	769.22
R3		R3	73.3	73.3	79.9	0.0	0.0	0.0		x	Total	5.00	r	6114118.67	2320250.94	777.73

Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL''			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Moving Pt. Src		
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night				Number		
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(ft^2)		(min)	(min)	(min)	(dB)	(Hz)		Day	Evening	Night
SITEBOUNDARY		SITEBOUNDARY00002	122.5	122.5	122.5	75.3	75.3	75.3	Lw"	75.3		0.0	0.0	0.0							0.0	500	(none)			
SITEBOUNDARY		SITEBOUNDARY00003	111.0	111.0	111.0	75.3	75.3	75.3	Lw"	75.3		0.0	0.0	0.0							0.0	500	(none)			

Barrier(s)

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height			
			left	right		horz.	vert.	Begin		End	
					(ft)	(ft)	(ft)	(ft)		(ft)	
BARRIERS		BARRIERS00001						4.00	r		
BARRIERS		BARRIERS00002						6.00	r		
BARRIERS		BARRIERS00003						6.00	r		
BARRIERS		BARRIERS00004						8.00	r		

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