Slover and Cactus Warehouse

NOISE IMPACT ANALYSIS

COUNTY OF SAN BERNARDINO

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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
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
I-10	Interstate 10
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
PPV	Peak Particle Velocity
Project	Slover and Cactus Warehouse
REMEL	Reference Energy Mean Emission Level
RMS	Root-mean-square
UP	Union Pacific
VdB	Vibration Decibels

EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the noise exposure and the necessary noise mitigation measures for the proposed Slover and Cactus Warehouse development ("Project"). The Project site is located on the southwest corner of Cactus Avenue and Slover Avenue in unincorporated County of San Bernardino. The Project is proposed to consist of up to 257,855 square feet (sf) of warehouse use. This study has been prepared consistent with applicable County of San Bernardino noise standards, and significance criteria based on guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1) In addition, since sensitive receiver locations are in the adjacent jurisdiction of the City of Rialto, appropriate City of Rialto standards and thresholds are used in this analysis as well.

OFF-SITE TRAFFIC NOISE ANALYSIS

Traffic generated by the operation of the proposed Project will influence the traffic noise levels in surrounding off-site areas. To quantify the traffic noise increases on the surrounding off-site areas, the changes in traffic noise levels on six roadway segments surrounding the Project site were calculated based on the change in the average daily traffic (ADT) volumes. The traffic noise levels provided in this analysis are based on the traffic forecasts found in *Slover and Cactus Warehouse 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, Opening Year 2020, and Horizon Year 2040 traffic conditions. The analysis shows that the unmitigated Project-related traffic noise level increases under all traffic scenarios will be *less than significant*.

OPERATIONAL NOISE ANALYSIS

Using reference noise levels to represent the potential noise sources within Slover and Cactus Warehouse site, this analysis estimates the Project-related operational (stationary-source) noise levels at the nearby receiver locations. The Project-related operational noise sources are expected to include idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements.

OPERATIONAL NOISE LEVEL COMPLIANCE

The analysis shows that the unmitigated Project-related operational noise levels will exceed the County of San Bernardino exterior noise level standards at one of the off-site noise-sensitive receiver locations in the Project study area, R6, representing the noise-sensitive residential homes west of the Project site. Therefore, operational noise mitigation in the form of noise a barrier is required to reduce the impacts at nearby sensitive receiver location R6. Project operational noise levels at all other receiver locations, both noise-sensitive and adjacent industrial uses, are below the County exterior noise level standards, and therefore, will experience unmitigated *less than significant* noise impacts.

With the recommended noise barrier shown on Exhibit 9-A of this report, the Project operational noise levels will satisfy the County of San Bernardino exterior noise level standards at all receiver locations, and the Project operational noise impacts will be *less than significant* with mitigation.

OPERATIONAL NOISE LEVEL CONTRIBUTIONS

Further, this analysis demonstrates that the Project-related noise level increases to the existing noise environment at all noise-sensitive receiver locations would be less than the Federal Interagency Committee on Noise (FICON) guidance for noise level increases, and thus would be *less than significant* during daytime and nighttime hours. Therefore, the operational noise level impacts associated with the proposed Project activities, such as the idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements will be *less than significant*.

OPERATIONAL NOISE MITIGATION MEASURES

The following noise barriers are required to reduce the operational noise level impacts at the nearby sensitive receiver locations:

- A minimum 8-foot high noise barrier at the western Project site boundary is required as shown on Exhibit 9-A. The barrier shall provide a weight of at least 4 pounds per square foot of face area with no decorative cutouts or line-of-sight openings between shielded areas and the roadways, and a minimum transmission loss of 20 dBA. (3) The barrier shall consist of a solid face from top to bottom. Unnecessary openings or decorative cutouts shall not be made. All gaps (except for weep holes) should be filled with grout or caulking. The noise barrier shall be constructed using the following materials:
    - Masonry block;
    - Earthen berm;
    - Or any combination of construction materials capable of the minimum weight of 4 pounds per square foot and a minimum transmission loss of 20 dBA.

CONSTRUCTION NOISE ANALYSIS

Construction activities 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 Slover and Cactus Warehouse site, this analysis estimates the Project-related construction noise levels at nearby sensitive receiver locations. Since the County of San Bernardino and City of Rialto General Plan and Municipal Codes do not identify specific construction noise level thresholds, a threshold is identified based on the National Institute for Occupational Safety and Health (NIOSH) limits for construction noise, which is consistent with criteria established by the Federal Transit Administration (FTA). The worst-case Project-related short-term construction noise levels are expected to approach 77.9 dBA L_{eq} and will satisfy the 85 dBA L_{eq} threshold identified by NIOSH at all receiver locations.

To describe the temporary Project construction noise level contributions to the existing ambient noise environment, the Project construction noise levels were combined with the existing ambient noise levels measurements at the off-site receiver locations. A temporary noise level increase of 12 dBA L_{eq} is considered a potentially significant impact based on the Caltrans substantial noise level increase criteria which is used to assess the Project-construction noise level increases. (4) The analysis shows that the Project will contribute unmitigated, worst-case construction noise level increases ranging from 7.5 to 22.1 dBA L_{eq} at the nearby receiver locations during the daytime construction hours, and from 7.8 to 22.5 dBA L_{eq} during nighttime concrete pouring activity. Since the worst-case temporary noise level increases during Project construction will exceed the 12 dBA L_{eq} significance threshold, the unmitigated construction noise level increases are considered a *potentially significant* temporary noise impact at receiver locations R3 and R4. Therefore, construction noise mitigation is required to reduce the short-term noise level increases at the potentially impacted receiver locations.

With the minimum 12-foot high temporary noise barrier mitigation measure identified herein, and outlined below, all nearby sensitive receiver locations will experience *less than significant* impacts due to temporary Project construction noise levels. The construction noise analysis presents a conservative approach with the highest noise-level-producing equipment for each stage of Project construction operating at the closest point from primary construction activity to the nearby sensitive receiver locations. This scenario is unlikely to occur during typical construction activities and likely overstates the construction noise levels which will be experienced at each receiver location.

CONSTRUCTION VIBRATION ANALYSIS

At distances ranging from 30 to 177 feet from Project construction activity, construction vibration velocity levels are expected to approach 0.07 in/sec PPV. Based on the County of San Bernardino vibration standards, the unmitigated Project construction vibration levels will satisfy the 0.2 in/sec PPV threshold at all of the nearby sensitive receiver locations. Therefore, the vibration impacts due to Project construction are 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 County of San Bernardino requirements thereby eliminating potential vibration impacts during the sensitive nighttime hours.

CONSTRUCTION NOISE MITIGATION MEASURES

The following mitigation measures are required to reduce noise levels produced by the construction equipment to the nearby sensitive residential land uses.

- Install a minimum 12-foot high temporary construction noise barrier at the Project's southern site boundary adjacent to sensitive receiver locations R3 and R4 (residential homes), shown on Exhibit ES-A, for the duration of Project construction. The noise control barriers must have a solid face from top to bottom. The noise control barriers must meet the minimum height and be constructed as follows:
    - The temporary noise barriers shall provide a minimum transmission loss of 20 dBA (Federal Highway Administration, Noise Barrier Design Handbook). The noise barrier shall be constructed using an acoustical blanket (e.g. vinyl acoustic curtains or quilted blankets) attached to the construction site perimeter fence or equivalent temporary fence posts. Example photos are provided in Appendix 10.2.;
    - The noise barrier must be maintained, and any damage promptly repaired. Gaps, holes, or weaknesses in the barrier or openings between the barrier and the ground shall be promptly repaired;
    - The noise control barrier and associated elements shall be completely removed, and the site appropriately restored upon the conclusion of the construction activity.
- Prior to approval of grading plans and/or issuance of building permits, plans shall include a note indicating that noise-generating Project construction activities shall comply with the requirements of the County of San Bernardino Development Code. (5)
- During all Project site construction, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the Project site.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project site during all Project construction (i.e., to the northern center).
- The contractor shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise, consistent with County of San Bernardino General Plan Noise Element, Policy N 1.5. (6)

SUMMARY OF CEQA SIGNIFICANCE FINDINGS

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

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Off-Site Traffic Noise	7	*Less Than Significant*	*n/a*
Operational Noise	9	*Potentially Significant*	*Less Than Significant*
Construction Noise	10	*Potentially Significant*	*Less Than Significant*
Construction Vibration		*Less Than Significant*	*n/a*

EXHIBIT ES-A: SUMMARY OF RECOMMENDATIONS

1 INTRODUCTION

This noise analysis has been completed to determine the noise impacts associated with the development of the proposed Slover and Cactus Warehouse ("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 impacts.

1.1 SITE LOCATION

The proposed Slover and Cactus Warehouse Project is located on the southwest corner of Cactus Avenue and Slover Avenue in unincorporated County of San Bernardino, as shown on Exhibit 1-A. The Project site is located roughly 150 feet south of an existing Union Pacific (UP) railroad yard and approximately 1,800 feet south of Interstate 10 (I-10). The Project site is mostly vacant, with three existing residential homes located in the western and southeastern portions of the site. Existing noise-sensitive receivers, such as residential homes, are located east, south, and west of the Project site.

1.2 PROJECT DESCRIPTION

It is our understanding that the Project is proposed to consist of up to 257,855 square feet (sf) of warehouse use, as shown on Exhibit 1-B. For the purposes of this analysis, the Project is anticipated to be developed in a single phase with an Opening Year of 2020.

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: idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements. This noise analysis is intended to describe noise level impacts associated with the expected typical operational activities at the Project site.

Per the *Slover and Cactus Warehouse Traffic Impact Analysis* prepared by Urban Crossroads, Inc. the Project is expected to generate a net total of approximately 449 trip-ends per day (actual vehicles). (2) The net Project trip generation includes 90 truck trip-ends per day from the proposed buildings within the Project site. 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

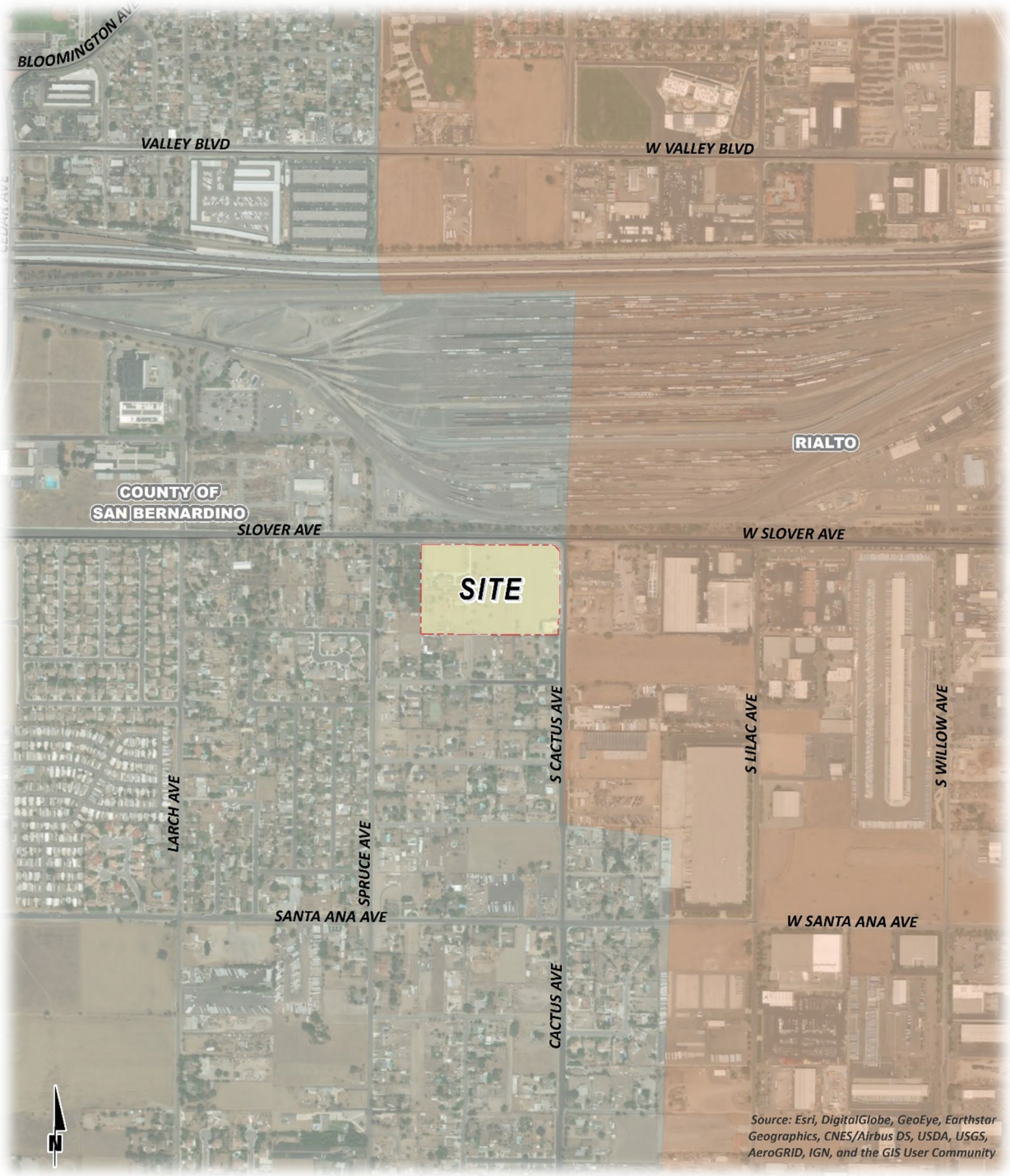
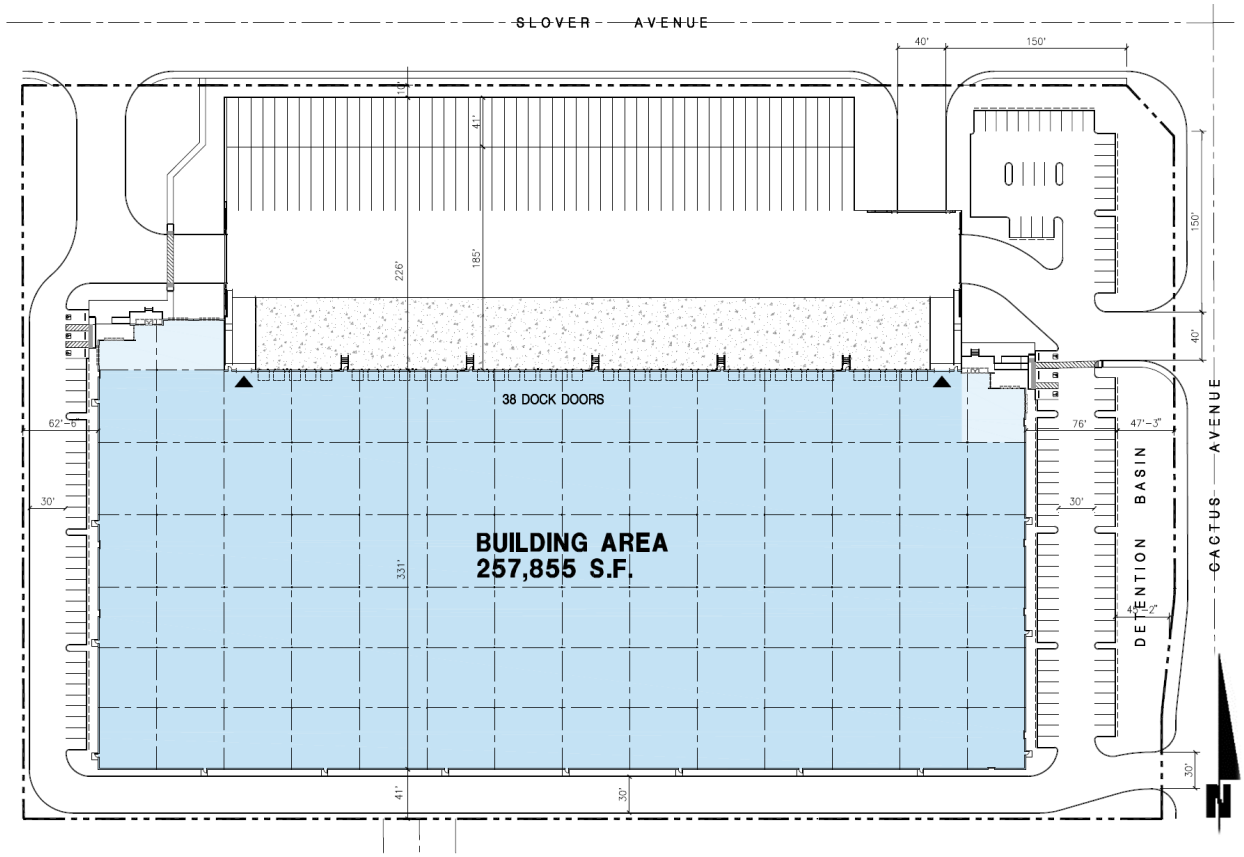


EXHIBIT 1-B: SITE PLAN



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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		

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

2.1 RANGE OF NOISE

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. (7) 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. (8) 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.

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 County of San Bernardino relies on the 24-hour CNEL level to assess land use compatibility with transportation related noise sources.

2.3 SOUND PROPAGATION

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

2.3.1 GEOMETRIC SPREADING

Sound from a localized source (i.e., a stationary point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source. (7)

2.3.2 GROUND ABSORPTION

The propagation path of noise from a highway to a receptor 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 receptor, 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 receptor 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. (9)

2.3.3 ATMOSPHERIC EFFECTS

Receptors 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. (7)

2.3.4 SHIELDING

A large object or barrier in the path between a noise source and a receptor can substantially attenuate noise levels at the receptor. 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 resident. 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. (9)

2.4 NOISE CONTROL

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

2.5 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receptor. 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. (9)

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. (10)

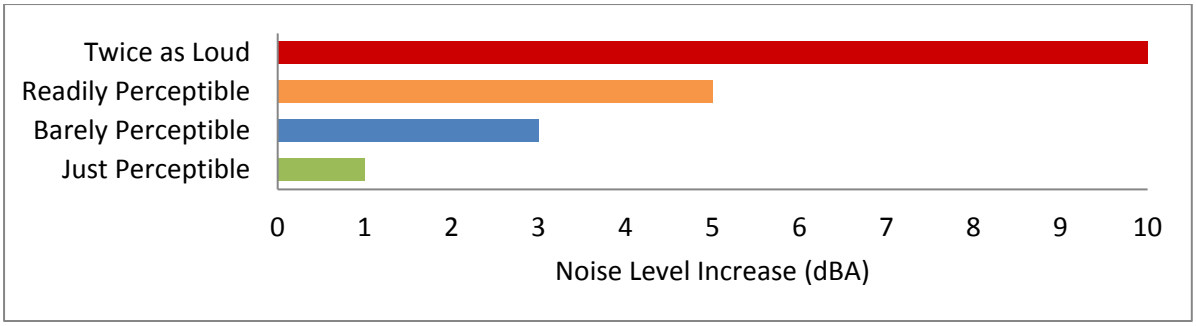
2.7 COMMUNITY RESPONSE TO NOISE

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. (11) 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. (11) 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. An increase or decrease of 1 dBA cannot be perceived except in carefully controlled laboratory experiments, a change of 3 dBA are considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (9)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



2.8 EXPOSURE TO HIGH NOISE LEVELS

The Occupational Safety and Health Administration (OSHA) sets legal limits on noise exposure in the workplace. The permissible exposure limit (PEL) for a worker over an eight-hour day is 90 dBA. The OSHA standard uses a 5 dBA exchange rate. This means that when the noise level is increased by 5 dBA, the amount of time a person can be exposed to a certain noise level to receive the same dose is cut in half. The National Institute for Occupational Safety and Health (NIOSH) has recommended that all worker exposures to noise should be controlled below a level equivalent to 85 dBA for eight hours to minimize occupational noise induced hearing loss. NIOSH also recommends a 3 dBA exchange rate so that every increase by 3 dBA doubles the amount of the noise and halves the recommended amount of exposure time. (12)

OSHA has implemented requirements to protect all workers in general industry (e.g. the manufacturing and the service sectors) for employers to implement a Hearing Conservation Program where workers are exposed to a time weighted average noise level of 85 dBA or higher over an eight-hour work shift. Hearing Conservation Programs require employers to measure noise levels, provide free annual hearing exams and free hearing protection, provide training, and conduct evaluations of the adequacy of the hearing protectors in use unless changes to tools, equipment and schedules are made so that they are less noisy and worker exposure to noise is less than the 85 dBA. This noise study does not evaluate the noise exposure of workers within a project or construction site based on CEQA requirements, and instead, evaluates Project-related operational and construction noise levels at the nearby sensitive receiver locations in the Project study area. Further, periodic exposure to high noise levels in short duration, such as Project construction, is typically considered an annoyance and not impactful to human health. It would take several years of exposure to high noise levels to result in hearing impairment. (13)

2.9 VIBRATION

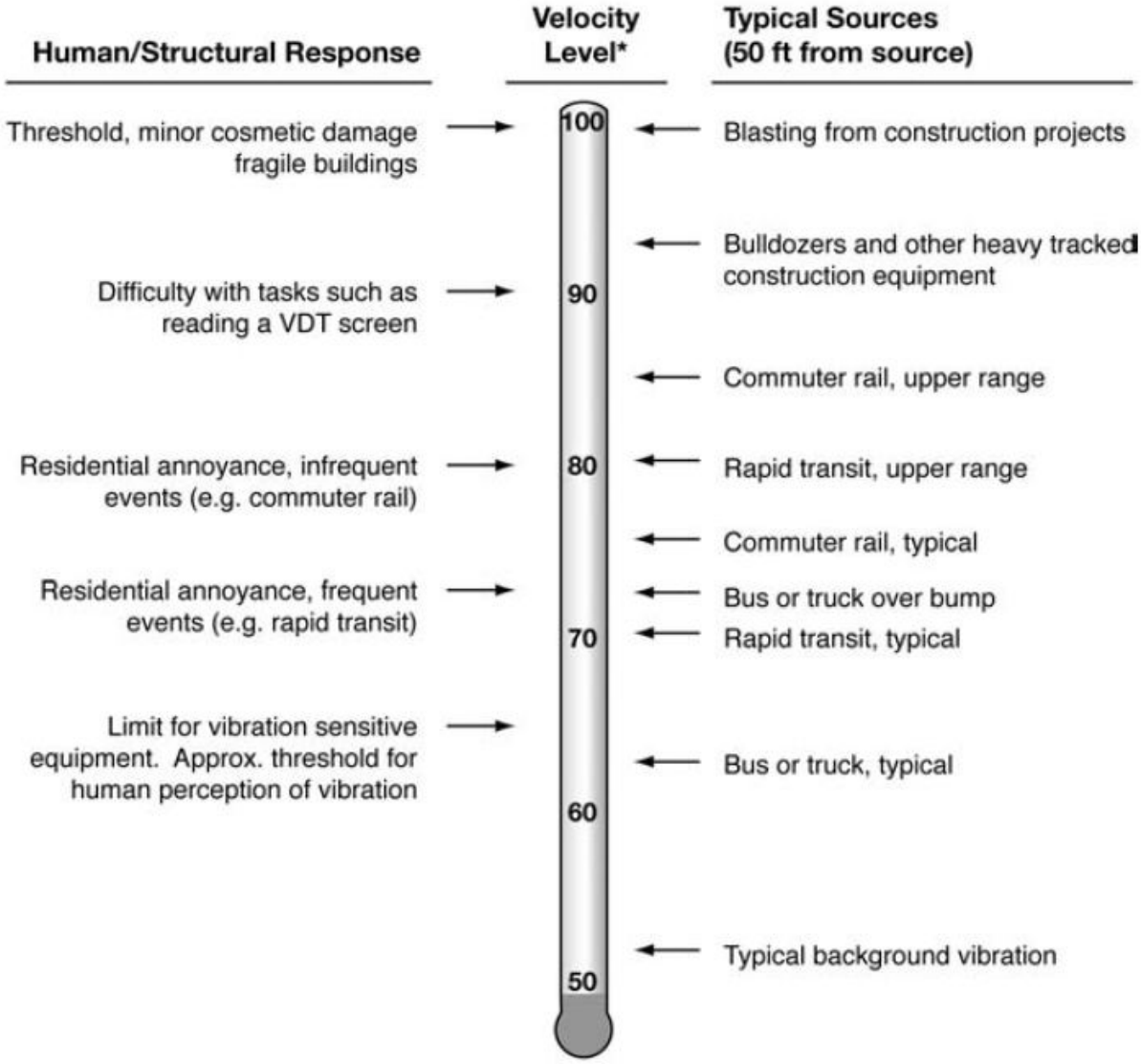
Per the Federal Transit Administration (FTA) *Transit Noise Impact and Vibration Assessment* (14), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such as explosions.

As is the case with airborne sound, ground-borne vibrations may be described by amplitude and frequency.

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

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

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



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

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

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3 REGULATORY SETTING

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

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared per guidelines adopted by the Governor's Office of Planning and Research. (15) The purpose of the Noise Element is to *limit the exposure of the community to excessive noise levels*. In addition, the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts.

3.2 STATE OF CALIFORNIA BUILDING STANDARDS

The 2016 State of California's Green Building Standards Code contains mandatory measures for non-residential building construction in Section 5.507 on Environmental Comfort. (16) 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 COUNTY OF SAN BERNARDINO GENERAL PLAN NOISE ELEMENT

The County of San Bernardino has adopted a Noise Element of the General Plan to limit the exposure of the community to excessive noise levels. (6) The most common sources of environmental noise in San Bernardino County are associated with roads, airports, railroad operations, and industrial activities. The facilities are used to transport residents, consumer products and provide basic infrastructure for the community. (6) To address these noise sources

found in the County of San Bernardino, the following goals have been identified in the General Plan Noise Element:

N 1 The County will abate and avoid excessive noise exposures through noise mitigation measures incorporated into the design of new noise-generating and new noise-sensitive land uses, while protecting areas within the County where the present noise environment is within acceptable limits.

N 1.5 Limit truck traffic in residential and commercial areas to designated truck routes; limit construction, delivery, and through-truck traffic to designated routes; and distribute maps of approved truck routes to County traffic officers.

N 2 The County will strive to preserve and maintain the quiet environment of mountain, desert and other rural areas.

3.4 COUNTY OF SAN BERNARDINO DEVELOPMENT CODE

While the County of San Bernardino General Plan Noise Element provides guidelines and criteria to assess transportation noise on sensitive land uses, the County Code, Title 8 Development Code contains the noise level limits for mobile, stationary, and construction-related noise sources. (5)

Further, since some noise-sensitive receiver locations are located within the adjacent City of Rialto, east of the Project site, this section describes the noise level standards related to the Project based on the City of Rialto General Plan and Municipal Code.

3.4.1 TRANSPORTATION NOISE STANDARDS

Section 83.01.080(d), Table 83-3, contains the County of San Bernardino's mobile noise source-related standards, shown on Exhibit 3-A. Based on the County's mobile noise source standards, there are no exterior or interior noise level standards for the warehouse buildings of the Project. Exterior transportation (mobile) noise level standards for residential land uses in the Project study area are shown to be 60 dBA CNEL. This standard is consistent with the land use compatibility criteria of the City of Rialto General Plan, Exhibit 5.5, for residential uses, which are considered *normally acceptable* with exterior noise levels of up to 60 dBA CNEL. (17)

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

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

Notes:

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

(2) The outdoor environment shall be limited to:

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

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

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

Source: County of San Bernardino County Code, Title 8 Development Code, Table 83-3.

3.4.2 OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as the Slover and Cactus Warehouse Project, stationary-source (operational) noise such as the expected idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements are typically evaluated against standards established under a jurisdiction's Municipal Code. Therefore, to accurately describe the potential Project-related operational noise levels, this analysis presents the appropriate stationary-source noise level standards from the County of San Bernardino and adjacent jurisdiction of the City of Rialto, since some nearby receiver locations are within City's boundaries.

The County of San Bernardino County Code, Title 8 Development Code, Section 83.01.080(c) establishes the noise level standards for stationary noise sources. Since the Project's industrial land use will potentially impact adjacent noise-sensitive uses in the Project study area, this noise study relies on the more conservative residential noise level standards to describe potential operational noise impacts. For residential properties, the exterior noise level shall not exceed 55 dBA L_{eq} during the daytime hours (7:00 a.m. to 10:00 p.m.) and 45 dBA L_{eq} during the nighttime

hours (10:00 p.m. to 7:00 a.m.) for both the whole hour, and for not more than 30 minutes in any hour. In addition, the County of San Bernardino County Code identifies an anytime exterior noise level limit of 70 dBA L_{eq} for industrial uses. (5)

The exterior noise level standards shall apply for a cumulative period of 30 minutes in any hour, as well as 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 County of San Bernardino operational noise level standards are shown on Table 3-1 and included in Appendix 3.1.

The City of Rialto Municipal Code does not identify specific exterior noise level standards. (18) Therefore, County of San Bernardino Development Code standards are used in this noise study to evaluate potential impacts at adjacent sensitive receiver locations per CEQA Guidelines, discussed in Section 4.

TABLE 3-1: OPERATIONAL NOISE STANDARDS

Jurisdiction	Land Use	Time Period	Exterior Noise Level Standards[1]					
			L_{eq} (Hourly)	L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (<1 min)
County of San Bernardino[2]	Residential	7:00 a.m. to 10:00 p.m.	55	55	60	65	70	75
		10:00 p.m. to 7:00 a.m.	45	45	50	55	60	65
	Industrial	Anytime	70	70	75	80	85	90

[1] L_{eq} represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. The percent noise level is the level exceeded "n" percent of the time during the measurement period. L_{25} is the noise level exceeded 25% of the time.
[2]Source: County of San Bernardino Development Code, Title 8, Section 83.01.080 (Appendix 3.1).

3.4.3 CONSTRUCTION NOISE STANDARDS

To analyze noise impacts originating from the construction of the Slover and Cactus Warehouse Project, noise from construction activities are typically limited to the hours of operation established under a jurisdiction's Municipal Code. Section 83.01.080(g)(3) of the County of San Bernardino Development Code, provided in Appendix 3.1, indicates that construction activity is considered exempt from the noise level standards between the hours of 7:00a.m. to 7:00 p.m. except on Sundays and Federal holidays. (5) However, neither the County of San Bernardino or City of Rialto General Plan and Municipal Codes establish numeric maximum acceptable construction source noise levels at potentially affected receivers, which would allow for a quantified determination of what CEQA constitutes a *substantial temporary or periodic noise increase*. Therefore, the following construction noise level threshold is used in this noise study.

To evaluate whether the Project will generate potentially significant construction noise levels at off-site sensitive receiver locations, a construction-related noise level threshold is adopted from the *Criteria for Recommended Standard: Occupational Noise Exposure* prepared by the National Institute for Occupational Safety and Health (NIOSH). (19) A division of the U.S. Department of Health and Human Services, NIOSH identifies a noise level threshold based on the duration of

exposure to the source. The construction related noise level threshold starts at 85 dBA for more than eight hours per day, and for every 3 dBA increase, the exposure time is cut in half. This results in noise level thresholds of 88 dBA for more than four hours per day, 92 dBA for more than one hour per day, 96 dBA for more than 30 minutes per day, and up to 100 dBA for more than 15 minutes per day. (19) For the purposes of this analysis, the lowest, more conservative construction noise level threshold of 85 dBA L_{eq} is used as an acceptable threshold for construction noise at the nearby sensitive receiver locations. Since this construction-related noise level threshold represents the energy average of the noise source over a given time, they are expressed as L_{eq} noise levels. Therefore, the noise level threshold of 85 dBA L_{eq} over a period of eight hours or more is used to evaluate the potential Project-related construction noise level impacts at the nearby sensitive receiver locations.

The 85 dBA L_{eq} threshold is also consistent with the FTA *Transit Noise and Vibration Impact Assessment* criteria for construction noise which identifies an hourly construction noise level threshold of 90 dBA L_{eq} during daytime hours, and 80 dBA L_{eq} during nighttime hours for construction for general assessment at noise-sensitive uses (e.g., residential, medical/hospital, school, etc.). (14) Detailed assessment, according to the FTA, identifies an 8-hour dBA L_{eq} noise level threshold specific to noise-sensitive uses of 80 dBA L_{eq}. Therefore, the Noise Study relies on the NIOSH 85 dBA L_{eq} threshold, consistent with FTA general and detailed assessment criteria for noise-sensitive uses and represents an appropriate threshold for construction noise analysis.

3.4.4 CONSTRUCTION VIBRATION STANDARDS

To analyze vibration impacts originating from the operation and construction of the Slover and Cactus Warehouse, vibration-generating activities are typically evaluated against standards established under a jurisdiction's Municipal Code. Therefore, the County of San Bernardino Development Code vibration level standards are used in this analysis to assess potential impacts at nearby sensitive receiver locations. The City of Rialto Municipal Code does not identify specific vibration level standards. (18)

The County of San Bernardino Development Code, Section 83.01.090(a) states that vibration shall be no *greater than or equal to two-tenths inches per second measured at or beyond the lot line*. (5) Therefore, to determine if the vibration levels due to the operation and construction of the Project, the peak particle velocity (PPV) vibration level standard of 0.2 inches per second is used.

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4 SIGNIFICANCE CRITERIA

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

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

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

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

While the County of San Bernardino General Plan Guidelines provide direction on noise compatibility and establish noise standards by land use type that are sufficient to assess the significance of noise impacts, they do not define the levels at which increases are considered substantial for use under Guideline A. CEQA Appendix G Guideline C applies to nearby public and private airports, if any, and the Project's land use compatibility. The Project site is not located within two miles of a public airport or within an airport land use plan; nor is the Project within the vicinity of a private airstrip. As such, the Project site would not be exposed to excessive noise levels from airport operations, and therefore, impacts are considered *less than significant,* and no further noise analysis is conducted in relation to Guideline C.

4.1 NOISE-SENSITIVE RECEIVERS

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Guidelines described above at the closest sensitive receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing ambient noise levels, and the location of noise-sensitive receivers to determine if a noise increase represents a significant adverse environmental impact. This approach recognizes *that there is no single noise increase that renders the noise impact significant.* (20)

4.1.1 SUBSTANTIAL PERMANENT NOISE LEVEL INCREASES

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) (21) 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 (Leq).

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. (20) 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.

4.1.2 SUBSTANTIAL TEMPORARY OF PERIODIC NOISE LEVEL INCREASES

Due to the temporary, short-term nature of noise-generating construction activities, the temporary or periodic noise level increases over the existing ambient conditions must be considered under CEQA Guideline D. Therefore, the Caltrans *Traffic Noise Analysis Protocol* 12 dBA L_{eq} *substantial* noise level increase threshold is used in this analysis to assess temporary noise level increases. (4) If the Project-related construction noise levels generate a temporary noise level increase above the existing ambient noise levels of up to 12 dBA L_{eq}, then the Project construction noise level increases will be considered a potentially significant impact. Although the Caltrans recommendations were specifically developed to assess traffic noise impacts, the 12 dBA L_{eq} substantial noise level increase threshold is used in California to address noise level increases with the potential to exceed existing conditions. (4)

4.2 NON-NOISE-SENSITIVE RECEIVERS

The County of San Bernardino Development Code, Section 83.01.080(d), Table 83-3 identifies transportation-related noise level standards. As previously shown on Exhibit 3-A, non-noise-sensitive land uses such as office uses require exterior noise levels of 65 dBA CNEL per the County's Table 83-3 mobile noise source standards. No exterior noise level standards are identified for industrial uses in the Project study area. Further, the City of Rialto General Plan Exhibit 5.5 land use compatibility criteria for *normally acceptable* non-noise-sensitive uses includes exterior noise levels of 65 dBA CNEL identified for commercial, business park, office, and industrial uses. (17)

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 65 dBA CNEL exterior noise level standard, 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 65 dBA CNEL exterior noise level standard, 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 County of San Bernardino Development Code, Section 83.01.080(d), Table 83-3 exterior noise level standards.

4.3 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 impact 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 County of San Bernardino Development Code, Section 83.01.080(d), Table 83-3 65 dBA CNEL noise level standard and the Project creates a *readily perceptible* 5 dBA CNEL or greater Project-related noise level increase; or
    - are greater than the County of San Bernardino Development Code, Section 83.01.080(d), Table 83-3 65 dBA CNEL noise level standard and the Project creates a *barely perceptible* 3 dBA CNEL or greater Project-related noise level increase.

OPERATIONAL NOISE

- If Project-related operational (stationary-source) noise levels exceed:
    - the exterior 55 dBA L_{eq} daytime or 45 dBA L_{eq} nighttime noise level standards for sensitive land uses, or 70 dBA L_{eq} for industrial uses. These standards shall not be exceeded for a cumulative period of 30 minutes (L_{50}), or plus 5 dBA cannot be exceeded for a cumulative period of more than 15 minutes (L_{25}) in any hour, or the standard plus 10 dBA for a cumulative period of more than 5 minutes (L_8) in any hour, or the standard plus 15 dBA for a cumulative period of more than 1 minute (L_2) in any hour, or the standard plus 20 dBA at any time (L_{max}) (Section 83.01.080(c) of the County of San Bernardino County Code, Title 8 Development Code).
- If the existing ambient noise levels at the nearby noise-sensitive receivers near the Project site:
    - are less than 60 dBA L_{eq} and the Project creates a *readily perceptible* 5 dBA L_{eq} or greater Project-related noise level increase; or
    - range from 60 to 65 dBA L_{eq} and the Project creates a *barely perceptible* 3 dBA L_{eq} or greater Project-related noise level increase; or
    - already exceed 65 dBA L_{eq}, and the Project creates a community noise level impact of greater than 1.5 dBA L_{eq} (FICON, 1992).
- If long-term Project generated operational vibration levels exceed the County of San Bernardino vibration standard of 0.2 in/sec PPV at sensitive receiver locations (Section 83.01.090(a) of the County of San Bernardino County Code, Title 8 Development Code).

CONSTRUCTION NOISE AND VIBRATION

- If Project-related construction activities:
    - create noise levels which exceed the 85 dBA L_{eq} acceptable noise level threshold at the nearby noise-sensitive receiver locations (NIOSH, Criteria for Recommended Standard: Occupational Noise Exposure); or
    - generate temporary Project construction-related noise level increases which exceed the 12 dBA L_{eq} substantial noise level increase threshold at noise-sensitive receiver locations (Caltrans, Traffic Noise Analysis Protocol).
- If short-term Project construction vibration levels exceed the County of San Bernardino vibration standard of 0.2 in/sec PPV at sensitive receiver locations (Section 83.01.090(a) of the County of San Bernardino County Code, Title 8 Development Code).

TABLE 4-2: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Receiving Land Use	Condition(s)	Significance Criteria	
			Daytime	Nighttime
Off-Site Traffic	Noise-Sensitive[1]	If ambient is < 60 dBA CNEL	≥ 5 dBA CNEL Project increase	
		If ambient is 60 - 65 dBA CNEL	≥ 3 dBA CNEL Project increase	
		If ambient is > 65 dBA CNEL	≥ 1.5 dBA CNEL Project increase	
	Non-Noise-Sensitive[2]	if ambient is < 65 dBA CNEL	≥ 5 dBA CNEL Project increase	
		if ambient is > 65 dBA CNEL	≥ 3 dBA CNEL Project increase	
Operational	Residential	Exterior Noise Level Standards	See Table 3-1.	
	Industrial	Exterior Noise Level Standards		
	Noise-Sensitive[1]	if ambient is < 60 dBA L_{eq}	≥ 5 dBA L_{eq} Project increase	
		if ambient is 60 - 65 dBA L_{eq}	≥ 3 dBA L_{eq} Project increase	
		if ambient is > 65 dBA L_{eq}	≥ 1.5 dBA L_{eq} Project increase	
Construction	Noise-Sensitive	Noise Level Threshold at Sensitive Uses[4]	85 dBA L_{eq}	
		Noise Level Increase at Sensitive Uses[5]	12 dBA L_{eq}	
		Vibration Level Threshold[6]	0.2 in/sec PPV	

[1] Source: FICON, 1992.
[2] Sources: County of San Bernardino Development Code, Section 83.01.080(d), Table 83-3 and the City of Rialto General Plan Exhibit 5.5.
[3] Source: Section 83.01.080(g)(3) of the County of San Bernardino County Code, Title 8 Development Code (Appendix 3.1).
[4] Source: NIOSH, Criteria for Recommended Standard: Occupational Noise Exposure, June 1998.
[5] Source: Caltrans Traffic Noise Analysis Protocol, May 2011.
[6] Source: Section 83.01.090(a) of the County of San Bernardino County Code, Title 8 Development Code.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.; "PPV" = peak particle velocity.

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5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, seven 24-hour noise level measurements were taken at sensitive receiver 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, May 9th, 2018. 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. (22)

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 any 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*. (7) 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*. (14)

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. (14) 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 east of the Project site across Cactus Avenue near existing industrial uses and a residential home. The noise level measurements collected show an overall 24-hour exterior noise level of 66.2 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 61.6 dBA L_{eq} with an average nighttime noise level of 59.0 dBA L_{eq}.
- Location L2 represents the noise levels south of the Project site near existing residential homes on Cactus Avenue. The noise level measurements collected show an overall 24-hour exterior noise level of 72.1 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 68.3 dBA L_{eq} with an average nighttime noise level of 64.8 dBA L_{eq}.
- Location L3 represents the noise levels south of the Project site on Cactus Avenue near existing residential homes. The 24-hour CNEL indicates that the overall exterior noise level is 68.5 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 64.4 dBA L_{eq} with an average nighttime noise level of 61.3 dBA L_{eq}.
- Location L4 represents the noise levels south of the Project site on Spruce Avenue near existing residential homes. 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 63.1 dBA L_{eq} with an average nighttime noise level of 60.5 dBA L_{eq}.
- Location L5 represents the noise levels west of the Project site on Spruce Avenue near existing residential homes. The noise level measurements collected show an overall 24-hour exterior noise level of 60.9 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 55.8 dBA L_{eq} with an average nighttime noise level of 53.6 dBA L_{eq}.
- Location L6 represents the noise levels on Slover Avenue south of Bloomington Junior High School, west of the Project site. The noise level measurements collected show an overall 24-hour exterior noise level of 75.6 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 71.4 dBA L_{eq} with an average nighttime noise level of 68.3 dBA L_{eq}.
- Location L7 represents the noise levels north of the Project site adjacent to an existing railroad yard. The 24-hour CNEL indicates that the overall exterior noise level is 68.8 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 65.1 dBA L_{eq} with an average nighttime noise level of 61.1 dBA L_{eq}.

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

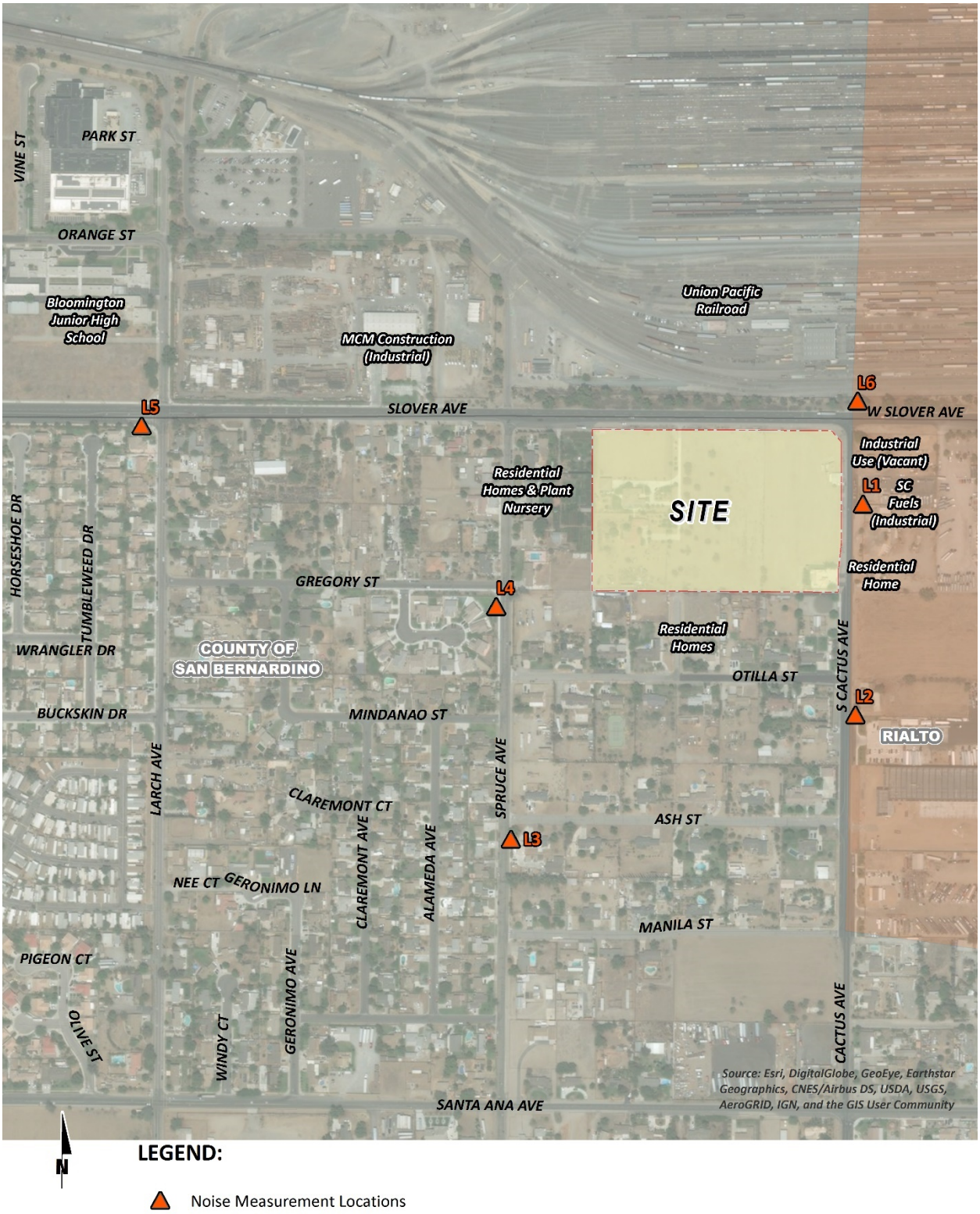
The background ambient noise levels in the Project study area are dominated by the transportation-related noise associated with the arterial roadway network and nearby railroad lines. The 24-hour existing noise level measurements shown on Table 5-1 present the existing ambient noise conditions.

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

Location[1]	Distance to Project Boundary (Feet)	Description	Energy Average Hourly Noise Level (dBA L_{eq})[2]		CNEL
			Daytime	Nighttime	
L1	80'	Located east of the Project site across Cactus Avenue near existing industrial uses and a residential home.	61.6	59.0	66.2
L2	475'	Located south of the Project site near existing residential homes on Cactus Avenue.	68.3	64.8	72.1
L3	1,070'	Located south of the Project site on Cactus Avenue near existing residential homes.	64.4	61.3	68.5
L4	1,000'	Located south of the Project site on Spruce Avenue near existing residential homes.	63.1	60.5	67.7
L5	375'	Located west of the Project site on Spruce Avenue near existing residential homes.	55.8	53.6	60.9
L6	1,730'	Located on Slover Avenue south of Bloomington Junior High School, west of the Project site.	71.4	68.3	75.6
L7	160'	Located north of the Project site adjacent to an existing railroad yard.	65.1	61.1	68.8

[1] See Exhibit 5-A for the noise level measurement locations.
[2] Energy (logarithmic) average hourly 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 estimated roadway noise impacts from vehicular traffic were calculated using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (23) 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. (24) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period.

6.2 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 six study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the County of San Bernardino and City of Rialto General Plan Circulation Elements, and the posted vehicle speeds. The ADT volumes used in this study are presented on Table 6-2 are based on the *Slover and Cactus Warehouse Traffic Impact Analysis* prepared by Urban Crossroads, Inc., for the following traffic scenarios: Existing, Opening Year 2020, and Horizon Year 2040 conditions. (2) For this analysis, soft site conditions are used to analyze the traffic noise impacts within the Project study area. Soft site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. Caltrans' research has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model as used in this off-site traffic noise analysis. (25)

Per the *Slover and Cactus Warehouse Traffic Impact Analysis* prepared by Urban Crossroads, Inc. the Project is expected to generate a net total of approximately 449 trip-ends per day (actual vehicles). (2) The net Project trip generation includes 90 truck trip-ends per day from the proposed buildings within the Project site. 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.

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. The 90 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 6-7 show the vehicle mixes used for the with Project traffic scenarios.

TABLE 6-1: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	Adjacent Planned (Existing if Different) Land Use[1]	Distance from Centerline to Nearest Adjacent Land Use (Feet)[2]	Vehicle Speed (mph)[3]
1	Cedar Av.	n/o Orange St.	Community Industrial (Vacant)	52'	40
2	Cedar Av.	n/o Slover Av.	Institutional/Industrial	52'	40
3	Cactus Av.	s/o Slover Av.	Industrial/Residential	44'	45
4	Slover Av.	e/o Cedar Av.	Institutional/Residential	52'	50
5	Slover Av.	e/o Larch Av.	Residential/Industrial	52'	50
6	Slover Av.	e/o Cactus Av.	Light Industrial	52'	45

[1] Sources: County of San Bernardino Fontana FH29 A Area Plan and the City of Rialto Land Use Policy Plan.
[2] Distance to adjacent land use is based upon the right-of-way distances for each functional roadway classification provided in the General Plan Circulation Elements.
[3] Source: Slover and Cactus Traffic Impact Analysis, Urban Crossroads, Inc.

TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic Volumes[1]					
			Existing		Opening Year 2020		Horizon Year 2040	
			Without Project	With Project	Without Project	With Project	Without Project	With Project
1	Cedar Av.	n/o Orange St.	37,018	37,216	44,475	44,673	45,428	45,626
2	Cedar Av.	n/o Slover Av.	30,273	30,471	38,810	39,008	42,691	42,889
3	Cactus Av.	s/o Slover Av.	25,564	25,792	30,071	30,299	33,079	33,307
4	Slover Av.	e/o Cedar Av.	12,948	13,199	14,878	15,129	15,890	16,141
5	Slover Av.	e/o Larch Av.	14,185	14,436	16,323	16,574	17,408	17,659
6	Slover Av.	e/o Cactus Av.	10,820	11,000	12,145	12,325	13,278	13,458

[1] Source: Slover and Cactus Traffic Impact Analysis, Urban Crossroads, Inc.

TABLE 6-3: TIME OF DAY VEHICLE SPLITS

Vehicle Type	Time of Day Splits			Total of Time of Day Splits
	Daytime	Evening	Nighttime	
Autos	66.89%	13.30%	19.81%	100.00%
Medium Trucks	65.96%	10.05%	23.99%	100.00%
Heavy Trucks	69.78%	9.19%	21.04%	100.00%

Based on an existing 24-hour vehicle count taken on Cedar Avenue north of Slover Avenue (Slover and Cactus Traffic Impact Analysis, Urban Crossroads, Inc.). 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 CONDITIONS VEHICLE MIX

Classification	Total % Traffic Flow			Total
	Autos	Medium Trucks	Heavy Trucks	
All Segments	87.86%	7.14%	5.00%	100.00%

Based on an existing 24-hour vehicle count taken on Cedar Avenue north of Slover Avenue (Slover and Cactus Traffic Impact Analysis, Urban Crossroads, Inc.). Vehicle mix percentage values rounded to the nearest one-hundredth. Vehicle mix percentage values rounded to the nearest one-hundredth.

TABLE 6-5: EXISTING WITH PROJECT CONDITIONS VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Cedar Av.	n/o Orange St.	87.78%	7.13%	5.09%	100.00%
2	Cedar Av.	n/o Slover Av.	87.76%	7.13%	5.11%	100.00%
3	Cactus Av.	s/o Slover Av.	87.92%	7.09%	4.99%	100.00%
4	Slover Av.	e/o Cedar Av.	87.69%	7.07%	5.24%	100.00%
5	Slover Av.	e/o Larch Av.	87.70%	7.08%	5.22%	100.00%
6	Slover Av.	e/o Cactus Av.	87.73%	7.08%	5.19%	100.00%

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

TABLE 6-6: OPENING YEAR 2020 WITH PROJECT CONDITIONS VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Cedar Av.	n/o Orange St.	87.80%	7.13%	5.07%	100.00%
2	Cedar Av.	n/o Slover Av.	87.79%	7.13%	5.09%	100.00%
3	Cactus Av.	s/o Slover Av.	87.91%	7.09%	4.99%	100.00%
4	Slover Av.	e/o Cedar Av.	87.71%	7.08%	5.21%	100.00%
5	Slover Av.	e/o Larch Av.	87.72%	7.09%	5.19%	100.00%
6	Slover Av.	e/o Cactus Av.	87.75%	7.09%	5.17%	100.00%

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

TABLE 6-7: HORIZON YEAR 2040 WITH PROJECT CONDITIONS VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Cedar Av.	n/o Orange St.	87.80%	7.13%	5.07%	100.00%
2	Cedar Av.	n/o Slover Av.	87.79%	7.13%	5.08%	100.00%
3	Cactus Av.	s/o Slover Av.	87.91%	7.10%	4.99%	100.00%
4	Slover Av.	e/o Cedar Av.	87.72%	7.09%	5.20%	100.00%
5	Slover Av.	e/o Larch Av.	87.73%	7.09%	5.18%	100.00%
6	Slover Av.	e/o Cactus Av.	87.76%	7.09%	5.15%	100.00%

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

6.3 CONSTRUCTION VIBRATION ASSESSMENT METHODOLOGY

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 several types of construction equipment are summarized on Table 6-8. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the human response (annoyance) using the following vibration assessment methods defined by the FTA. To describe the human response (annoyance) associated with vibration impacts the FTA provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

TABLE 6-8: 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, May 2006.

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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 *Slover and Cactus Warehouse 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 2020 Without / With the Project: This scenario refers to Opening Year noise conditions without and with the proposed Project. This scenario includes all cumulative projects identified in the Traffic Impact Analysis.
- Horizon Year 2040 Without / With the Project: This scenario refers to Horizon Year 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

Noise contours were used to assess the Project's incremental traffic-related noise impacts at land uses adjacent to roadways conveying Project traffic. The noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70, 65, and 60 dBA noise levels. The noise contours do not consider the effect of any existing noise barriers or topography that may attenuate ambient noise levels. In addition, because the noise contours reflect modeling of vehicular noise on area roadways, they appropriately do not reflect noise contributions from the surrounding stationary noise sources within the Project study area. Tables 7-1 and 7-6 present a summary of the exterior traffic noise levels, without barrier attenuation, for the six study area roadway segments analyzed from the without Project to the with Project conditions under Existing, Opening Year 2020, and Horizon Year 2040 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 CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Cedar Av.	n/o Orange St.	Community Industrial (Vacant)	77.3	160	345	743
2	Cedar Av.	n/o Slover Av.	Institutional/Industrial	76.5	140	302	650
3	Cactus Av.	s/o Slover Av.	Industrial/Residential	77.6	142	306	660
4	Slover Av.	e/o Cedar Av.	Institutional/Residential	74.7	107	231	498
5	Slover Av.	e/o Larch Av.	Residential/Industrial	75.1	114	246	529
6	Slover Av.	e/o Cactus Av.	Light Industrial	72.7	79	169	365

[1] Sources: County of San Bernardino Fontana FH29 A Area Plan and the City of Rialto Land Use Policy Plan.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest 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 CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Cedar Av.	n/o Orange St.	Community Industrial (Vacant)	77.4	162	348	751
2	Cedar Av.	n/o Slover Av.	Institutional/Industrial	76.5	142	305	658
3	Cactus Av.	s/o Slover Av.	Industrial/Residential	77.7	143	308	663
4	Slover Av.	e/o Cedar Av.	Institutional/Residential	74.9	110	237	511
5	Slover Av.	e/o Larch Av.	Residential/Industrial	75.3	117	252	542
6	Slover Av.	e/o Cactus Av.	Light Industrial	72.8	80	173	373

[1] Sources: County of San Bernardino Fontana FH29 A Area Plan and the City of Rialto Land Use Policy Plan.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-3: OPENING YEAR 2020 WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Cedar Av.	n/o Orange St.	Community Industrial (Vacant)	78.1	181	390	840
2	Cedar Av.	n/o Slover Av.	Institutional/Industrial	77.5	165	356	767
3	Cactus Av.	s/o Slover Av.	Industrial/Residential	78.3	158	341	735
4	Slover Av.	e/o Cedar Av.	Institutional/Residential	75.3	118	254	546
5	Slover Av.	e/o Larch Av.	Residential/Industrial	75.7	125	270	581
6	Slover Av.	e/o Cactus Av.	Light Industrial	73.2	85	183	394

[1] Sources: County of San Bernardino Fontana FH29 A Area Plan and the City of Rialto Land Use Policy Plan.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-4: OPENING YEAR 2020 WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Cedar Av.	n/o Orange St.	Community Industrial (Vacant)	78.2	182	393	847
2	Cedar Av.	n/o Slover Av.	Institutional/Industrial	77.6	167	359	774
3	Cactus Av.	s/o Slover Av.	Industrial/Residential	78.4	159	343	738
4	Slover Av.	e/o Cedar Av.	Institutional/Residential	75.5	120	259	559
5	Slover Av.	e/o Larch Av.	Residential/Industrial	75.9	128	275	593
6	Slover Av.	e/o Cactus Av.	Light Industrial	73.3	87	187	402

[1] Sources: County of San Bernardino Fontana FH29 A Area Plan and the City of Rialto Land Use Policy Plan.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-5: HORIZON YEAR 2040 WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Cedar Av.	n/o Orange St.	Community Industrial (Vacant)	78.2	184	395	852
2	Cedar Av.	n/o Slover Av.	Institutional/Industrial	77.9	176	379	817
3	Cactus Av.	s/o Slover Av.	Industrial/Residential	78.8	169	364	783
4	Slover Av.	e/o Cedar Av.	Institutional/Residential	75.6	123	265	571
5	Slover Av.	e/o Larch Av.	Residential/Industrial	76.0	131	281	606
6	Slover Av.	e/o Cactus Av.	Light Industrial	73.6	90	194	418

[1] Sources: County of San Bernardino Fontana FH29 A Area Plan and the City of Rialto Land Use Policy Plan.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-6: HORIZON YEAR 2040 WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Cedar Av.	n/o Orange St.	Community Industrial (Vacant)	78.3	185	399	859
2	Cedar Av.	n/o Slover Av.	Institutional/Industrial	78.0	178	383	824
3	Cactus Av.	s/o Slover Av.	Industrial/Residential	78.8	169	365	786
4	Slover Av.	e/o Cedar Av.	Institutional/Residential	75.7	126	271	583
5	Slover Av.	e/o Larch Av.	Residential/Industrial	76.1	133	287	618
6	Slover Av.	e/o Cactus Av.	Light Industrial	73.7	92	198	426

[1] Sources: County of San Bernardino Fontana FH29 A Area Plan and the City of Rialto Land Use Policy Plan.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

7.2 EXISTING CONDITION PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-1 presents the Existing without Project conditions CNEL noise levels. The without Project exterior noise levels are expected to range from 72.7 to 77.6 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing with Project conditions will range from 72.8 to 77.7 dBA CNEL. As shown on Table 7-7 the Project will generate a noise level increase of up to 0.2 dBA CNEL on the study area roadway segments. Based on the significance criteria in Section 4, the Project-related noise level increases are considered *less than significant* under Existing conditions at the land uses adjacent to roadways conveying Project traffic.

TABLE 7-7: EXISTING CONDITION OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Adjacent Land Use (dBA)[2]			Noise-Sensitive Land Use?	Threshold Exceeded?[3]
				No Project	With Project	Project Addition		
1	Cedar Av.	n/o Orange St.	Community Industrial (Vacant)	77.3	77.4	0.1	No	No
2	Cedar Av.	n/o Slover Av.	Institutional/Industrial	76.5	76.5	0.1	Yes	No
3	Cactus Av.	s/o Slover Av.	Industrial/Residential	77.6	77.7	0.0	Yes	No
4	Slover Av.	e/o Cedar Av.	Institutional/Residential	74.7	74.9	0.2	Yes	No
5	Slover Av.	e/o Larch Av.	Residential/Industrial	75.1	75.3	0.2	Yes	No
6	Slover Av.	e/o Cactus Av.	Light Industrial	72.7	72.8	0.1	No	No

[1] Sources: County of San Bernardino Fontana FH29 A Area Plan and the City of Rialto Land Use Policy Plan.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
[3] Significance Criteria (Section 4).

7.3 OPENING YEAR 2020 PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-3 presents the Opening Year 2020 without Project conditions CNEL noise levels. The without Project exterior noise levels are expected to range from 73.2 to 78.3 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-4 shows the Opening Year 2020 with Project conditions will range from 73.3 to 78.4 dBA CNEL. As shown on Table 7-8 the Project will generate a noise level increase of up to 0.1 dBA CNEL on the study area roadway segments. Based on the significance criteria in Section 4, the Project-related noise level increases are considered *less than significant* under Opening Year 2020 conditions at the land uses adjacent to roadways conveying Project traffic.

TABLE 7-8: OPENING YEAR OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Adjacent Land Use (dBA)[2]			Noise-Sensitive Land Use?	Threshold Exceeded?[3]
				No Project	With Project	Project Addition		
1	Cedar Av.	n/o Orange St.	Community Industrial (Vacant)	78.1	78.2	0.1	No	No
2	Cedar Av.	n/o Slover Av.	Institutional/Industrial	77.5	77.6	0.1	Yes	No
3	Cactus Av.	s/o Slover Av.	Industrial/Residential	78.3	78.4	0.0	Yes	No
4	Slover Av.	e/o Cedar Av.	Institutional/Residential	75.3	75.5	0.1	Yes	No
5	Slover Av.	e/o Larch Av.	Residential/Industrial	75.7	75.9	0.1	Yes	No
6	Slover Av.	e/o Cactus Av.	Light Industrial	73.2	73.3	0.1	No	No

[1] Sources: County of San Bernardino Fontana FH29 A Area Plan and the City of Rialto Land Use Policy Plan.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
[3] Significance Criteria (Section 4).

7.4 HORIZON YEAR 2040 PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-5 presents the Horizon Year 2040 without Project conditions CNEL noise levels. The without Project exterior noise levels are expected to range from 73.6 to 78.8 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-6 shows the Horizon Year 2040 with Project conditions will range from 73.7 to 78.8 dBA CNEL. As shown on Table 7-9 the Project will generate a noise level increase of up to 0.1 dBA CNEL on the study area roadway segments. Based on the significance criteria in Section 4, the Project-related noise level increases are considered *less than significant* under Horizon Year 2040 conditions at the land uses adjacent to roadways conveying Project traffic.

TABLE 7-9: HORIZON YEAR OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Adjacent Land Use (dBA)[2]			Noise-Sensitive Land Use?	Threshold Exceeded?[3]
				No Project	With Project	Project Addition		
1	Cedar Av.	n/o Orange St.	Community Industrial (Vacant)	78.2	78.3	0.1	No	No
2	Cedar Av.	n/o Slover Av.	Institutional/Industrial	77.9	78.0	0.1	Yes	No
3	Cactus Av.	s/o Slover Av.	Industrial/Residential	78.8	78.8	0.0	Yes	No
4	Slover Av.	e/o Cedar Av.	Institutional/Residential	75.6	75.7	0.1	Yes	No
5	Slover Av.	e/o Larch Av.	Residential/Industrial	76.0	76.1	0.1	Yes	No
6	Slover Av.	e/o Cactus Av.	Light Industrial	73.6	73.7	0.1	No	No

[1] Sources: County of San Bernardino Fontana FH29 A Area Plan and the City of Rialto Land Use Policy Plan.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
[3] Significance Criteria (Section 4).

8 RECEIVER LOCATIONS

To assess the potential for long-term operational and short-term construction noise impacts, the following five receiver locations as shown on Exhibit 8-A were identified as representative locations for focused 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, natural open space, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

Noise-sensitive receivers near the Project site include existing residential homes, and non-noise-sensitive receivers include existing industrial uses, 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 108 feet east of the Project site, R1 represents existing industrial uses across Cactus Avenue. A 24-hour noise level measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents the existing residential home located approximately 80 feet east of the Project site across Cactus Avenue. A 24-hour noise level measurement was taken near this location, L1, to describe the existing ambient noise environment.

R3: Location R3 represents the outdoor living area and stables in the backyards of residential homes located roughly 10 feet south of the Project site. A 24-hour noise level measurement was taken near this location, L1, to describe the existing ambient noise environment.

R4: Location R4 represents the outdoor living area and stables in the backyards of residential homes located roughly 10 feet south of the Project site. A 24-hour noise level measurement was taken near this location, L5, to describe the existing ambient noise environment.

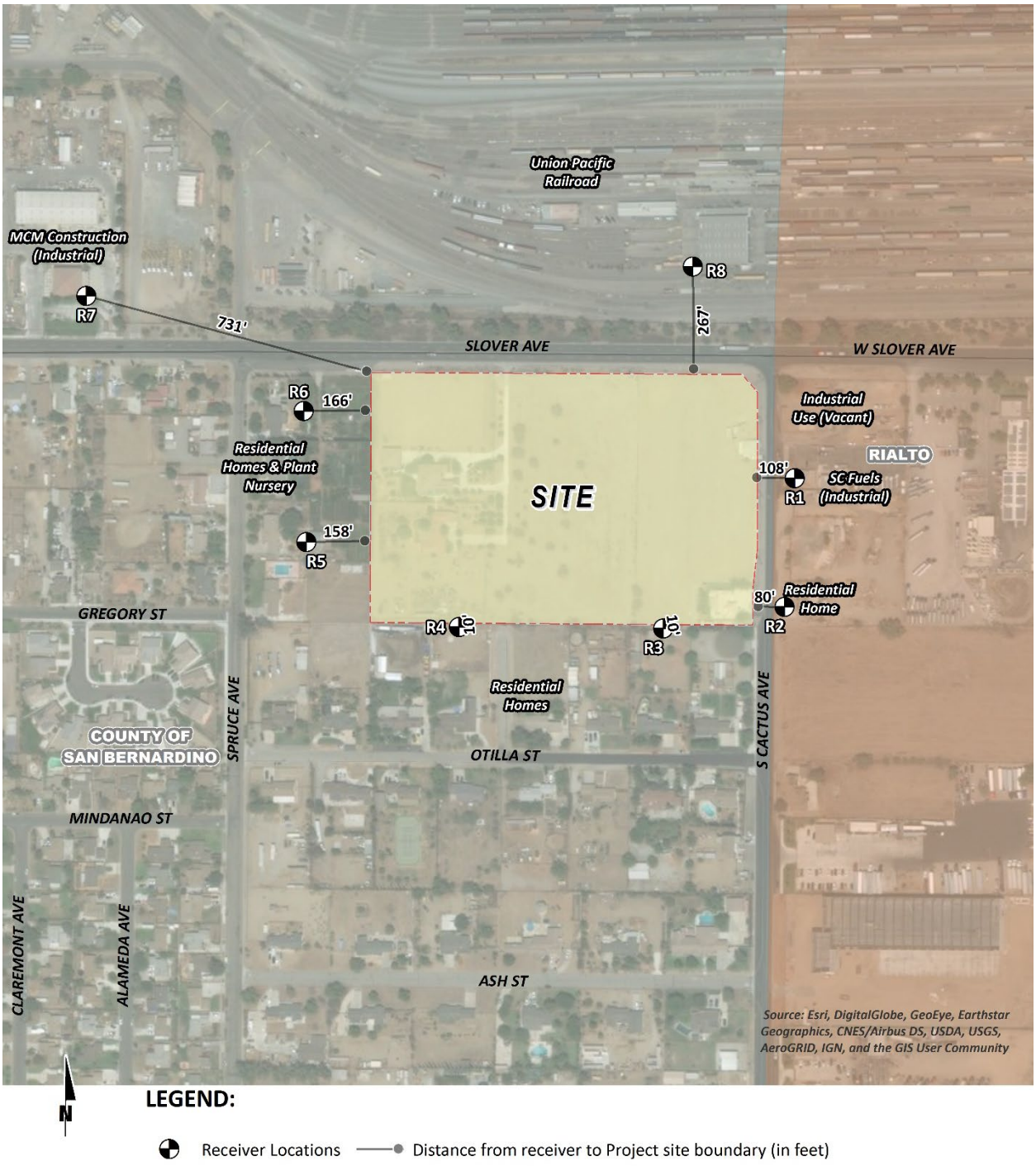
R5: Location R5 represents the existing residential home and nursery located roughly 158 feet west of the Project site on Spruce Avenue. A 24-hour noise level measurement was taken east of this location, L5, to describe the existing ambient noise environment.

R6: Location R6 represents the existing residential home and nursery located roughly 166 feet west of the Project site on Spruce Avenue. A 24-hour noise level measurement was taken near this location, L5, to describe the existing ambient noise environment.

R7: Location R7 represents the existing industrial use northwest of the Project site at roughly 731 feet. A 24-hour noise level measurement was taken near this location, L6, to describe the existing ambient noise environment.

R8: Location R8 represents the existing Union Pacific railroad yard roughly 267 feet north of the Project site. A 24-hour noise level measurement was taken east of this location, L7, to describe the existing ambient noise environment.

EXHIBIT 8-A: RECEIVER LOCATIONS



9 OPERATIONAL IMPACTS

This section analyzes the potential operational noise impacts due to the Project's stationary noise sources on the off-site noise-sensitive and adjacent industrial use receiver locations identified in Section 8. Exhibit 9-A identifies the receiver locations and noise source locations used to assess the Project-related operational noise levels.

9.1 REFERENCE NOISE LEVELS

To estimate the Project operational noise impacts, reference noise level measurements were collected from similar types of activities to represent the noise levels expected with the development of the proposed Project. This section provides a detailed description of the reference noise level measurements shown on Table 9-1 used to estimate the Project operational noise impacts. It is important to note that the following projected noise levels assume the worst-case noise environment with the idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements all operating continuously. These noise level impacts will likely vary throughout the day.

TABLE 9-1: REFERENCE NOISE LEVEL MEASUREMENTS

Noise Source	Duration (hh:mm:ss)	Ref. Distance (Feet)	Noise Source Height (Feet)	Hourly Activity (Mins)[4]	Reference Noise Level (dBA L_{eq})	
					@ Ref. Dist.	@ 50 Feet
Truck Unloading/Docking Activity[1]	0:15:00	30'	8'	60	67.2	62.8
Roof-Top Air Conditioning Units[2]	96:00:00	5'	5'	39	77.2	57.2
Parking Lot Vehicle Movements[3]	01:00:00	10'	5'	60	52.2	41.7

[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 on Wednesday, January 7, 2015.
[2] As measured by Urban Crossroads, Inc. on 7/27/2015 at the Santee Walmart located at 170 Town Center Parkway.
[3] As measured by Urban Crossroads, Inc. on 5/17/2017 at the Panasonic Avionics Corporation parking lot in the City of Lake Forest.
[4] Anticipated duration (minutes within the hour) of noise activity during typical hourly conditions expected at the Project site based on the reference noise level measurement activity.

9.1.1 TRUCK IDLING, DELIVERIES, BACKUP ALARMS, AND LOADING/UNLOADING

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 track 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 and air brakes noise.

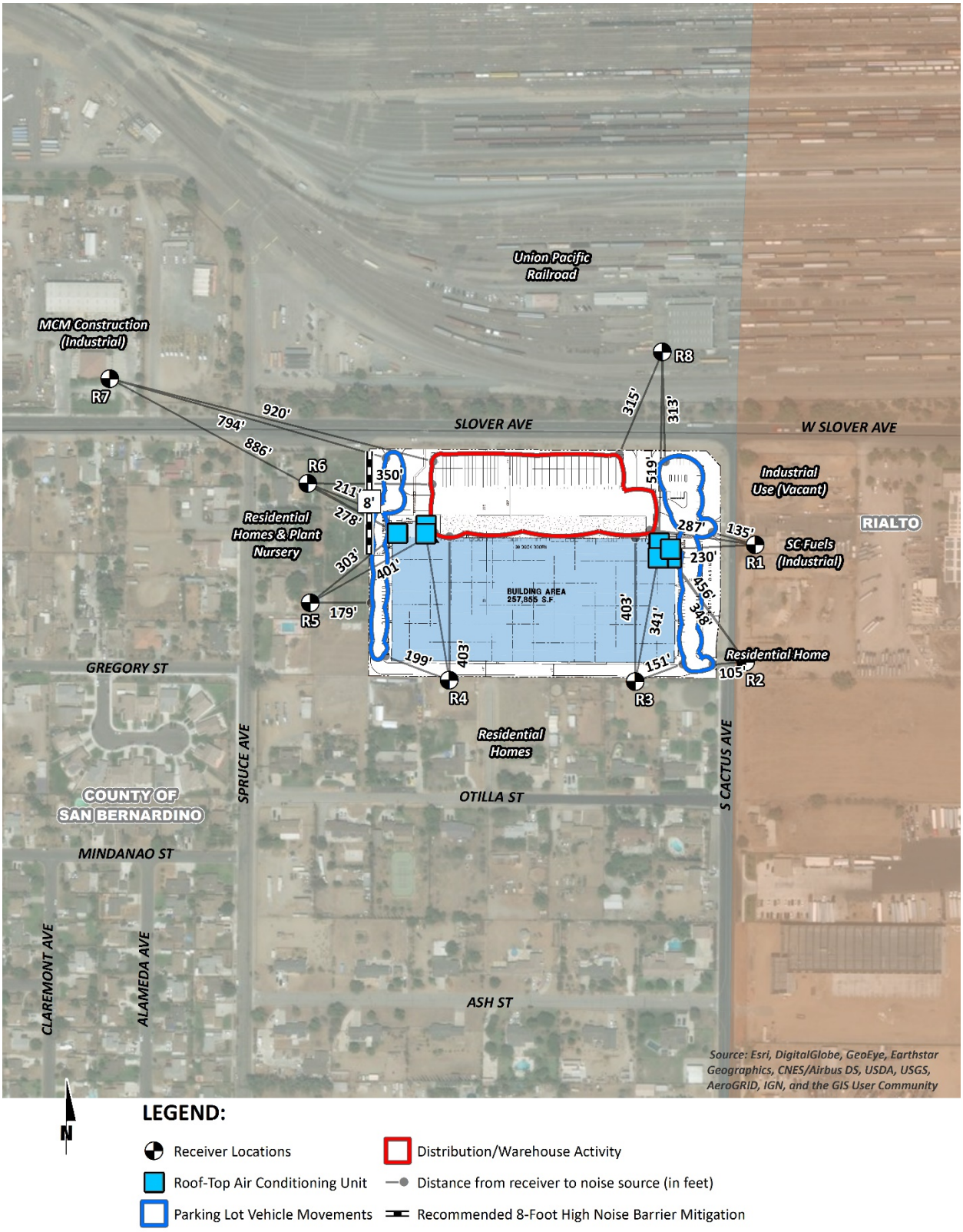
9.1.2 ROOF-TOP AIR CONDITIONING UNITS

To assess the impacts created by the roof-top air conditioning units at the Project buildings, 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 an 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}. Using the uniform reference distance of 50 feet, the noise level is 57.2 dBA L_{eq}. The operating conditions of the reference noise level measurement reflect peak summer cooling requirements with measured temperatures approaching 96 degrees Fahrenheit (°F) with average daytime temperatures of 82°F. The roof-top air condition units were observed to operate the most during the daytime hours for a total of 39 minutes per hour. The noise attenuation provided by a parapet wall is not reflected in this reference noise level measurement.

9.1.3 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 to operate for the entire hour (60 minutes).

EXHIBIT 9-A: OPERATIONAL NOISE SOURCE AND RECEIVER LOCATIONS



9.2 OPERATIONAL NOISE LEVELS

Based upon the reference noise levels, it is possible to estimate the Project operational stationary-source noise levels at each receiver location. The operational noise level calculations shown on Table 9-2 account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. Hard site conditions are used in the operational noise analysis which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source. The basic noise attenuation equation shown below is used to calculate the distance attenuation based on a reference noise level (SPL_1):

$$SPL_2 = SPL_1 - 20\log(D_2/D_1)$$

Where SPL_2 is the resulting noise level after attenuation, SPL_1 is the source noise level, D_2 is the distance to the reference sound pressure level (SPL_1), and D_1 is the distance to the receiver location. Table 9-2 indicates that the unmitigated operational noise levels associated with the idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements are expected to range from 34.0 to 48.8 dBA L_{eq} at nearby receiver locations. The unmitigated operational noise level calculation worksheets are included in Appendix 9.1.

9.3 OPERATIONAL NOISE LEVEL COMPLIANCE

To demonstrate compliance with local noise regulations, the Project-only operational noise levels are evaluated against exterior noise level thresholds based on the County of San Bernardino and City of Rialto exterior noise level standards at nearby noise-sensitive and non-noise-sensitive uses. Table 9-3 shows the operational noise levels associated with Slover and Cactus Warehouse Project will exceed the exterior noise level standards at one of the nearby sensitive receiver locations: R6. Therefore, operational noise mitigation measures are required to reduce the *potentially significant* noise level impacts at adjacent sensitive uses.

TABLE 9-2: UNMITIGATED PROJECT OPERATIONAL NOISE LEVELS

Receiver Location[1]	Noise Source[2]	Unmitigated Project Operational Noise Levels (dBA)[3]					
		L_{eq} (E. Avg.)	L_{50} (30 mins)	L_{25} (15 mins)	L_{8} (5 mins)	L_{2} (1 min)	L_{max} (Anytime)
R1	Truck Unloading/Docking Activity	47.6	44.6	47.6	52.2	56.0	60.4
	Roof-Top Air Conditioning Unit	42.0	39.2	40.9	42.2	42.5	43.0
	Parking Lot Vehicle Movements	35.2	32.0	33.0	38.0	44.0	54.9
	Combined Noise Level:	48.8	45.9	48.6	52.8	56.4	61.5
R2	Truck Unloading/Docking Activity	26.0	23.0	26.0	30.6	34.4	38.8
	Roof-Top Air Conditioning Unit	38.4	35.6	37.3	38.6	38.9	39.4
	Parking Lot Vehicle Movements	36.9	33.7	34.7	39.7	45.7	56.6
	Combined Noise Level:	40.9	37.9	39.4	42.5	46.8	56.8
R3	Truck Unloading/Docking Activity	26.9	23.9	26.9	31.5	35.3	39.7
	Roof-Top Air Conditioning Unit	23.6	20.8	22.5	23.8	24.1	24.6
	Parking Lot Vehicle Movements	34.5	31.3	32.3	37.3	43.3	54.2
	Combined Noise Level:	35.5	32.3	33.7	38.5	44.0	54.4
R4	Truck Unloading/Docking Activity	26.9	23.9	26.9	31.5	35.3	39.7
	Roof-Top Air Conditioning Unit	22.1	19.3	21.0	22.3	22.6	23.1
	Parking Lot Vehicle Movements	32.7	29.5	30.5	35.5	41.5	52.4
	Combined Noise Level:	34.0	30.9	32.4	37.1	42.5	52.6
R5	Truck Unloading/Docking Activity	27.0	24.0	27.0	31.6	35.4	39.8
	Roof-Top Air Conditioning Unit	39.7	36.9	38.6	39.9	40.2	40.7
	Parking Lot Vehicle Movements	33.4	30.2	31.2	36.2	42.2	53.1
	Combined Noise Level:	40.8	37.9	39.6	41.9	44.8	53.5
R6	Truck Unloading/Docking Activity	45.9	42.9	45.9	50.5	54.3	58.7
	Roof-Top Air Conditioning Unit	40.4	37.6	39.3	40.6	40.9	41.4
	Parking Lot Vehicle Movements	32.3	29.1	30.1	35.1	41.1	52.0
	Combined Noise Level:	47.1	44.2	46.9	51.0	54.7	59.6
R7	Truck Unloading/Docking Activity	37.5	34.5	37.5	42.1	45.9	50.3
	Roof-Top Air Conditioning Unit	30.3	27.5	29.2	30.5	30.8	31.3
	Parking Lot Vehicle Movements	23.7	20.5	21.5	26.5	32.5	43.4
	Combined Noise Level:	38.4	35.4	38.2	42.5	46.2	51.2
R8	Truck Unloading/Docking Activity	46.8	43.8	46.8	51.4	55.2	59.6
	Roof-Top Air Conditioning Unit	35.0	32.2	33.9	35.2	35.5	36.0
	Parking Lot Vehicle Movements	29.6	26.4	27.4	32.4	38.4	49.3
	Combined Noise Level:	47.2	44.2	47.1	51.6	55.3	60.0

[1] See Exhibit 9-A for the receiver and noise source locations.
[2] Reference noise sources as shown on Table 9-1.
[3] Operational noise level calculations are provided in Appendix 9.1.

TABLE 9-3: UNMITIGATED OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	Land Use	Noise Level at Receiver Locations (dBA)[2]						Threshold Exceeded?[3]
		L_{eq} (E. Avg.)	L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)	
Daytime	**Residential**	**55**	**55**	**60**	**65**	**70**	**75**	**-**
Nighttime		**45**	**45**	**50**	**55**	**60**	**65**	**-**
Anytime	**Industrial**	**70**	**70**	**75**	**80**	**85**	**90**	**-**
R1	Industrial	48.8	45.9	48.6	52.8	56.4	61.5	No
R2	Residential	40.9	37.9	39.4	42.5	46.8	56.8	No
R3	Residential	35.5	32.3	33.7	38.5	44.0	54.4	No
R4	Residential	34.0	30.9	32.4	37.1	42.5	52.6	No
R5	Residential	40.8	37.9	39.6	41.9	44.8	53.5	No
R6	Residential	47.1	44.2	46.9	51.0	54.7	59.6	Yes
R7	Industrial	38.4	35.4	38.2	42.5	46.2	51.2	No
R8	Industrial	47.2	44.2	47.1	51.6	55.3	60.0	No

[1] See Exhibit 9-A for the receiver and noise source locations.
[2] Estimated Project operational noise levels as shown on Table 9-2.
[3] Do the estimated Project operational noise levels meet the operational noise level standards (Table 3-1)?
"E. Avg." = Logarithmic (energy) average

To reduce the *potentially significant* operational noise level impacts at receiver location R6, the construction of a minimum 8-foot high noise barrier western Project site boundary is required, as shown on Exhibit 9-A. With the noise barrier shown on Exhibit 9-A, further detailed in the Executive Summary, the mitigated Project operational noise level will approach 43.9 dBA L_{eq} at receiver location R6, as shown on Table 9-4. Table 9-5 shows that the mitigated Project operational noise level at R6 will satisfy the County of San Bernardino exterior noise level standards, and therefore, the Project operational noise impacts are considered *less than significant* with mitigation.

TABLE 9-4: MITIGATED PROJECT OPERATIONAL NOISE LEVELS AT R6

Receiver Location[1]	Noise Source[2]	Mitigated Project Operational Noise Levels (dBA)[3]					
		L_{eq} (E. Avg.)	L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
R6	Truck Unloading/Docking Activity	40.8	37.8	40.8	45.4	49.2	53.6
	Roof-Top Air Conditioning Unit	40.4	37.6	39.3	40.6	40.9	41.4
	Parking Lot Vehicle Movements	32.3	29.1	30.1	35.1	41.1	52.0
	Combined Noise Level:	43.9	41.0	43.3	46.9	50.3	56.0

[1] See Exhibit 9-A for the receiver and noise source locations.
[2] Reference noise sources as shown on Table 9-1.
[3] Mitigated operational noise level calculations are provided in Appendix 9.1.

TABLE 9-5: MITIGATED OPERATIONAL NOISE LEVEL COMPLIANCE AT R6

Receiver Location[1]	Land Use	Noise Level at Receiver Locations (dBA)[2]						Threshold Exceeded?[3]
		L_{eq} (E. Avg.)	L_{50} (30 mins)	L_{25} (15 mins)	L_{8} (5 mins)	L_{2} (1 min)	L_{max} (Anytime)	
Daytime	**Residential**	**55**	**55**	**60**	**65**	**70**	**75**	**-**
Nighttime		**45**	**45**	**50**	**55**	**60**	**65**	**-**
Anytime	**Industrial**	**70**	**70**	**75**	**80**	**85**	**90**	**-**
R6	Residential	43.9	41.0	43.3	46.9	50.3	56.0	No

[1] See Exhibit 9-A for the receiver and noise source locations.
[2] Estimated Project operational noise levels as shown on Table 9-2.
[3] Do the estimated Project operational noise levels meet the operational noise level standards (Table 3-1)?
"E. Avg." = Logarithmic (energy) average

9.4 PROJECT OPERATIONAL NOISE CONTRIBUTION

To describe the Project operational noise level contributions at nearby noise-sensitive receiver locations, the Project operational noise levels were combined with the existing ambient noise levels measurements for the off-site noise-sensitive 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. (7) 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. Noise levels that would be experienced at receiver locations when mitigated Project-source noise is added to the ambient daytime and nighttime conditions are presented on Tables 9-6 and 9-7, respectively.

As indicated on Tables 9-6 and 9-7, the Project will contribute an operational noise level increase during the daytime hours of up to 0.6 dBA L_{eq} and during the nighttime hours of up to 0.9 dBA L_{eq} due to the high ambient noise levels measured in the Project study area. Based on the without Project (ambient) noise levels, the Project operational noise level increases will, therefore, remain below the significance criteria discussed in Section 4, and therefore, the increases at the sensitive receiver locations will be *less than significant*. On this basis, Project operational stationary-source noise would not result in a substantial temporary/periodic, or permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project.

TABLE 9-6: DAYTIME OPERATIONAL NOISE LEVEL CONTRIBUTIONS

Receiver Location[1]	Total Project Operational Noise Level (dBA L_{eq})[2]	Measurement Location[3]	Reference Ambient Noise Levels (dBA L_{eq})[4]	Combined Project and Ambient (dBA L_{eq})[5]	Project Contribution (dBA L_{eq})[6]	Threshold Exceeded?[7]
R1	48.8	L1	61.6	61.8	0.2	No
R2	40.9	L1	61.6	61.6	0.0	No
R3	35.5	L1	61.6	61.6	0.0	No
R4	34.0	L5	55.8	55.8	0.0	No
R5	40.8	L5	55.8	55.9	0.1	No
R6	47.1	L5	55.8	56.4	0.6	No
R7	38.4	L6	71.4	71.4	0.0	No
R8	47.2	L7	65.1	65.2	0.1	No

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

TABLE 9-7: NIGHTTIME OPERATIONAL NOISE LEVEL CONTRIBUTIONS

Receiver Location[1]	Total Project Operational Noise Level (dBA L_{eq})[2]	Measurement Location[3]	Reference Ambient Noise Levels (dBA L_{eq})[4]	Combined Project and Ambient (dBA L_{eq})[5]	Project Contribution (dBA L_{eq})[6]	Threshold Exceeded?[7]
R1	48.8	L1	59.0	59.4	0.4	No
R2	40.9	L1	59.0	59.1	0.1	No
R3	35.5	L1	59.0	59.0	0.0	No
R4	34.0	L5	53.6	53.6	0.0	No
R5	40.8	L5	53.6	53.8	0.2	No
R6	47.1	L5	53.6	54.5	0.9	No
R7	38.4	L6	68.3	68.3	0.0	No
R8	47.2	L7	61.1	61.3	0.2	No

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

9.5 OPERATIONAL VIBRATION IMPACTS

To assess the potential vibration impacts from truck haul trips associated with operational activities the County of San Bernardino threshold for vibration of 0.2 in/sec PPV is used, as previously shown on Table 4-2. Truck vibration levels are dependent on vehicle characteristics, load, speed, and pavement conditions. Typical vibration levels for the Slover and Cactus Warehouse heavy truck activity at normal traffic speeds will approach 0.004 in/sec PPV at 25 feet based on the FTA *Transit Noise Impact and Vibration Assessment.* (14) 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 County of San Bernardino vibration thresholds, and therefore, will be *less than significant*.

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10 CONSTRUCTION IMPACTS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 10-A shows the construction activity boundaries in relation to the nearby sensitive receiver locations.

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:

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

This construction noise analysis was prepared using reference noise level measurements taken by Urban Crossroads, Inc. to describe the typical construction activity noise levels for each stage of Project construction. The construction reference noise level measurements represent a list of typical construction activity noise levels. Noise levels generated by heavy construction equipment can range from approximately 68 dBA to in excess of 80 dBA when measured at 50 feet. Hard site conditions are used in the construction noise analysis which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source (i.e. construction equipment). 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. The construction stages used in this analysis are consistent with the data used to support the construction emissions in *Slover and Cactus Warehouse Air Quality Impact Analysis* prepared by Urban Crossroads, Inc. (26)

10.2 CONSTRUCTION REFERENCE NOISE LEVELS

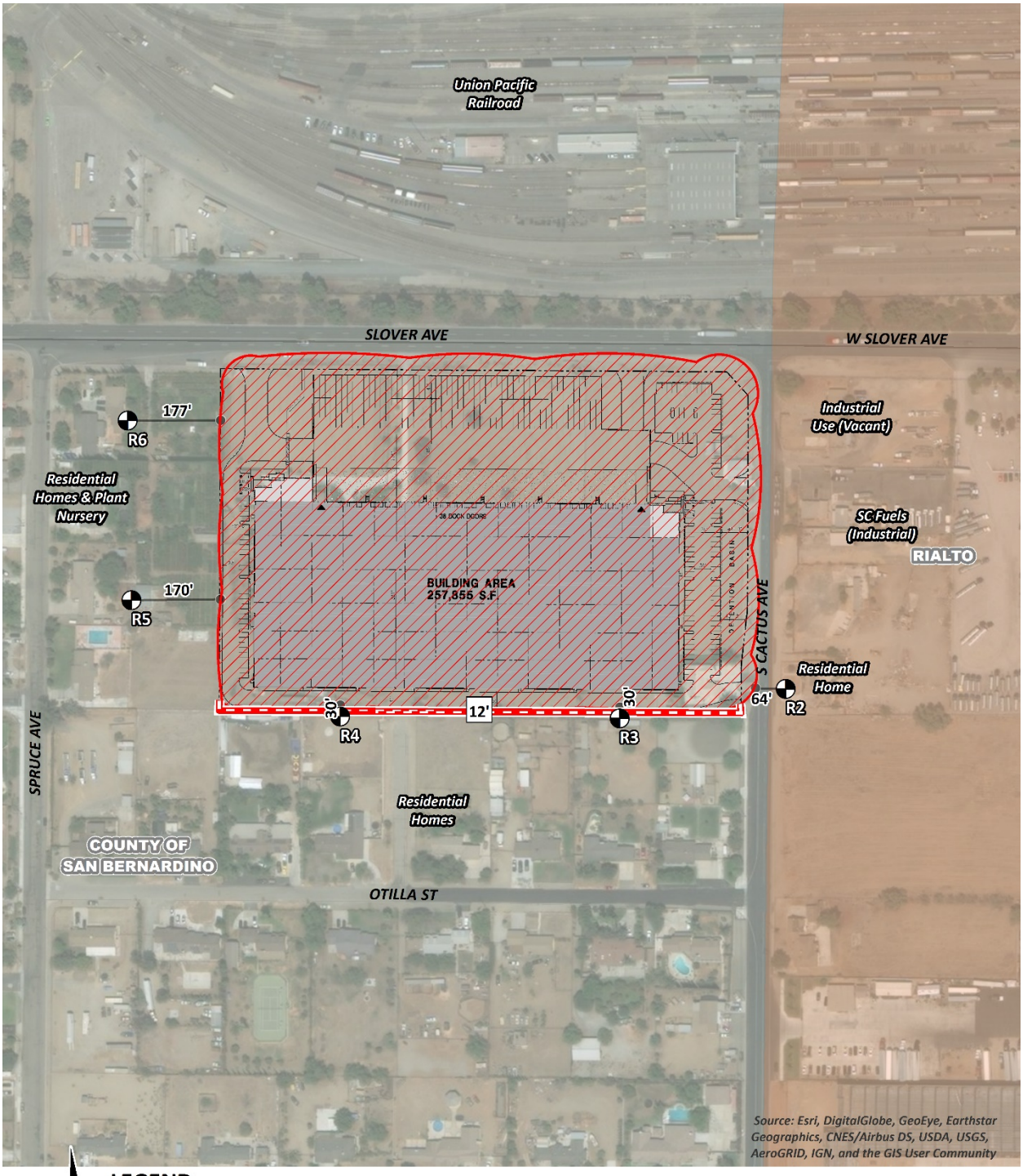
To describe the Project construction noise levels, measurements were collected for similar activities at several construction sites. Table 10-1 provides a summary of the construction reference noise level measurements. Since the reference noise levels were collected at varying distances, all construction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

TABLE 10-1: CONSTRUCTION REFERENCE NOISE LEVELS

ID	Noise Source	Reference Distance From Source (Feet)	Reference Noise Levels @ Reference Distance (dBA Leq)	Reference Noise Levels @ 50 Feet (dBA Leq)[5]
1	Truck Pass-Bys & Dozer Activity[1]	30'	63.6	59.2
2	Dozer Activity[1]	30'	68.6	64.2
3	Construction Vehicle Maintenance Activities[2]	30'	71.9	67.5
4	Foundation Trenching[2]	30'	72.6	68.2
5	Rough Grading Activities[2]	30'	77.9	73.5
6	Framing[3]	30'	66.7	62.3
7	Concrete Mixer Truck Movements[4]	50'	71.2	71.2
8	Concrete Paver Activities[4]	30'	70.0	65.6
9	Concrete Mixer Pour & Paving Activities[4]	30'	70.3	65.9
10	Concrete Mixer Backup Alarms & Air Brakes[4]	50'	71.6	71.6
11	Concrete Mixer Pour Activities[4]	50'	67.7	67.7

[1] As measured by Urban Crossroads, Inc. on 10/14/15 at a business park construction site located at the northwest corner of Barranca Parkway and Alton Parkway in the City of Irvine.
[2] As measured by Urban Crossroads, Inc. on 10/20/15 at a construction site located in Rancho Mission Viejo.
[3] As measured by Urban Crossroads, Inc. on 10/20/15 at a construction site located in Rancho Mission Viejo.
[4] Reference noise level measurements were collected from a nighttime concrete pour at an industrial construction site, located at 27334 San Bernardino Avenue in the City of Redlands, between 1:00 a.m. to 2:00 a.m. on 7/1/15.
[5] Reference noise levels are calculated at 50 feet using a drop off rate of 6 dBA per doubling of distance (point source).

EXHIBIT 10-A: CONSTRUCTION ACTIVITY AND RECEIVER LOCATIONS



10.3 CONSTRUCTION NOISE ANALYSIS

Tables 10-2 to 10-7 show the Project construction stages and the reference construction noise levels used for each stage. Table 10-8 provides a summary of the noise levels from each stage of construction at each of the sensitive receiver locations. Based on the reference construction noise levels, the Project-related construction noise levels when the highest reference noise level is operating at the edge of primary construction activity nearest each sensitive receiver location will range from 62.5 to 77.9 dBA L_{eq} at the sensitive receiver locations, as shown on Table 10-7.

TABLE 10-2: DEMOLITION EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	64.2

Noise-Sensitive Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R2	64'	-2.1	0.0	62.0
R3	30'	4.4	0.0	68.6
R4	30'	4.4	0.0	68.6
R5	170'	-10.6	0.0	53.5
R6	177'	-11.0	0.0	53.2

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

TABLE 10-3: SITE PREPARATION EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	64.2

Noise-Sensitive Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R2	64'	-2.1	0.0	62.0
R3	30'	4.4	0.0	68.6
R4	30'	4.4	0.0	68.6
R5	170'	-10.6	0.0	53.5
R6	177'	-11.0	0.0	53.2

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

TABLE 10-4: GRADING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Rough Grading Activities	73.5
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	73.5

Noise-Sensitive Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R2	64'	-2.1	0.0	71.3
R3	30'	4.4	0.0	77.9
R4	30'	4.4	0.0	77.9
R5	170'	-10.6	0.0	62.8
R6	177'	-11.0	0.0	62.5

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

TABLE 10-5: BUILDING CONSTRUCTION EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Construction Vehicle Maintenance Activities	67.5
Foundation Trenching	68.2
Truck Pass-Bys & Dozer Activity	59.2
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	68.2

Noise-Sensitive Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R2	64'	-2.1	0.0	66.0
R3	30'	4.4	0.0	72.6
R4	30'	4.4	0.0	72.6
R5	170'	-10.6	0.0	57.5
R6	177'	-11.0	0.0	57.2

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

TABLE 10-6: PAVING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Concrete Mixer Truck Movements	71.2
Concrete Paver Activities	65.6
Concrete Mixer Pour & Paving Activities	65.9
Concrete Mixer Backup Alarms & Air Brakes	71.6
Concrete Mixer Pour Activities	67.7
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	71.6

Noise-Sensitive Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R2	64'	-2.1	0.0	69.5
R3	30'	4.4	0.0	76.0
R4	30'	4.4	0.0	76.0
R5	170'	-10.6	0.0	61.0
R6	177'	-11.0	0.0	60.6

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

TABLE 10-7: ARCHITECTURAL COATING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Construction Vehicle Maintenance Activities	67.5
Framing	62.3
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	67.5

Noise-Sensitive Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R2	64'	-2.1	0.0	65.3
R3	30'	4.4	0.0	71.9
R4	30'	4.4	0.0	71.9
R5	170'	-10.6	0.0	56.8
R6	177'	-11.0	0.0	56.5

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

10.4 CONSTRUCTION NOISE THRESHOLDS OF SIGNIFICANCE

The construction noise analysis shows that the highest construction noise levels will occur when construction activities take place at the closest point from the edge of primary construction activity to each of the nearby receiver locations. As shown on Table 10-8, the unmitigated construction noise levels are expected to range from 62.5 to 77.9 dBA L_{eq} at the nearby receiver locations.

TABLE 10-8: UNMITIGATED CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})						
	Demolition	Site Preparation	Grading	Building Construction	Paving	Architectural Coating	Highest Levels[2]
R2	62.0	62.0	71.3	66.0	69.5	65.3	71.3
R3	68.6	68.6	77.9	72.6	76.0	71.9	77.9
R4	68.6	68.6	77.9	72.6	76.0	71.9	77.9
R5	53.5	53.5	62.8	57.5	61.0	56.8	62.8
R6	53.2	53.2	62.5	57.2	60.6	56.5	62.5

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Estimated construction noise levels during peak operating conditions.

Table 10-9 shows the highest construction noise levels at the potentially impacted receiver locations are expected to approach 77.9 dBA L_{eq} and, therefore, will satisfy the construction noise level threshold of 85 dBA L_{eq} at all receiver locations. The noise impact due to unmitigated Project construction noise levels is, therefore, considered a *less than significant* impact at all receiver locations.

TABLE 10-9: CONSTRUCTION EQUIPMENT NOISE LEVEL COMPLIANCE

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})		
	Highest Levels[2]	Threshold[3]	Threshold Exceeded?[4]
R2	71.3	85	No
R3	77.9	85	No
R4	77.9	85	No
R5	62.8	85	No
R6	62.5	85	No

[1] Noise-sensitive receiver locations are shown on Exhibit 10-A.
[2] Estimated construction noise levels during peak operating conditions, as shown on Table 10-8.
[3] Construction noise level threshold as shown on Table 4-2.
[4] Do the estimated Project construction noise levels exceed the construction noise level threshold?

10.5 CONSTRUCTION NOISE LEVEL INCREASES

To describe the temporary Project construction noise level contributions to the existing ambient noise environment, the Project construction noise levels were combined with the existing ambient noise levels measurements at the off-site receiver locations. The difference between the combined Project-construction and ambient noise levels are used to describe the construction noise level contributions.

10.5.1 DAYTIME CONSTRUCTION ACTIVITIES

Temporary noise level increases that would be experienced at sensitive receiver locations when Project construction-source noise is added to the ambient daytime conditions are presented on Table 10-10. A temporary noise level increase of 12 dBA L_{eq} is considered a potentially significant impact based on the Caltrans substantial noise level increase criteria which is used to assess the Project-construction noise level increases. (4)

As indicated on Table 10-10, the Project will potentially contribute unmitigated, worst-case construction noise level increases between 7.5 to 22.1 dBA L_{eq} at nearby noise-sensitive receiver locations. Since the worst-case temporary noise level increases during Project construction will exceed the 12 dBA L_{eq} significance threshold at receiver locations R3 and R4, the unmitigated construction noise level increases are considered a *potentially significant* temporary noise impact. All other receiver locations will experience *less than significant* temporary construction noise level impacts.

TABLE 10-10: UNMITIGATED DAYTIME CONSTRUCTION NOISE LEVEL INCREASES (DBA L_{EQ})

Receiver Location[1]	Highest Project Construction Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Temporary Worst-Case Project Contribution[6]	Threshold Exceeded?[7]
R2	71.3	L1	61.6	71.8	10.2	No
R3	77.9	L1	61.6	78.0	16.4	Yes
R4	77.9	L5	55.8	77.9	22.1	Yes
R5	62.8	L5	55.8	63.6	7.8	No
R6	62.5	L5	55.8	63.3	7.5	No

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Highest unmitigated Project construction noise levels as shown on Table 10-8.
[3] Ambient 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 construction activities.
[6] The temporary noise level increase expected with the addition of the proposed Project activities.
[7] Based on the 12 dBA Leq temporary increase significance criteria as defined in Section 4.

Therefore, temporary construction noise mitigation measures are required to reduce the impacts at receiver locations R3 and R4. This includes mitigation in the form of a minimum 12-foot high temporary noise barrier for receiver locations R3 and R4 where Project construction noise level increases could potentially exceed the noise level increase threshold, as shown on Exhibit 10-A. The construction noise analysis presents a conservative approach with the highest noise-level-

producing equipment for each stage of Project construction operating at the closest point from primary construction activity to the nearby sensitive receiver locations. This scenario is unlikely to occur during typical construction activities and likely overstates the construction noise levels which will be experienced at each receiver location. With the construction noise mitigation measures identified in this noise study, shown on Exhibit 10-A, the worst-case construction noise level increases at the nearby residential receivers would be reduced.

The noise attenuation provided through temporary noise barriers depends on many factors including cost, wind loading, the location of the receiver, and the ability to place barriers such that the line-of-sight of the receiver is blocked to the noise source, among others. This analysis assumes a temporary noise barrier constructed using frame-mounted materials such as vinyl acoustic curtains or quilted blankets attached to the construction site perimeter fence.

As shown on Table 10-11, the temporary construction noise barrier mitigation will reduce the construction noise level increases at R3 and R4 to range from 5.8 to 10.7 dBA L_{eq} which is below the 12 dBA L_{eq} temporary noise level increase threshold. Therefore, the noise impact due to Project construction is considered a *less than significant* impact with mitigation for receiver locations R3 and R4. Appendix 10.1 includes the temporary construction noise barrier attenuation calculations. Sample temporary noise barrier photos are provided in Appendix 10.2 for reference.

TABLE 10-11: MITIGATED DAYTIME CONSTRUCTION NOISE LEVEL INCREASES (DBA L_{EQ})

Receiver Location[1]	Mitigated Project Construction Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Temporary Worst-Case Project Contribution[6]	Threshold Exceeded?[7]
R3	66.1	L1	61.6	67.4	5.8	No
R4	66.1	L5	55.8	66.5	10.7	No

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Mitigated construction noise level with the temporary noise barrier (Appendix 10.1).
[3] Ambient 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 construction activities.
[6] The temporary noise level increase expected with the addition of the proposed Project activities.
[7] Based on the 12 dBA L_{eq} temporary increase significance criteria as defined in Section 4.

10.5.2 NIGHTTIME CONCRETE POUR CONSTRUCTION ACTIVITIES

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 10-6, are based on nighttime concrete pouring activity reference noise level measurements, which are shown to result in Project construction noise levels ranging from 60.6 to 76.0 dBA L_{eq} at the nearby sensitive receiver locations. Table 10-12 shows the nighttime concrete pouring activity temporary noise level increases over existing nighttime ambient conditions range from 7.8 to 22.5 dBA L_{eq}. Since the worst-case temporary noise level increases during Project construction will exceed the 12 dBA L_{eq} significance threshold at receiver locations R3 and R4, the

unmitigated construction noise level increases are considered a *potentially significant* temporary noise impact. All other receiver locations will experience *less than significant* temporary construction noise level impacts.

TABLE 10-12: UNMITIGATED NIGHTTIME CONSTRUCTION NOISE LEVEL INCREASES (DBA L_{EQ})

Receiver Location[1]	Nighttime Concrete Pour Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Temporary Worst-Case Project Contribution[6]	Threshold Exceeded?[7]
R2	69.5	L1	59.0	69.8	10.8	No
R3	76.0	L1	59.0	76.1	17.1	Yes
R4	76.0	L5	53.6	76.1	22.5	Yes
R5	61.0	L5	53.6	61.7	8.1	No
R6	60.6	L5	53.6	61.4	7.8	No

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Unmitigated nighttime concrete pour (paving) construction noise levels as shown on Table 10-6.
[3] Ambient 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 construction activities.
[6] The temporary noise level increase expected with the addition of the proposed Project activities.
[7] Based on the 12 dBA Leq temporary increase significance criteria as defined in Section 4.

Therefore, the previously identified temporary construction noise mitigation measures are required to reduce the potential nighttime concrete pouring activity noise level impacts at receiver locations R3 and R4. This includes mitigation in the form of a minimum 12-foot high temporary noise barrier for receiver locations R3 and R4 where Project construction noise level increases could potentially exceed the noise level increase threshold, as shown on Exhibit 10-A.

As shown on Table 10-13, the temporary construction noise barrier mitigation will reduce the nighttime concrete pouring activity construction noise level increases at R3 and R4 to range from 6.3 to 11.0 dBA L_{eq} which is below the 12 dBA L_{eq} temporary noise level increase threshold. Therefore, the noise impact due to Project construction is considered a *less than significant* impact with mitigation for receiver locations R3 and R4.

TABLE 10-13: MITIGATED NIGHTTIME CONSTRUCTION NOISE LEVEL INCREASES (DBA L_{EQ})

Receiver Location[1]	Mitigated Project Construction Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Temporary Worst-Case Project Contribution[6]	Threshold Exceeded?[7]
R3	64.2	L1	59.0	65.3	6.3	No
R4	64.2	L5	53.6	64.6	11.0	No

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Mitigated construction noise level with the temporary noise barrier (Appendix 10.1).
[3] Ambient 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 construction activities.
[6] The temporary noise level increase expected with the addition of the proposed Project activities.
[7] Based on the 12 dBA L_{eq} temporary increase significance criteria as defined in Section 4.

10.6 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 building, the vibration is usually short-term and is not of sufficient magnitude to cause building damage. It is not expected that heavy equipment such as large bulldozers would operate close enough to any residences to cause a vibration impact.
- 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 6-8 and the construction vibration assessment methodology published by the FTA, it is possible to estimate the Project vibration impacts. Table 10-14 presents the expected Project related vibration levels at each of the sensitive receiver locations based on the County of San Bernardino 0.2 in/sec PPV threshold for vibration.

At distances ranging from 30 to 177 feet from Project construction activity, construction vibration velocity levels are expected to approach 0.07 in/sec PPV, as shown on Table 10-14. Based on the County of San Bernardino vibration standards, the unmitigated Project construction vibration levels will satisfy the 0.2 in/sec PPV threshold at all of the nearby sensitive receiver locations. Therefore, the vibration impacts due to Project construction are 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 County of San Bernardino requirements thereby eliminating potential vibration impacts during the sensitive nighttime hours.

TABLE 10-14: UNMITIGATED CONSTRUCTION EQUIPMENT VIBRATION LEVELS

Receiver[1]	Distance to Const. Activity (Feet)	Receiver PPV Levels (in/sec)[2]					Threshold (in/sec PPV)	Threshold Exceeded?[4]
		Small Bulldozer	Jack-hammer	Loaded Trucks	Large Bulldozer	Peak Vibration		
R2	64'	0.001	0.009	0.019	0.022	0.022	0.2	No
R3	30'	0.002	0.027	0.058	0.068	0.068	0.2	No
R4	30'	0.002	0.027	0.058	0.068	0.068	0.2	No
R5	170'	0.000	0.002	0.004	0.005	0.005	0.2	No
R6	177'	0.000	0.002	0.004	0.005	0.005	0.2	No

[1] Receiver locations are shown on Exhibit 10-A.
[2] Based on the Vibration Source Levels of Construction Equipment included on Table 6-8.
[3] 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.
[4] Does the peak vibration exceed the County of San Bernardino maximum acceptable vibration threshold?

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11 REFERENCES

1. **State of California.** *California Environmental Quality Act, Appendix G.* 2018.
2. **Urban Crossroads, Inc.** *Slover and Cactus Warehouse Traffic Impact Analysis.* May 2019.
3. **U.S. Department of Transportation Federal Highway Administration.** Acoustical Consideration. *Noise Barrier Design Handbook.* [Online] [Cited: November 28, 2016.] https://www.fhwa.dot.gov/environment/noise/noise_barriers/design_construction/design/design03.cfm.
4. **California Department of Transportation.** *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects.* May 2011.
5. **County of San Bernardino.** *Code of Ordinances, Title 8 Development Code, Chapter 83.01 General Performance Standards.*
6. —. *General Plan Noise Element.* April 2007.
7. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
8. **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.
9. **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.
10. **U.S. Department of Transportation, Federal Highway Administration.** *Highway Traffic Noise in the United States, Problem and Response.* April 2000. p. 3.
11. **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.
12. **Occupational Safety and Health Administration.** *Standard 29 CRF, Part 1910.*
13. **Center for Disease Control and Prevention.** About Hearing Loss. [Online] [Cited: 04 15, 2016.] http://www.cdc.gov/healthyschools/noise/signs.htm.
14. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment.* May 2006. FTA-VA-90-1003-06.
15. **Office of Planning and Research.** *State of California General Plan Guidlines 2003.* October 2003.
16. **State of California.** *California Green Building Standards Code.* 2016.
17. **City of Rialto.** *General Plan.* December 2010.
18. —. *Municipal Code, Chapter 9.50 - Noise Control.*
19. **National Institute for Occupational Safety and Health.** *Criteria for Recommended Standard: Occupational Noise Exposure.* June 1998.
20. **California Court of Appeal.** *Gray v. County of Madera, F053661.* 167 Cal.App.4th 1099; - Cal.Rptr.3d, October 2008.
21. **Federal Interagency Committee on Noise.** *Federal Agency Review of Selected Airport Noise Analysis Issues.* August 1992.

22. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*

23. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.

24. **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.

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

26. **Urban Crossroads, Inc.** *Slover and Cactus Warehouse Air Quality Impact Analysis.* April 2019.

12 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Slover and Cactus Warehouse 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:

COUNTY OF SAN BERNARDINO DEVELOPMENT CODE

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Print

§ 83.01.080 Noise.

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

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

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

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

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

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

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

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

Table 83-2

Noise Standards for Stationary Noise Sources

Affected Land Uses (Receiving Noise)	*7:00 a.m. - 10:00 p.m. Leq*	*10:00 p.m. - 7:00 a.m. Leq*
Residential	55 dB(A)	45 dB(A)
Professional Services	55 dB(A)	55 dB(A)
Other Commercial	60 dB(A)	60 dB(A)
Industrial	70 dB(A)	70 dB(A)
Leq = (Equivalent Energy Level). The sound level corresponding to a steady-state sound level containing the same total energy as a time-varying signal over a given sample period, typically one, eight or 24 hours.		
dB(A) = (A-weighted Sound Pressure Level). The sound pressure level, in decibels, as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound, placing greater emphasis on those frequencies within the sensitivity range of the human ear.		
Ldn = (Day-Night Noise Level). The average equivalent A-weighted sound level during a 24-hour day obtained by adding 10 decibels to the hourly noise levels measured during the night (from 10:00 p.m. to 7:00 a.m.). In this way Ldn takes into account the lower tolerance of people for noise during nighttime periods.		

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

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

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

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

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

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

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

Table 83-3

Noise Standards for Adjacent Mobile Noise Sources

Land Use		*Ldn (or CNEL) dB(A)*	
Categories	*Uses*	*Interior* (1)	*Exterior* (2)
Residential	Single and multi-family, duplex, mobile homes	45	60(3)
Commercial	Hotel, motel, transient housing	45	60(3)
	Commercial retail, bank, restaurant	50	N/A

	Office building, research and development, professional offices	45	65
	Amphitheater, concert hall, auditorium, movie theater	45	N/A
Institutional/Public	Hospital, nursing home, school classroom, religious institution, library	45	65
Open Space	Park	N/A	65
Notes:			
(1) The indoor environment shall exclude bathrooms, kitchens, toilets, closets and corridors.			
(2) The outdoor environment shall be limited to: · Hospital/office building patios · Hotel and motel recreation areas · Mobile home parks · Multi-family private patios or balconies · Park picnic areas · Private yard of single-family dwellings · School playgrounds			
(3) An exterior noise level of up to 65 dB(A) (or CNEL) shall be allowed provided exterior noise levels have been substantially mitigated through a reasonable application of the best available noise reduction technology, and interior noise exposure does not exceed 45 dB(A) (or CNEL) with windows and doors closed. Requiring that windows and doors remain closed to achieve an acceptable interior noise level shall necessitate the use of air conditioning or mechanical ventilation.			
CNEL = (Community Noise Equivalent Level). The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night from 10:00 p.m. to 7:00 a.m.			

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

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

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

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

(2) Emergency equipment, vehicles, and devices.

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

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

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

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

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

§ 83.01.090 Vibration.

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

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

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

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

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

(Ord. 4011, passed - -2007)

APPENDIX 5.1:

STUDY AREA PHOTOS

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L1_N
34, 3' 44.600000", 117, 22' 59.440000"

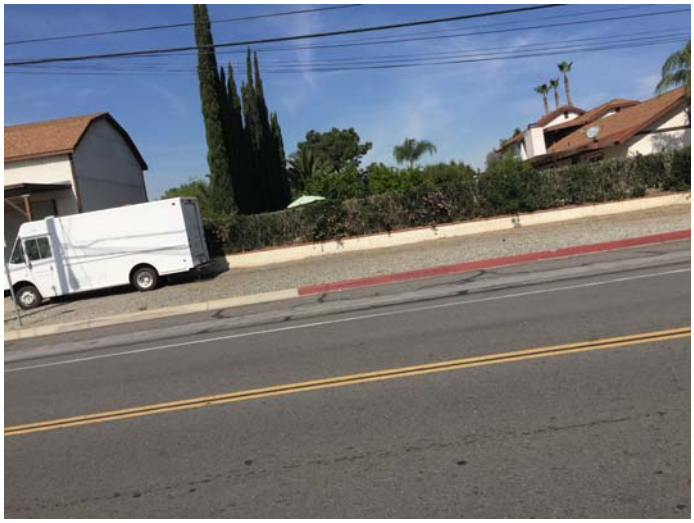
L1_S
34, 3' 44.600000", 117, 22' 59.470000"

L1_W
34, 3' 44.570000", 117, 22' 59.500000"

L2_E
34, 3' 36.270000", 117, 22' 59.860000"

L2_N
34, 3' 36.270000", 117, 22' 59.860000"

L2_S
34, 3' 36.270000", 117, 22' 59.860000"



L2_W
34, 3' 36.250000", 117, 22' 59.830000"

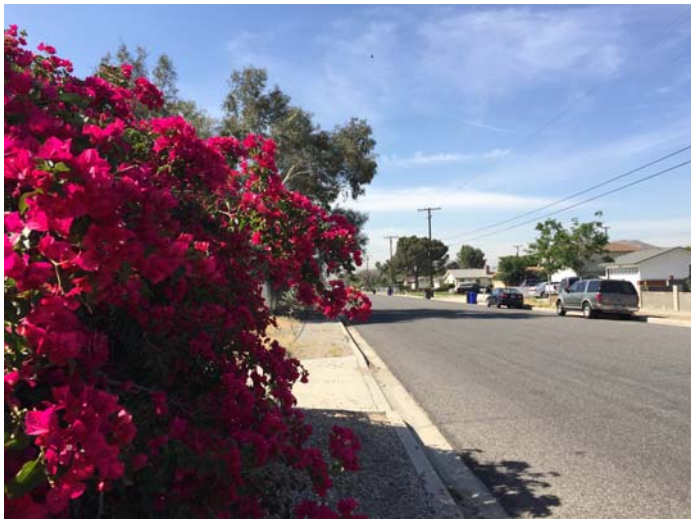
L3_E
34, 3' 29.510000", 117, 22' 59.330000"

L3_N
34, 3' 29.520000", 117, 22' 59.360000"

L3_S
34, 3' 29.520000", 117, 22' 59.360000"

L4_E
34, 3' 31.030000", 117, 23' 15.400000"

L4_N
34, 3' 31.030000", 117, 23' 15.370000"



L4_S
34, 3' 31.030000", 117, 23' 15.400000"

L4_W
34, 3' 31.030000", 117, 23' 15.400000"

L5_E
34, 3' 40.780000", 117, 23' 16.990000"

L5_N
34, 3' 40.810000", 117, 23' 16.990000"

L5_S
34, 3' 40.810000", 117, 23' 16.990000"

L5_W
34, 3' 40.800000", 117, 23' 16.970000"

L6_E
34, 3' 47.020000", 117, 23' 32.510000"

L6_N
34, 3' 47.050000", 117, 23' 32.510000"

L6_S
34, 3' 47.060000", 117, 23' 32.540000"

L6_W
34, 3' 47.020000", 117, 23' 32.510000"

L7_E
34, 3' 48.240000", 117, 22' 59.880000"

L7_N
34, 3' 48.240000", 117, 22' 59.830000"

L7_S
34, 3' 48.240000", 117, 22' 59.830000"

L7_W
34, 3' 48.270000", 117, 22' 59.880000"

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APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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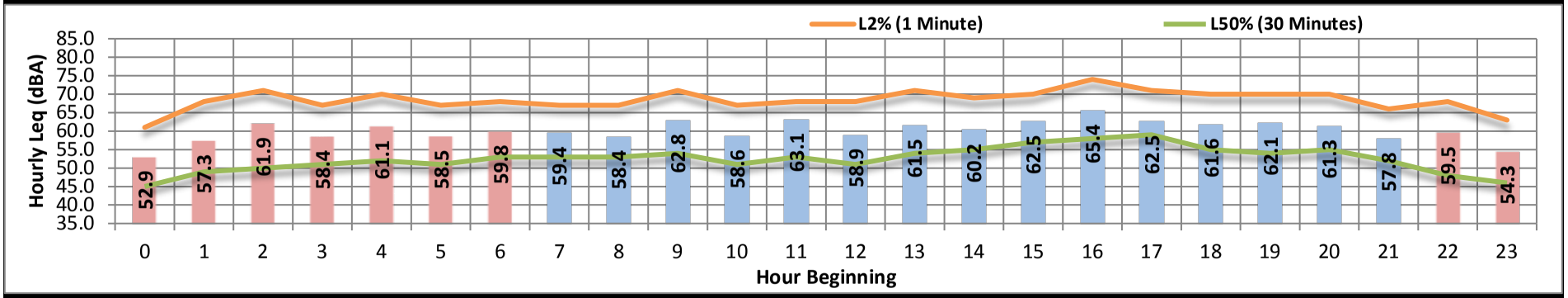
24-Hour Noise Level Measurement Summary

				Energy Average Leq		24-Hour
Project Name:	Slover & Cactus	*JN:*	11183	*Day*	*Night*	*CNEL*
Location:	L1 - Located east of the Project site across Cactus Avenue near existing industrial uses and a residential home.	*Analyst:*	A. Wolfe	61.6	59.0	66.2
		Date:	5/9/2018			

Hourly Leq dBA Readings (unadjusted)



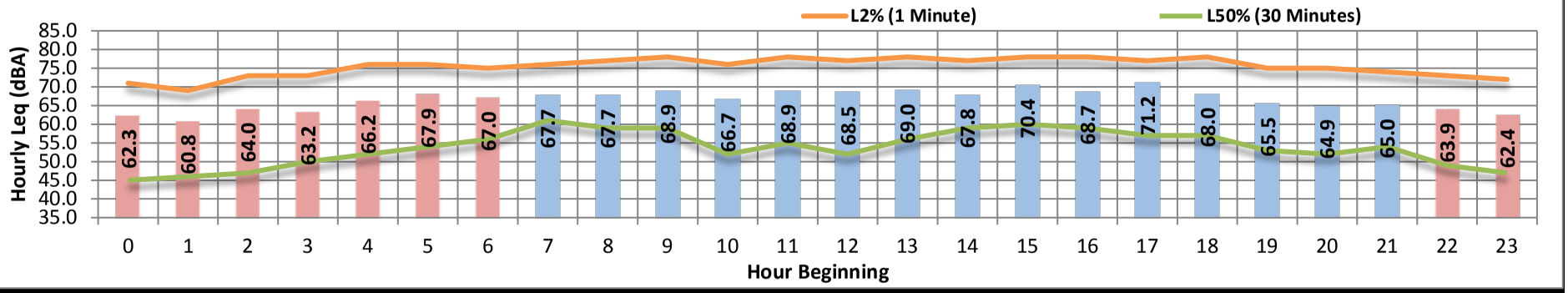
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	57.8	75.6	42.9	67.0	66.0	63.0	61.0	56.0	51.0	45.0	45.0	43.0
	Max	65.4	92.9	49.1	77.0	74.0	71.0	69.0	62.0	59.0	53.0	52.0	51.0
Energy Average:		61.6	Average:		71.4	69.3	65.7	63.8	58.3	54.3	48.6	47.8	46.7
Night	Min	52.9	74.0	41.1	66.0	61.0	56.0	54.0	48.0	45.0	43.0	42.0	41.0
	Max	61.9	88.9	46.9	73.0	71.0	69.0	66.0	58.0	53.0	49.0	48.0	47.0
Energy Average:		59.0	Average:		69.8	67.0	62.7	60.4	53.6	49.4	46.2	45.7	44.3
Hourly Summary													
Night	0	52.9	74.0	41.2	66.0	61.0	56.0	54.0	48.0	45.0	43.0	42.0	42.0
	1	57.3	79.7	41.6	71.0	68.0	60.0	58.0	51.0	49.0	47.0	46.0	42.0
	2	61.9	85.0	43.7	73.0	71.0	69.0	66.0	56.0	50.0	45.0	45.0	44.0
	3	58.4	79.8	45.8	69.0	67.0	64.0	62.0	55.0	51.0	48.0	48.0	47.0
	4	61.1	84.7	46.7	72.0	70.0	65.0	62.0	56.0	52.0	49.0	48.0	47.0
	5	58.5	77.2	46.9	70.0	67.0	64.0	62.0	55.0	51.0	48.0	48.0	47.0
	6	59.8	82.2	44.0	70.0	68.0	65.0	63.0	58.0	53.0	48.0	47.0	45.0
Day	7	59.4	83.7	44.7	70.0	67.0	63.0	61.0	57.0	53.0	47.0	47.0	45.0
	8	58.4	75.6	44.6	68.0	67.0	64.0	62.0	57.0	53.0	47.0	46.0	45.0
	9	62.8	85.0	44.3	74.0	71.0	67.0	65.0	58.0	54.0	47.0	46.0	45.0
	10	58.6	81.8	43.0	69.0	67.0	63.0	61.0	56.0	51.0	45.0	45.0	44.0
	11	63.1	92.9	43.6	70.0	68.0	65.0	63.0	57.0	53.0	46.0	46.0	45.0
	12	58.9	77.0	42.9	71.0	68.0	64.0	62.0	56.0	51.0	46.0	45.0	43.0
	13	61.5	83.3	44.1	74.0	71.0	66.0	64.0	58.0	54.0	47.0	46.0	45.0
	14	60.2	81.5	46.7	70.0	69.0	66.0	64.0	58.0	55.0	49.0	48.0	47.0
	15	62.5	85.0	47.7	72.0	70.0	67.0	66.0	61.0	57.0	51.0	50.0	49.0
	16	65.4	84.7	48.5	77.0	74.0	71.0	69.0	62.0	58.0	53.0	52.0	51.0
	17	62.5	78.9	49.1	73.0	71.0	67.0	66.0	61.0	59.0	52.0	51.0	50.0
	18	61.6	78.4	48.3	72.0	70.0	67.0	65.0	60.0	55.0	51.0	50.0	49.0
	19	62.1	88.0	47.8	73.0	70.0	66.0	64.0	58.0	54.0	50.0	49.0	49.0
	20	61.3	83.2	47.6	71.0	70.0	66.0	64.0	59.0	55.0	51.0	50.0	48.0
	21	57.8	76.9	43.9	67.0	66.0	63.0	61.0	57.0	52.0	47.0	46.0	45.0
Night	22	59.5	88.9	43.6	71.0	68.0	62.0	60.0	53.0	48.0	45.0	45.0	44.0
	23	54.3	76.3	41.1	66.0	63.0	59.0	57.0	50.0	46.0	43.0	42.0	41.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Project Name:	Slover & Cactus	*JN:*	11183	*Energy Average Leq*	*24-Hour*
Location:	L2 - Located south of the Project site near existing residential homes on Cactus Avenue.	*Analyst:*	A. Wolfe	*Day* / *Night*	*CNEL*
		Date:	5/9/2018	68.3 / 64.8	72.1

Hourly Leq dBA Readings (unadjusted)



Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	64.9	84.6	42.1	77.0	74.0	71.0	68.0	59.0	52.0	46.0	45.0	43.0
	Max	71.2	100.7	47.9	81.0	78.0	75.0	73.0	66.0	61.0	54.0	53.0	49.0
Energy Average:		68.3	Average:		79.3	76.8	73.3	70.9	63.0	56.3	49.1	48.0	46.4
Night	Min	60.8	83.9	42.0	73.0	69.0	62.0	58.0	49.0	45.0	43.0	43.0	42.0
	Max	67.9	95.3	47.3	79.0	76.0	73.0	71.0	64.0	56.0	49.0	49.0	48.0
Energy Average:		64.8	Average:		76.3	73.1	68.3	65.1	55.1	49.6	45.9	45.3	44.8
Hourly Summary													
Night	0	62.3	87.6	42.2	76.0	71.0	64.0	60.0	49.0	45.0	43.0	43.0	43.0
	1	60.8	84.6	42.4	73.0	69.0	62.0	58.0	49.0	46.0	44.0	43.0	43.0
	2	64.0	86.9	43.4	76.0	73.0	68.0	65.0	53.0	47.0	44.0	44.0	43.0
	3	63.2	84.8	45.4	76.0	73.0	68.0	65.0	56.0	50.0	47.0	46.0	45.0
	4	66.2	87.8	47.3	79.0	76.0	71.0	68.0	57.0	52.0	49.0	48.0	48.0
	5	67.9	95.3	47.3	79.0	76.0	73.0	70.0	60.0	54.0	49.0	49.0	48.0
	6	67.0	87.2	46.4	77.0	75.0	73.0	71.0	64.0	56.0	49.0	48.0	47.0
Day	7	67.7	91.0	45.2	78.0	76.0	73.0	71.0	66.0	61.0	51.0	50.0	47.0
	8	67.7	85.4	47.3	79.0	77.0	74.0	72.0	63.0	59.0	54.0	53.0	49.0
	9	68.9	90.4	44.2	81.0	78.0	74.0	72.0	64.0	59.0	51.0	49.0	47.0
	10	66.7	88.5	44.3	79.0	76.0	72.0	69.0	59.0	52.0	47.0	46.0	45.0
	11	68.9	92.7	44.8	81.0	78.0	74.0	71.0	63.0	55.0	48.0	47.0	46.0
	12	68.5	96.3	44.0	80.0	77.0	73.0	70.0	60.0	52.0	47.0	46.0	45.0
	13	69.0	95.3	42.1	81.0	78.0	74.0	72.0	65.0	56.0	48.0	46.0	43.0
	14	67.8	86.9	44.6	79.0	77.0	74.0	72.0	65.0	59.0	49.0	48.0	46.0
	15	70.4	99.4	45.8	80.0	78.0	75.0	73.0	66.0	60.0	50.0	49.0	47.0
	16	68.7	92.5	47.9	79.0	78.0	75.0	73.0	66.0	59.0	51.0	50.0	49.0
	17	71.2	100.7	47.0	80.0	77.0	74.0	72.0	64.2	57.0	50.0	49.0	48.0
	18	68.0	86.7	46.3	80.0	78.0	74.0	72.0	64.0	57.0	49.0	48.0	47.0
	19	65.5	84.6	45.6	78.0	75.0	71.0	69.0	60.0	53.0	47.0	47.0	46.0
	20	64.9	85.1	45.2	78.0	75.0	71.0	68.0	59.0	52.0	48.0	47.0	46.0
	21	65.0	84.7	43.7	77.0	74.0	71.0	68.0	61.0	54.0	46.0	45.0	45.0
Night	22	63.9	90.9	43.6	76.0	73.0	69.0	66.0	56.0	49.0	45.0	44.0	44.0
	23	62.4	83.9	42.0	75.0	72.0	67.0	63.0	52.0	47.0	43.0	43.0	42.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Project Name: Slover & Cactus

Location: L3 - Located south of the Project site on Cactus Avenue near existing residential homes.

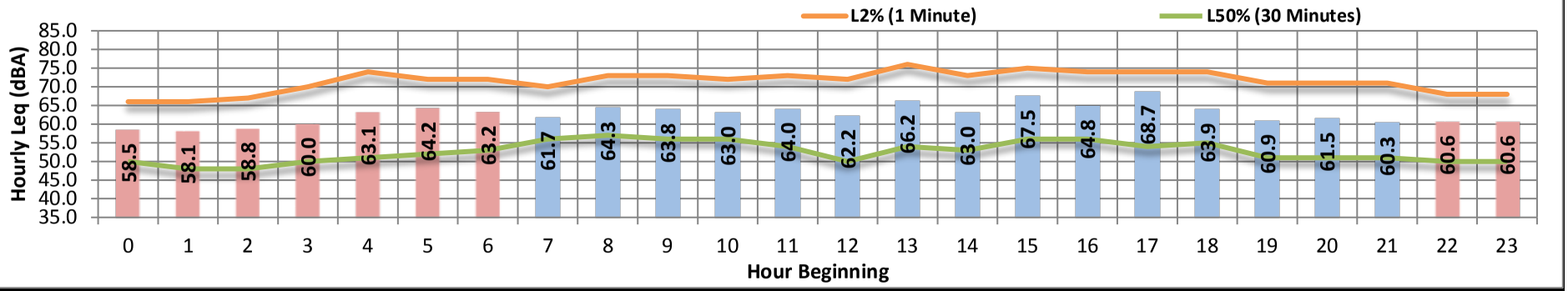
JN: 11183

Analyst: A. Wolfe

Date: 5/9/2018

Energy Average Leq		24-Hour
Day	Night	CNEL
64.4	61.3	68.5

Hourly Leq dBA Readings (unadjusted)



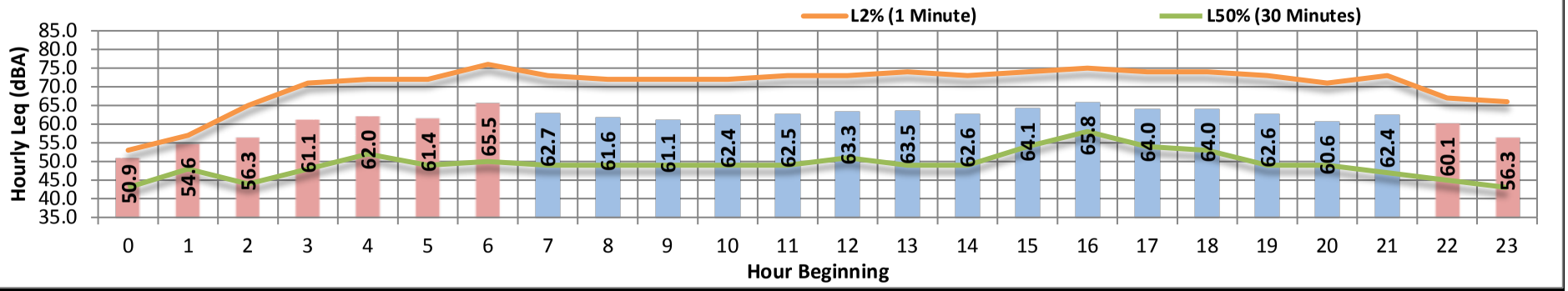
Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	60.3	76.6	43.2	72.0	70.0	67.0	65.0	56.0	50.0	45.0	45.0	44.0
	Max	68.7	95.7	53.1	79.0	76.0	71.0	69.0	63.0	57.0	54.0	54.0	53.0
Energy Average:		64.4	Average:		74.7	72.8	68.9	66.7	60.1	54.0	48.7	48.3	47.3
Night	Min	58.1	80.1	44.8	69.0	66.0	59.0	55.0	50.0	48.0	46.0	46.0	45.0
	Max	64.2	91.2	47.6	76.0	74.0	69.0	67.0	61.0	53.0	49.0	49.0	48.0
Energy Average:		61.3	Average:		72.2	69.2	65.1	62.8	53.9	50.2	47.3	47.0	46.2
Hourly Summary													
Night	0	58.5	83.4	45.5	72.0	66.0	59.0	55.0	52.0	50.0	47.0	47.0	46.0
	1	58.1	82.8	44.8	69.0	66.0	64.0	63.0	50.0	48.0	46.0	46.0	45.0
	2	58.8	81.9	45.4	70.0	67.0	64.0	62.0	53.0	48.0	46.0	46.0	46.0
	3	60.0	80.1	45.6	72.0	70.0	66.0	64.0	53.0	50.0	47.0	47.0	46.0
	4	63.1	81.2	47.6	76.0	74.0	69.0	66.0	54.0	51.0	49.0	49.0	48.0
	5	64.2	91.2	46.8	74.0	72.0	68.0	66.0	57.0	52.0	49.0	48.0	47.0
	6	63.2	85.7	45.6	74.0	72.0	68.0	67.0	61.0	53.0	48.0	47.0	46.0
Day	7	61.7	81.4	45.8	72.0	70.0	67.0	65.0	60.0	56.0	49.0	47.0	46.0
	8	64.3	80.1	45.1	75.0	73.0	70.0	68.0	63.0	57.0	48.0	47.0	46.0
	9	63.8	82.3	46.4	74.0	73.0	69.0	67.0	61.0	56.0	53.0	53.0	52.0
	10	63.0	83.3	53.1	74.0	72.0	68.0	65.0	60.0	56.0	54.0	54.0	53.0
	11	64.0	83.8	45.0	76.0	73.0	70.0	68.0	61.0	54.0	47.0	47.0	46.0
	12	62.2	81.7	43.2	75.0	72.0	67.0	65.0	57.0	50.0	45.0	45.0	44.0
	13	66.2	87.3	44.3	79.0	76.0	71.0	68.0	61.0	54.0	46.0	46.0	45.0
	14	63.0	79.4	44.8	74.0	73.0	70.0	67.0	61.0	53.0	47.0	46.0	45.0
	15	67.5	95.7	46.6	77.0	75.0	71.0	69.0	63.0	56.0	49.0	48.0	47.0
	16	64.8	86.7	49.1	76.0	74.0	70.0	68.0	62.0	56.0	51.0	50.0	49.0
	17	68.7	95.6	47.9	76.0	74.0	70.0	68.0	61.0	54.0	49.0	49.0	48.0
	18	63.9	81.9	47.6	75.0	74.0	70.0	67.0	62.0	55.0	49.0	49.0	48.0
	19	60.9	76.6	46.2	73.0	71.0	67.0	65.0	57.0	51.0	48.0	48.0	47.0
	20	61.5	82.0	46.5	73.0	71.0	67.0	65.0	56.0	51.0	48.0	48.0	47.0
	21	60.3	77.6	45.6	72.0	71.0	67.0	65.0	56.0	51.0	48.0	47.0	47.0
Night	22	60.6	87.1	46.3	71.0	68.0	65.0	63.0	54.0	50.0	47.0	47.0	46.0
	23	60.6	89.2	46.0	72.0	68.0	63.0	59.0	51.0	50.0	47.0	46.0	46.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

				Energy Average Leq		24-Hour
Project Name:	Slover & Cactus	*JN:*	11183	*Day*	*Night*	*CNEL*
Location:	L4 - Located south of the Project site on Spruce Avenue near existing residential homes.	*Analyst:*	A. Wolfe	63.1	60.5	67.7
		Date:	5/9/2018			

Hourly Leq dBA Readings (unadjusted)



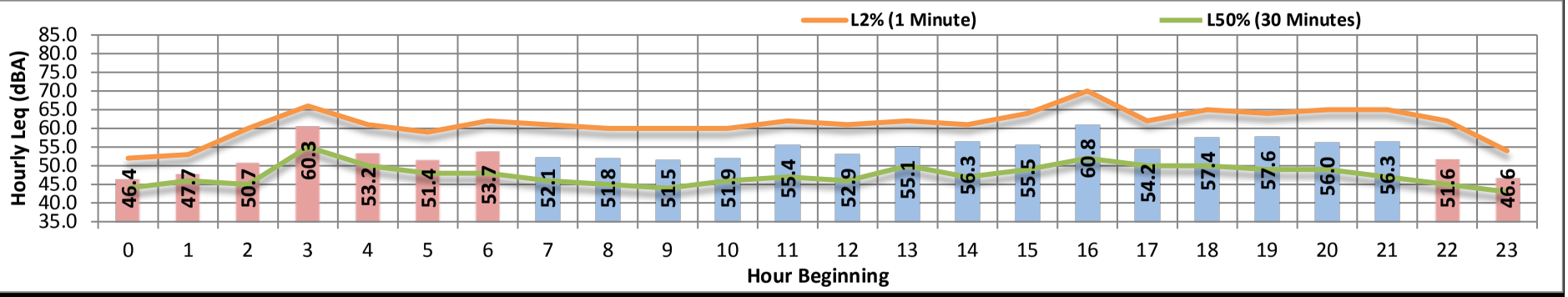
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	60.6	78.3	41.7	73.0	71.0	67.0	64.0	54.0	47.0	44.0	43.0	42.0
	Max	65.8	87.4	47.8	77.0	75.0	72.0	70.0	63.0	58.0	51.0	50.0	49.0
Energy Average:		63.1	Average:		74.8	73.1	69.4	66.7	57.2	50.5	45.8	45.0	44.3
Night	Min	50.9	78.3	40.7	60.0	53.0	48.0	47.0	45.0	43.0	42.0	42.0	41.0
	Max	65.5	88.6	46.2	77.0	76.0	73.0	71.0	60.0	52.0	49.0	48.0	47.0
Energy Average:		60.5	Average:		70.3	66.6	60.8	57.3	50.0	46.9	44.4	44.0	43.2
Hourly Summary													
Night	0	50.9	78.3	40.7	60.0	53.0	48.0	47.0	45.0	43.0	42.0	42.0	41.0
	1	54.6	80.4	40.7	64.0	57.0	53.0	52.0	50.0	48.0	44.0	43.0	41.0
	2	56.3	84.5	42.0	68.0	65.0	56.0	52.0	46.0	44.0	43.0	43.0	42.0
	3	61.1	81.3	44.6	74.0	71.0	67.0	63.0	52.0	48.0	46.0	45.0	45.0
	4	62.0	83.9	46.2	75.0	72.0	66.0	61.0	53.0	52.0	49.0	48.0	47.0
	5	61.4	82.5	44.6	75.0	72.0	66.0	61.0	52.0	49.0	46.0	46.0	45.0
	6	65.5	84.2	43.7	77.0	76.0	73.0	71.0	60.0	50.0	45.0	45.0	44.0
Day	7	62.7	80.6	43.0	75.0	73.0	70.0	67.0	57.0	49.0	45.0	44.0	43.0
	8	61.6	80.4	42.5	74.0	72.0	68.0	64.0	54.0	49.0	44.0	44.0	43.0
	9	61.1	79.2	42.0	74.0	72.0	68.0	64.0	55.0	49.0	44.0	43.0	42.0
	10	62.4	86.4	42.1	74.0	72.0	68.0	65.0	55.0	49.0	44.0	43.0	43.0
	11	62.5	83.4	42.6	74.0	73.0	70.0	67.0	57.0	49.0	45.0	44.0	43.0
	12	63.3	80.7	41.7	75.0	73.0	69.0	67.0	62.0	51.0	45.0	44.0	43.0
	13	63.5	84.6	42.5	75.0	74.0	71.0	68.0	56.0	49.0	44.0	43.0	43.0
	14	62.6	81.5	43.7	75.0	73.0	69.0	67.0	56.0	49.0	45.0	45.0	44.0
	15	64.1	82.3	44.4	75.0	74.0	71.0	69.0	60.0	54.0	47.0	46.0	45.0
	16	65.8	83.2	47.8	77.0	75.0	72.0	70.0	63.0	58.0	51.0	50.0	49.0
	17	64.0	81.4	47.0	76.0	74.0	70.0	68.0	60.0	54.0	49.0	49.0	48.0
	18	64.0	87.4	44.8	76.0	74.0	70.0	67.0	59.0	53.0	48.0	47.0	46.0
	19	62.6	81.8	44.3	75.0	73.0	69.0	67.0	56.0	49.0	46.0	45.0	45.0
	20	60.6	78.3	44.5	73.0	71.0	67.0	65.0	54.0	49.0	46.0	45.0	45.0
	21	62.4	80.8	41.9	74.0	73.0	69.0	66.0	54.0	47.0	44.0	43.0	42.0
Night	22	60.1	88.6	41.9	70.0	67.0	62.0	57.0	47.0	45.0	43.0	42.0	42.0
	23	56.3	78.6	41.7	70.0	66.0	56.0	52.0	45.0	43.0	42.0	42.0	42.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

			Energy Average Leq		24-Hour
Project Name:	Slover & Cactus	*JN:* 11183	*Day*	*Night*	*CNEL*
Location:	L5 - Located west of the Project site on Spruce Avenue near existing residential homes.	*Analyst:* A. Wolfe	55.8	53.6	60.9
		Date: 5/9/2018			

Hourly Leq dBA Readings (unadjusted)



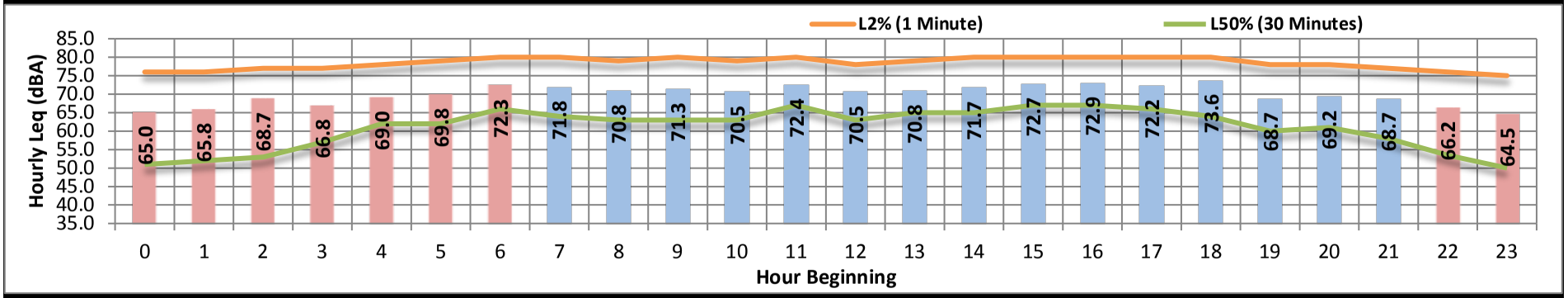
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	51.5	70.8	40.9	61.0	60.0	57.0	55.0	49.0	44.0	42.0	42.0	41.0
	Max	60.8	86.0	46.7	72.0	70.0	66.0	64.0	56.0	52.0	48.0	48.0	47.0
Energy Average:		55.8	Average:		65.0	62.8	59.5	57.7	51.8	47.8	44.7	44.3	43.7
Night	Min	46.4	63.1	41.0	55.0	52.0	50.0	48.0	45.0	43.0	42.0	42.0	41.0
	Max	60.3	88.6	46.2	68.0	66.0	62.0	60.0	57.0	55.0	48.0	48.0	47.0
Energy Average:		53.6	Average:		61.0	58.8	55.2	53.2	49.1	47.1	44.6	44.1	43.6
					Hourly Summary								
Night	0	46.4	63.1	41.6	55.0	52.0	50.0	49.0	46.0	44.0	42.0	42.0	42.0
	1	47.7	64.9	41.8	55.0	53.0	50.0	49.0	47.0	46.0	43.0	43.0	42.0
	2	50.7	74.2	41.4	63.0	60.0	54.0	50.0	46.0	45.0	43.0	42.0	42.0
	3	60.3	88.6	46.2	68.0	66.0	62.0	60.0	57.0	55.0	48.0	47.0	47.0
	4	53.2	67.5	46.1	63.0	61.0	58.0	56.0	52.0	50.0	48.0	48.0	46.0
	5	51.4	68.6	44.6	61.0	59.0	56.0	55.0	50.0	48.0	46.0	45.0	45.0
	6	53.7	68.2	44.3	63.0	62.0	59.0	58.0	52.0	48.0	46.0	45.0	45.0
Day	7	52.1	72.5	42.8	63.0	61.0	57.0	56.0	50.0	46.0	44.0	44.0	43.0
	8	51.8	73.4	41.7	61.0	60.0	57.0	55.0	49.0	45.0	43.0	42.0	42.0
	9	51.5	70.8	41.1	62.0	60.0	57.0	55.0	49.0	44.0	42.0	42.0	41.0
	10	51.9	71.4	41.2	62.0	60.0	57.0	55.0	51.0	46.0	43.0	42.0	42.0
	11	55.4	79.2	41.9	66.0	62.0	58.0	57.0	53.0	47.0	43.0	43.0	42.0
	12	52.9	76.0	40.9	63.0	61.0	58.0	56.0	50.0	46.0	42.0	42.0	41.0
	13	55.1	77.3	41.9	64.0	62.0	59.0	58.0	54.0	50.0	44.0	43.0	42.0
	14	56.3	86.0	43.2	63.0	61.0	58.0	56.0	50.0	47.0	45.0	44.0	44.0
	15	55.5	72.9	43.6	66.0	64.0	61.0	59.0	53.0	49.0	46.0	45.0	44.0
	16	60.8	83.8	45.8	72.0	70.0	66.0	64.0	56.0	52.0	48.0	48.0	47.0
	17	54.2	72.3	46.7	64.0	62.0	60.0	58.0	52.0	50.0	48.0	47.0	47.0
	18	57.4	81.2	45.6	68.0	65.0	62.0	60.0	54.0	50.0	47.0	47.0	46.0
	19	57.6	85.4	45.0	66.0	64.0	60.0	58.0	52.0	49.0	46.0	46.0	46.0
	20	56.0	74.1	44.9	67.0	65.0	62.0	60.0	53.0	49.0	46.0	46.0	45.0
	21	56.3	82.3	42.7	68.0	65.0	61.0	58.0	51.0	47.0	44.0	44.0	43.0
Night	22	51.6	69.8	41.8	64.0	62.0	57.0	54.0	47.0	45.0	43.0	43.0	42.0
	23	46.6	63.3	41.0	57.0	54.0	51.0	48.0	45.0	43.0	42.0	42.0	41.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

				Energy Average Leq		24-Hour
Project Name:	Slover & Cactus	*JN:*	11183	*Day*	*Night*	*CNEL*
Location:	L6 - Located on Slover Avenue south of Bloomington Junior High School, west of the Project site.	*Analyst:*	A. Wolfe	71.4	68.3	75.6
		Date:	5/9/2018			

Hourly Leq dBA Readings (unadjusted)



Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	68.7	86.2	46.9	79.0	77.0	75.0	73.0	65.0	58.0	50.0	49.0	48.0
	Max	73.6	101.8	52.1	82.0	80.0	78.0	77.0	73.0	67.0	58.0	56.0	54.0
Energy Average:		71.4	Average:		80.8	79.2	76.7	75.5	70.1	63.7	54.7	53.3	51.2
Night	Min	64.5	85.4	43.7	77.0	75.0	71.0	67.0	56.0	50.0	46.0	45.0	44.0
	Max	72.3	95.9	51.1	81.0	80.0	78.0	77.0	72.0	66.0	57.0	55.0	52.0
Energy Average:		68.3	Average:		78.9	77.1	73.4	71.3	62.3	56.3	50.3	49.3	47.3
Hourly Summary													
Night	0	65.0	85.8	43.7	78.0	76.0	71.0	67.0	56.0	51.0	46.0	45.0	44.0
	1	65.8	88.0	43.7	79.0	76.0	71.0	68.0	56.0	52.0	46.0	45.0	44.0
	2	68.7	95.9	44.3	80.0	77.0	73.0	71.0	60.0	53.0	47.0	47.0	45.0
	3	66.8	86.0	48.2	78.0	77.0	73.0	71.0	63.0	57.0	53.0	52.0	50.0
	4	69.0	85.4	51.1	79.0	78.0	75.0	74.0	67.0	62.0	56.0	55.0	52.0
	5	69.8	85.4	49.6	80.0	79.0	76.0	75.0	69.0	62.0	54.0	52.0	50.0
	6	72.3	88.5	49.1	81.0	80.0	78.0	77.0	72.0	66.0	57.0	55.0	51.0
Day	7	71.8	89.3	49.4	81.0	80.0	78.0	77.0	72.0	64.0	55.0	53.0	51.0
	8	70.8	86.2	49.7	81.0	79.0	77.0	76.0	70.0	63.0	55.0	53.0	51.0
	9	71.3	88.1	50.1	81.0	80.0	77.0	76.0	70.0	63.0	54.0	53.0	51.0
	10	70.5	89.8	48.1	81.0	79.0	76.0	75.0	69.0	63.0	53.0	52.0	50.0
	11	72.4	87.6	50.1	82.0	80.0	78.0	76.0	73.0	67.0	57.0	55.0	52.0
	12	70.5	93.4	47.5	79.0	78.0	76.0	75.0	70.0	63.0	53.0	51.0	49.0
	13	70.8	91.6	48.8	80.0	79.0	76.0	75.0	70.0	65.0	54.0	53.0	51.0
	14	71.7	89.3	50.4	82.0	80.0	77.0	76.0	71.0	65.0	56.0	55.0	52.0
	15	72.7	92.0	51.4	82.0	80.0	78.0	77.0	73.0	67.0	57.0	56.0	53.0
	16	72.9	92.7	52.1	82.0	80.0	78.0	77.0	73.0	67.0	58.0	56.0	54.0
	17	72.2	92.3	51.3	81.0	80.0	77.0	76.0	72.0	66.0	57.0	55.0	53.0
	18	73.6	101.8	51.0	82.0	80.0	77.0	76.0	70.0	64.0	55.0	54.0	52.0
	19	68.7	87.8	49.7	79.0	78.0	75.0	73.0	66.0	60.0	53.0	52.0	50.0
	20	69.2	88.2	48.9	80.0	78.0	75.0	74.0	67.0	61.0	53.0	52.0	51.0
	21	68.7	90.3	46.9	79.0	77.0	75.0	73.0	65.0	58.0	50.0	49.0	48.0
Night	22	66.2	86.7	45.3	78.0	76.0	73.0	71.0	61.0	53.5	48.0	48.0	46.0
	23	64.5	85.7	43.8	77.0	75.0	71.0	68.0	57.0	50.0	46.0	45.0	44.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Project Name: Slover & Cactus

Location: L7 - Located north of the Project site adjacent to an existing railroad yard.

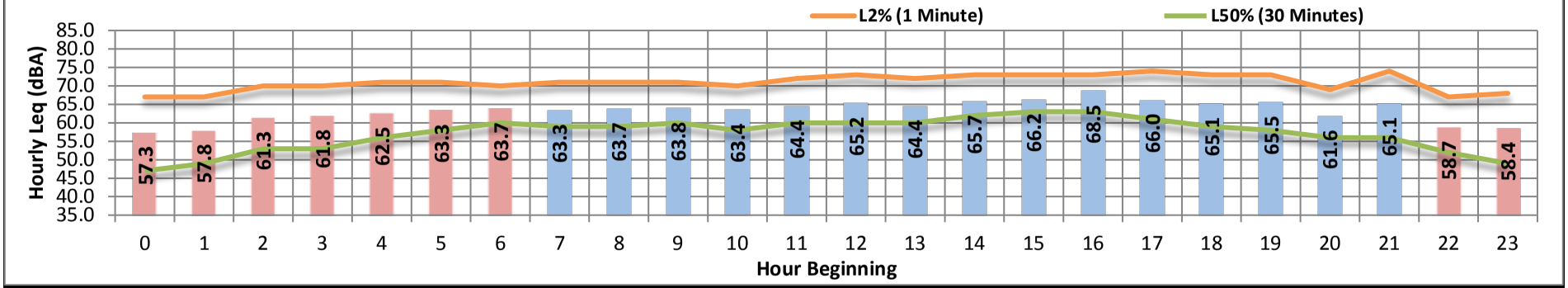
JN: 11183

Analyst: A. Wolfe

Date: 5/9/2018

Energy Average Leq		*24-Hour*
Day	*Night*	*CNEL*
65.1	61.1	68.8

Hourly Leq dBA Readings (unadjusted)



Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	61.6	78.4	43.3	71.0	69.0	67.0	66.0	61.0	56.0	47.0	46.0	44.0
	Max	68.5	95.0	49.6	76.0	74.0	73.0	72.0	67.0	63.0	56.0	54.0	52.0
Energy Average:		65.1	Average:		73.7	72.1	69.7	68.5	64.1	59.6	51.6	49.9	47.9
Night	Min	57.3	74.3	42.5	68.0	67.0	64.0	62.0	53.0	47.0	44.0	43.0	43.0
	Max	63.7	82.0	49.3	73.0	71.0	69.0	67.0	64.0	60.0	54.0	53.0	51.0
Energy Average:		61.1	Average:		70.8	69.0	66.3	64.6	58.3	53.0	48.1	47.2	46.1
Hourly Summary													
Night	0	57.3	75.3	42.8	69.0	67.0	64.0	62.0	53.0	47.0	44.0	43.0	43.0
	1	57.8	78.6	42.7	69.0	67.0	64.0	62.0	54.0	49.0	46.0	45.0	43.0
	2	61.3	82.0	46.1	72.0	70.0	66.0	65.0	58.0	53.0	48.0	47.0	46.0
	3	61.8	81.5	46.2	72.0	70.0	67.0	66.0	59.0	53.0	48.0	47.0	46.0
	4	62.5	79.5	47.8	72.0	71.0	69.0	67.0	62.0	56.0	50.0	49.0	48.0
	5	63.3	78.6	49.3	73.0	71.0	69.0	67.0	63.0	58.0	52.0	51.0	50.0
	6	63.7	77.3	47.7	72.0	70.0	68.0	67.0	64.0	60.0	54.0	53.0	51.0
Day	7	63.3	78.4	47.3	72.0	71.0	68.0	67.0	63.0	59.0	52.0	50.0	48.0
	8	63.7	80.1	47.4	72.0	71.0	69.0	68.0	64.0	59.0	51.0	49.0	48.0
	9	63.8	79.3	47.4	72.0	71.0	69.0	68.0	64.0	60.0	53.0	52.0	50.0
	10	63.4	88.0	46.5	72.0	70.0	68.0	67.0	62.0	58.0	51.0	50.0	48.0
	11	64.4	80.3	46.0	74.0	72.0	70.0	69.0	64.0	60.0	51.0	50.0	48.0
	12	65.2	82.6	44.9	76.0	73.0	70.0	69.0	64.0	60.0	50.0	49.0	46.0
	13	64.4	80.5	44.2	74.0	72.0	69.0	68.0	64.0	60.0	52.0	49.0	46.0
	14	65.7	83.3	46.7	74.0	73.0	70.0	69.0	66.0	62.0	53.0	51.0	48.0
	15	66.2	81.2	47.3	74.0	73.0	71.0	70.0	66.0	63.0	55.0	52.0	49.0
	16	68.5	95.0	49.6	76.0	73.0	71.0	70.0	67.0	63.0	56.0	54.0	52.0
	17	66.0	87.8	47.8	75.0	74.0	71.0	69.0	65.0	61.0	52.0	51.0	49.0
	18	65.1	87.3	46.6	74.0	73.0	70.0	68.0	64.0	59.0	52.0	50.0	48.0
	19	65.5	88.3	45.8	75.0	73.0	70.0	68.0	64.0	58.0	50.0	48.0	47.0
	20	61.6	79.6	45.9	71.0	69.0	67.0	66.0	61.0	56.0	49.0	48.0	47.0
	21	65.1	82.3	43.3	74.0	74.0	73.0	72.0	63.0	56.0	47.0	46.0	44.0
Night	22	58.7	74.3	44.1	68.0	67.0	65.0	63.0	58.0	52.0	47.0	46.0	45.0
	23	58.4	77.9	42.5	70.0	68.0	65.0	62.0	54.0	49.0	44.0	44.0	43.0

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APPENDIX 7.1:

OFF-SITE TRAFFIC NOISE LEVEL CONTOURS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Cedar Av.
Road Segment: n/o Orange St.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,018 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,702 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.86%
Medium Trucks:	66.0%	10.1%	24.0%	7.14%
Heavy Trucks:	69.8%	9.2%	21.0%	5.00%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	3.80	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	77.72	-7.10	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-8.66	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.5	67.0	66.0	62.9	70.1	70.6
Medium Trucks:	69.8	67.2	65.1	64.1	71.0	71.3
Heavy Trucks:	73.5	71.2	68.4	67.2	74.4	74.6
Vehicle Noise:	76.1	73.7	71.5	69.9	77.0	77.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	152	329	708	1,525
CNEL:	160	345	743	1,601

Friday, May 17, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Cedar Av.
Road Segment: n/o Slover Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,273 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,027 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.86%
Medium Trucks:	66.0%	10.1%	24.0%	7.14%
Heavy Trucks:	69.8%	9.2%	21.0%	5.00%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	2.92	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	77.72	-7.98	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-9.53	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.6	66.1	65.1	62.0	69.3	69.7
Medium Trucks:	68.9	66.3	64.2	63.2	70.1	70.4
Heavy Trucks:	72.7	70.3	67.5	66.4	73.5	73.8
Vehicle Noise:	75.3	72.8	70.6	69.0	76.1	76.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	133	287	619	1,334
CNEL:	140	302	650	1,400

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Cactus Av.
Road Segment: s/o Slover Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,564 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,556 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:	66.9%	13.3%	19.8%	87.86%
Medium Trucks:	66.0%	10.1%	24.0%	7.14%
Heavy Trucks:	69.8%	9.2%	21.0%	5.00%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	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	1.68	1.28	-1.20	*-4.61*	0.000	0.000
Medium Trucks:	79.45	-9.22	1.31	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-10.78	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:	70.2	67.7	66.7	63.6	70.9	71.3
Medium Trucks:	70.3	67.7	65.6	64.6	71.5	71.8
Heavy Trucks:	73.6	71.2	68.4	67.3	74.4	74.7
Vehicle Noise:	76.4	74.0	71.8	70.2	77.3	77.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	135	292	628	1,353
CNEL:	142	306	660	1,421

Friday, May 17, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Slover Av.
Road Segment: e/o Cedar Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	12,948 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,295 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.86%
Medium Trucks:	66.0%	10.1%	24.0%	7.14%
Heavy Trucks:	69.8%	9.2%	21.0%	5.00%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-1.73	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	81.00	-12.63	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-14.19	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.7	65.1	64.1	61.1	68.3	68.7
Medium Trucks:	67.6	65.0	62.8	61.8	68.8	69.1
Heavy Trucks:	70.4	68.0	65.3	64.1	71.2	71.5
Vehicle Noise:	73.5	71.1	69.0	67.3	74.4	74.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	102	220	474	1,021
CNEL:	107	231	498	1,073

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Slover Av.
Road Segment: e/o Larch Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,185 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,419 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.86%
Medium Trucks:	66.0%	10.1%	24.0%	7.14%
Heavy Trucks:	69.8%	9.2%	21.0%	5.00%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-1.34	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	81.00	-12.24	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-13.79	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.0	65.5	64.5	61.5	68.7	69.1
Medium Trucks:	68.0	65.4	63.2	62.2	69.2	69.5
Heavy Trucks:	70.8	68.4	65.7	64.5	71.6	71.9
Vehicle Noise:	73.9	71.5	69.3	67.7	74.8	75.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	108	234	503	1,085
CNEL:	114	246	529	1,140

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Slover Av.
Road Segment: e/o Cactus Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,820 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,082 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	38 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.86%
Medium Trucks:	66.0%	10.1%	24.0%	7.14%
Heavy Trucks:	69.8%	9.2%	21.0%	5.00%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.662
Medium Trucks:	48.480
Heavy Trucks:	48.498

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-2.06	0.07	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	79.45	-12.96	0.10	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-14.51	0.10	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.3	62.7	61.7	58.7	65.9	66.3
Medium Trucks:	65.4	62.8	60.6	59.6	66.6	66.9
Heavy Trucks:	68.6	66.3	63.5	62.3	69.4	69.7
Vehicle Noise:	71.5	69.0	66.9	65.3	72.4	72.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	75	161	347	749
CNEL:	79	169	365	786

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Cedar Av.
Road Segment: n/o Orange St.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,216 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,722 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.78%
Medium Trucks:	66.0%	10.1%	24.0%	7.13%
Heavy Trucks:	69.8%	9.2%	21.0%	5.09%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	3.82	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	77.72	-7.09	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-8.55	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.5	67.0	66.0	62.9	70.2	70.6
Medium Trucks:	69.8	67.2	65.1	64.1	71.0	71.3
Heavy Trucks:	73.6	71.3	68.5	67.3	74.5	74.7
Vehicle Noise:	76.2	73.8	71.5	70.0	77.1	77.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	154	332	715	1,540
CNEL:	162	348	751	1,617

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Cedar Av.
Road Segment: n/o Slover Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,471 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,047 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.76%
Medium Trucks:	66.0%	10.1%	24.0%	7.13%
Heavy Trucks:	69.8%	9.2%	21.0%	5.11%

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:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	2.95	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	77.72	-7.96	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-9.40	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.6	66.1	65.1	62.1	69.3	69.7
Medium Trucks:	69.0	66.4	64.2	63.2	70.2	70.4
Heavy Trucks:	72.8	70.4	67.7	66.5	73.6	73.9
Vehicle Noise:	75.3	72.9	70.7	69.1	76.2	76.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	135	291	627	1,350
CNEL:	142	305	658	1,417

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Cactus Av.
Road Segment: s/o Slover Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,792 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,579 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:	66.9%	13.3%	19.8%	87.92%
Medium Trucks:	66.0%	10.1%	24.0%	7.09%
Heavy Trucks:	69.8%	9.2%	21.0%	4.99%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	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	1.72	1.28	-1.20	*-4.61*	0.000	0.000
Medium Trucks:	79.45	-9.22	1.31	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-10.74	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:	70.3	67.7	66.7	63.7	70.9	71.3
Medium Trucks:	70.3	67.7	65.6	64.6	71.5	71.8
Heavy Trucks:	73.6	71.3	68.5	67.3	74.4	74.7
Vehicle Noise:	76.5	74.0	71.9	70.3	77.3	77.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	136	293	631	1,359
CNEL:	143	308	663	1,428

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Slover Av.
Road Segment: e/o Cedar Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,199 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,320 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.69%
Medium Trucks:	66.0%	10.1%	24.0%	7.07%
Heavy Trucks:	69.8%	9.2%	21.0%	5.24%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-1.66	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	81.00	-12.59	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-13.90	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.7	65.2	64.2	61.2	68.4	68.8
Medium Trucks:	67.6	65.0	62.9	61.9	68.8	69.1
Heavy Trucks:	70.7	68.3	65.5	64.4	71.5	71.8
Vehicle Noise:	73.7	71.2	69.1	67.5	74.6	74.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	105	226	486	1,048
CNEL:	110	237	511	1,101

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Slover Av.
Road Segment: e/o Larch Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,436 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,444 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.70%
Medium Trucks:	66.0%	10.1%	24.0%	7.08%
Heavy Trucks:	69.8%	9.2%	21.0%	5.22%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-1.27	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	81.00	-12.20	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-13.52	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.1	65.6	64.6	61.5	68.8	69.2
Medium Trucks:	68.0	65.4	63.3	62.3	69.2	69.5
Heavy Trucks:	71.1	68.7	65.9	64.7	71.9	72.2
Vehicle Noise:	74.1	71.6	69.5	67.9	74.9	75.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	111	239	516	1,111
CNEL:	117	252	542	1,168

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Slover Av.
Road Segment: e/o Cactus Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,100 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	38 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.73%
Medium Trucks:	66.0%	10.1%	24.0%	7.08%
Heavy Trucks:	69.8%	9.2%	21.0%	5.19%

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:	48.662
Medium Trucks:	48.480
Heavy Trucks:	48.498

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-1.99	0.07	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	79.45	-12.92	0.10	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-14.28	0.10	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.3	62.8	61.8	58.8	66.0	66.4
Medium Trucks:	65.4	62.8	60.7	59.7	66.6	66.9
Heavy Trucks:	68.9	66.5	63.7	62.6	69.7	70.0
Vehicle Noise:	71.6	69.2	67.0	65.4	72.5	72.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	77	165	355	765
CNEL:	80	173	373	804

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2020 Without Project
Road Name: Cedar Av.
Road Segment: n/o Orange St.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	44,475 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,448 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.86%
Medium Trucks:	66.0%	10.1%	24.0%	7.14%
Heavy Trucks:	69.8%	9.2%	21.0%	5.00%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	4.59	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	77.72	-6.31	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-7.86	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.3	67.7	66.8	63.7	70.9	71.4
Medium Trucks:	70.6	68.0	65.9	64.9	71.8	72.1
Heavy Trucks:	74.3	72.0	69.2	68.0	75.2	75.4
Vehicle Noise:	76.9	74.5	72.3	70.7	77.8	78.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	172	371	800	1,723
CNEL:	181	390	840	1,809

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2020 Without Project
Road Name: Cedar Av.
Road Segment: n/o Slover Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	38,810 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,881 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.86%
Medium Trucks:	66.0%	10.1%	24.0%	7.14%
Heavy Trucks:	69.8%	9.2%	21.0%	5.00%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	4.00	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	77.72	-6.90	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-8.45	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.7	67.2	66.2	63.1	70.3	70.8
Medium Trucks:	70.0	67.4	65.3	64.3	71.2	71.5
Heavy Trucks:	73.8	71.4	68.6	67.4	74.6	74.9
Vehicle Noise:	76.3	73.9	71.7	70.1	77.2	77.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	157	339	730	1,574
CNEL:	165	356	767	1,652

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2020 Without Project
Road Name: Cactus Av.
Road Segment: s/o Slover Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,071 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,007 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:	66.9%	13.3%	19.8%	87.86%
Medium Trucks:	66.0%	10.1%	24.0%	7.14%
Heavy Trucks:	69.8%	9.2%	21.0%	5.00%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	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	2.38	1.28	-1.20	*-4.61*	0.000	0.000
Medium Trucks:	79.45	-8.52	1.31	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-10.07	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:	70.9	68.4	67.4	64.3	71.6	72.0
Medium Trucks:	71.0	68.4	66.3	65.3	72.2	72.5
Heavy Trucks:	74.3	71.9	69.1	68.0	75.1	75.4
Vehicle Noise:	77.2	74.7	72.5	70.9	78.0	78.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	151	325	700	1,508
CNEL:	158	341	735	1,584

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2020 Without Project
Road Name: Slover Av.
Road Segment: e/o Cedar Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,878 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,488 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.86%
Medium Trucks:	66.0%	10.1%	24.0%	7.14%
Heavy Trucks:	69.8%	9.2%	21.0%	5.00%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-1.13	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	81.00	-12.03	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-13.58	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.3	65.7	64.7	61.7	68.9	69.3
Medium Trucks:	68.2	65.6	63.4	62.4	69.4	69.7
Heavy Trucks:	71.0	68.6	65.9	64.7	71.8	72.1
Vehicle Noise:	74.1	71.7	69.6	67.9	75.0	75.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	112	241	520	1,120
CNEL:	118	254	546	1,177

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2020 Without Project
Road Name: Slover Av.
Road Segment: e/o Larch Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,323 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,632 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.86%
Medium Trucks:	66.0%	10.1%	24.0%	7.14%
Heavy Trucks:	69.8%	9.2%	21.0%	5.00%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-0.73	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	81.00	-11.63	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-13.18	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.7	66.1	65.1	62.1	69.3	69.7
Medium Trucks:	68.6	66.0	63.8	62.8	69.8	70.1
Heavy Trucks:	71.4	69.0	66.3	65.1	72.2	72.5
Vehicle Noise:	74.5	72.1	70.0	68.3	75.4	75.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	119	257	553	1,191
CNEL:	125	270	581	1,252

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2020 Without Project
Road Name: Slover Av.
Road Segment: e/o Cactus Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	12,145 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,215 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	38 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.86%
Medium Trucks:	66.0%	10.1%	24.0%	7.14%
Heavy Trucks:	69.8%	9.2%	21.0%	5.00%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.662
Medium Trucks:	48.480
Heavy Trucks:	48.498

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-1.56	0.07	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	79.45	-12.46	0.10	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-14.01	0.10	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.8	63.2	62.2	59.2	66.4	66.8
Medium Trucks:	65.9	63.3	61.1	60.1	67.1	67.4
Heavy Trucks:	69.1	66.8	64.0	62.8	70.0	70.2
Vehicle Noise:	72.0	69.5	67.4	65.8	72.9	73.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	81	174	375	809
CNEL:	85	183	394	849

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2020 With Project
Road Name: Cedar Av.
Road Segment: n/o Orange St.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	44,673 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,467 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.80%
Medium Trucks:	66.0%	10.1%	24.0%	7.13%
Heavy Trucks:	69.8%	9.2%	21.0%	5.07%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	4.61	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	77.72	-6.29	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-7.77	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.3	67.8	66.8	63.7	70.9	71.4
Medium Trucks:	70.6	68.0	65.9	64.9	71.8	72.1
Heavy Trucks:	74.4	72.1	69.3	68.1	75.2	75.5
Vehicle Noise:	77.0	74.5	72.3	70.8	77.9	78.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	174	374	807	1,738
CNEL:	182	393	847	1,824

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2020 With Project
Road Name: Cedar Av.
Road Segment: n/o Slover Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	39,008 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,901 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.79%
Medium Trucks:	66.0%	10.1%	24.0%	7.13%
Heavy Trucks:	69.8%	9.2%	21.0%	5.09%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	4.02	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	77.72	-6.88	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-8.35	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.7	67.2	66.2	63.1	70.4	70.8
Medium Trucks:	70.0	67.4	65.3	64.3	71.2	71.5
Heavy Trucks:	73.9	71.5	68.7	67.5	74.7	75.0
Vehicle Noise:	76.4	74.0	71.8	70.2	77.3	77.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	159	342	737	1,589
CNEL:	167	359	774	1,668

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2020 With Project
Road Name: Cactus Av.
Road Segment: s/o Slover Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,299 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,030 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:	66.9%	13.3%	19.8%	87.91%
Medium Trucks:	66.0%	10.1%	24.0%	7.09%
Heavy Trucks:	69.8%	9.2%	21.0%	4.99%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	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	2.42	1.28	-1.20	*-4.61*	0.000	0.000
Medium Trucks:	79.45	-8.51	1.31	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-10.04	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:	71.0	68.4	67.4	64.4	71.6	72.0
Medium Trucks:	71.0	68.4	66.3	65.3	72.2	72.5
Heavy Trucks:	74.3	72.0	69.2	68.0	75.1	75.4
Vehicle Noise:	77.2	74.7	72.6	71.0	78.0	78.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	151	326	703	1,514
CNEL:	159	343	738	1,590

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2020 With Project
Road Name: Slover Av.
Road Segment: e/o Cedar Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,129 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,513 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.71%
Medium Trucks:	66.0%	10.1%	24.0%	7.08%
Heavy Trucks:	69.8%	9.2%	21.0%	5.21%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-1.07	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	81.00	-11.99	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-13.33	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.3	65.8	64.8	61.7	69.0	69.4
Medium Trucks:	68.2	65.6	63.5	62.5	69.4	69.7
Heavy Trucks:	71.3	68.9	66.1	64.9	72.1	72.4
Vehicle Noise:	74.3	71.8	69.7	68.1	75.1	75.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	115	247	532	1,146
CNEL:	120	259	559	1,204

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2020 With Project
Road Name: Slover Av.
Road Segment: e/o Larch Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,574 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,657 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.72%
Medium Trucks:	66.0%	10.1%	24.0%	7.09%
Heavy Trucks:	69.8%	9.2%	21.0%	5.19%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-0.67	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	81.00	-11.60	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-12.95	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.7	66.2	65.2	62.1	69.4	69.8
Medium Trucks:	68.6	66.0	63.9	62.9	69.8	70.1
Heavy Trucks:	71.6	69.3	66.5	65.3	72.4	72.7
Vehicle Noise:	74.7	72.2	70.1	68.4	75.5	75.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	122	262	565	1,216
CNEL:	128	275	593	1,278

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2020 With Project
Road Name: Slover Av.
Road Segment: e/o Cactus Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	12,325 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,232 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	38 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.75%
Medium Trucks:	66.0%	10.1%	24.0%	7.09%
Heavy Trucks:	69.8%	9.2%	21.0%	5.17%

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:	48.662
Medium Trucks:	48.480
Heavy Trucks:	48.498

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-1.50	0.07	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	79.45	-12.43	0.10	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-13.80	0.10	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.8	63.3	62.3	59.3	66.5	66.9
Medium Trucks:	65.9	63.3	61.2	60.2	67.1	67.4
Heavy Trucks:	69.3	67.0	64.2	63.0	70.2	70.4
Vehicle Noise:	72.1	69.7	67.5	65.9	73.0	73.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	82	178	383	825
CNEL:	87	187	402	866

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Cedar Av.
Road Segment: n/o Orange St.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	45,428 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,543 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.86%
Medium Trucks:	66.0%	10.1%	24.0%	7.14%
Heavy Trucks:	69.8%	9.2%	21.0%	5.00%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	4.69	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	77.72	-6.21	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-7.77	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.4	67.8	66.8	63.8	71.0	71.5
Medium Trucks:	70.7	68.1	66.0	65.0	71.9	72.2
Heavy Trucks:	74.4	72.1	69.3	68.1	75.2	75.5
Vehicle Noise:	77.0	74.6	72.4	70.8	77.9	78.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	175	377	811	1,748
CNEL:	184	395	852	1,835

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Cedar Av.
Road Segment: n/o Slover Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	42,691 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,269 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.86%
Medium Trucks:	66.0%	10.1%	24.0%	7.14%
Heavy Trucks:	69.8%	9.2%	21.0%	5.00%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	4.42	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	77.72	-6.48	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-8.04	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.1	67.6	66.6	63.5	70.8	71.2
Medium Trucks:	70.4	67.8	65.7	64.7	71.6	71.9
Heavy Trucks:	74.2	71.8	69.0	67.9	75.0	75.3
Vehicle Noise:	76.8	74.3	72.1	70.5	77.6	77.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	168	361	778	1,677
CNEL:	176	379	817	1,761

Friday, May 17, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Cactus Av.
Road Segment: s/o Slover Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	33,079 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,308 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:	66.9%	13.3%	19.8%	87.86%
Medium Trucks:	66.0%	10.1%	24.0%	7.14%
Heavy Trucks:	69.8%	9.2%	21.0%	5.00%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	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	2.80	1.28	-1.20	*-4.61*	0.000	0.000
Medium Trucks:	79.45	-8.10	1.31	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-9.66	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:	71.3	68.8	67.8	64.8	72.0	72.4
Medium Trucks:	71.5	68.9	66.7	65.7	72.7	72.9
Heavy Trucks:	74.7	72.3	69.6	68.4	75.5	75.8
Vehicle Noise:	77.6	75.1	73.0	71.3	78.4	78.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	161	346	746	1,607
CNEL:	169	364	783	1,688

Friday, May 17, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Slover Av.
Road Segment: e/o Cedar Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,890 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,589 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.86%
Medium Trucks:	66.0%	10.1%	24.0%	7.14%
Heavy Trucks:	69.8%	9.2%	21.0%	5.00%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-0.85	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	81.00	-11.75	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-13.30	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.5	66.0	65.0	62.0	69.2	69.6
Medium Trucks:	68.5	65.9	63.7	62.7	69.7	69.9
Heavy Trucks:	71.3	68.9	66.1	65.0	72.1	72.4
Vehicle Noise:	74.4	71.9	69.8	68.2	75.3	75.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	117	252	543	1,170
CNEL:	123	265	571	1,229

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Slover Av.
Road Segment: e/o Larch Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,408 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,741 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.86%
Medium Trucks:	66.0%	10.1%	24.0%	7.14%
Heavy Trucks:	69.8%	9.2%	21.0%	5.00%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-0.45	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	81.00	-11.35	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-12.90	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.9	66.4	65.4	62.4	69.6	70.0
Medium Trucks:	68.9	66.3	64.1	63.1	70.1	70.3
Heavy Trucks:	71.7	69.3	66.5	65.4	72.5	72.8
Vehicle Noise:	74.8	72.3	70.2	68.6	75.7	76.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	124	268	577	1,243
CNEL:	131	281	606	1,307

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Slover Av.
Road Segment: e/o Cactus Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,278 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,328 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	38 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.86%
Medium Trucks:	66.0%	10.1%	24.0%	7.14%
Heavy Trucks:	69.8%	9.2%	21.0%	5.00%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.662
Medium Trucks:	48.480
Heavy Trucks:	48.498

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-1.17	0.07	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	79.45	-12.07	0.10	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-13.62	0.10	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.2	63.6	62.6	59.6	66.8	67.2
Medium Trucks:	66.3	63.7	61.5	60.5	67.5	67.8
Heavy Trucks:	69.5	67.2	64.4	63.2	70.3	70.6
Vehicle Noise:	72.4	69.9	67.8	66.2	73.3	73.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	86	185	398	858
CNEL:	90	194	418	901

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Cedar Av.
Road Segment: n/o Orange St.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	45,626 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,563 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.80%
Medium Trucks:	66.0%	10.1%	24.0%	7.13%
Heavy Trucks:	69.8%	9.2%	21.0%	5.07%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	4.70	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	77.72	-6.20	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-7.68	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.4	67.9	66.9	63.8	71.0	71.5
Medium Trucks:	70.7	68.1	66.0	65.0	71.9	72.2
Heavy Trucks:	74.5	72.2	69.4	68.2	75.3	75.6
Vehicle Noise:	77.1	74.6	72.4	70.9	78.0	78.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	176	380	818	1,762
CNEL:	185	399	859	1,850

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Cedar Av.
Road Segment: n/o Slover Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	42,889 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,289 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.79%
Medium Trucks:	66.0%	10.1%	24.0%	7.13%
Heavy Trucks:	69.8%	9.2%	21.0%	5.08%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	4.43	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	77.72	-6.47	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-7.95	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.1	67.6	66.6	63.6	70.8	71.2
Medium Trucks:	70.5	67.9	65.7	64.7	71.6	71.9
Heavy Trucks:	74.3	71.9	69.1	67.9	75.1	75.4
Vehicle Noise:	76.8	74.4	72.2	70.6	77.7	78.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	169	364	785	1,692
CNEL:	178	383	824	1,776

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Cactus Av.
Road Segment: s/o Slover Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	33,307 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,331 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:	66.9%	13.3%	19.8%	87.91%
Medium Trucks:	66.0%	10.1%	24.0%	7.10%
Heavy Trucks:	69.8%	9.2%	21.0%	4.99%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	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	-8.10	1.31	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-9.63	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:	71.4	68.8	67.8	64.8	72.0	72.4
Medium Trucks:	71.5	68.9	66.7	65.7	72.7	72.9
Heavy Trucks:	74.7	72.4	69.6	68.4	75.5	75.8
Vehicle Noise:	77.6	75.1	73.0	71.4	78.5	78.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	161	347	748	1,612
CNEL:	169	365	786	1,694

Friday, May 17, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Slover Av.
Road Segment: e/o Cedar Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,141 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,614 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.72%
Medium Trucks:	66.0%	10.1%	24.0%	7.09%
Heavy Trucks:	69.8%	9.2%	21.0%	5.20%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-0.78	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	81.00	-11.71	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-13.06	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.6	66.1	65.1	62.0	69.2	69.7
Medium Trucks:	68.5	65.9	63.8	62.8	69.7	70.0
Heavy Trucks:	71.5	69.2	66.4	65.2	72.3	72.6
Vehicle Noise:	74.6	72.1	70.0	68.3	75.4	75.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	120	258	555	1,195
CNEL:	126	271	583	1,256

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Slover Av.
Road Segment: e/o Larch Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,659 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,766 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.73%
Medium Trucks:	66.0%	10.1%	24.0%	7.09%
Heavy Trucks:	69.8%	9.2%	21.0%	5.18%

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	46.400
Medium Trucks:	46.209
Heavy Trucks:	46.228

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-0.39	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	81.00	-11.32	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-12.68	0.41	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.0	66.5	65.5	62.4	69.6	70.1
Medium Trucks:	68.9	66.3	64.1	63.2	70.1	70.4
Heavy Trucks:	71.9	69.5	66.8	65.6	72.7	73.0
Vehicle Noise:	74.9	72.5	70.4	68.7	75.8	76.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	127	273	589	1,268
CNEL:	133	287	618	1,332

Friday, May 17, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Slover Av.
Road Segment: e/o Cactus Av.

Project Name: Slover & Cactus
Job Number: 11183

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,458 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,346 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	38 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.9%	13.3%	19.8%	87.76%
Medium Trucks:	66.0%	10.1%	24.0%	7.09%
Heavy Trucks:	69.8%	9.2%	21.0%	5.15%

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:	48.662
Medium Trucks:	48.480
Heavy Trucks:	48.498

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-1.11	0.07	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	79.45	-12.04	0.10	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-13.43	0.10	-1.20	*-5.41*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.2	63.7	62.7	59.6	66.9	67.3
Medium Trucks:	66.3	63.7	61.6	60.6	67.5	67.8
Heavy Trucks:	69.7	67.4	64.6	63.4	70.5	70.8
Vehicle Noise:	72.5	70.1	67.9	66.3	73.4	73.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	87	188	406	874
CNEL:	92	198	426	918

Friday, May 17, 2019

APPENDIX 9.1:

OPERATIONAL NOISE LEVEL CALCULATIONS

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STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R1**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	287.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	287.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	64.2	67.2	71.8	75.6	80.0
Distance Attenuation	287.0	-19.6	-19.6	-19.6	-19.6	-19.6	-19.6
Shielding (Barrier Attenuation)	287.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		47.6	44.6	47.6	52.2	56.0	60.4
60 Minute Hourly Adjustment		**47.6**	**44.6**	**47.6**	**52.2**	**56.0**	**60.4**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R1**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	230.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	230.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	230.0	-33.3	-33.3	-33.3	-33.3	-33.3	-33.3
Shielding (Barrier Attenuation)	230.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		43.9	41.1	42.8	44.1	44.4	44.9
39 Minute Hourly Adjustment		**42.0**	**39.2**	**40.9**	**42.2**	**42.5**	**43.0**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R1**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	135.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	135.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	52.2	49.0	50.0	55.0	61.0	71.9
Distance Attenuation	135.0	-17.0	-17.0	-17.0	-17.0	-17.0	-17.0
Shielding (Barrier Attenuation)	135.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		35.2	32.0	33.0	38.0	44.0	54.9
60 Minute Hourly Adjustment		**35.2**	**32.0**	**33.0**	**38.0**	**44.0**	**54.9**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R2**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	456.0 feet	***Barrier Height:***	**30.0 feet**
Noise Distance to Barrier:	10.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	446.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	64.2	67.2	71.8	75.6	80.0
Distance Attenuation	456.0	-23.6	-23.6	-23.6	-23.6	-23.6	-23.6
Shielding (Barrier Attenuation)	10.0	-17.6	-17.6	-17.6	-17.6	-17.6	-17.6
Raw (Distance + Barrier)		26.0	23.0	26.0	30.6	34.4	38.8
60 Minute Hourly Adjustment		**26.0**	**23.0**	**26.0**	**30.6**	**34.4**	**38.8**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R2**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	348.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	348.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	348.0	-36.9	-36.9	-36.9	-36.9	-36.9	-36.9
Shielding (Barrier Attenuation)	348.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		40.3	37.5	39.2	40.5	40.8	41.3
39 Minute Hourly Adjustment		**38.4**	**35.6**	**37.3**	**38.6**	**38.9**	**39.4**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R2**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	105.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	105.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	52.2	49.0	50.0	55.0	61.0	71.9
Distance Attenuation	105.0	-15.3	-15.3	-15.3	-15.3	-15.3	-15.3
Shielding (Barrier Attenuation)	105.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		36.9	33.7	34.7	39.7	45.7	56.6
60 Minute Hourly Adjustment		**36.9**	**33.7**	**34.7**	**39.7**	**45.7**	**56.6**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R3**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	403.0 feet	***Barrier Height:***	**30.0 feet**
Noise Distance to Barrier:	10.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	393.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	64.2	67.2	71.8	75.6	80.0
Distance Attenuation	403.0	-22.6	-22.6	-22.6	-22.6	-22.6	-22.6
Shielding (Barrier Attenuation)	10.0	-17.7	-17.7	-17.7	-17.7	-17.7	-17.7
Raw (Distance + Barrier)		26.9	23.9	26.9	31.5	35.3	39.7
60 Minute Hourly Adjustment		**26.9**	**23.9**	**26.9**	**31.5**	**35.3**	**39.7**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R3**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	341.0 feet	***Barrier Height:***	**30.0 feet**
Noise Distance to Barrier:	291.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	50.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	341.0	-36.7	-36.7	-36.7	-36.7	-36.7	-36.7
Shielding (Barrier Attenuation)	291.0	-15.0	-15.0	-15.0	-15.0	-15.0	-15.0
Raw (Distance + Barrier)		25.5	22.7	24.4	25.7	26.0	26.5
39 Minute Hourly Adjustment		**23.6**	**20.8**	**22.5**	**23.8**	**24.1**	**24.6**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R3**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	151.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	151.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	52.2	49.0	50.0	55.0	61.0	71.9
Distance Attenuation	151.0	-17.7	-17.7	-17.7	-17.7	-17.7	-17.7
Shielding (Barrier Attenuation)	151.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		34.5	31.3	32.3	37.3	43.3	54.2
60 Minute Hourly Adjustment		**34.5**	**31.3**	**32.3**	**37.3**	**43.3**	**54.2**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R4**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	403.0 feet	***Barrier Height:***	**30.0 feet**
Noise Distance to Barrier:	10.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	393.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	64.2	67.2	71.8	75.6	80.0
Distance Attenuation	403.0	-22.6	-22.6	-22.6	-22.6	-22.6	-22.6
Shielding (Barrier Attenuation)	10.0	-17.7	-17.7	-17.7	-17.7	-17.7	-17.7
Raw (Distance + Barrier)		26.9	23.9	26.9	31.5	35.3	39.7
60 Minute Hourly Adjustment		**26.9**	**23.9**	**26.9**	**31.5**	**35.3**	**39.7**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R4**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	403.0	feet	***Barrier Height:***	**30.0 feet**
Noise Distance to Barrier:	353.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	50.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	403.0	-38.1	-38.1	-38.1	-38.1	-38.1	-38.1
Shielding (Barrier Attenuation)	353.0	-15.1	-15.1	-15.1	-15.1	-15.1	-15.1
Raw (Distance + Barrier)		24.0	21.2	22.9	24.2	24.5	25.0
39 Minute Hourly Adjustment		**22.1**	**19.3**	**21.0**	**22.3**	**22.6**	**23.1**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R4**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	199.0	feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	199.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0	feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	52.2	49.0	50.0	55.0	61.0	71.9
Distance Attenuation	199.0	-19.5	-19.5	-19.5	-19.5	-19.5	-19.5
Shielding (Barrier Attenuation)	199.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		32.7	29.5	30.5	35.5	41.5	52.4
60 Minute Hourly Adjustment		**32.7**	**29.5**	**30.5**	**35.5**	**41.5**	**52.4**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R5**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	401.0 feet	***Barrier Height:***	**30.0 feet**
Noise Distance to Barrier:	10.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	391.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	64.2	67.2	71.8	75.6	80.0
Distance Attenuation	401.0	-22.5	-22.5	-22.5	-22.5	-22.5	-22.5
Shielding (Barrier Attenuation)	10.0	-17.7	-17.7	-17.7	-17.7	-17.7	-17.7
Raw (Distance + Barrier)		27.0	24.0	27.0	31.6	35.4	39.8
60 Minute Hourly Adjustment		**27.0**	**24.0**	**27.0**	**31.6**	**35.4**	**39.8**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R5**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	303.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	303.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	303.0	-35.6	-35.6	-35.6	-35.6	-35.6	-35.6
Shielding (Barrier Attenuation)	303.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		41.6	38.8	40.5	41.8	42.1	42.6
39 Minute Hourly Adjustment		**39.7**	**36.9**	**38.6**	**39.9**	**40.2**	**40.7**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R5**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	179.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	179.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	52.2	49.0	50.0	55.0	61.0	71.9
Distance Attenuation	179.0	-18.8	-18.8	-18.8	-18.8	-18.8	-18.8
Shielding (Barrier Attenuation)	179.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		33.4	30.2	31.2	36.2	42.2	53.1
60 Minute Hourly Adjustment		**33.4**	**30.2**	**31.2**	**36.2**	**42.2**	**53.1**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R6**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	350.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	350.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	64.2	67.2	71.8	75.6	80.0
Distance Attenuation	350.0	-21.3	-21.3	-21.3	-21.3	-21.3	-21.3
Shielding (Barrier Attenuation)	350.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		45.9	42.9	45.9	50.5	54.3	58.7
60 Minute Hourly Adjustment		**45.9**	**42.9**	**45.9**	**50.5**	**54.3**	**58.7**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R6**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	278.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	278.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	278.0	-34.9	-34.9	-34.9	-34.9	-34.9	-34.9
Shielding (Barrier Attenuation)	278.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		42.3	39.5	41.2	42.5	42.8	43.3
39 Minute Hourly Adjustment		**40.4**	**37.6**	**39.3**	**40.6**	**40.9**	**41.4**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R6**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	211.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	211.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	52.2	49.0	50.0	55.0	61.0	71.9
Distance Attenuation	211.0	-19.9	-19.9	-19.9	-19.9	-19.9	-19.9
Shielding (Barrier Attenuation)	211.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		32.3	29.1	30.1	35.1	41.1	52.0
60 Minute Hourly Adjustment		**32.3**	**29.1**	**30.1**	**35.1**	**41.1**	**52.0**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R7**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	920.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	920.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	64.2	67.2	71.8	75.6	80.0
Distance Attenuation	920.0	-29.7	-29.7	-29.7	-29.7	-29.7	-29.7
Shielding (Barrier Attenuation)	920.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		37.5	34.5	37.5	42.1	45.9	50.3
60 Minute Hourly Adjustment		**37.5**	**34.5**	**37.5**	**42.1**	**45.9**	**50.3**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R7**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	886.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	886.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	886.0	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Shielding (Barrier Attenuation)	886.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		32.2	29.4	31.1	32.4	32.7	33.2
39 Minute Hourly Adjustment		**30.3**	**27.5**	**29.2**	**30.5**	**30.8**	**31.3**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R7**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	794.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	794.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	52.2	49.0	50.0	55.0	61.0	71.9
Distance Attenuation	794.0	-28.5	-28.5	-28.5	-28.5	-28.5	-28.5
Shielding (Barrier Attenuation)	794.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		23.7	20.5	21.5	26.5	32.5	43.4
60 Minute Hourly Adjustment		**23.7**	**20.5**	**21.5**	**26.5**	**32.5**	**43.4**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R8**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	315.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	315.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	64.2	67.2	71.8	75.6	80.0
Distance Attenuation	315.0	-20.4	-20.4	-20.4	-20.4	-20.4	-20.4
Shielding (Barrier Attenuation)	315.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		46.8	43.8	46.8	51.4	55.2	59.6
60 Minute Hourly Adjustment		**46.8**	**43.8**	**46.8**	**51.4**	**55.2**	**59.6**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R8**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	519.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	519.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	519.0	-40.3	-40.3	-40.3	-40.3	-40.3	-40.3
Shielding (Barrier Attenuation)	519.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		36.9	34.1	35.8	37.1	37.4	37.9
39 Minute Hourly Adjustment		**35.0**	**32.2**	**33.9**	**35.2**	**35.5**	**36.0**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R8**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	319.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	319.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	52.2	49.0	50.0	55.0	61.0	71.9
Distance Attenuation	319.0	-22.6	-22.6	-22.6	-22.6	-22.6	-22.6
Shielding (Barrier Attenuation)	319.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		29.6	26.4	27.4	32.4	38.4	49.3
60 Minute Hourly Adjustment		**29.6**	**26.4**	**27.4**	**32.4**	**38.4**	**49.3**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R6**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	350.0 feet	***Barrier Height:***	**8.0 feet**
Noise Distance to Barrier:	180.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	170.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	64.2	67.2	71.8	75.6	80.0
Distance Attenuation	350.0	-21.3	-21.3	-21.3	-21.3	-21.3	-21.3
Shielding (Barrier Attenuation)	180.0	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1
Raw (Distance + Barrier)		40.8	37.8	40.8	45.4	49.2	53.6
60 Minute Hourly Adjustment		**40.8**	**37.8**	**40.8**	**45.4**	**49.2**	**53.6**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R6**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	278.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	278.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	278.0	-34.9	-34.9	-34.9	-34.9	-34.9	-34.9
Shielding (Barrier Attenuation)	278.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		42.3	39.5	41.2	42.5	42.8	43.3
39 Minute Hourly Adjustment		**40.4**	**37.6**	**39.3**	**40.6**	**40.9**	**41.4**

STATIONARY SOURCE NOISE PREDICTION MODEL

5/9/2018

Observer Location: **R6**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	211.0	feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	211.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0	feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	52.2	49.0	50.0	55.0	61.0	71.9
Distance Attenuation	211.0	-19.9	-19.9	-19.9	-19.9	-19.9	-19.9
Shielding (Barrier Attenuation)	211.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		32.3	29.1	30.1	35.1	41.1	52.0
60 Minute Hourly Adjustment		**32.3**	**29.1**	**30.1**	**35.1**	**41.1**	**52.0**

APPENDIX 10.1:

TEMPORARY CONSTRUCTION NOISE BARRIER ATTENUATION CALCULATIONS

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STATIONARY SOURCE NOISE PREDICTION MODEL 5/10/2018

Observer Location: **R3**
Source: Highest Ref. Mobile Equipment
Condition: Construction Mitigation

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	30.0 feet	***Barrier Height:***	**12.0 feet**
Noise Distance to Barrier:	10.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	20.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	50.0	73.5	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	30.0	4.4	4.4	4.4	4.4	4.4	4.4
Shielding (Barrier Attenuation)	10.0	-11.8	-11.8	-11.8	-11.8	-11.8	-11.8
Raw (Distance + Barrier)		66.1	-7.4	-7.4	-7.4	-7.4	-7.4
60 Minute Hourly Adjustment		**66.1**	**-7.4**	**-7.4**	**-7.4**	**-7.4**	**-7.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 5/10/2018

Observer Location: **R4**
Source: Highest Ref. Mobile Equipment
Condition: Construction Mitigation

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	30.0 feet	***Barrier Height:***	**12.0 feet**
Noise Distance to Barrier:	10.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	20.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	50.0	73.5	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	30.0	4.4	4.4	4.4	4.4	4.4	4.4
Shielding (Barrier Attenuation)	10.0	-11.8	-11.8	-11.8	-11.8	-11.8	-11.8
Raw (Distance + Barrier)		66.1	-7.4	-7.4	-7.4	-7.4	-7.4
60 Minute Hourly Adjustment		**66.1**	**-7.4**	**-7.4**	**-7.4**	**-7.4**	**-7.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 5/16/2019

Observer Location: **R3**
Source: Highest Nighttime Equipment
Condition: Construction Mitigation

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	30.0 feet	***Barrier Height:***	**12.0 feet**
Noise Distance to Barrier:	10.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	20.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	50.0	71.6	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	30.0	4.4	4.4	4.4	4.4	4.4	4.4
Shielding (Barrier Attenuation)	10.0	-11.8	-11.8	-11.8	-11.8	-11.8	-11.8
Raw (Distance + Barrier)		64.2	-7.4	-7.4	-7.4	-7.4	-7.4
60 Minute Hourly Adjustment		**64.2**	**-7.4**	**-7.4**	**-7.4**	**-7.4**	**-7.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 5/16/2019

Observer Location: **R4**
Source: Highest Nighttime Equipment
Condition: Construction Mitigation

Project Name: Slover & Cactus
Job Number: 11183
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	30.0 feet	***Barrier Height:***	**12.0 feet**
Noise Distance to Barrier:	10.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	20.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	50.0	71.6	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	30.0	4.4	4.4	4.4	4.4	4.4	4.4
Shielding (Barrier Attenuation)	10.0	-11.8	-11.8	-11.8	-11.8	-11.8	-11.8
Raw (Distance + Barrier)		64.2	-7.4	-7.4	-7.4	-7.4	-7.4
60 Minute Hourly Adjustment		**64.2**	**-7.4**	**-7.4**	**-7.4**	**-7.4**	**-7.4**

APPENDIX 10.2:

TEMPORARY NOISE BARRIER SAMPLE PHOTOS

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Temporary Construction Noise Barrier Examples

I-Beam & Acoustic Material 01

I-Beam & Acoustic Material 02

I-Beam & Acoustic Material 03

K-Rail Plywood & Acoustic Material

K-Rail Temporary Fence & Acoustic Material

K-Rail-Mounted Acoustic Material 01

Temporary Construction Noise Barrier Examples

Pillar & Acoustic Material

Straw Bales 01

Straw Bales 02

Temporary Fence & Acoustic Material 01

Temporary Fence & Acoustic Material 02