Kaiser Commerce Center

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	Kaiser Commerce Center
REMEL	Reference Energy Mean Emission Level
RMS	Root-mean-square
VdB	Vibration Decibels

EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the noise exposure and the necessary noise mitigation measures for the proposed Kaiser Commerce Center development ("Project"). The Project site is located south of San Bernardino Avenue, between Commerce Drive and Calabash Avenue in the unincorporated County of San Bernardino. The Project is proposed to consist of a single building of 165,324 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 four 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 *Kaiser Commerce Center 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 and Opening Year Cumulative 2020 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 Kaiser Commerce Center 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 satisfy the County of San Bernardino exterior noise level standards at all the off-site noise-sensitive receiver locations. The Project operational noise levels at all receiver locations, therefore, will result in *less than significant* noise impacts. .

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*.

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 Kaiser Commerce Center site, this analysis estimates the Project-related construction noise levels at nearby sensitive receiver locations. Since the County of San Bernardino does 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 40.2 dBA L_{eq} and will satisfy the 85 dBA L_{eq} threshold identified by NIOSH at all receiver locations.

Construction Vibration Analysis

At distances ranging from 2,293 to 4,864 feet from Project construction activity, no construction vibration velocity levels are expected at nearby receiver locations. 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 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.

SUMMARY OF CEQA SIGNIFICANCE FINDINGS

The results of this Kaiser Commerce Center Noise Impact Analysis are summarized below based on the significance criteria in Section 4 of this report consistent with Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (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	*Less Than Significant*	*n/a*
Construction Noise	10	*Less Than Significant*	*n/a*
Construction Vibration		*Less Than Significant*	*n/a*

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1 INTRODUCTION

This noise analysis has been completed to determine the noise impacts associated with the development of the proposed Kaiser Commerce Center ("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 Kaiser Commerce Center Project is located south of San Bernardino Avenue, between Commerce Drive and Calabash 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 heavy industrial pipe facility with rail yard and approximately 2,000 feet south of Autoclub Speedway. The Project site is located roughly 0.65 miles north of Interstate 10 (I-10) and 1.90 miles east of the Interstate 15 (I-15). Nearby industrial uses in the Project study area surround Project site to the north, east, and south; the Kaiser Commerce Center Specific Plan area surrounds the Project to the west.

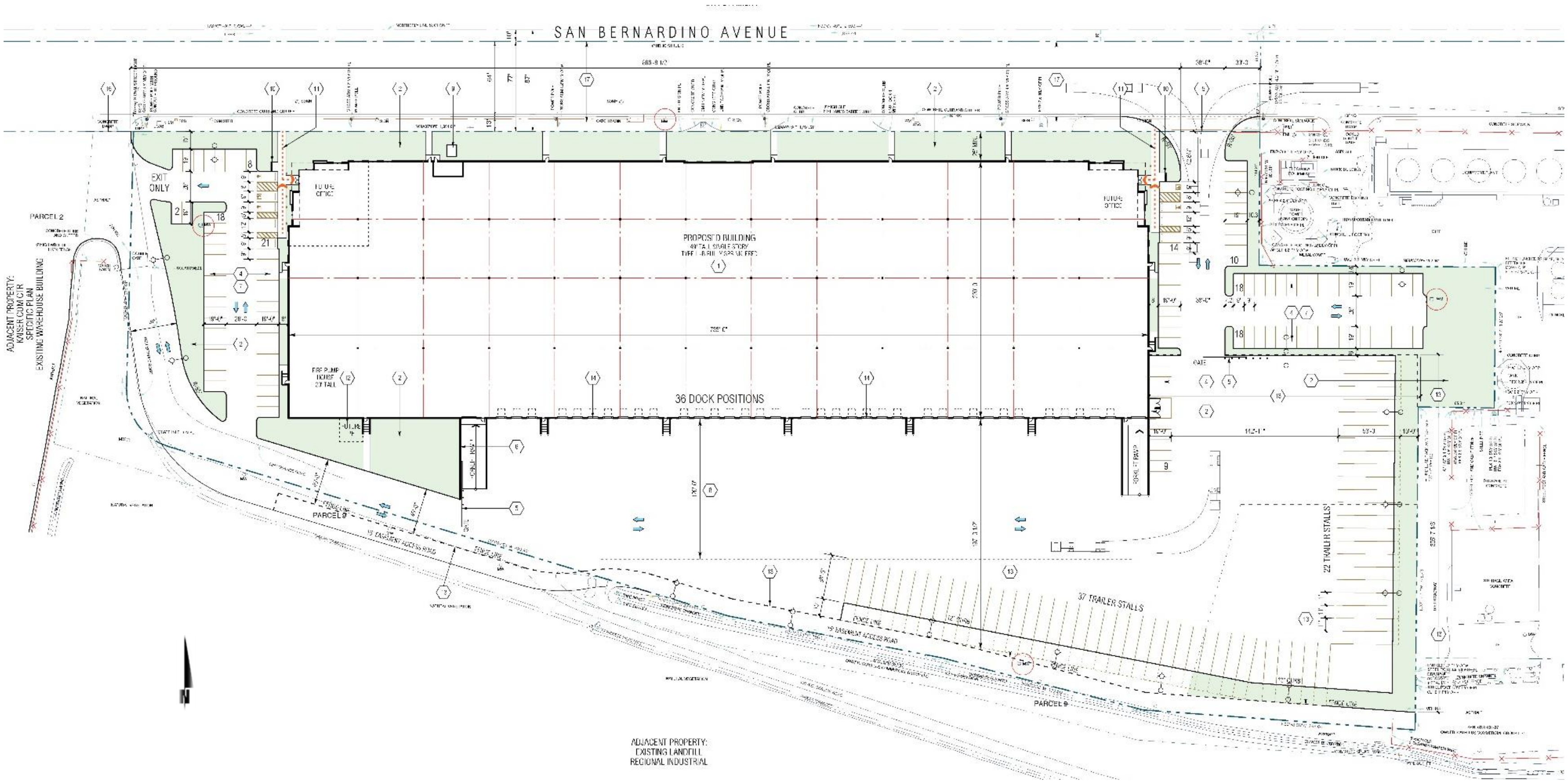
1.2 PROJECT DESCRIPTION

It is our understanding that the Project is proposed to consist of up to 165,324 square feet (sf) of warehouse use, as shown on Exhibit 1-B. 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 *Kaiser Commerce Center Traffic Impact Analysis* prepared by Urban Crossroads, Inc. the Project is expected to generate a net total of approximately 288 trip-ends per day (actual vehicles). (2) The net Project trip generation includes 58 truck trip-ends per day from the proposed building 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	
QUIET URBAN NIGHTTIME	THEATER, LARGE CONFERENCE ROOM (BACKGROUND)	40		SLEEP DISTURBANCE
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. (3) 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. (4) 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. (3)

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. (5)

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. (3)

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. (5)

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. (5)

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. (6)

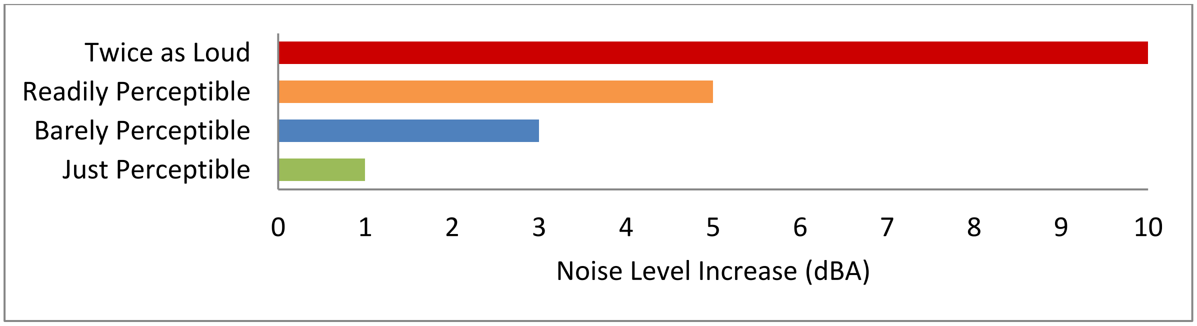
2.7 COMMUNITY RESPONSE TO NOISE

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. (7) 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. (7) 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*. (5)

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. (8)

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. (9)

2.9 VIBRATION

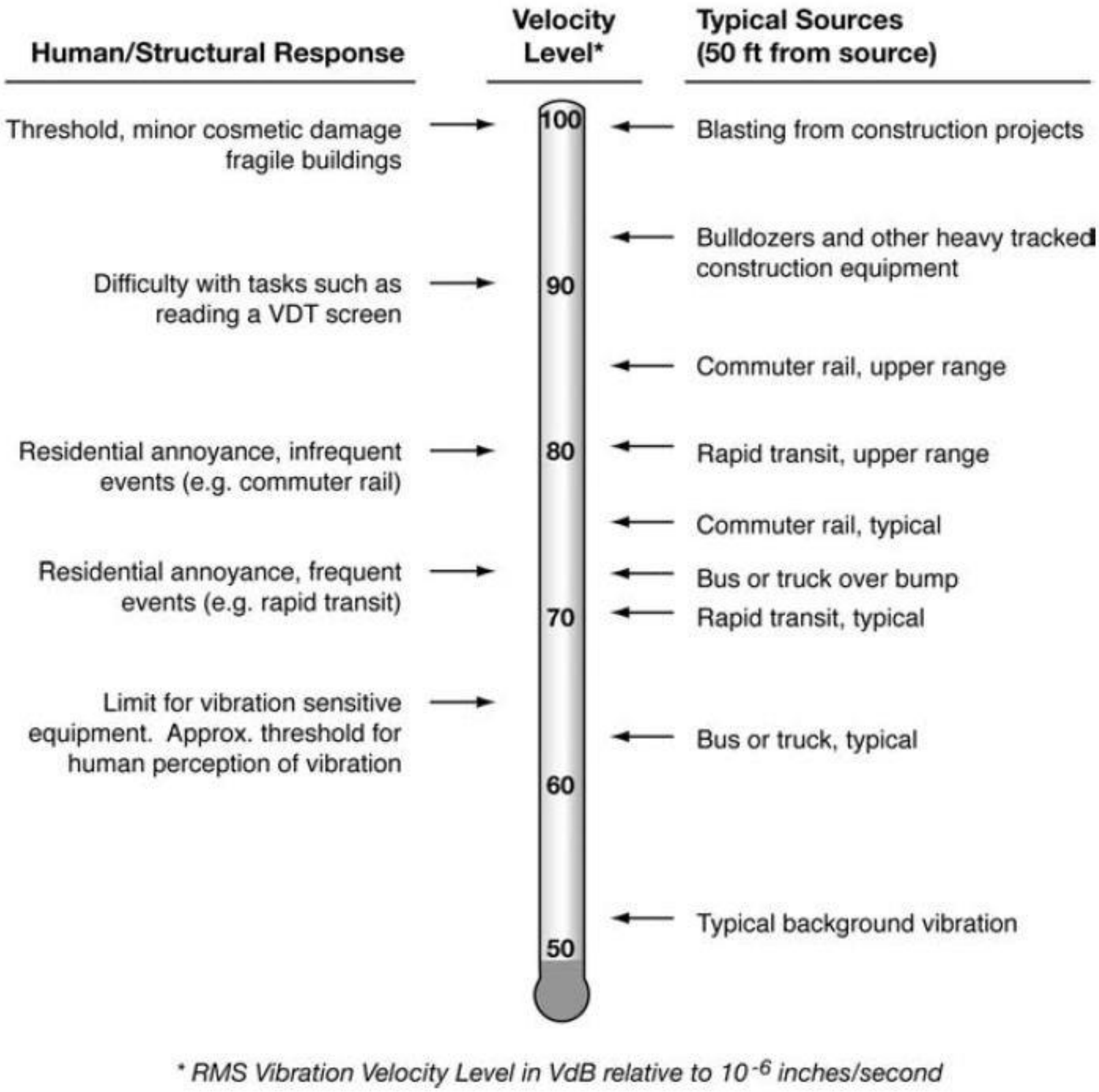
Per the Federal Transit Administration (FTA) *Transit Noise Impact and Vibration Assessment* (10), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural 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



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. (11) The purpose of the Noise Element is to *limit the exposure of the community to excessive noise levels*. In addition, the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts.

3.2 STATE OF CALIFORNIA 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. (12) These noise standards are applied to new construction in California for controlling interior noise levels resulting from exterior noise sources. The regulations specify that acoustical studies must be prepared when non-residential structures are developed in areas where the exterior noise levels exceed 65 dBA CNEL, such as within a noise contour of an airport, freeway, railroad, and other areas where noise contours are not readily available. If the development falls within an airport or freeway 65 dBA CNEL noise contour, the combined sound transmission class (STC) rating of the wall and roof-ceiling assemblies must be at least 50. For those developments in areas where noise contours are not readily available, and the noise level exceeds 65 dBA L_{eq} for any hour of operation, a wall and roof-ceiling combined STC rating of 45, and exterior windows with a minimum STC rating of 40 are required (Section 5.507.4.1).

3.3 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. (13) 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. (13) 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. (14)

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.

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 Kaiser Commerce Center 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.

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. (14)

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.

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 Kaiser Commerce Center 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. (14) 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). (15) 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. (15) 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.). (10) 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 Kaiser Commerce Center, 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 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*. (14) 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.* (16)

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) (17) 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. (16) 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. (18) 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. (18)

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.

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 increase of greater than 1.5 dBA CNEL (FICON, 1992).
- When the noise levels at existing and future non-noise-sensitive land uses (e.g. industrial, etc.):
    - are less than the 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 increase 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.
[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, 24-hour noise level measurements were taken at four locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Thursday, September 26th, 2019. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (19)

5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site. Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent every part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (3) 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*. (10)

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. (10) 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 northeast of project site in the parking lot of Kaiser Park. The noise levels at this location consist primarily of traffic noise from California Steel Way and parking lot vehicle movements. The noise level measurements collected show an overall 24-hour exterior noise level of 63.4 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 57.6 dBA L_{eq} with an average nighttime noise level of 56.5 dBA L_{eq}.
- Location L2 represents the noise levels southeast of Project site on Calabash Avenue and Iris Drive near existing residential homes. The ambient noise levels at this location account for traffic on Calabash Avenue as well as background truck movement noise at Velocity Truck Centers to the southwest. The noise level measurements collected show an overall 24-hour exterior noise level of 58.9 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 53.5 dBA L_{eq} with an average nighttime noise level of 51.9 dBA L_{eq}.
- Location L3 represents the noise levels southeast of the Project site on Iris Drive near existing single-family residential homes. The noise level measurements collected show an overall 24-hour exterior noise level of 58.9 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 53.5 dBA L_{eq} with an average nighttime noise level of 51.9 dBA L_{eq}. The noise levels at this location consist primarily of traffic noise from Iris Drive and background activity from Century Truck & Equipment.
- Location L4 represents the noise levels northwest of the Project site on Etiwanda Avenue near San Bernardino County Probation Center. The 24-hour CNEL indicates that the overall exterior noise level is 78.3 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 73.1 dBA L_{eq} with an average nighttime noise level of 71.4 dBA L_{eq}. Traffic on Etiwanda Avenue and background industrial activity represents the primary source of noise at this location.

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

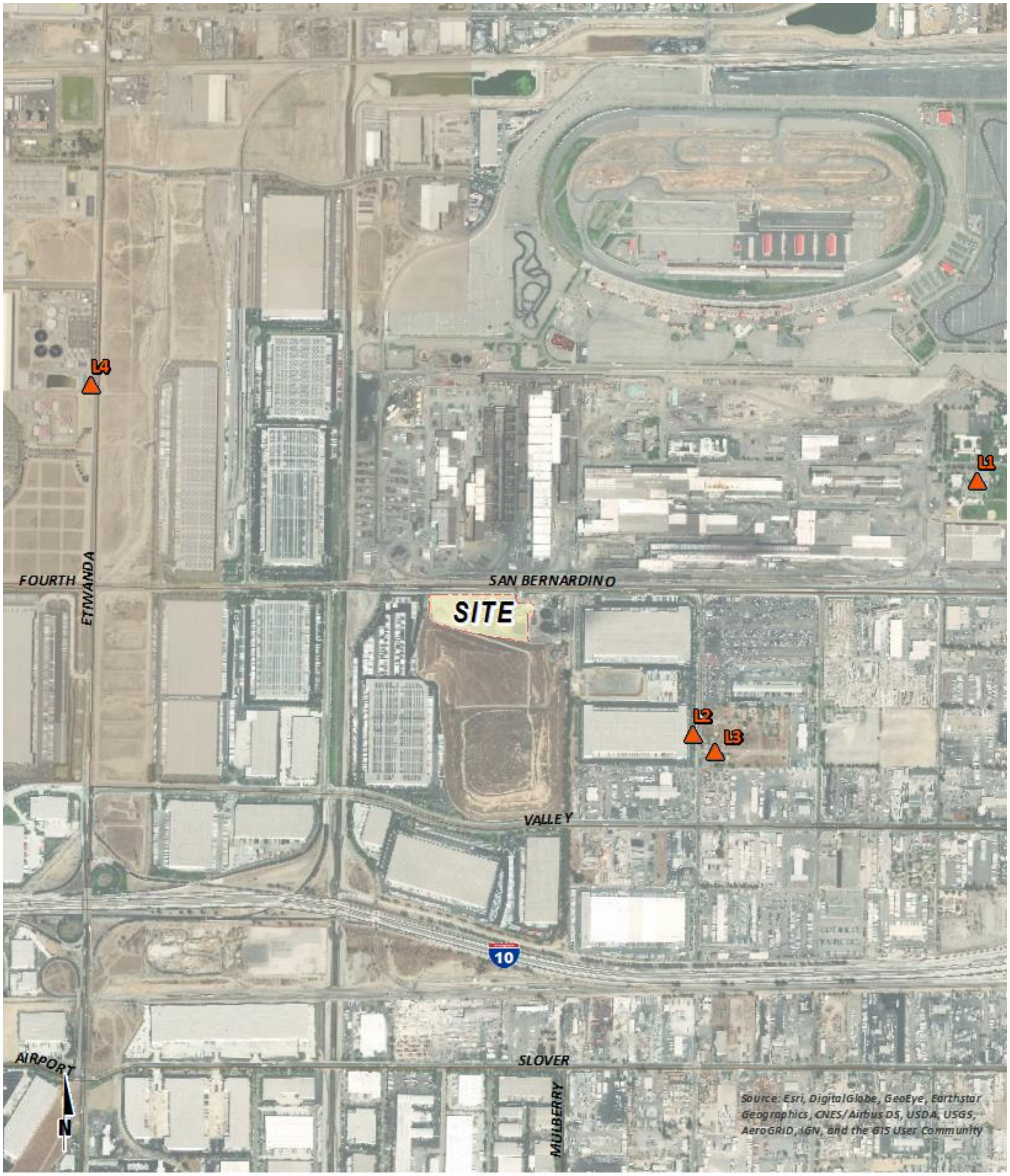
The background ambient noise levels in the Project study area are dominated by the transportation-related noise associated with surface streets as well as background industrial activity from Southwest Industrial Park. This includes the auto and heavy truck activities on study area roadway segments near the noise level measurement locations. The 24-hour existing noise level measurement results are shown on Table 5-1.

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

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]		CNEL
		Daytime	Nighttime	
L1	Located northeast of project site in the parking lot of Kaiser Park.	57.6	56.5	63.4
L2	Located southeast of Project site on Calabash Avenue and Iris Drive near existing residential homes.	64.5	64.4	70.9
L3	Located southeast of the Project site on Iris Drive near existing single-family residential homes.	53.5	51.9	58.9
L4	Located northwest of the Project site on Etiwanda Avenue near San Bernardino County Probation Center.	73.1	71.4	78.3

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

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS



LEGEND:

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

6.2 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 four 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 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 *Kaiser Commerce Center Traffic Impact Analysis* prepared by Urban Crossroads, Inc., for the following traffic scenarios: Existing, Opening Year Cumulative 2020 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. (23)

Per the *Kaiser Commerce Center Traffic Impact Analysis* prepared by Urban Crossroads, Inc. the Project is expected to generate a net total of approximately 288 trip-ends per day (actual vehicles). (2) The net Project trip generation includes 58 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 58 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	San Bernardino Av.	w/o Private Dwy. 1	Kaiser Commerce Specific Plan	52'	55
2	San Bernardino Av.	w/o Prologis Dr.	Regional Industrial	52'	55
3	San Bernardino Av.	e/o Prologis Dr.	Regional Industrial	52'	55
4	San Bernardino Av.	e/o Private Dwy. 4	Regional Industrial	52'	55

[1] Sources: County of San Bernardino FH28A Land Use Zoning Districts
[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: Kaiser Commerce 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	
			Without Project	With Project	Without Project	With Project
1	San Bernardino Av.	w/o Private Dwy. 1	22,428	22,543	22,614	22,729
2	San Bernardino Av.	w/o Prologis Dr.	22,042	22,157	22,228	22,343
3	San Bernardino Av.	e/o Prologis Dr.	22,042	22,128	20,131	20,217
4	San Bernardino Av.	e/o Private Dwy. 4	22,042	22,215	20,131	20,304

[1] Source: Kaiser Commerce 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	73.79%	7.63%	18.58%	100.00%
Medium Trucks	79.12%	4.51%	16.36%	100.00%
Heavy Trucks	76.95%	5.18%	17.87%	100.00%

Based on an existing 24-hour vehicle count taken on San Bernardino Avenue west of Mulbery Road (Kaiser Commerce 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	77.15%	12.95%	9.91%	100.00%

Based on an existing 24-hour vehicle count taken on San Bernardino Avenue west of Mulbery Road (Kaiser Commerce 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	San Bernardino Av.	w/o Private Dwy. 1	77.16%	12.90%	9.94%	100.00%
2	San Bernardino Av.	w/o Prologis Dr.	77.16%	12.90%	9.94%	100.00%
3	San Bernardino Av.	e/o Prologis Dr.	77.16%	12.91%	9.93%	100.00%
4	San Bernardino Av.	e/o Private Dwy. 4	77.17%	12.87%	9.96%	100.00%

[1] Source: Kaiser Commerce 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	San Bernardino Av.	w/o Private Dwy. 1	77.16%	12.90%	9.94%	100.00%
2	San Bernardino Av.	w/o Prologis Dr.	77.16%	12.90%	9.94%	100.00%
3	San Bernardino Av.	e/o Prologis Dr.	77.16%	12.90%	9.93%	100.00%
4	San Bernardino Av.	e/o Private Dwy. 4	77.17%	12.86%	9.96%	100.00%

[1] Source: Kaiser Commerce 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 6-7: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

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

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

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 *Kaiser Commerce Center Traffic Impact Analysis*. (2) Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway. Noise contours were developed for the following traffic scenarios:

- Existing Conditions Without / With Project: This scenario refers to the existing present-day noise conditions without and with the proposed Project.
- Opening Year Cumulative 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.

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 7-4 present a summary of the exterior traffic noise levels, without barrier attenuation, for the four study area roadway segments analyzed from the without Project to the with Project conditions under Existing, Opening Year Cumulative 2020 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	San Bernardino Av.	w/o Private Dwy. 1	Kaiser Commerce Specific Plan	79.4	220	473	1020
2	San Bernardino Av.	w/o Prologis Dr.	Regional Industrial	79.3	217	468	1008
3	San Bernardino Av.	e/o Prologis Dr.	Regional Industrial	79.3	217	468	1008
4	San Bernardino Av.	e/o Private Dwy 4.	Regional Industrial	79.3	217	468	1008

[1] Source: County of San Bernardino FH28A Land Use Zoning Districts
[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	San Bernardino Av.	w/o Private Dwy. 1	Kaiser Commerce Specific Plan	79.4	221	475	1024
2	San Bernardino Av.	w/o Prologis Dr.	Regional Industrial	79.3	218	470	1013
3	San Bernardino Av.	e/o Prologis Dr.	Regional Industrial	79.3	218	469	1011
4	San Bernardino Av.	e/o Private Dwy 4.	Regional Industrial	79.4	219	471	1015

[1] Source: County of San Bernardino FH28A Land Use Zoning Districts
[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	San Bernardino Av.	w/o Private Dwy. 1	Kaiser Commerce Specific Plan	79.4	221	476	1026
2	San Bernardino Av.	w/o Prologis Dr.	Regional Industrial	79.4	218	471	1014
3	San Bernardino Av.	e/o Prologis Dr.	Regional Industrial	78.9	205	441	949
4	San Bernardino Av.	e/o Private Dwy 4.	Regional Industrial	78.9	205	441	949

[1] Source: County of San Bernardino FH28A Land Use Zoning Districts
[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	San Bernardino Av.	w/o Private Dwy. 1	Kaiser Commerce Specific Plan	79.5	222	478	1030
2	San Bernardino Av.	w/o Prologis Dr.	Regional Industrial	79.4	219	473	1018
3	San Bernardino Av.	e/o Prologis Dr.	Regional Industrial	78.9	205	442	952
4	San Bernardino Av.	e/o Private Dwy 4.	Regional Industrial	79.0	206	444	956

[1] Source: County of San Bernardino FH28A Land Use Zoning Districts
[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 79.3 to 79.4 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 79.3 to 79.4 dBA CNEL. As shown on Table 7-5 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 Existing conditions at the land uses adjacent to roadways conveying Project traffic.

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 78.9 to 79.4 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 78.9 to 79.5 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 7-5: 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?	Off-Site Traffic Noise Threshold[3]	Threshold Exceeded?[3]
				No Project	With Project	Project Addition			
1	San Bernardino Av.	w/o Private Dwy. 1	Kaiser Commerce Specific Plan	79.4	79.4	0.0	No	3.0	No
2	San Bernardino Av.	w/o Prologis Dr.	Regional Industrial	79.3	79.3	0.0	No	3.0	No
3	San Bernardino Av.	e/o Prologis Dr.	Regional Industrial	79.3	79.3	0.0	No	3.0	No
4	San Bernardino Av.	e/o Private Dwy. 4	Regional Industrial	79.3	79.4	0.1	No	3.0	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).

TABLE 7-6: OPENING YEAR CUMULATIVE 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?	Off-Site Traffic Noise Threshold[3]	Threshold Exceeded?[3]
				No Project	With Project	Project Addition			
1	San Bernardino Av.	w/o Private Dwy. 1	Kaiser Commerce Specific Plan	79.4	79.5	0.1	No	3.0	No
2	San Bernardino Av.	w/o Prologis Dr.	Regional Industrial	79.4	79.4	0.0	No	3.0	No
3	San Bernardino Av.	e/o Prologis Dr.	Regional Industrial	78.9	78.9	0.0	No	3.0	No
4	San Bernardino Av.	e/o Private Dwy. 4	Regional Industrial	78.9	79.0	0.1	No	3.0	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. 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.

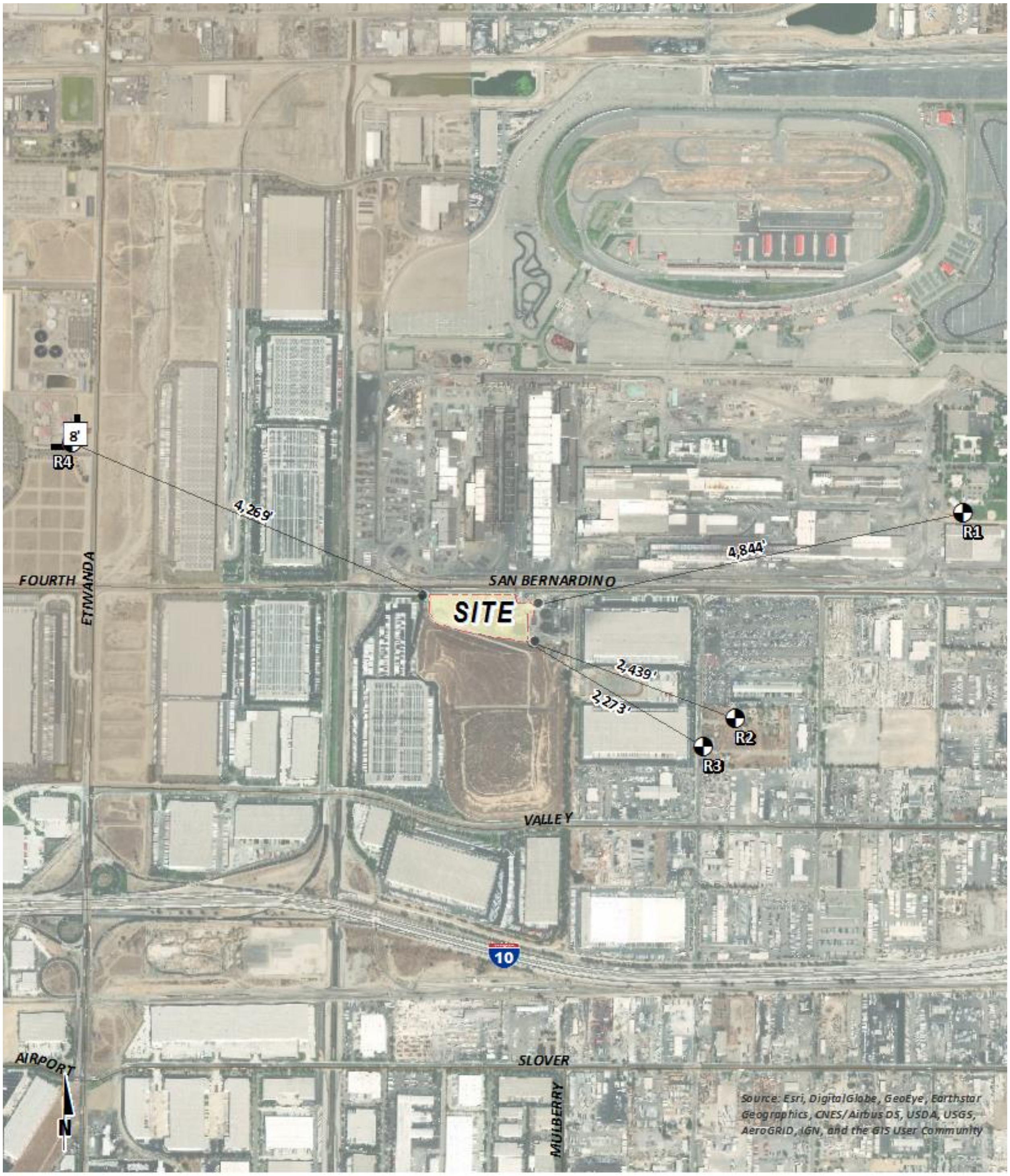
R1: Located about 4,844 feet west of the Project site, R1 represents Kaiser Park south of California Steel Way. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents the existing residential homes located southeast of the Project site at about 2,439 feet, on the north side of Rosemary Drive. A 24-hour noise measurement was taken near this location, L2, to describe the existing ambient noise environment.

R3: Location R3 represents the existing residential homes located southeast of the Project site at about 2,273 feet, on the north side of Iris Drive. A 24-hour noise measurement was taken near this location, L3, to describe the existing ambient noise environment.

R4: Location R4 represents the San Bernardino County Probation Center at approximately 4,269 feet from the Project site. A 24-hour noise measurement near this location, L4, is used to describe the existing ambient noise environment.

EXHIBIT 8-A: RECEIVER LOCATIONS



LEGEND:

Receiver Locations

Distance from receiver to Project site boundary (in feet)

8' Existing Barrier Height (in feet)

Existing Barrier

9 OPERATIONAL IMPACTS

This section analyzes the potential operational noise impacts due to the Project's stationary noise sources on the off-site 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.

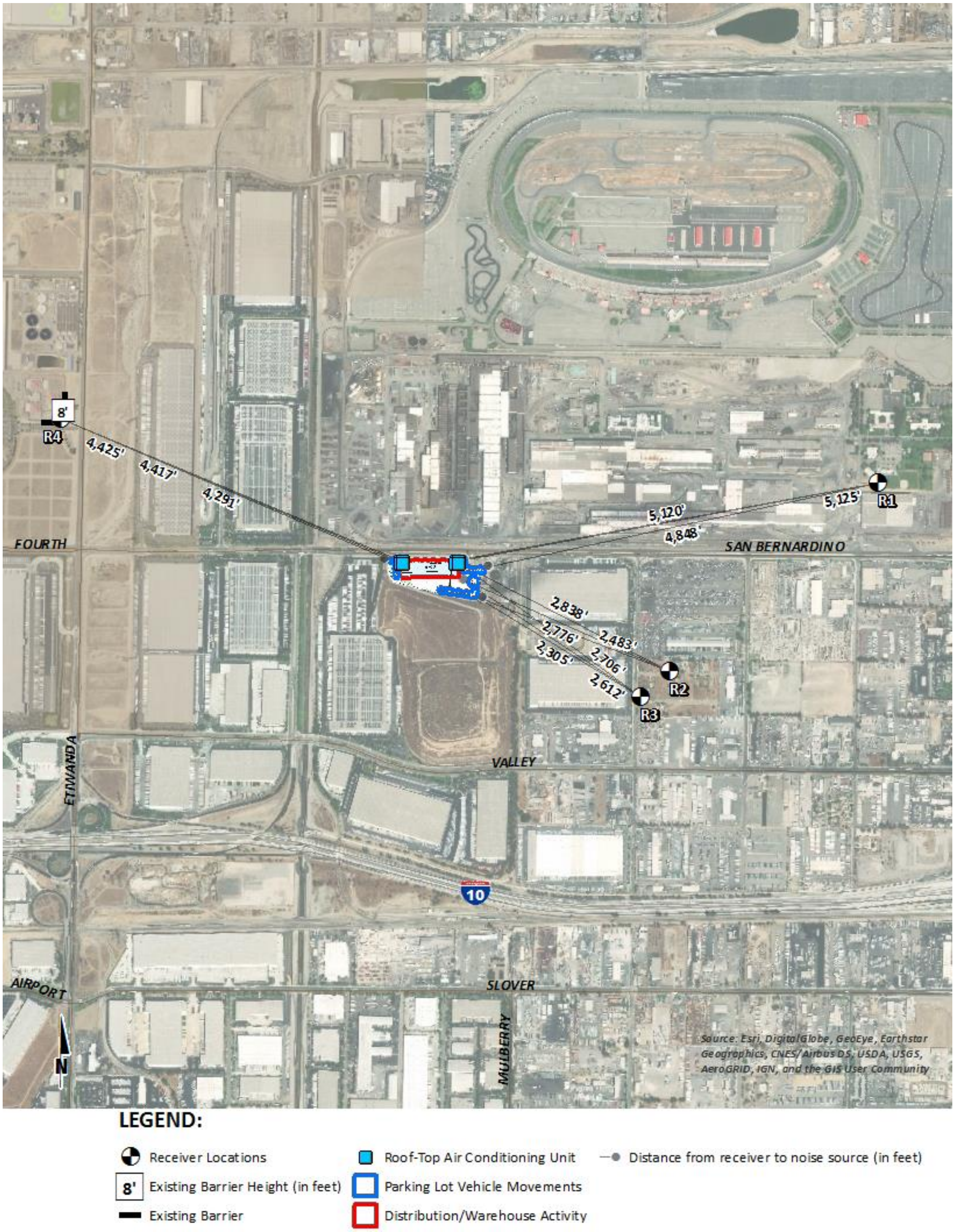
9.1.2 ROOF-TOP AIR CONDITIONING UNITS

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 23.6 to 29.3 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 noise level standards at nearby receiver locations. Table 9-3 shows the operational noise levels associated with Kaiser Commerce Center Project will satisfy the exterior noise level standards at the nearby receiver locations. Therefore, the Project-related operational noise level impacts are considered *less than significant* at adjacent 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	22.6	19.6	22.6	27.2	31.0	35.4
	Roof-Top Air Conditioning Unit	15.1	12.3	14.0	15.3	15.6	16.1
	Parking Lot Vehicle Movements	11.9	8.7	9.7	14.7	20.7	31.6
	Combined Noise Level:	23.6	20.6	23.4	27.7	31.5	36.9
R2	Truck Unloading/Docking Activity	27.9	24.9	27.9	32.5	36.3	40.7
	Roof-Top Air Conditioning Unit	20.2	17.4	19.1	20.4	20.7	21.2
	Parking Lot Vehicle Movements	16.3	13.1	14.1	19.1	25.1	36.0
	Combined Noise Level:	28.8	25.8	28.6	32.9	36.7	42.0
R3	Truck Unloading/Docking Activity	28.4	25.4	28.4	33.0	36.8	41.2
	Roof-Top Air Conditioning Unit	20.6	17.8	19.5	20.8	21.1	21.6
	Parking Lot Vehicle Movements	16.8	13.6	14.6	19.6	25.6	36.5
	Combined Noise Level:	29.3	26.3	29.1	33.4	37.2	42.5
R4	Truck Unloading/Docking Activity	23.8	20.8	23.8	28.4	32.2	36.6
	Roof-Top Air Conditioning Unit	16.4	13.6	15.3	16.6	16.9	17.4
	Parking Lot Vehicle Movements	12.7	9.5	10.5	15.5	21.5	32.4
	Combined Noise Level:	24.8	21.8	24.5	28.9	32.7	38.0

[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**	**-**
R1	Residential	23.6	20.6	23.4	27.7	31.5	36.9	No
R2	Residential	28.8	25.8	28.6	32.9	36.7	42.0	No
R3	Residential	29.3	26.3	29.1	33.4	37.2	42.5	No
R4	Residential	24.8	21.8	24.5	28.9	32.7	38.0	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 receiver locations, the Project operational noise levels were combined with the existing ambient noise levels measurements for the off-site 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. (3) 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 9-4 and 9-5, the Project will not contribute a measurable operational noise level increase during the daytime or nighttime hours 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 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 9-4: 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	23.6	L1	57.6	57.6	0.0	No
R2	28.8	L2	64.5	64.5	0.0	No
R3	29.3	L3	53.5	53.5	0.0	No
R4	24.8	L4	73.1	73.1	0.0	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 9-5: 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	23.6	L1	56.5	56.5	0.0	No
R2	28.8	L2	64.4	64.4	0.0	No
R3	29.3	L3	51.9	51.9	0.0	No
R4	24.8	L4	71.4	71.4	0.0	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 Kaiser Commerce Center 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.* (10) 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 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 *Kaiser Commerce Center Air Quality Impact Analysis* prepared by Urban Crossroads, Inc. (24)

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

LEGEND:

- Receiver Locations
- Construction Activity
- 8' Existing Barrier Height (in feet)
- Distance from receiver to construction activity (in feet)
- Existing Barrier

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 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 33.7 to 40.2 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

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})
R1	4,864'	-39.8	0.0	24.4
R2	2,459'	-33.8	0.0	30.3
R3	2,293'	-33.2	0.0	30.9
R4	4,289'	-38.7	0.0	25.5

[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 10-3: 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

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})
R1	4,864'	-39.8	0.0	24.4
R2	2,459'	-33.8	0.0	30.3
R3	2,293'	-33.2	0.0	30.9
R4	4,289'	-38.7	0.0	25.5

[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 10-4: 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

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})
R1	4,864'	-39.8	0.0	33.7
R2	2,459'	-33.8	0.0	39.6
R3	2,293'	-33.2	0.0	40.2
R4	4,289'	-38.7	0.0	34.8

[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

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})
R1	4,864'	-39.8	0.0	28.4
R2	2,459'	-33.8	0.0	34.3
R3	2,293'	-33.2	0.0	34.9
R4	4,289'	-38.7	0.0	29.5

[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 10-6: 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

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})
R1	4,864'	-39.8	0.0	31.8
R2	2,459'	-33.8	0.0	37.8
R3	2,293'	-33.2	0.0	38.4
R4	4,289'	-38.7	0.0	32.9

[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

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})
R1	4,864'	-39.8	0.0	27.7
R2	2,459'	-33.8	0.0	33.6
R3	2,293'	-33.2	0.0	34.2
R4	4,289'	-38.7	0.0	28.8

[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 33.7 to 40.2 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]
R1	24.4	24.4	33.7	28.4	31.8	27.7	33.7
R2	30.3	30.3	39.6	34.3	37.8	33.6	39.6
R3	30.9	30.9	40.2	34.9	38.4	34.2	40.2
R4	25.5	25.5	34.8	29.5	32.9	28.8	34.8

[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 40.2 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]
R1	33.7	85	No
R2	39.6	85	No
R3	40.2	85	No
R4	34.8	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 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. (18)

As indicated on Table 10-10, the Project will potentially contribute unmitigated, worst-case construction noise level increases of 0.2 dBA L_{eq} at nearby receiver locations. Since the worst-case temporary noise level increases during Project construction satisfy the 12 dBA L_{eq} significance threshold at all receiver locations, the unmitigated construction noise level increases are considered *less than significant.*

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]
R1	33.7	L1	57.6	57.6	0.0	No
R2	39.6	L2	64.5	64.5	0.0	No
R3	40.2	L3	53.5	53.7	0.2	No
R4	34.8	L4	73.1	73.1	0.0	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.

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 31.8 to 38.4 dBA L_{eq} at the nearby receiver locations. Table 10-11 shows the nighttime concrete pouring activity temporary noise level increases over existing nighttime ambient conditions range from 0.0 to 0.2 dBA L_{eq}. Since the worst-case temporary noise level increases during Project construction satisfy the 12 dBA L_{eq} significance threshold at all receiver locations, the unmitigated construction noise level increases are considered *less than significant.*

TABLE 10-11: 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]
R1	31.8	L1	56.5	56.5	0.0	No
R2	37.8	L2	64.4	64.4	0.0	No
R3	38.4	L3	51.9	52.1	0.2	No
R4	32.9	L4	71.4	71.4	0.0	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.

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 10-12 presents the expected

Project related vibration levels at each of the receiver locations based on the County of San Bernardino 0.2 in/sec PPV threshold for vibration.

At distances ranging from 2,293 to 4,864 feet from Project construction activity, no construction vibration velocity levels are expected at nearby receiver locations, as shown on Table 10-12. 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 10-12: 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		
R1	4,864'	0.000	0.000	0.000	0.000	0.000	0.2	No
R2	2,459'	0.000	0.000	0.000	0.000	0.000	0.2	No
R3	2,293'	0.000	0.000	0.000	0.000	0.000	0.2	No
R4	4,289'	0.000	0.000	0.000	0.000	0.000	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

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21. **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.

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

23. **Urban Crossroads, Inc.** *Kaiser Commerce Air Quality Impact Analysis.* November 2019.

12 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Kaiser Commerce Center Project. The information contained in this noise study report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 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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§ 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_E
34, 4' 50.290000", 117, 29' 30.720000"

L1_N
34, 4' 50.290000", 117, 29' 30.720000"

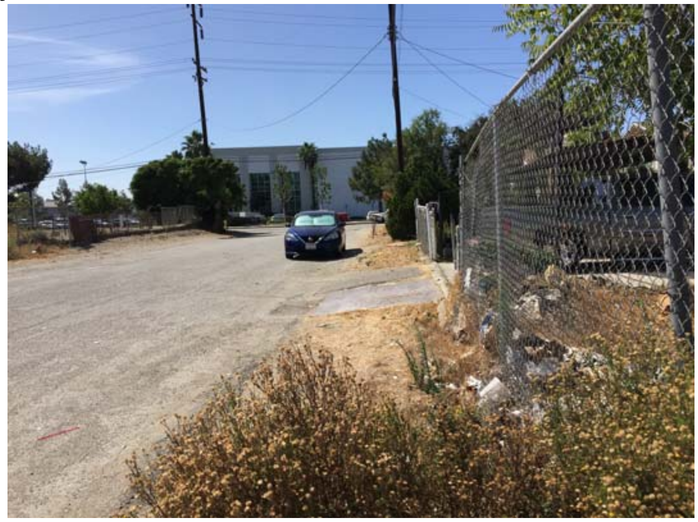
L1_S
34, 4' 50.290000", 117, 29' 30.720000"

L1_W
34, 4' 50.290000", 117, 29' 30.720000"

L2_E
34, 4' 20.660000", 117, 30' 4.610000"

L2_H
34, 4' 22.450000", 117, 30' 7.220000"

L2_S
34, 4' 22.450000", 117, 30' 7.220000"



L2_W
34, 4' 20.680000", 117, 30' 4.590000"

L3_E
34, 4' 22.090000", 117, 30' 7.310000"

L3_N
34, 4' 10.020000", 117, 30' 7.330000"

L3_S
34, 4' 22.160000", 117, 30' 7.220000"

L3_W
34, 4' 22.070000", 117, 30' 7.330000"

L4_E
34, 5' 0.630000", 117, 31' 26.790000"

L4_N
34, 4' 52.330000", 117, 31' 17.320000"

L4_S
34, 5' 0.850000", 117, 31' 26.850000"

L4_W
34, 5' 0.630000", 117, 31' 26.790000"

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APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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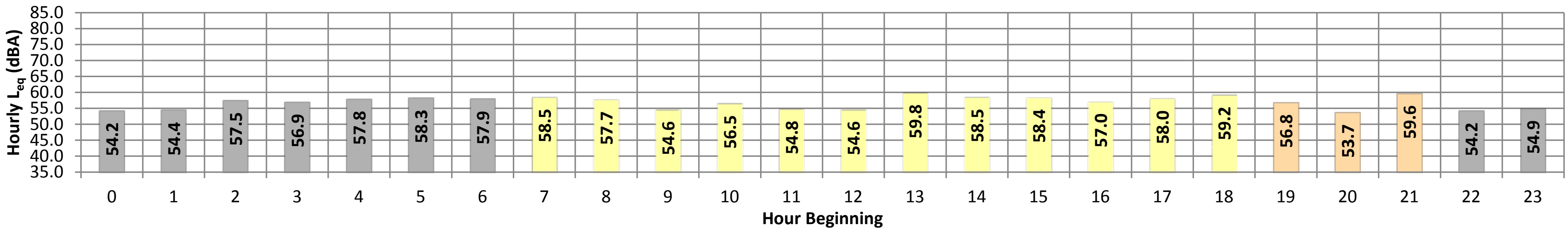
24-Hour Noise Level Measurement Summary

Date: Thursday, September 26, 2019 *Location:* L1 - Located northeast of project site in the parking lot of Kaiser Park. *Meter:* Piccolo I *JN:* 12113

Project: Kaiser Commerce Center *Analyst:* P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	54.2	72.1	51.2	61.0	60.0	56.0	55.0	53.0	53.0	52.0	51.0	51.0	54.2	10.0	64.2
	1	54.4	76.7	49.9	62.0	59.0	56.0	55.0	53.0	52.0	51.0	50.0	50.0	54.4	10.0	64.4
	2	57.5	79.8	51.8	67.0	62.0	58.0	56.0	54.0	54.0	53.0	52.0	52.0	57.5	10.0	67.5
	3	56.9	78.1	52.0	63.0	60.0	58.0	58.0	56.0	55.0	54.0	53.0	53.0	56.9	10.0	66.9
	4	57.8	68.3	53.5	62.0	61.0	60.0	60.0	58.0	57.0	55.0	54.0	54.0	57.8	10.0	67.8
	5	58.3	81.5	53.4	65.0	62.0	60.0	59.0	57.0	56.0	55.0	54.0	54.0	58.3	10.0	68.3
	6	57.9	76.0	53.6	66.0	62.0	60.0	59.0	57.0	56.0	55.0	54.0	54.0	57.9	10.0	67.9
Day	7	58.5	74.7	53.8	66.0	64.0	62.0	61.0	58.0	56.0	55.0	54.0	54.0	58.5	0.0	58.5
	8	57.7	83.3	52.4	66.0	61.0	58.0	57.0	55.0	54.0	53.0	53.0	52.0	57.7	0.0	57.7
	9	54.6	65.8	51.5	58.0	57.0	56.0	56.0	54.0	54.0	52.0	52.0	52.0	54.6	0.0	54.6
	10	56.5	77.8	50.1	64.0	62.0	59.0	58.0	55.0	54.0	52.0	51.0	50.0	56.5	0.0	56.5
	11	54.8	68.8	50.7	62.0	60.0	58.0	57.0	54.0	53.0	52.0	52.0	51.0	54.8	0.0	54.8
	12	54.6	65.7	50.8	59.0	58.0	57.0	56.0	55.0	53.0	52.0	52.0	51.0	54.6	0.0	54.6
	13	59.8	81.5	52.0	69.0	66.0	62.0	61.0	58.0	56.0	53.0	53.0	52.0	59.8	0.0	59.8
	14	58.5	79.7	51.8	68.0	65.0	61.0	60.0	56.0	55.0	53.0	53.0	52.0	58.5	0.0	58.5
	15	58.4	76.8	51.2	67.0	65.0	63.0	62.0	57.0	55.0	53.0	52.0	51.0	58.4	0.0	58.4
	16	57.0	78.3	51.9	64.0	63.0	60.0	59.0	56.0	55.0	53.0	53.0	52.0	57.0	0.0	57.0
	17	58.0	83.0	51.9	67.0	62.0	59.0	57.0	55.0	54.0	53.0	53.0	52.0	58.0	0.0	58.0
	18	59.2	77.1	52.4	69.0	66.0	63.0	61.0	58.0	55.0	53.0	53.0	53.0	59.2	0.0	59.2
Evening	19	56.8	80.2	51.9	63.0	61.0	59.0	58.0	56.0	54.0	53.0	53.0	52.0	56.8	5.0	61.8
	20	53.7	63.9	50.9	57.0	56.0	55.0	55.0	54.0	53.0	52.0	51.0	51.0	53.7	5.0	58.7
	21	59.6	84.4	49.6	70.0	68.0	63.0	60.0	55.0	53.0	51.0	50.0	50.0	59.6	5.0	64.6
Night	22	54.2	71.5	49.3	61.0	59.0	57.0	56.0	54.0	53.0	50.0	50.0	49.0	54.2	10.0	64.2
	23	54.9	66.0	52.5	58.0	57.0	56.0	55.0	55.0	54.0	53.0	53.0	53.0	54.9	10.0	64.9

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	54.6	65.7	50.1	58.0	57.0	56.0	56.0	54.0	53.0	52.0	51.0	50.0
	Max	59.8	83.3	53.8	69.0	66.0	63.0	62.0	58.0	56.0	55.0	54.0	54.0
Energy Average		57.6	Average:		64.9	62.4	59.8	58.8	55.9	54.5	52.8	52.6	51.8
Evening	Min	53.7	63.9	49.6	57.0	56.0	55.0	55.0	54.0	53.0	51.0	50.0	50.0
	Max	59.6	84.4	51.9	70.0	68.0	63.0	60.0	56.0	54.0	53.0	53.0	52.0
Energy Average		57.3	Average:		63.3	61.7	59.0	57.7	55.0	53.3	52.0	51.3	51.0
Night	Min	54.2	66.0	49.3	58.0	57.0	56.0	55.0	53.0	52.0	50.0	50.0	49.0
	Max	58.3	81.5	53.6	67.0	62.0	60.0	60.0	58.0	57.0	55.0	54.0	54.0
Energy Average		56.5	Average:		62.8	60.2	57.9	57.0	55.2	54.4	53.1	52.3	52.2

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
57.2	57.6	56.5

24-Hour CNEL (dBA)
63.4

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Date: Wednesday, September 25, 2019	*Location:* L2 - Located southeast of Project site on Calabash Avenue and Iris Drive near existing residential homes.	*Meter:* Piccolo I	*JN:* 12113
Project: Kaiser Commerce Center			*Analyst:* P. Mara

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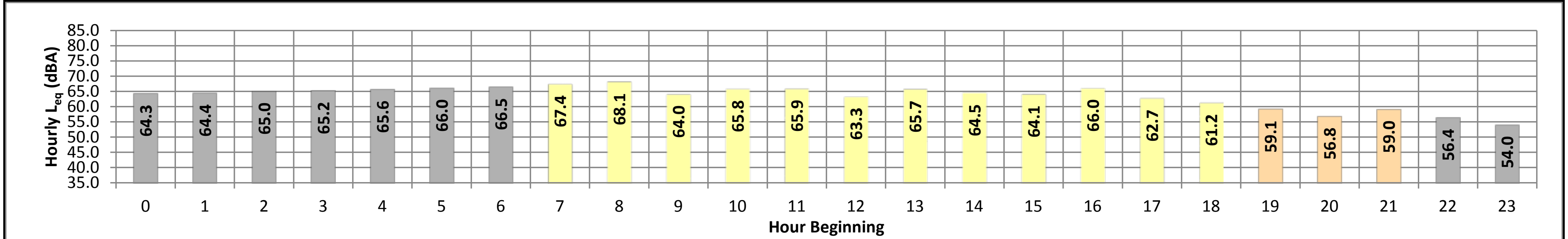

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	64.3	88.7	47.5	71.0	70.0	69.0	68.0	63.0	63.0	50.0	49.0	48.0	64.3	10.0	74.3
	1	64.4	75.0	62.9	69.0	67.0	65.0	65.0	64.0	64.0	63.0	63.0	63.0	64.4	10.0	74.4
	2	65.0	74.8	62.3	69.0	68.0	66.0	66.0	65.0	64.0	63.0	63.0	63.0	65.0	10.0	75.0
	3	65.2	74.8	63.7	70.0	69.0	67.0	66.0	65.0	64.0	64.0	64.0	64.0	65.2	10.0	75.2
	4	65.6	74.2	63.9	71.0	70.0	68.0	67.0	65.0	64.0	64.0	64.0	64.0	65.6	10.0	75.6
	5	66.0	76.3	64.0	71.0	70.0	69.0	68.0	66.0	65.0	64.0	64.0	64.0	66.0	10.0	76.0
	6	66.5	81.6	63.0	72.0	71.0	70.0	69.0	66.0	65.0	64.0	63.0	63.0	66.5	10.0	76.5
Day	7	67.4	79.0	62.6	76.0	76.0	74.0	70.0	65.0	63.0	63.0	63.0	62.0	67.4	0.0	67.4
	8	68.1	80.5	49.7	76.0	76.0	75.0	72.0	66.0	63.0	62.0	62.0	53.0	68.1	0.0	68.1
	9	64.0	80.1	45.9	74.0	72.0	70.0	68.0	63.0	60.0	49.0	48.0	46.0	64.0	0.0	64.0
	10	65.8	84.0	44.7	73.0	72.0	70.0	68.0	66.0	65.0	50.0	48.0	46.0	65.8	0.0	65.8
	11	65.9	92.5	44.2	76.0	74.0	70.0	69.0	61.0	53.0	47.0	46.0	45.0	65.9	0.0	65.9
	12	63.3	81.5	44.1	74.0	73.0	70.0	68.0	60.0	53.0	47.0	46.0	45.0	63.3	0.0	63.3
	13	65.7	87.2	45.5	75.0	73.0	71.0	69.0	65.0	60.0	49.0	48.0	46.0	65.7	0.0	65.7
	14	64.5	83.7	52.9	74.0	72.0	70.0	68.0	63.0	59.0	55.0	54.0	53.0	64.5	0.0	64.5
	15	64.1	86.7	51.3	73.0	71.0	69.0	67.0	62.0	58.0	55.0	54.0	52.0	64.1	0.0	64.1
	16	66.0	83.2	46.8	74.0	72.0	71.0	70.0	68.0	57.0	49.0	49.0	48.0	66.0	0.0	66.0
	17	62.7	83.3	46.1	73.0	72.0	69.0	67.0	60.0	53.0	48.0	48.0	46.0	62.7	0.0	62.7
	18	61.2	78.3	46.4	72.0	70.0	68.0	66.0	58.0	52.0	48.0	48.0	47.0	61.2	0.0	61.2
Evening	19	59.1	75.4	45.8	71.0	69.0	65.0	63.0	55.0	51.0	47.0	47.0	46.0	59.1	5.0	64.1
	20	56.8	74.3	45.3	68.0	66.0	63.0	61.0	53.0	49.0	47.0	46.0	46.0	56.8	5.0	61.8
	21	59.0	83.3	43.8	71.0	68.0	62.0	58.0	52.0	49.0	45.0	45.0	44.0	59.0	5.0	64.0
Night	22	56.4	77.0	43.6	70.0	67.0	60.0	56.0	49.0	47.0	45.0	45.0	44.0	56.4	10.0	66.4
	23	54.0	74.0	43.1	67.0	64.0	58.0	54.0	48.0	47.0	44.0	44.0	43.0	54.0	10.0	64.0

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	61.2	78.3	44.1	72.0	70.0	68.0	66.0	58.0	52.0	47.0	46.0	45.0
	Max	68.1	92.5	62.6	76.0	76.0	75.0	72.0	68.0	65.0	63.0	63.0	62.0
Energy Average		65.3	Average:		74.2	72.8	70.6	68.5	63.1	58.0	51.8	51.2	49.1
Evening	Min	56.8	74.3	43.8	68.0	66.0	62.0	58.0	52.0	49.0	45.0	45.0	44.0
	Max	59.1	83.3	45.8	71.0	69.0	65.0	63.0	55.0	51.0	47.0	47.0	46.0
Energy Average		58.4	Average:		70.0	67.7	63.3	60.7	53.3	49.7	46.3	46.0	45.3
Night	Min	54.0	74.0	43.1	67.0	64.0	58.0	54.0	48.0	47.0	44.0	44.0	43.0
	Max	66.5	88.7	64.0	72.0	71.0	70.0	69.0	66.0	65.0	64.0	64.0	64.0
Energy Average		64.4	Average:		70.0	68.4	65.8	64.3	61.2	60.3	57.9	57.7	57.3

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
64.5	**64.5**	**64.4**

24-Hour CNEL (dBA)
70.9

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URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Date: Wednesday, September 25, 2019	*Location:* L3 - Located southeast of the Project site on Iris Drive near existing single-family residential homes.	*Meter:* Piccolo I	*JN:* 12113
Project: Kaiser Commerce Center			*Analyst:* P. Mara

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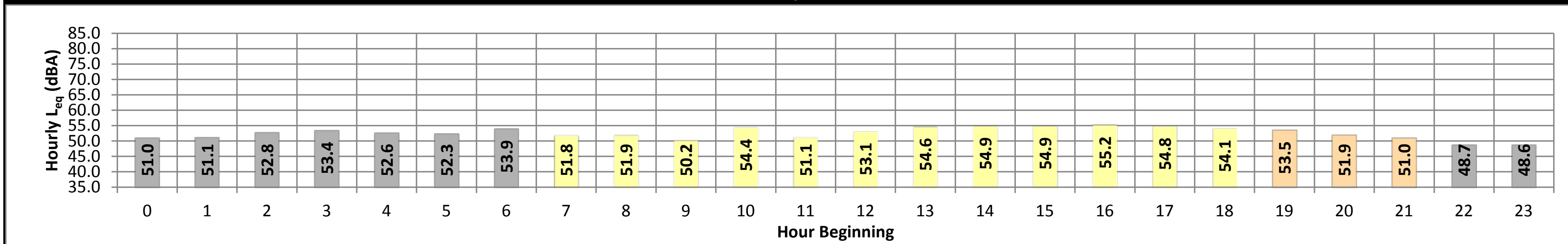

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	51.0	69.1	46.9	60.0	58.0	54.0	52.0	50.0	49.0	48.0	47.0	47.0	51.0	10.0	61.0
	1	51.1	67.5	47.2	58.0	56.0	53.0	52.0	50.0	49.0	48.0	48.0	47.0	51.1	10.0	61.1
	2	52.8	72.6	47.5	59.0	58.0	56.0	55.0	52.0	50.0	49.0	48.0	48.0	52.8	10.0	62.8
	3	53.4	65.8	49.3	58.0	57.0	56.0	55.0	53.0	52.0	51.0	50.0	50.0	53.4	10.0	63.4
	4	52.6	70.8	46.5	59.0	57.0	56.0	55.0	52.0	50.0	48.0	47.0	47.0	52.6	10.0	62.6
	5	52.3	64.5	47.8	58.0	57.0	55.0	54.0	52.0	51.0	49.0	49.0	48.0	52.3	10.0	62.3
	6	53.9	69.6	48.7	60.0	59.0	57.0	56.0	54.0	52.0	50.0	49.0	49.0	53.9	10.0	63.9
Day	7	51.8	66.7	47.3	58.0	57.0	55.0	54.0	51.0	50.0	48.0	48.0	48.0	51.8	0.0	51.8
	8	51.9	68.4	46.0	60.0	58.0	55.0	54.0	51.0	49.0	47.0	47.0	46.0	51.9	0.0	51.9
	9	50.2	66.4	44.2	58.0	56.0	54.0	53.0	50.0	48.0	45.0	45.0	44.0	50.2	0.0	50.2
	10	54.4	73.9	45.0	64.0	61.0	57.0	55.0	50.0	48.0	46.0	46.0	45.0	54.4	0.0	54.4
	11	51.1	69.9	44.7	60.0	58.0	55.0	54.0	50.0	48.0	46.0	46.0	45.0	51.1	0.0	51.1
	12	53.1	71.2	45.3	59.0	58.0	56.0	55.0	53.0	51.0	48.0	47.0	46.0	53.1	0.0	53.1
	13	54.6	77.9	47.0	62.0	59.0	57.0	56.0	54.0	52.0	50.0	49.0	48.0	54.6	0.0	54.6
	14	54.9	71.6	48.9	63.0	61.0	58.0	57.0	54.0	53.0	51.0	50.0	50.0	54.9	0.0	54.9
	15	54.9	71.5	49.2	62.0	60.0	58.0	57.0	54.0	53.0	50.0	50.0	49.0	54.9	0.0	54.9
	16	55.2	70.8	49.3	63.0	61.0	59.0	58.0	55.0	53.0	51.0	50.0	50.0	55.2	0.0	55.2
	17	54.8	73.1	48.4	63.0	61.0	58.0	57.0	54.0	52.0	50.0	50.0	49.0	54.8	0.0	54.8
	18	54.1	69.1	49.2	60.0	59.0	57.0	56.0	54.0	52.0	51.0	50.0	50.0	54.1	0.0	54.1
Evening	19	53.5	67.2	48.0	60.0	59.0	57.0	56.0	53.0	52.0	50.0	49.0	48.0	53.5	5.0	58.5
	20	51.9	73.0	47.1	59.0	57.0	55.0	54.0	51.0	50.0	48.0	48.0	47.0	51.9	5.0	56.9
	21	51.0	65.1	44.4	59.0	57.0	55.0	54.0	51.0	48.0	45.0	45.0	45.0	51.0	5.0	56.0
Night	22	48.7	62.7	44.0	56.0	55.0	53.0	52.0	47.0	46.0	45.0	45.0	44.0	48.7	10.0	58.7
	23	48.6	64.3	43.2	57.0	55.0	52.0	51.0	48.0	46.0	44.0	44.0	43.0	48.6	10.0	58.6

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	50.2	66.4	44.2	58.0	56.0	54.0	53.0	50.0	48.0	45.0	45.0	44.0
	Max	55.2	77.9	49.3	64.0	61.0	59.0	58.0	55.0	53.0	51.0	50.0	50.0
Energy Average		53.7	Average:		61.0	59.1	56.6	55.5	52.5	50.8	48.6	48.2	47.5
Evening	Min	51.0	65.1	44.4	59.0	57.0	55.0	54.0	51.0	48.0	45.0	45.0	45.0
	Max	53.5	73.0	48.0	60.0	59.0	57.0	56.0	53.0	52.0	50.0	49.0	48.0
Energy Average		52.3	Average:		59.3	57.7	55.7	54.7	51.7	50.0	47.7	47.3	46.7
Night	Min	48.6	62.7	43.2	56.0	55.0	52.0	51.0	47.0	46.0	44.0	44.0	43.0
	Max	53.9	72.6	49.3	60.0	59.0	57.0	56.0	54.0	52.0	51.0	50.0	50.0
Energy Average		51.9	Average:		58.3	56.9	54.7	53.6	50.9	49.4	48.0	47.4	47.0

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
52.9	**53.5**	**51.9**

24-Hour CNEL (dBA)
58.9

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Date: Wednesday, September 25, 2019
Project: Kaiser Commerce Center
Location: L4 - Located northwest of the Project site on Etiwanda Avenue near San Bernardino County Probation Center.
Meter: Piccolo I
JN: 12113
Analyst: P. Mara

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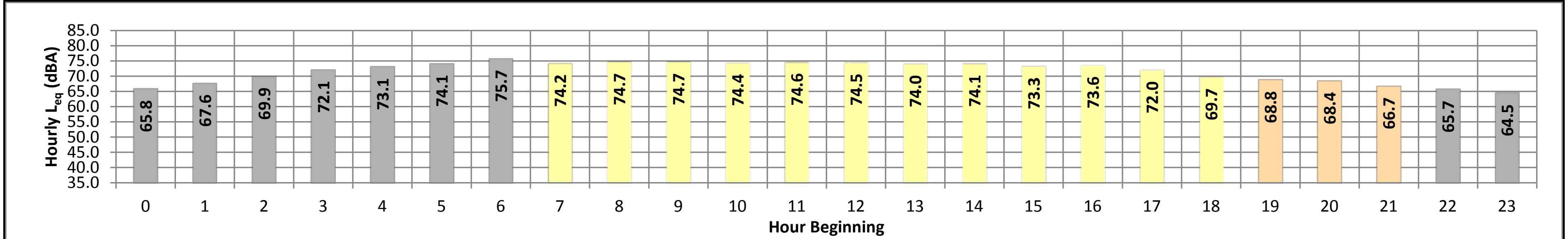

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	65.8	84.9	48.2	78.0	76.0	72.0	70.0	61.0	54.0	50.0	49.0	48.0	65.8	10.0	75.8
	1	67.6	85.2	48.9	79.0	77.0	74.0	72.0	64.0	57.0	52.0	51.0	50.0	67.6	10.0	77.6
	2	69.9	86.7	49.4	81.0	79.0	76.0	74.0	68.0	60.0	54.0	53.0	51.0	69.9	10.0	79.9
	3	72.1	86.6	53.3	81.0	80.0	78.0	77.0	72.0	66.0	56.0	55.0	54.0	72.1	10.0	82.1
	4	73.1	88.4	55.1	82.0	81.0	79.0	77.0	73.0	68.0	58.0	57.0	55.0	73.1	10.0	83.1
	5	74.1	87.9	55.9	82.0	81.0	79.0	78.0	75.0	70.0	60.0	59.0	57.0	74.1	10.0	84.1
	6	75.7	91.2	56.4	84.0	82.0	81.0	79.0	76.0	73.0	61.0	59.0	57.0	75.7	10.0	85.7
Day	7	74.2	87.1	51.8	82.0	81.0	79.0	78.0	75.0	71.0	57.0	55.0	52.0	74.2	0.0	74.2
	8	74.7	91.2	50.4	83.0	82.0	80.0	79.0	75.0	70.0	57.0	54.0	51.0	74.7	0.0	74.7
	9	74.7	91.8	47.5	83.0	82.0	80.0	79.0	75.0	70.0	56.0	53.0	49.0	74.7	0.0	74.7
	10	74.4	88.6	46.5	83.0	82.0	80.0	79.0	75.0	70.0	55.0	52.0	49.0	74.4	0.0	74.4
	11	74.6	92.0	47.4	83.0	82.0	80.0	79.0	75.0	70.0	56.0	52.0	48.0	74.6	0.0	74.6
	12	74.5	89.7	47.7	83.0	82.0	80.0	79.0	75.0	70.0	57.0	53.0	49.0	74.5	0.0	74.5
	13	74.0	91.8	47.5	83.0	81.0	79.0	78.0	74.0	70.0	55.0	52.0	49.0	74.0	0.0	74.0
	14	74.1	94.7	47.3	83.0	81.0	79.0	78.0	74.0	70.0	57.0	52.0	49.0	74.1	0.0	74.1
	15	73.3	91.7	48.7	81.0	80.0	78.0	77.0	73.0	70.0	57.0	53.0	50.0	73.3	0.0	73.3
	16	73.6	93.7	48.4	82.0	81.0	79.0	78.0	74.0	70.0	57.0	54.0	50.0	73.6	0.0	73.6
	17	72.0	87.9	49.0	80.0	79.0	77.0	76.0	72.0	68.0	56.0	54.0	51.0	72.0	0.0	72.0
	18	69.7	82.9	49.1	79.0	78.0	75.0	74.0	70.0	65.0	53.0	51.0	50.0	69.7	0.0	69.7
Evening	19	68.8	83.9	48.4	79.0	77.0	75.0	73.0	68.0	62.0	52.0	51.0	49.0	68.8	5.0	73.8
	20	68.4	89.5	48.5	78.0	77.0	74.0	72.0	67.0	61.0	51.0	50.0	49.0	68.4	5.0	73.4
	21	66.7	83.6	45.7	78.0	76.0	73.0	71.0	65.0	57.0	48.0	47.0	46.0	66.7	5.0	71.7
Night	22	65.7	84.7	45.8	77.0	75.0	72.0	70.0	63.0	54.0	48.0	47.0	46.0	65.7	10.0	75.7
	23	64.5	82.8	44.5	77.0	74.0	71.0	68.0	60.0	51.0	46.0	45.0	45.0	64.5	10.0	74.5

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	69.7	82.9	46.5	79.0	78.0	75.0	74.0	70.0	65.0	53.0	51.0	48.0
	Max	74.7	94.7	51.8	83.0	82.0	80.0	79.0	75.0	71.0	57.0	55.0	52.0
Energy Average		73.8	Average:		82.1	80.9	78.8	77.8	73.9	69.5	56.1	52.9	49.8
Evening	Min	66.7	83.6	45.7	78.0	76.0	73.0	71.0	65.0	57.0	48.0	47.0	46.0
	Max	68.8	89.5	48.5	79.0	77.0	75.0	73.0	68.0	62.0	52.0	51.0	49.0
Energy Average		68.1	Average:		78.3	76.7	74.0	72.0	66.7	60.0	50.3	49.3	48.0
Night	Min	64.5	82.8	44.5	77.0	74.0	71.0	68.0	60.0	51.0	46.0	45.0	45.0
	Max	75.7	91.2	56.4	84.0	82.0	81.0	79.0	76.0	73.0	61.0	59.0	57.0
Energy Average		71.4	Average:		80.1	78.3	75.8	73.9	68.0	61.4	53.9	52.8	51.4

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
72.6	73.1	71.4

24-Hour CNEL (dBA)
78.3

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: San Bernardino Av.
Road Segment: w/o Private Dwy. 1

Project Name: Kaiser Commerce Center
Job Number: 12113

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,428 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,243 vehicles
Vehicle Speed:	55 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:	73.8%	7.6%	18.6%	77.15%
Medium Trucks:	79.1%	4.5%	16.4%	12.95%
Heavy Trucks:	77.0%	5.2%	17.9%	9.91%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	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:	71.78	-0.33	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	82.40	-8.08	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	86.40	-9.24	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:	70.6	68.5	64.7	63.8	71.1	71.4
Medium Trucks:	73.5	71.7	65.3	66.1	73.7	73.8
Heavy Trucks:	76.4	74.4	68.7	69.3	76.7	76.9
Vehicle Noise:	78.9	77.0	71.4	71.8	79.2	79.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	213	460	991	2,134
CNEL:	220	473	1,020	2,198

Wednesday, November 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: San Bernardino Av.
Road Segment: w/o Prologis Dr.

Project Name: Kaiser Commerce Center
Job Number: 12113

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,042 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,204 vehicles
Vehicle Speed:	55 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:	73.8%	7.6%	18.6%	77.15%
Medium Trucks:	79.1%	4.5%	16.4%	12.95%
Heavy Trucks:	77.0%	5.2%	17.9%	9.91%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	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:	71.78	-0.40	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	82.40	-8.16	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	86.40	-9.32	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:	70.6	68.4	64.6	63.7	71.0	71.3
Medium Trucks:	73.5	71.6	65.2	66.1	73.6	73.8
Heavy Trucks:	76.3	74.4	68.7	69.3	76.6	76.8
Vehicle Noise:	78.8	76.9	71.3	71.7	79.1	79.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	211	455	979	2,110
CNEL:	217	468	1,008	2,172

Wednesday, November 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: San Bernardino Av.
Road Segment: e/o Prologis Dr.

Project Name: Kaiser Commerce Center
Job Number: 12113

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,042 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,204 vehicles
Vehicle Speed:	55 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:	73.8%	7.6%	18.6%	77.15%
Medium Trucks:	79.1%	4.5%	16.4%	12.95%
Heavy Trucks:	77.0%	5.2%	17.9%	9.91%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	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:	71.78	-0.40	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	82.40	-8.16	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	86.40	-9.32	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:	70.6	68.4	64.6	63.7	71.0	71.3
Medium Trucks:	73.5	71.6	65.2	66.1	73.6	73.8
Heavy Trucks:	76.3	74.4	68.7	69.3	76.6	76.8
Vehicle Noise:	78.8	76.9	71.3	71.7	79.1	79.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	211	455	979	2,110
CNEL:	217	468	1,008	2,172

Wednesday, November 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: San Bernardino Av.
Road Segment: e/o Private Dwy 4.

Project Name: Kaiser Commerce Center
Job Number: 12113

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,042 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,204 vehicles
Vehicle Speed:	55 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:	73.8%	7.6%	18.6%	77.15%
Medium Trucks:	79.1%	4.5%	16.4%	12.95%
Heavy Trucks:	77.0%	5.2%	17.9%	9.91%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	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:	71.78	-0.40	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	82.40	-8.16	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	86.40	-9.32	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:	70.6	68.4	64.6	63.7	71.0	71.3
Medium Trucks:	73.5	71.6	65.2	66.1	73.6	73.8
Heavy Trucks:	76.3	74.4	68.7	69.3	76.6	76.8
Vehicle Noise:	78.8	76.9	71.3	71.7	79.1	79.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	211	455	979	2,110
CNEL:	217	468	1,008	2,172

Wednesday, November 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: San Bernardino Av.
Road Segment: w/o Private Dwy. 1
Project Name: Kaiser Commerce Center
Job Number: 12113

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,543 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,254 vehicles
Vehicle Speed:	55 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:	73.8%	7.6%	18.6%	77.16%
Medium Trucks:	79.1%	4.5%	16.4%	12.90%
Heavy Trucks:	77.0%	5.2%	17.9%	9.94%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.400
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:	71.78	-0.30	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	82.40	-8.07	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	86.40	-9.21	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:	70.7	68.5	64.7	63.8	71.1	71.4
Medium Trucks:	73.5	71.7	65.3	66.1	73.7	73.8
Heavy Trucks:	76.4	74.5	68.8	69.4	76.8	76.9
Vehicle Noise:	78.9	77.0	71.4	71.8	79.2	79.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	214	462	995	2,143
CNEL:	221	475	1,024	2,207

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: San Bernardino Av.
Road Segment: w/o Prologis Dr.
Project Name: Kaiser Commerce Center
Job Number: 12113

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,157 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,216 vehicles
Vehicle Speed:	55 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:	73.8%	7.6%	18.6%	77.16%
Medium Trucks:	79.1%	4.5%	16.4%	12.90%
Heavy Trucks:	77.0%	5.2%	17.9%	9.94%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.400
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:	71.78	-0.38	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	82.40	-8.15	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	86.40	-9.28	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:	70.6	68.5	64.6	63.7	71.1	71.3
Medium Trucks:	73.5	71.7	65.2	66.1	73.6	73.8
Heavy Trucks:	76.3	74.4	68.7	69.3	76.7	76.9
Vehicle Noise:	78.8	76.9	71.4	71.7	79.2	79.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	212	456	983	2,118
CNEL:	218	470	1,013	2,181

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: San Bernardino Av.
Road Segment: e/o Prologis Dr.
Project Name: Kaiser Commerce Center
Job Number: 12113

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,128 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,213 vehicles
Vehicle Speed:	55 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:	73.8%	7.6%	18.6%	77.16%
Medium Trucks:	79.1%	4.5%	16.4%	12.91%
Heavy Trucks:	77.0%	5.2%	17.9%	9.93%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.400
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:	71.78	-0.39	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	82.40	-8.15	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	86.40	-9.29	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:	70.6	68.5	64.6	63.7	71.0	71.3
Medium Trucks:	73.5	71.7	65.2	66.1	73.6	73.8
Heavy Trucks:	76.3	74.4	68.7	69.3	76.7	76.9
Vehicle Noise:	78.8	76.9	71.3	71.7	79.1	79.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	212	456	982	2,116
CNEL:	218	469	1,011	2,179

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: San Bernardino Av.
Road Segment: e/o Private Dwy 4.
Project Name: Kaiser Commerce Center
Job Number: 12113

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,215 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,221 vehicles
Vehicle Speed:	55 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:	73.8%	7.6%	18.6%	77.17%
Medium Trucks:	79.1%	4.5%	16.4%	12.87%
Heavy Trucks:	77.0%	5.2%	17.9%	9.96%

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:	71.78	-0.37	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	82.40	-8.15	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	86.40	-9.26	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:	70.6	68.5	64.7	63.7	71.1	71.3
Medium Trucks:	73.5	71.7	65.2	66.1	73.6	73.8
Heavy Trucks:	76.3	74.4	68.7	69.3	76.7	76.9
Vehicle Noise:	78.9	76.9	71.4	71.7	79.2	79.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	212	457	985	2,123
CNEL:	219	471	1,015	2,186

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2020 Without Project
Road Name: San Bernardino Av.
Road Segment: w/o Private Dwy. 1
Project Name: Kaiser Commerce Center
Job Number: 12113

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,614 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,261 vehicles
Vehicle Speed:	55 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:	73.8%	7.6%	18.6%	77.15%
Medium Trucks:	79.1%	4.5%	16.4%	12.95%
Heavy Trucks:	77.0%	5.2%	17.9%	9.91%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	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:	71.78	-0.29	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	82.40	-8.04	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	86.40	-9.21	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:	70.7	68.6	64.7	63.8	71.1	71.4
Medium Trucks:	73.6	71.8	65.3	66.2	73.7	73.9
Heavy Trucks:	76.4	74.5	68.8	69.4	76.8	76.9
Vehicle Noise:	78.9	77.0	71.4	71.8	79.2	79.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	215	462	996	2,146
CNEL:	221	476	1,026	2,210

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2020 Without Project
Road Name: San Bernardino Av.
Road Segment: w/o Prologis Dr.
Project Name: Kaiser Commerce Center
Job Number: 12113

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,228 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,223 vehicles
Vehicle Speed:	55 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:	73.8%	7.6%	18.6%	77.15%
Medium Trucks:	79.1%	4.5%	16.4%	12.95%
Heavy Trucks:	77.0%	5.2%	17.9%	9.91%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	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:	71.78	-0.37	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	82.40	-8.12	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	86.40	-9.28	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:	70.6	68.5	64.7	63.7	71.1	71.3
Medium Trucks:	73.5	71.7	65.3	66.1	73.6	73.8
Heavy Trucks:	76.3	74.4	68.7	69.3	76.7	76.9
Vehicle Noise:	78.8	76.9	71.4	71.7	79.2	79.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	212	457	985	2,122
CNEL:	218	471	1,014	2,185

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2020 Without Project
Road Name: San Bernardino Av.
Road Segment: e/o Prologis Dr.
Project Name: Kaiser Commerce Center
Job Number: 12113

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,131 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,013 vehicles
Vehicle Speed:	55 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:	73.8%	7.6%	18.6%	77.15%
Medium Trucks:	79.1%	4.5%	16.4%	12.95%
Heavy Trucks:	77.0%	5.2%	17.9%	9.91%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	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:	71.78	-0.80	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	82.40	-8.55	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	86.40	-9.71	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:	70.2	68.1	64.2	63.3	70.6	70.9
Medium Trucks:	73.1	71.3	64.8	65.7	73.2	73.4
Heavy Trucks:	75.9	74.0	68.3	68.9	76.3	76.4
Vehicle Noise:	78.4	76.5	70.9	71.3	78.7	78.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	199	428	922	1,986
CNEL:	205	441	949	2,045

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2020 Without Project
Road Name: San Bernardino Av.
Road Segment: e/o Private Dwy 4.
Project Name: Kaiser Commerce Center
Job Number: 12113

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,131 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,013 vehicles
Vehicle Speed:	55 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:	73.8%	7.6%	18.6%	77.15%
Medium Trucks:	79.1%	4.5%	16.4%	12.95%
Heavy Trucks:	77.0%	5.2%	17.9%	9.91%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	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:	71.78	-0.80	0.38	-1.20	*-4.66*	0.000	0.000
Medium Trucks:	82.40	-8.55	0.41	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	86.40	-9.71	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:	70.2	68.1	64.2	63.3	70.6	70.9
Medium Trucks:	73.1	71.3	64.8	65.7	73.2	73.4
Heavy Trucks:	75.9	74.0	68.3	68.9	76.3	76.4
Vehicle Noise:	78.4	76.5	70.9	71.3	78.7	78.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	199	428	922	1,986
CNEL:	205	441	949	2,045

Wednesday, November 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2020 With Project — *Project Name:* Kaiser Commerce Center
Road Name: San Bernardino Av. — *Job Number:* 12113
Road Segment: w/o Private Dwy. 1

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,729 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,273 vehicles
Vehicle Speed:	55 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:	73.8%	7.6%	18.6%	77.16%
Medium Trucks:	79.1%	4.5%	16.4%	12.90%
Heavy Trucks:	77.0%	5.2%	17.9%	9.94%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.400
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:	71.78	-0.27	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	82.40	-8.04	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	86.40	-9.17	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:	70.7	68.6	64.8	63.8	71.2	71.4
Medium Trucks:	73.6	71.8	65.3	66.2	73.7	73.9
Heavy Trucks:	76.4	74.5	68.8	69.4	76.8	77.0
Vehicle Noise:	78.9	77.0	71.5	71.8	79.3	79.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	215	464	1,000	2,155
CNEL:	222	478	1,030	2,219

Wednesday, November 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2020 With Project — *Project Name:* Kaiser Commerce Center
Road Name: San Bernardino Av. — *Job Number:* 12113
Road Segment: w/o Prologis Dr.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,343 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,234 vehicles
Vehicle Speed:	55 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:	73.8%	7.6%	18.6%	77.16%
Medium Trucks:	79.1%	4.5%	16.4%	12.90%
Heavy Trucks:	77.0%	5.2%	17.9%	9.94%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.400
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:	71.78	-0.34	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	82.40	-8.11	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	86.40	-9.24	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:	70.6	68.5	64.7	63.8	71.1	71.3
Medium Trucks:	73.5	71.7	65.3	66.1	73.6	73.8
Heavy Trucks:	76.4	74.4	68.7	69.3	76.7	76.9
Vehicle Noise:	78.9	77.0	71.4	71.8	79.2	79.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	213	459	989	2,130
CNEL:	219	473	1,018	2,194

Wednesday, November 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2020 With Project — *Project Name:* Kaiser Commerce Center
Road Name: San Bernardino Av. — *Job Number:* 12113
Road Segment: e/o Prologis Dr.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,217 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,022 vehicles
Vehicle Speed:	55 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:	73.8%	7.6%	18.6%	77.16%
Medium Trucks:	79.1%	4.5%	16.4%	12.90%
Heavy Trucks:	77.0%	5.2%	17.9%	9.93%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.400
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:	71.78	-0.78	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	82.40	-8.54	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	86.40	-9.68	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:	70.2	68.1	64.2	63.3	70.7	70.9
Medium Trucks:	73.1	71.3	64.8	65.7	73.2	73.4
Heavy Trucks:	75.9	74.0	68.3	68.9	76.3	76.5
Vehicle Noise:	78.4	76.5	71.0	71.3	78.8	78.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	199	429	925	1,993
CNEL:	205	442	952	2,052

Wednesday, November 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2020 With Project — *Project Name:* Kaiser Commerce Center
Road Name: San Bernardino Av. — *Job Number:* 12113
Road Segment: e/o Private Dwy 4.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,304 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,030 vehicles
Vehicle Speed:	55 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:	73.8%	7.6%	18.6%	77.17%
Medium Trucks:	79.1%	4.5%	16.4%	12.86%
Heavy Trucks:	77.0%	5.2%	17.9%	9.96%

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:	71.78	-0.76	0.38	-1.20	-4.66	0.000	0.000
Medium Trucks:	82.40	-8.54	0.41	-1.20	-4.87	0.000	0.000
Heavy Trucks:	86.40	-9.65	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:	70.2	68.1	64.3	63.4	70.7	70.9
Medium Trucks:	73.1	71.3	64.8	65.7	73.2	73.4
Heavy Trucks:	76.0	74.0	68.3	68.9	76.3	76.5
Vehicle Noise:	78.5	76.5	71.0	71.4	78.8	79.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	200	431	928	2,000
CNEL:	206	444	956	2,059

Wednesday, November 20, 2019

APPENDIX 9.1:

OPERATIONAL NOISE LEVEL CALCULATIONS

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STATIONARY SOURCE NOISE PREDICTION MODEL

11/20/2019

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

Project Name: Kaiser Commerce
Job Number: 12113
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	5,120.0	feet
Noise Distance to Barrier:	5,120.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Elevation:	0.0	feet
Noise Source Elevation:	0.0	feet
Barrier Elevation:	0.0	feet
Barrier Height:	**0.0**	**feet**
Noise Source Height:	8.0	feet
Observer Height:	5.0	feet
Barrier Type (0-Wall, 1-Berm):	0	
Drop Off Coefficient:	20.0	

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	5,120.0	-44.6	-44.6	-44.6	-44.6	-44.6	-44.6
Shielding (Barrier Attenuation)	5,120.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		22.6	19.6	22.6	27.2	31.0	35.4
60 Minute Hourly Adjustment		**22.6**	**19.6**	**22.6**	**27.2**	**31.0**	**35.4**

STATIONARY SOURCE NOISE PREDICTION MODEL

11/20/2019

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

Project Name: Kaiser Commerce
Job Number: 12113
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	5,125.0	feet
Noise Distance to Barrier:	5,125.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Elevation:	0.0	feet
Noise Source Elevation:	30.0	feet
Barrier Elevation:	0.0	feet
Barrier Height:	**0.0**	**feet**
Noise Source Height:	5.0	feet
Observer Height:	5.0	feet
Barrier Type (0-Wall, 1-Berm):	0	
Drop Off Coefficient:	20.0	

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	5,125.0	-60.2	-60.2	-60.2	-60.2	-60.2	-60.2
Shielding (Barrier Attenuation)	5,125.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		17.0	14.2	15.9	17.2	17.5	18.0
39 Minute Hourly Adjustment		**15.1**	**12.3**	**14.0**	**15.3**	**15.6**	**16.1**

STATIONARY SOURCE NOISE PREDICTION MODEL

11/20/2019

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

Project Name: Kaiser Commerce
Job Number: 12113
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	4,848.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	4,848.0 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	4,848.0	-40.3	-40.3	-40.3	-40.3	-40.3	-40.3
Shielding (Barrier Attenuation)	4,848.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		11.9	8.7	9.7	14.7	20.7	31.6
60 Minute Hourly Adjustment		**11.9**	**8.7**	**9.7**	**14.7**	**20.7**	**31.6**

STATIONARY SOURCE NOISE PREDICTION MODEL

11/20/2019

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

Project Name: Kaiser Commerce
Job Number: 12113
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	2,776.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,776.0 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	2,776.0	-39.3	-39.3	-39.3	-39.3	-39.3	-39.3
Shielding (Barrier Attenuation)	2,776.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		27.9	24.9	27.9	32.5	36.3	40.7
60 Minute Hourly Adjustment		**27.9**	**24.9**	**27.9**	**32.5**	**36.3**	**40.7**

STATIONARY SOURCE NOISE PREDICTION MODEL

11/20/2019

Observer Location:	**R2**	*Project Name:*	Kaiser Commerce
Source:	Roof-Top Air Conditioning Unit	*Job Number:*	12113
Condition:	Operational	*Analyst:*	B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	2,838.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,838.0 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	2,838.0	-55.1	-55.1	-55.1	-55.1	-55.1	-55.1
Shielding (Barrier Attenuation)	2,838.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		22.1	19.3	21.0	22.3	22.6	23.1
39 Minute Hourly Adjustment		**20.2**	**17.4**	**19.1**	**20.4**	**20.7**	**21.2**

STATIONARY SOURCE NOISE PREDICTION MODEL

11/20/2019

Observer Location:	**R2**	*Project Name:*	Kaiser Commerce
Source:	Parking Lot Vehicle Movements	*Job Number:*	12113
Condition:	Operational	*Analyst:*	B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	2,483.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,483.0 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	2,483.0	-35.9	-35.9	-35.9	-35.9	-35.9	-35.9
Shielding (Barrier Attenuation)	2,483.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		16.3	13.1	14.1	19.1	25.1	36.0
60 Minute Hourly Adjustment		**16.3**	**13.1**	**14.1**	**19.1**	**25.1**	**36.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/20/2019

***Observer Location:* R3** | *Project Name:* Kaiser Commerce
Source: Unloading/Docking Activity | *Job Number:* 12113
Condition: Operational | *Analyst:* B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	2,612.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,612.0 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	2,612.0	-38.8	-38.8	-38.8	-38.8	-38.8	-38.8
Shielding (Barrier Attenuation)	2,612.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		28.4	25.4	28.4	33.0	36.8	41.2
60 Minute Hourly Adjustment		**28.4**	**25.4**	**28.4**	**33.0**	**36.8**	**41.2**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/20/2019

***Observer Location:* R3** | *Project Name:* Kaiser Commerce
Source: Roof-Top Air Conditioning Unit | *Job Number:* 12113
Condition: Operational | *Analyst:* B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	2,706.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,706.0 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	2,706.0	-54.7	-54.7	-54.7	-54.7	-54.7	-54.7
Shielding (Barrier Attenuation)	2,706.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		22.5	19.7	21.4	22.7	23.0	23.5
39 Minute Hourly Adjustment		**20.6**	**17.8**	**19.5**	**20.8**	**21.1**	**21.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/20/2019

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

Project Name: Kaiser Commerce
Job Number: 12113
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	2,305.0	feet
Noise Distance to Barrier:	2,305.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Elevation:	0.0	feet
Noise Source Elevation:	0.0	feet
Barrier Elevation:	0.0	feet
Barrier Height:	**0.0**	**feet**
Noise Source Height:	5.0	feet
Observer Height:	5.0	feet
Barrier Type (0-Wall, 1-Berm):	0	
Drop Off Coefficient:	15.0	

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	2,305.0	-35.4	-35.4	-35.4	-35.4	-35.4	-35.4
Shielding (Barrier Attenuation)	2,305.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		16.8	13.6	14.6	19.6	25.6	36.5
60 Minute Hourly Adjustment		**16.8**	**13.6**	**14.6**	**19.6**	**25.6**	**36.5**

STATIONARY SOURCE NOISE PREDICTION MODEL 11/20/2019

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

Project Name: Kaiser Commerce
Job Number: 12113
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	4,417.0	feet
Noise Distance to Barrier:	4,417.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Elevation:	0.0	feet
Noise Source Elevation:	0.0	feet
Barrier Elevation:	0.0	feet
Barrier Height:	**0.0**	**feet**
Noise Source Height:	8.0	feet
Observer Height:	5.0	feet
Barrier Type (0-Wall, 1-Berm):	0	
Drop Off Coefficient:	20.0	

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	4,417.0	-43.4	-43.4	-43.4	-43.4	-43.4	-43.4
Shielding (Barrier Attenuation)	4,417.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		23.8	20.8	23.8	28.4	32.2	36.6
60 Minute Hourly Adjustment		**23.8**	**20.8**	**23.8**	**28.4**	**32.2**	**36.6**

STATIONARY SOURCE NOISE PREDICTION MODEL
11/20/2019

Observer Location:	**R4**	*Project Name:*	Kaiser Commerce
Source:	Roof-Top Air Conditioning Unit	*Job Number:*	12113
Condition:	Operational	*Analyst:*	B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	4,425.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	4,425.0 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	4,425.0	-58.9	-58.9	-58.9	-58.9	-58.9	-58.9
Shielding (Barrier Attenuation)	4,425.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		18.3	15.5	17.2	18.5	18.8	19.3
39 Minute Hourly Adjustment		**16.4**	**13.6**	**15.3**	**16.6**	**16.9**	**17.4**

STATIONARY SOURCE NOISE PREDICTION MODEL
11/20/2019

Observer Location:	**R4**	*Project Name:*	Kaiser Commerce
Source:	Parking Lot Vehicle Movements	*Job Number:*	12113
Condition:	Operational	*Analyst:*	B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	4,291.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	4,291.0 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	4,291.0	-39.5	-39.5	-39.5	-39.5	-39.5	-39.5
Shielding (Barrier Attenuation)	4,291.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		12.7	9.5	10.5	15.5	21.5	32.4
60 Minute Hourly Adjustment		**12.7**	**9.5**	**10.5**	**15.5**	**21.5**	**32.4**