Appendix E
Noise

BLOOMINGTON INDUSTRIAL FACILITY
Draft
ENVIRONMENTAL IMPACT REPORT

NOISE AND VIBRATION TECHNICAL REPORT, BLOOMINGTON DISTRIBUTION PROJECT

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TABLE OF CONTENTS

Section **Page No.**

TABLE OF CONTENTS (CONTINUED)

Section **Page No.**

APPENDICES

FIGURES

TABLES

ACRONYMS

Acronym	Definition
ADT	average daily traffic
dB	decibel
dBA	A-weighted decibel
CEQA	California Environmental Quality Act
CNEL	community noise equivalent level
FHWA	Federal Highway Administration
L_{eq}	equivalent sound level
PPV	peak particle velocity
TNM	Traffic Noise Model
VdB	velocity decibel

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SUMMARY

The project applicant (Western Realco) is proposing to construct a single 676,983-square-foot distribution building within an approximately 35-acre property. The site would include two detention basins and landscaping along Cedar Avenue and Jurupa Avenue. There will be a total of 272 automobile parking stalls constructed for employee parking with access from Cedar Avenue and Jurupa Avenue. Truck access will be installed from Cedar Avenue, and the dockyard would include 138 trailer storage stalls, 4 grade level ramps, and 110 dock high doors.

This noise and vibration report summarizes the impact analysis evaluating the potential for significant adverse impacts due to construction, operation and maintenance of the proposed project. Potential noise impacts during construction were found to be potentially significant; with implementation of the recommended mitigation measures, noise impacts would be reduced to a level of less than significant. During operation and maintenance, noise impacts were determined to be less than significant; therefore, no operations noise mitigation would be required.

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1 INTRODUCTION

1.1 Purpose

The purpose of this report is to estimate and evaluate the potential noise and vibration impacts associated with construction and operation of the Bloomington Distribution Project (proposed project) relative to the significance thresholds and noise / vibration standards of the County of San Bernardino.

1.2 Project Location

The proposed project would be located north of Jurupa Avenue, east of Linden Avenue, and west of Cedar Avenue in the census-designated place (CDP) of Bloomington, in the County of San Bernardino, California, as shown in Figures 1 and 2.

1.3 Project Description

Western Realco is proposing to construct a single 676,983-square-foot distribution building within an approximately 35-acre property. The site would include two detention basins and landscaping along Cedar Avenue and Jurupa Avenue. There will be a total of 272 automobile parking stalls constructed for employee parking with access from Cedar Avenue and Jurupa Avenue. Truck access will be installed from Cedar Avenue, and the dockyard would include 138 trailer storage stalls, 4 grade level ramps, and 110 dock high doors. A site plan of the project is shown in Figure 3.

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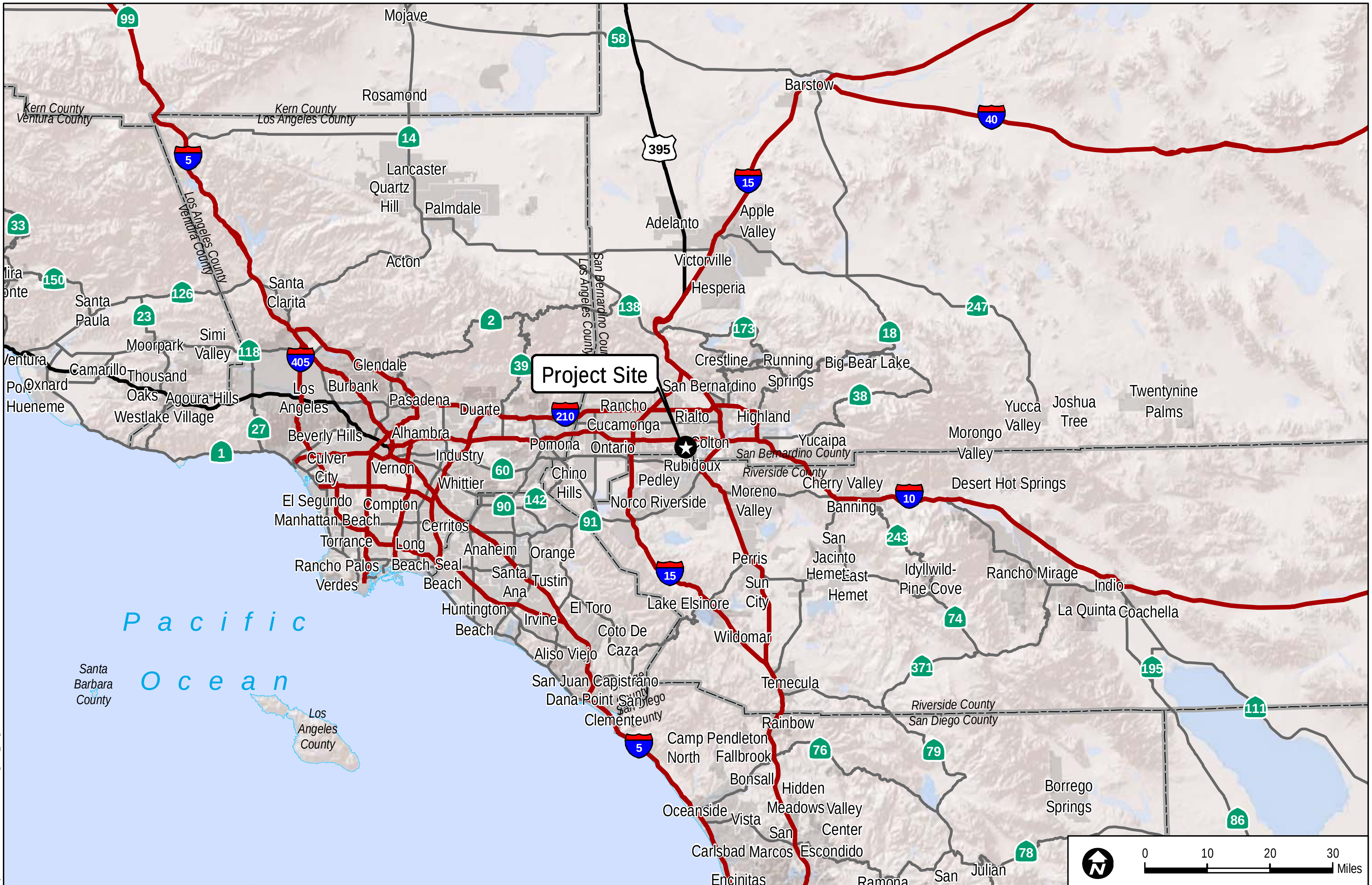

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FIGURE 1

Regional Map

WESTERN REALCO - BLOOMINGTON, CA

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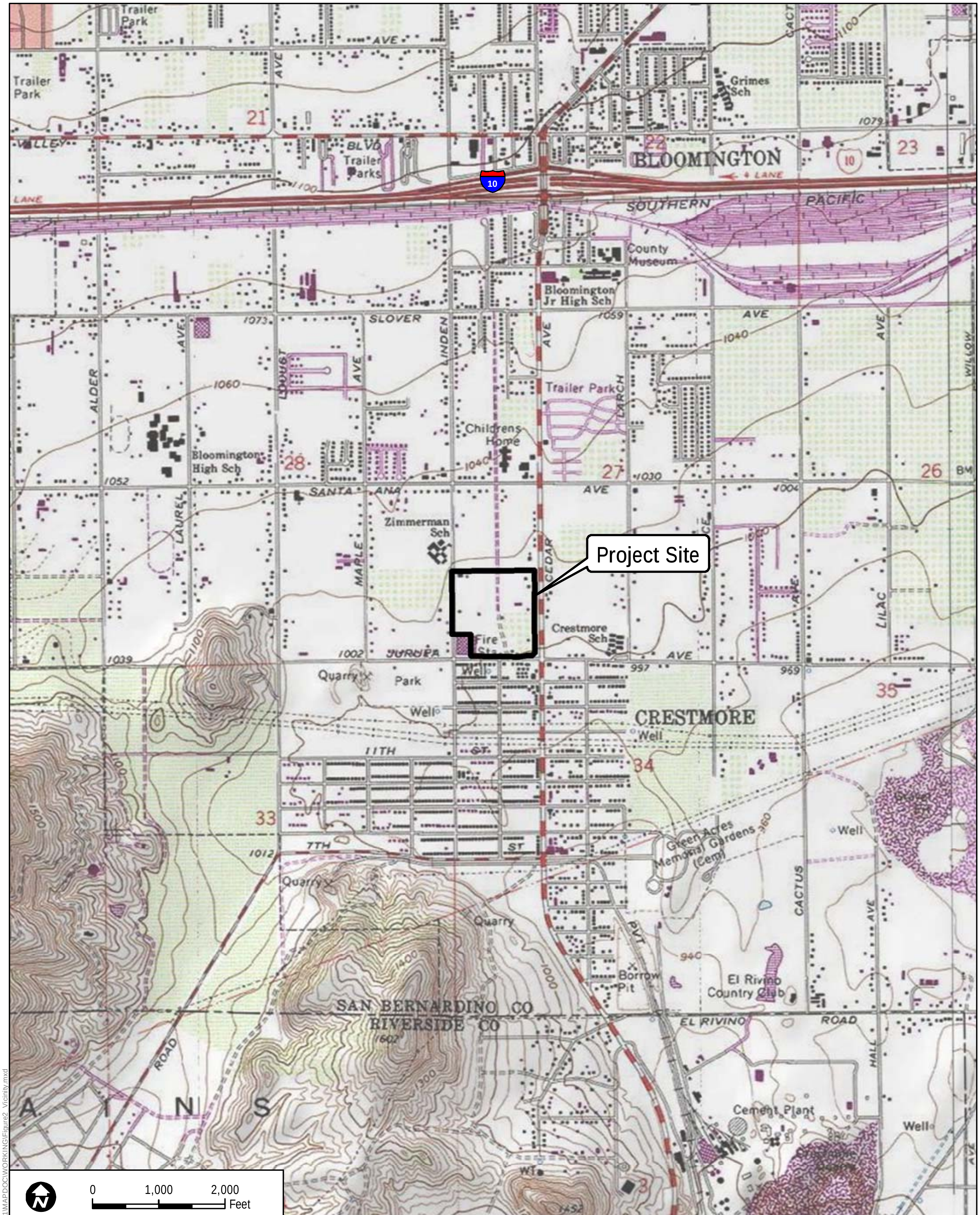

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SOURCE: USGS 7.5-Minute Series - Fontana Quadrangle.

FIGURE 2
Vicinity Map

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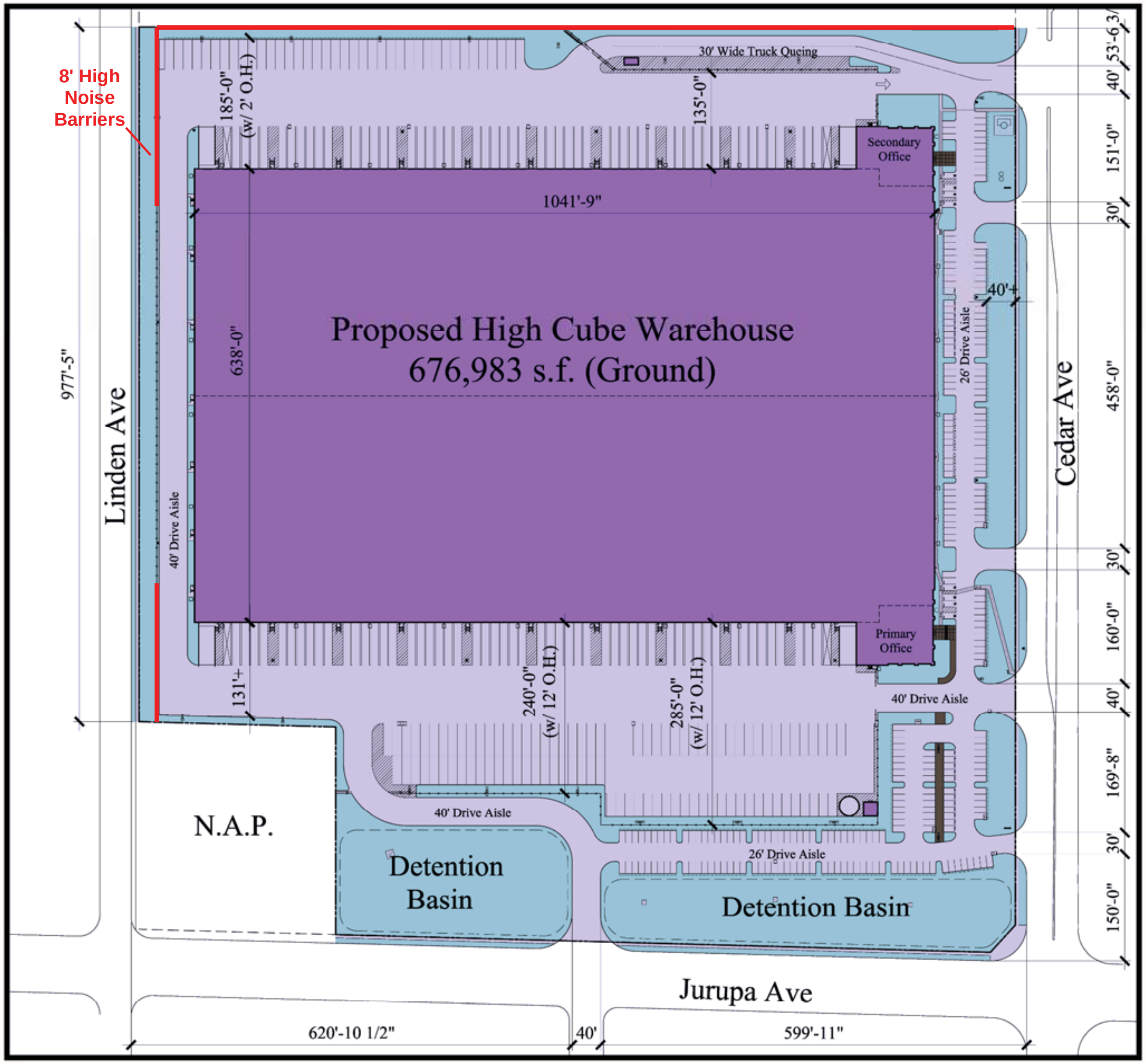
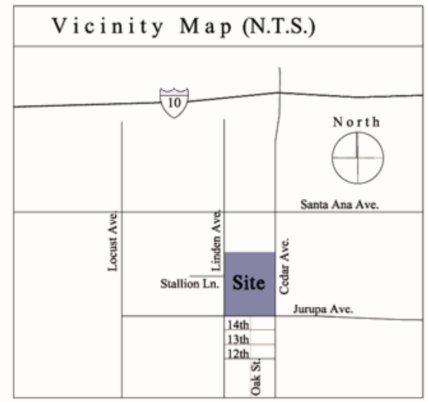


Site Plan Summary

Gross Site Area (To Original Property Lines)	(35.43 Acres)	1,543,291 s.f.
Gross Site Area (To Ultmate Right of Way)	(34.54 Acres)	1,504,407 s.f.
Total Building Area (Ground Floor)		676,983 s.f.
Site Coverage to Ultimate R.O.W. (.45 Max F.A.R)		45.00%
Parking Required (IC Zoning)		267 Spaces
Office (18,000 s.f. / 1/250)	72 Spaces	
WH (40,000 s.f. / 1/1,000)	40 Spaces	
WH (618,983 s.f. / 1/4,000)	155 Spaces	
Parking Provided		267 Spaces
Dock Yard		110 Dock High Doors 4 Grade Level Doors 138 Trailer Storage Stalls
Landscape Provided (15% Required)		17%



Legend

- Property Line (Current)
- Top of Slope (Detension Basin)
- Potential Interior Wall Location
- Fencing
- Parking Overhang (24")
- Solid Hatch Represents Landscape Area
- Shade Represents On-Site Hardscape Materials (Concrete or Ashpalt Paving)
- Dark Shade Represents Enhanced Hardscape Materials
- Diagonal Hatch Represents Painted Stripes

North

CONCEPTUAL SITE PLAN

0 60 120 180 240

Scale: 1" = 60'-0"

SOURCE: BASTIEN AND ASSOCIATES, INC., 2016

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WESTERN REAL CO - BLOOMINGTONS, CA

FIGURE 3

Site Plan

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2 FUNDAMENTALS OF NOISE AND VIBRATION

The following is a brief discussion of fundamental noise concepts and terminology.

2.1 Sound, Noise, and Acoustics

Sound is actually a process that consists of three components: the sound source, the sound path, and the sound receiver. All three components must be present for sound to exist. Without a source to produce sound, there is no sound. Similarly, without a medium to transmit sound pressure waves, there is no sound. Finally, sound must be received; a hearing organ, sensor, or object must be present to perceive, register, or be affected by sound or noise. In most situations, there are many different sound sources, paths, and receptors rather than just one of each. Acoustics is the field of science that deals with the production, propagation, reception, effects, and control of sound. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired.

2.2 Sound Pressure Levels and Decibels

The amplitude of a sound determines its loudness. Loudness of sound increases with increasing amplitude. Sound pressure amplitude is measured in units of micronewton per square meter, also called micropascal. One micropascal is approximately one-hundred billionth (0.00000000001) of normal atmospheric pressure. The pressure of a very loud sound may be 200 million micropascals, or 10 million times the pressure of the weakest audible sound. Because expressing sound levels in terms of micropascal would be very cumbersome, sound pressure level in logarithmic units is used instead to describe the ratio of actual sound pressure to a reference pressure squared. These units are called Bels. To provide a finer resolution, a Bel is subdivided into 10 decibels (dB).

2.3 A-Weighted Sound Level

Sound pressure level alone is not a reliable indicator of loudness. The frequency, or pitch, of a sound also has a substantial effect on how humans will respond. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness, or human response, is determined by the characteristics of the human ear.

Human hearing is limited not only in the range of audible frequencies, but also in the way it perceives the sound in that range. In general, the healthy human ear is most sensitive to sounds between 1,000 and 5,000 hertz, and it perceives a sound within that range as more intense than a sound of higher or lower frequency with the same magnitude. To approximate the frequency response of the human ear, a series of sound level adjustments is usually applied to the sound measured by a sound level meter. The adjustments (referred to as a weighting network) are frequency-dependent.

The A-scale weighting network approximates the frequency response of the average young ear when listening to ordinary sounds. When people make judgments about the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special situations (e.g., B-scale, C-scale, D-scale), but these scales are rarely used in conjunction with most environmental noise. Noise levels are typically reported in terms of A-weighted sound levels. All sound levels discussed in this report are A-weighted decibels (dBA). Examples of typical noise levels for common indoor and outdoor activities are depicted in Table 1.

Table 1
Typical Sound Levels in the Environment and Industry

Common Outdoor Activities	Noise Level (dB)	Common Indoor Activities
	110	Rock band
Jet fly over at 300 meters (1,000 feet)	100	
Gas lawn mower at 1 meter (3 feet)	90	
Diesel truck at 15 meters (50 feet), at 80 kilometers per hour (50 miles per hour)	80	Food blender at 1 meter (3 feet); garbage disposal at 1 meter (3 feet)
Noisy urban area, daytime; gas lawn mower at 30 meters (100 feet)	70	Vacuum cleaner at 3 meters (10 feet)
Commercial area; heavy traffic at 90 meters (300 feet)	60	Normal speech at 1 meter (3 feet)
Quite urban, daytime	50	Large business office; dishwasher next room
Quite urban, nighttime	40	Theater; large conference room (background)
Quite suburban, nighttime	30	Library
Quite rural, nighttime	20	Bedroom at night; concert hall (background)
	10	Broadcast/Recording studio
Lowest threshold of human hearing	0	Lowest threshold of human hearing

Source: Caltrans 1998

2.4 Human Response to Changes in Noise Levels

Under controlled conditions in an acoustics laboratory, the trained, healthy human ear is able to discern changes in sound levels of 1 dBA when exposed to steady, single-frequency signals in the mid-frequency range. Outside such controlled conditions, the trained ear can detect changes of 2 dBA in normal environmental noise. It is widely accepted that the average healthy ear, however, can barely perceive noise level changes of 3 dBA. A change of 5 dBA is readily perceptible, and a change of 10 dBA is perceived as twice or half as loud. A doubling of sound energy results in a 3 dBA increase in sound, which means that a doubling of sound energy (e.g., doubling the volume of traffic on a road) would result in a barely perceptible change in sound level).

2.5 Noise Descriptors

Additional units of measure have been developed to evaluate the long-term characteristics of sound. The equivalent sound level (L_{eq}) is also referred to as the time-average sound level. It is the equivalent steady-state sound level that in a stated period of time would contain the same acoustical energy as the time-varying sound level during the same time period. The 1-hour A-weighted equivalent sound level, L_{eq}(h), is the energy average of the A-weighted sound levels occurring during a 1-hour period, and is the basis for the County of San Bernardino's noise ordinance criteria.

People are generally more sensitive and annoyed by noise occurring during the evening and nighttime hours. Thus, another noise descriptor used in community noise assessments—the community noise equivalent level (CNEL)—was introduced. The CNEL scale represents a time-weighted, 24-hour average noise level based on the A-weighted sound level. The CNEL accounts for the increased noise sensitivity during the evening hours (7 p.m. to 10 p.m.) and nighttime hours (10 p.m. to 7 a.m.) by adding 5 dBA and 10 dBA, respectively, to the average sound levels occurring during the evening and nighttime hours.

2.6 Sound Propagation

Sound propagation (i.e., the passage of sound from a noise source to a receiver) is influenced by geometric spreading, ground absorption, atmospheric effects, and shielding by natural and/or built features.

Sound levels attenuate (or diminish) at a rate of approximately 6 dBA per doubling of distance from an outdoor point source due to the geometric spreading of the sound waves. Atmospheric conditions such as humidity, temperature, and wind gradients can also temporarily either increase or decrease sound levels. In general, the greater the distance the receiver is from the source, the greater the potential for variation in sound levels due to atmospheric effects. Additional sound attenuation can result from built features such as intervening walls and buildings, and by natural features such as hills and dense woods.

2.7 Groundborne Vibration Fundamentals

Groundborne vibration is a small, rapidly fluctuating motion transmitted through the ground. The strength of groundborne vibration attenuates fairly rapidly over distance. Some soil types transmit vibration quite efficiently; other types (primarily sandy soils) do not. Several basic measurement units are commonly used to describe the intensity of ground vibration. The descriptors used by the Federal Transit Administration are peak particle velocity (PPV), in units of inches per second, and velocity decibel (VdB). The calculation to determine PPV at a given distance is as follows:

$$PPV_{distance} = PPV_{ref}*(25/D)^{\wedge}1.5$$

Where:

PPV_{equip} = the peak particle velocity in inches per second of the equipment adjusted for distance

PPV_{ref} = the reference vibration level in inches per second at 25 feet

D = the distance from the equipment to the receiver

The velocity parameter (instead of acceleration or displacement) best correlates with human perception of vibration. Thus, the response of humans, buildings, and sensitive equipment to vibration is described in this section in terms of the root-mean square velocity level in VdB units relative to 1 micro-inch per second. As a point of reference, the average person can just barely perceive vibration velocity levels below 70 VdB (typically in the vertical direction). The calculation to determine the root-mean square at a given distance is as follows:

$$L_v(D) = L_v(25 \text{ feet}) – 30*\log(D/25)$$

Where:

$L_v(D)$ = the vibration level at the receiver

$L_v(25 \text{ feet})$ = the reference source vibration level

D = the distance from the vibration activity to the receiver

Typical background vibration levels are between 50 and 60 VdB, and the level for minor cosmetic damage to fragile buildings or blasting generally begins at 100 VdB.

3 REGULATORY SETTING

3.1 Federal

Although no federal regulations are directly applicable to the proposed project, the Federal Transit Administration provides guidance related to noise levels from construction activities which is used for this project in the absence of a local agency construction noise standard. The FTA's *Transit Noise and Vibration Impact Assessment* manual (FTA, 2006) Based upon the information provided in Chapter 12 (Noise and Vibration During Construction) of the FTA handbook, adverse community reaction would be anticipated if construction noise levels exceed 90 dBA $L_{eq\ 1\text{-hour}}$ during daytime hours or 80 dBA $L_{eq\ 1\text{-hour}}$ during nighttime hours, or 80 dBA $L_{eq\ 8\text{-hour}}$ during daytime hours or 70 dBA $L_{eq\ 8\text{-hour}}$ during nighttime hours.

3.2 State

Government Code Section 65302(g)

California Government Code Section 65302(g) requires the preparation of a Noise Element in a general plan, which shall identify and appraise the noise problems in the community. The Noise Element shall recognize the guidelines adopted by the Office of Noise Control in the State Department of Health Services and shall quantify, to the extent practicable, current and projected noise levels for the following sources:

1. Highways and freeways
2. Primary arterials and major local streets
3. Passenger and freight on-line railroad operations and ground rapid transit systems
4. Aviation and airport-related operations
5. Local industrial plants
6. Other ground stationary noise sources contributing to the community noise environment.

California Department of Transportation Vibration Standards

The California Department of Transportation (Caltrans) Division of Environmental Analysis created the Transportation and Construction Vibration Guidance Manual, which provides guidance to Caltrans engineers, planners, and consultants in assessing vibration from construction, operation, and maintenance of Caltrans projects. The manual also provides general information on the potential effects and levels of vibration on people and vibration-sensitive land uses. For the purposes of providing a recognized threshold for annoyance from vibration, the vibration impacts analysis for the proposed project references the Caltrans threshold of approximately 0.10 inches/second peak particle velocity (PPV) as the level at which continuous vibration begins to cause annoyance (Caltrans 2013).

3.3 Local

3.3.1 County of San Bernardino Municipal Code

Noise Standards. The County's Municipal Code (Title 8, Development Code; Division 3, Countywide Development Standards; Chapter 83.01, General Performance Standards, Section 83.01.080, Noise) sets interior and exterior noise standards for specific land uses by type of noise source. Noise standards for stationary noise sources are summarized in Table 2. As shown, the noise standard for residential properties is 55 dB(A) L_{eq} from 7 a.m. to 10 p.m. and 45 dB(A) L_{eq} from 10 p.m. to 7 a.m. For industrial properties the noise standard from stationary noise sources is 70 dB(A) during any time of the day or night. The County's Municipal Code exempts noise from construction noise provided that construction is limited to between the hours of 7 a.m. to 7 p.m. except on Sundays or federal holidays.

Table 2
Noise Standards for Stationary Noise Sources

Affected Land Uses (Receiving Noise)	7:00 a.m. - 10:00 p.m. (dBA L_{eq})	10:00 p.m. –7:00 a.m. (dBA L_{eq})
Residential	55	45
Professional Services	55	55
Other Commercial	60	60
Industrial	70	70

Source: County of San Bernardino 2007
Notes: dBA = A-weighted decibel scale
L_{eq} = (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.

For noise from mobile sources (such as traffic), the County's standards are summarized in Table 3.

Table 3
Noise Standards for Adjacent Mobile Noise Sources

Categories	Uses	L_{dn} or CNEL, dB(A)	
		Interior	*Exterior*
Residential	Single and multi-family, duplex, mobile homes	45	60
Commercial	Hotel, motel, transient housing	45	60
	Commercial retail, bank, restaurant	50	N/A

Table 3
Noise Standards for Adjacent Mobile Noise Sources

Categories	Uses	L_{dn} or CNEL, dB(A)	
		Interior	*Exterior*
	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

Source: County of San Bernardino 2007
Notes: dBA = A-weighted decibel scale
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.
N/A = not applicable

Vibration Standards. The County's Municipal Code, Section 83.01.090 prohibits the operation of any device that creates vibration that can be felt without the aid of instruments at or beyond the lot line, or which produces a particle velocity greater than or equal to two-tenths (0.2) inches per second measured at or beyond the lot line.

3.3.2 County of San Bernardino 2007 General Plan

The Noise Element of the 2007 General Plan (County of San Bernardino 2007) includes goals and policies, including that "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." The Noise Element refers to the Municipal Code for the specific noise standards as they would relate to this project.

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4 EXISTING CONDITIONS

The project area is subject to typical suburban noises and semi-rural, such as noise generated by traffic, schoolyard, and day-to-day outdoor activities including occasional noise from roosters. Noise around the project site is the cumulative effect of noise from transportation activities and stationary sources. "Transportation noise" typically refers to noise from automobile use, trucking, airport operations, and rail operations. "Stationary noise" typically refers to noise from sources such as heating, ventilation, and air conditioning (HVAC) systems, compressors, landscape maintenance equipment, or machinery associated with local industrial or commercial activities.

Currently, the project site is disturbed with evidence of recent disking within open areas of the site. Multiple single-family homes and junk yards are present throughout the northern half of the site and three single-family homes are located in the southeastern portion of the site. A dirt road that looks to be an old channel now filled with soil runs north to south through the center of the project site.

The project site is primarily subject to traffic noise on the adjacent arterial roadways such as Cedar Avenue to the east, Jurupa Avenue to the south and Linden Avenue to the west. Table 4 provides the existing daily traffic volumes along the roadway segments that are primarily subject to traffic noise and that have noise-sensitive land uses. The nearest airport in the vicinity of the project site is Flabob Airport (a small local airport), located approximately 4.3 miles to the south. The nearest major commercial airport is Ontario International Airport, located approximately 10.5 miles to the west. Although the project site is within the Influence Area of Ontario International Airport, the project site is outside of the airports 60-65 dBA CNEL noise impact contours and is therefore not located within any airport's noise impact zone (City of Ontario, 2011).

Table 4
Existing Daily Traffic Volumes

Key Roadway Segment	Lanes	Existing Traffic Conditions
		Daily Volume
1. Cedar Avenue north of Jurupa Avenue	4D	20,400
2. Cedar Avenue south of Jurupa Avenue and Santa Ana Avenue	4D	20,800
3. Linden Avenue north of Jurupa Avenue	2U	2,100
4. Linden Avenue south of Jurupa Avenue and Santa Ana Avenue	2U	1,900
5. Jurupa Avenue west of Linden Avenue	2U	2,600
6. Jurupa Avenue between Linden Avenue and Oak Street	2U	2,700
7. Jurupa Avenue between Oak Street and Cedar Avenue	2U	2,900
8. Jurupa Avenue east of Cedar Avenue	2U	3,500

Notes: D = divided, U = undivided

4.1 Ambient Noise Monitoring

Noise measurements were conducted on and near the project site in February 2015 and in August 2016 to document the typical existing noise levels. Table 65 provides the location, date, and time the noise measurements were taken. The noise measurements conducted in February 2015 were short-term in duration (15 minutes each), and the noise measurement conducted in August 2016 was long-term (24 hours duration).

The noise measurements were made using a SoftdB Piccolo Integrating Sound Level Meter equipped with a 0.5-inch, pre-polarized condenser microphone with pre-amplifier. The sound level meter meets the current American National Standards Institute (ANSI) standard for a Type 2 general purpose sound level meter. The sound level meter was calibrated before and after the measurements, and the measurements were conducted with the microphone covered with a windscreen and positioned approximately 5 feet above the ground.

For the short-term measurements, five noise measurement locations that represented key potential sensitive receptors or sensitive land uses were selected adjacent to or near the project site; these locations are depicted as Receptors 1–5 (M1–M5) on Figure 4. Location M1 was taken at a residence on Cedar Avenue, east of the project site; M2 was at a residence on Jurupa Avenue, south of the project site; M3 was at a residence on Linden Avenue, west of the project site; M4 was at the Walter Zimmerman Elementary School on Linden Avenue, northwest of the project sited; and M5 was at the Upland Indonesian Seventh-Day Adventist Church on Cedar Avenue, north of the project site. The measured average, maximum and minimum noise levels and measurement locations are provided in Table 5, and the field noise measurement data sheets are included in Appendix A. As shown, measured average short-term noise levels ranged from 62 dBA L_{eq} at M2 to 71 dBA L_{eq} at M1. The primary noise source at the sites listed in Table 5 was from traffic along the adjacent roads.

Table 5
Short-Term Measurement Noise Levels

Receptors	Location/Address	Date	Time	Description	L_{eq} (dBA)	L_{max} (dBA)	L_{min} (dBA)
M1	Residence east of project site; 11169 Cedar Avenue	February 5, 2015	1:16 p.m.–1:31 p.m.	95 feet east of Cedar Avenue and 850 feet north of Jurupa Avenue	71	84	49
M2	Residence south of project site; 18579 Jurupa Avenue	February 5, 2015	1:55 p.m.–2:10 p.m.	65 feet south of Jurupa Avenue and 500 feet east of Linden Avenue	62	75	51
M3	Residence west of project site; 11266 Linden Avenue	February 5, 2015	2:25 p.m.–2:40 p.m.	65 feet west of Linden Avenue and 300 feet north of Jurupa Avenue	65	81	48

Table 5
Short-Term Measurement Noise Levels

Receptors	Location/Address	Date	Time	Description	L_{eq} (dBA)	L_{max} (dBA)	L_{min} (dBA)
M4	Elementary School northwest of project site; 11050 Linden Avenue	February 5, 2015	2:56 p.m.–3:11 p.m.	100 feet west of Linden Avenue and 1,500 feet north of Jurupa Avenue	67	87	49
M5	Elementary School north of project site; 11100 Linden Avenue	February 5, 2015	3:38 p.m.–3:53 p.m.	130 feet east of Cedar Avenue and 1,400 feet north of Jurupa Avenue	67	78	48

Notes: L_{eq} = equivalent continuous sound level (time-averaged sound level); L_{max} = maximum sound level during the measurement interval

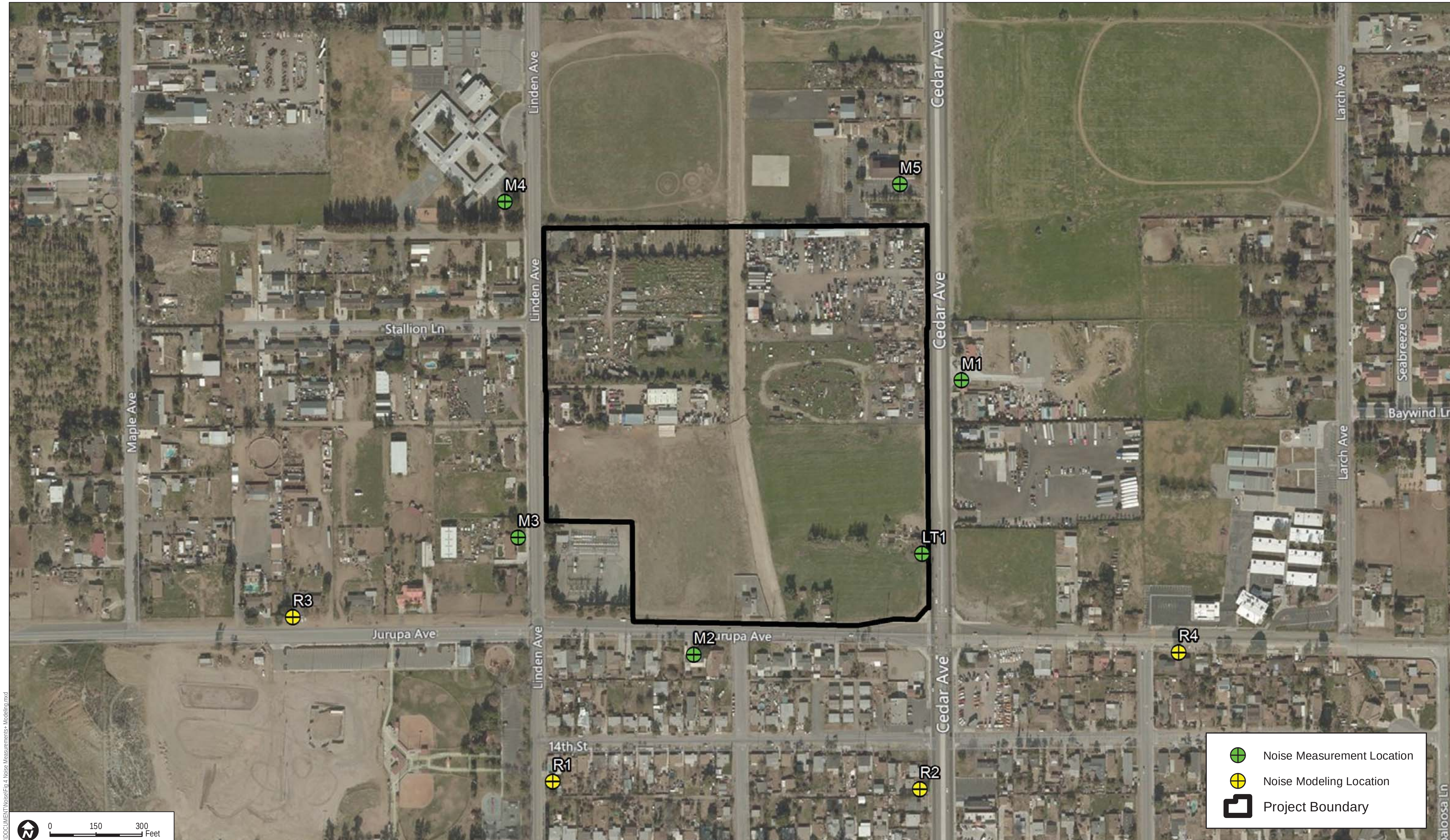
For the long-term measurement, one on-site noise measurement location was selected; the location is depicted as LT1 on Figure 4. Measurement LT1 was taken adjacent to an existing on-site residence along Cedar Avenue, approximately 55 feet west of the centerline of Cedar Avenue and approximately 270 feet north of the centerline of Jurupa Avenue. The measured hourly average, maximum and minimum noise levels are provided in Table 6, and the detailed data output sheet is included in Appendix A. The primary noise source at LT1, based upon field observations during setup and retrieval of the noise measurement equipment was from traffic along the adjacent roads, particularly heavy truck traffic. As shown in Table 6, hourly noise levels at LT1 ranged from 59 to 68 dBA L_{eq}, the 24-hour average noise level was 65 dBA L_{eq}, and the weighted day-night noise level was 71 dBA L_{dn}.

Table 6
Long-Term Measured Noise Levels

LT1				
Measurement Start Time	*Measurement End Time*	*L_{eq} (dBA)*	*L_{max} (dBA)*	*L_{min} (dBA)*
9:54	10:54	65	87	44
10:54	11:54	65	87	45
11:54	12:54	65	84	45
12:54	13:54	65	83	46
13:54	14:54	65	80	45
14:54	15:54	66	85	48
15:54	16:54	67	89	50
16:54	17:54	65	84	49
17:54	18:54	66	84	50
18:54	19:54	66	86	49
19:54	20:54	64	81	45
20:54	21:54	64	82	46
21:54	22:54	64	85	45

Table 6
Long-Term Measured Noise Levels

LT1				
Measurement Start Time	*Measurement End Time*	*L_{eq} (dBA)*	*L_{max} (dBA)*	*L_{min} (dBA)*
22:54	23:54	61	79	44
23:54	0:54	60	78	43
0:54	1:54	59	80	43
1:54	2:54	59	77	43
2:54	3:54	62	78	43
3:54	4:54	66	83	46
4:54	5:54	67	91	49
5:54	6:54	68	84	50
6:54	7:54	66	85	48
7:54	8:54	66	83	48
8:54	9:54	64	84	46
Maximum Level		**68**	**91**	**50**
Minimum Level		**59**	**74**	**43**
24-Hour Average ($L_{eq\ 24Hr}$)		**65**		
L_{dn}		**71**		



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SOURCE: Bing Maps 2015

FIGURE 4

Noise Measurement and Modeling Locations

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5 PROJECT IMPACT ANALYSIS

5.1 Methodology

Ambient noise measurements were conducted to quantify the existing daytime noise environment at five sites representative of nearby noise-sensitive land uses. Estimated noise levels resulting from the proposed construction activities were obtained from reports prepared by the Federal Transit Administration (FTA 2006) and field data from files. The noise impact assessment utilized criteria established in the County of San Bernardino General Plan Noise Element and Municipal Code Noise Ordinance. The noise levels associated with selected roadways was determined based the provided traffic impact analysis (Kunzman Associates 2016) and using the Federal Highway Administration's Traffic Noise Model (TNM), Version 2.5 (FHWA 2004).

5.2 Thresholds of Significance

The significance criteria used to evaluate the project impacts related to noise are based on Appendix G of the CEQA Guidelines. According to Appendix G, a significant impact related to noise would occur if the project would:

1. Result in the exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
2. Result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.
3. Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
4. Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.
5. Be located within 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, and if so, the project would expose people residing or working in the project area to excessive noise levels.

Substantial Changes in Ambient Noise Levels

Some guidance regarding the determination of a substantial permanent increase in ambient noise levels in the project vicinity above existing levels is provided by the 1992 findings of the Federal Interagency Committee on Noise (FICON), which assessed the annoyance effects of changes in ambient noise levels resulting from aircraft operations. The FICON recommendations are based upon studies that relate aircraft and traffic noise levels to the percentage of persons highly annoyed by the noise. Annoyance is a qualitative measure of the adverse reaction of people to noise that generates speech interference, sleep disturbance, or interference with the desire for a tranquil environment.

The rationale for the FICON recommendations is that it is possible to consistently describe the annoyance of people exposed to transportation noise in terms of L_{dn}. The changes in noise exposure that are shown in Table 7 are expected to result in equal changes in annoyance at sensitive land uses. Although the FICON recommendations were specifically developed to address aircraft noise impacts, they are used in this analysis to define a substantial increase in community noise levels related to all transportation noise sources and permanent non-transportation noise sources.

Table 7
Measures of Substantial Increase for Community Noise Sources

Ambient Noise Level Without Project (L_{dn})	Significant Impact Assumed to Occur if the Project Increases Ambient Noise Levels by:
<60 dB	+ 5 dB or more
60-65 dB	+ 3 dB or more
>65 dB	+ 2 dB or more

5.3 Construction Noise Impacts

Development activities for project construction would generally involve the following phases: demolition, site preparation, grading, building construction, architectural coatings, and paving. Although specific project construction details and equipment specifications are not available at this time, the following are typical types of construction equipment that would be expected:

- Concrete/industrial saws
- Excavators
- Dozers
- Tractors/loaders/backhoes
- Forklifts
- Welders
- Cement and mortar mixers
- Paving equipment
- Trenching equipment
- Off-highway water trucks
- Materials delivery trucks
- Pneumatic tools
- Graders
- Cranes

- Generator sets
- Air compressors
- Pavers
- Scrapers
- Rollers
- Concrete trucks
- Asphalt trucks.

As demonstrated by this list, construction equipment would include only standard equipment that would be employed for any routine construction project of this scale; construction equipment with substantially higher noise-generation characteristics (such as pile drivers, rock drills, blasting equipment) would not be necessary for development of any phase of the project.

Equipment that would be in operation during construction would include excavators, backhoes, scrapers, forklifts, compressors, paving equipment, and haul trucks. The typical maximum noise levels for various pieces of construction equipment at a distance of 50 feet are presented in Table 8, Construction Equipment Maximum Noise Levels. Note that the equipment noise levels presented in Table 8 are maximum noise levels. Typically, construction equipment operates in alternating cycles of full power and low power, producing average noise levels less than the maximum noise level. The average sound level of construction activity also depends on the amount of time that the equipment operates and the intensity of construction activities during that time.

Table 8
Construction Equipment Noise Emission Levels

Equipment	Typical Sound Level (dBA) 50 Feet from Source
Air compressor	81
Backhoe	80
Compactor	82
Concrete mixer	85
Concrete pump	82
Concrete vibrator	76
Crane, mobile	83
Dozer	85
Generator	81
Grader	85
Impact wrench	85
Jackhammer	88
Loader	85
Paver	89
Pneumatic tool	85
Pump	76
Roller	74

Table 8
Construction Equipment Noise Emission Levels

Equipment	Typical Sound Level (dBA) 50 Feet from Source
Saw	76
Truck	88

Source: FTA 2006.

As part of the demolition phase of construction, several structures (including existing on-site residences) would be demolished and removed from the project site, and no residences would exist on-site. The nearest noise sensitive receptors to the project construction work would be the residences to the west, on the west side of Linden Avenue. Residences are also located just to the east and south of the project site, on the other sides of Cedar Avenue and Jurupa Avenue, respectively. Other than the residences, the nearest other noise-sensitive receivers such as the elementary school and the church are located are also located in proximity to the project site. Noise levels generated by construction equipment (or by any point source) decrease at a rate of approximately 6 dBA per doubling of distance from the source (Harris 1979). Therefore, if a particular construction activity generated average noise levels of 88 dBA at 50 feet, the L_{eq} would be 82 dBA at 100 feet, 76 dBA at 200 feet, 70 dBA at 400 feet, and so on. Intervening structures that block the line of sight, such as buildings, would further decrease the resultant noise level by a minimum of 5 dBA. The effects of molecular air absorption and anomalous excess attenuation would reduce the noise level from construction activities at more distant locations at the rates of 0.7 dBA and 1.0 dBA per 1,000 feet, respectively.

The closest point of construction activities to the nearest nose-sensitive receivers would be approximately 60 feet (during grading and landscaping of the site boundaries) and the furthest would be approximately 1,250 feet. Actual building construction activities would be approximately 150 feet away or further. The nearest noise-sensitive receivers are located approximately 400 feet away from the acoustic center of construction activity (the idealized point from which the energy sum of all construction activity noise near and far would be centered).

The Federal Highway Administration’s (FHWA) Roadway Construction Noise Model (RCNM) (FHWA 2008) was used to estimate construction noise levels at the nearest occupied noise-sensitive land uses. Although the model was funded and promulgated by the FHWA, the RCNM is often used for non-roadway projects, because the same types of construction equipment used for roadway projects are also used for other project types. Input variables for the RCNM consist of the receiver/land use types, the equipment type and number of each (e.g., two graders, a loader, a tractor), the duty cycle for each piece of equipment (e.g., percentage of hours the equipment typically works per day), and the distance from the noise-sensitive receiver. No topographical or structural shielding was assumed in the modeling. The RCNM has default duty-cycle values for the various pieces of equipment, which were derived from an extensive study of typical construction activity patterns. Those default duty-cycle values were used for this noise analysis.

Using the FHWA's RCNM construction noise model and construction information (types and number of construction equipment by phase), the estimated noise levels from construction were calculated for a representative range of distances, as presented in Table 9, Construction Noise Model Results Summary. The RCNM inputs and outputs are provided in Appendix B.

Table 9
Construction Noise Model Results Summary

Construction Phase	Construction Noise at Representative Receiver Distances (dBA L_{eq})	
	Nearest Construction Work - 60 Feet (Approx.)	*Typical Construction Work - 400 Feet (Approx.)*
Demolition	81	68
Site Preparation	82	67
Grading	84	69
Building Construction	80	65
Paving	83	68
Architectural Coatings	73	58

L_{eq} = equivalent continuous sound level

As presented in Table 9 the highest noise levels are predicted to occur during grading activities when noise levels from construction activities would be as high as 84 dBA equivalent continuous sound level (L_{eq}) at the nearest existing residential property boundaries, approximately 60 feet away. At more typical distances of approximately 400 feet, construction noise would range from approximately 58 to 69 dBA L_{eq}. Nearby noise-sensitive land uses would be exposed to elevated construction noise levels; the exposure would be short-term, and would cease upon project construction. It is anticipated that construction activities associated with the proposed project would take place between 7:00 a.m. and 7:00 p.m., and would not take place on Sundays or federal holidays, and would therefore not violate County of San Bernardino Municipal Code or General Plan standards for construction. However, construction noise levels are predicted to exceed FTA guidance related to noise levels from construction activities and adverse community reaction (see Section 3.1). During periods of nearest construction work, noise levels would exceed the FTA's guideline of 80 dBA $L_{eq\ 8\text{-}hour}$ during daytime hours. Additionally, the predicted noise levels would be substantially higher than existing ambient daytime noise levels (as shown in Table 5)[1]. Therefore, noise impacts from construction are considered significant. The implementation of mitigation measures **MM NOI-1** and **MM NOI-2** would reduce construction noise substantially.

1 Existing ambient noise levels ranging from 62 to 71 dBA L_{eq} were measured whereas "nearest construction work" noise levels ranging from 73 to 84 dBA L_{eq} are predicted.

Therefore, temporary construction-related noise impacts would be **less than significant with mitigation incorporated**.

Temporary noise from construction would be readily audible at the nearest sensitive receptors and at times could represent a substantial temporary increase. Impacts are considered **less than significant with mitigation incorporated** (please see Section 4.10.6).

5.4 Operational Noise Impacts

Long-term operational noise from the project would consist of noise associated with typical office and warehousing activities. Noise would be generated by truck and passenger vehicle trips to and from the site on adjacent roadways; trucks backing up, starting up, and idling; fork lifts; and mechanical plant (heating, ventilation, and air conditioning [HVAC]) noise. Predicted noise levels from each of these noise sources are addressed in the following sections. Long-term operational noises also include project-generated traffic and overall traffic noise at the site.

5.4.1 Off-Site Traffic Noise

The project would generate traffic along adjacent roads including Cedar Avenue, Jurupa Avenue and Linden Avenue. Traffic noise modeling was conducted for the proposed project using the traffic volumes from the project's traffic impact analysis report and the FHWA's TNM model. The TNM noise model accepts as input the number and types of vehicles on the roadway, vehicle speeds, and receiver locations. The modeled traffic speeds used were the posted speed limits in the project vicinity; 45 miles per hour (mph) on Cedar Avenue; 40 mph on Jurupa Avenue; and 25 mph on Linden Avenue. The noise modeling input and output files, and the Non-Passenger Car Equivalent traffic volumes provided by Kunzman Associates are included in Appendix C.

The information provided from this modeling was compared to the noise impact significance criteria in the County's Municipal Code for adjacent mobile noise sources (i.e., a 60 dBA CNEL/L_{dn} noise standard for noise-sensitive land uses) and the FICON thresholds for noise increase (i.e., a 5 dBA increase in an ambient noise environment of less than 60 dBA L_{dn}, a 3 dBA noise increase in an ambient noise environment of 60 - 65 dBA L_{dn} and a 2 dBA increase in an ambient noise environment of more than 65 dBA L_{dn}) to assess whether project traffic noise would cause a significant impact and, if so, where. The results of the traffic noise analysis are shown in Table 10 for the existing and existing plus project scenarios and in Table 11 for the year 2018 and year 2018 plus project scenarios.

As shown in Table 10, the existing plus project traffic noise would generate a noise level increase of 1 dBA CNEL or less (rounded to whole numbers) along the studied roads in the vicinity of the site. The additional traffic volume along the adjacent roads would not substantially increase the existing noise level in the project vicinity and the traffic noise level increase is considered less than significant; no mitigation measures are necessary.

Table 10
Project-Related Traffic Noise: Existing

Modeled Receptor	Key Roadway Segment	Existing ADT[1] Volume	Existing + Project ADT[1] Volume	Existing Noise Level (dBA CNEL)	Existing + Project Noise Level (dBA CNEL)	Noise Level Increase (dB)
M1 - Residences east of Project	Cedar Avenue: Jurupa Avenue to Santa Ana Avenue	20,500	21,200	68	69	1
M2 - Residences south of Project	Jurupa Avenue: Linden Avenue to Cedar Avenue	5,000	5,200	65	65	0
M3 - Residences on Linden Ave west of Project	Linden Avenue: Jurupa Avenue to Santa Ana Avenue	2,700	2,700	58	58	0
M4 - School northwest of Project	Linden Avenue: Jurupa Avenue to Santa Ana Avenue	2,700	2,700	53	53	0
M5 - Church north of Project	Cedar Avenue: Jurupa Avenue to Santa Ana Avenue	20,500	21,200	66	67	1
R1 - Residences south of Project	Linden Avenue: 11th Street to Jurupa Avenue	2,100	2,100	56	56	0
R2 - Residences south of Project	Cedar Avenue: 11th Street to Jurupa Avenue	20,200	20,400	68	69	1
R3 - Residences southwest of Project	Jurupa Avenue: west of Linden Avenue	4,100	4,100	65	65	0
R4 - Residences on Jurupa Ave southeast of Project	Jurupa Avenue: east of Cedar Avenue	5,700	5,800	67	67	0

Source: Kunzman Associates 2016 (Traffic Volumes).
Note: [1] ADT = Average Daily Traffic (non Passenger-Car-Equivalents)

The project's traffic study analyzed project Average Daily Traffic (ADT) to Year 2018, the year of planned project completion. With the project, the Year 2018 (i.e., existing plus ambient growth plus cumulative plus project ADT) traffic noise would generate a noise level increase of approximately 1 dB or less compared to the Year 2018 without project scenario. The noise level increases associated with the Year 2018 conditions are depicted in Table 11. The additional project traffic volume along the adjacent roads in Year 2018 would not substantially increase the existing noise level in the project vicinity and the traffic noise level increase is considered less than significant; no mitigation measures are necessary.

Table 11
Project-Related Traffic Noise: Future (Year 2018)

Modeled Receptor	Key Roadway Segment	Future (Year 2018) ADT[1] Volume	Future (Year 2018) + Project ADT[1] Volume	Future (Year 2018) Noise Level (dBA CNEL)	Future (Year 2018) + Project Noise Level (dBA CNEL)	Noise Level Increase (dB)
M1 - Residences east of Project	Cedar Avenue: Jurupa Avenue to Santa Ana Avenue	21,500	22,200	69	69	0
M2 - Residences south of Project	Jurupa Avenue: Linden Avenue to Cedar Avenue	5,100	5,300	65	65	0
M3 - Residences on Linden Ave west of Project	Linden Avenue: Jurupa Avenue to Santa Ana Avenue	2,800	2,800	58	58	0
M4 - School northwest of Project	Linden Avenue: Jurupa Avenue to Santa Ana Avenue	2,800	2,800	54	54	0
M5 - Church north of Project	Cedar Avenue: Jurupa Avenue to Santa Ana Avenue	21,500	22,200	66	67	1
R1 - Residences south of Project	Linden Avenue: 11th Street to Jurupa Avenue	2,100	2,100	56	56	0
R2 - Residences south of Project	Cedar Avenue: 11th Street to Jurupa Avenue	21,300	22,500	69	69	0
R3 - Residences southwest of Project	Jurupa Avenue: west of Linden Avenue	4,200	4,200	65	65	0
R4 - Residences on Jurupa Ave southeast of Project	Jurupa Avenue: east of Cedar Avenue	6,300	6,400	68	68	0

Source: Kunzman Associates 2016 (Traffic Volumes).
Note: [1] ADT = Average Daily Traffic (non Passenger-Car-Equivalents)

5.4.2 On-Site Operations Noise

Trucks, passenger vehicles, and ancillary equipment such as forklifts and HVAC equipment would create noise during on-site operations. Based on information from the Project applicant, operations in the proposed industrial building may be conducted 24 hours a day. The operations will be typical of warehouse / distribution center use. The nearest residences in the vicinity of the proposed Project site are located approximately 700 feet from the center and approximately 150 feet from the nearest side of the proposed industrial building, to the west. Refrigerated trucks (which have an additional auxiliary cooling system which could result in higher individual truck noise levels) are not anticipated as part of this project.

In order to ensure that noise from on-site operations meets noise standards contained in the San Bernardino County Municipal Code, predictive noise modeling was conducted. The estimated maximum number of trucks per hour (17) during the peak morning and evening hours was used for the worst-case hourly noise calculations, based upon the Traffic Impacts Analysis in which this is listed as the highest hourly truck volume from the project. Also taken into account were the planned 8-foot high solid masonry walls on the northern and the northwestern and southwestern project boundaries, as well as shielding which would be provided by the proposed building for equipment inside or otherwise screened by the building. Using standard noise propagation rates (i.e., 6 decibels per doubling of distance) and reference noise emission data[2], the noise levels from activities such as trucks maneuvering in and out of loading docks, trucks driving by, forklifts, HVAC noise and passenger vehicle parking lot activities were calculated for the five nearest noise-sensitive receiver locations (residences to the west, south and east, the school to the northwest and the church to the north). Also accounted for were the typical duration of each noise “event” and the number of noise events per hour anticipated during the peak hour. These assumptions were based upon the trip generation data provided in the projects Traffic Impacts Analysis, as well as the above-referenced noise measurements and observations for a similar project. These data were compiled in a computer spreadsheet program; the spreadsheet input and output data are contained in Appendix D. The results of the noise analysis from on-site operations are summarized in Table 12. As Table 12 shows, noise levels from Project activities would range from 38 dBA L_{eq} to 45 dBA L_{eq}, and thus would not exceed the San Bernardino County noise municipal code noise ordinance. The noise levels would also be well below existing ambient noise levels, based upon the noise measurement data summarized in Section 4.1 On-site noise from the proposed project would thus be less than significant.

Table 12
Noise from On-Site Activities

Representative Noise-Sensitive Land Uses	Estimated Noise Level (dBA L_{eq})	San Bernardino County Noise Ordinance Standard (45 dBA L_{eq}) Exceeded?
Linden Avenue Residences West of Project Site	45	No
Jurupa Avenue Residences South of Project Site	44	No
Cedar Avenue Residences East of Project Site	42	No

2 Reference noise data based upon noise measurements conducted by Jim Wilder, URS Corporation, 2000 for a similar type of facility and shown in Appendix D

Table 12
Noise from On-Site Activities

Representative Noise-Sensitive Land Uses	Estimated Noise Level (dBA L_{eq})	San Bernardino County Noise Ordinance Standard (45 dBA L_{eq}) Exceeded?
Elementary School Northwest of Project Site	38	No
Church North of Project Site	39	No

5.5 Vibration Impacts

The heavier pieces of construction equipment used at the project site could include dozers, graders, cranes, loaded trucks, water trucks, and pavers. Groundborne vibration information related to construction activities has been collected by the California Department of Transportation (Caltrans). Information from Caltrans indicates that continuous vibrations with a PPV of approximately 0.10 inches/second begin to cause annoyance (Caltrans 2013). Ground-borne vibration is typically attenuated over short distances (typically on the order of 25 feet). The closest homes would be approximately 60 feet or more from the nearest construction area. At this distance and with the anticipated construction equipment, the PPV is estimated to be 0.024 inches/second or lower, which would be well below 0.10 inches/second at the adjacent sensitive receptors mentioned in the Caltrans guidance, and well below the County's vibration standard of 0.20 inches/second. Therefore, construction activities are not anticipated to result in continuous vibration levels that typically annoy people, and the vibration impact would be less than significant. Operational vibration would also be less than significant; no major equipment that would be capable of transmitting vibrations beyond the property boundaries is envisioned, and the rubber-tired heavy and medium trucks and automobiles associated with project operations would not create vibration levels higher than already experienced along the adjacent arterial roadways.

6 MITIGATION MEASURES

The following mitigation measures would reduce temporary noise levels from construction activities.

6.1 Construction Noise Mitigation Measures

Construction noise is potentially significant and could adversely affect nearby residents during construction. However, the noise would be temporary and limited to the duration of the construction. The following measures should be incorporated into the Project contract specifications to minimize construction noise impacts:

1. All noise-producing Project equipment and vehicles using internal combustion engines shall be equipped with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. Mobile or fixed “package” equipment (e.g., arc-welders, air compressors) shall be equipped with shrouds and noise control features that are readily available for that type of equipment.
2. All mobile or fixed noise-producing equipment used on the Project that are regulated for noise output by a local, state, or federal agency shall comply with such regulation while in the course of Project activity.
3. Electrically powered equipment shall be used instead of pneumatic or internal combustion powered equipment, where feasible.
4. Material stockpiles and mobile equipment staging, parking, and maintenance areas shall be located as far as practicable from noise-sensitive receptors.
5. Construction site and access road speed limits shall be established and enforced during the construction period.
6. Construction operations shall not occur between 7:00 p.m. and 7:00 a.m. Monday through Saturday, or at any time on Sunday or on federal holidays. The hours of construction, including noisy maintenance activities and all spoils and material transport, shall be restricted to the periods and days permitted by the local noise or other applicable ordinance.
7. The use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only.
8. No Project-related public address or music system shall be audible at any adjacent receptor.
9. The on-site construction supervisor shall have the responsibility and authority to receive and resolve noise complaints. A clear appeal process to the owner shall be established

prior to construction commencement that will allow for resolution of noise problems that cannot be immediately solved by the site supervisor.

Effectiveness of these mitigation measures would vary from several decibels (which in general is a relatively small change) to ten or more decibels (which subjectively would be perceived as a substantial change), depending upon the specific equipment and the original condition of that equipment, the specific locations of the noise sources and the receivers, etc. Relocation of equipment to a more distant location, for example, could range from 1 decibel or less to over 15 decibels, depending upon the location of the equipment before and after relocation. Installation of more effective silencers could range from several decibels to well over 10 decibels. Reduction of idling equipment could reduce overall noise levels from barely any reduction to several decibels. Cumulatively, however, these measures would result in substantial decreases in the noise from construction. With implementation of these measures, short-term construction impacts associated with exposure of persons to or generation of noise levels in excess of established standards would be less than significant.

6.2 Level of Significance After Mitigation

With implementation of the listed mitigation measures, temporary construction noise would be reduced to a level below significance. Project-related noise impacts would be less than significant.

7 REFERENCES

California Department of Transportation (Caltrans). September, 2013. Transportation and Construction Vibration Guidance Manual. Division of Environmental Analysis, Environmental Engineering, Hazardous Waste, Air, Noise, Paleontology Office. Sacramento, California.

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County of San Bernardino. 2007a. Noise Element. In San Bernardino County 2007 General Plan.

County of San Bernardino. 2007b. Noise Standards. County of San Bernardino Municipal Code (Title 8, Development Code; Division 3, Countywide Development Standards; Chapter 83.01, General Performance Standards, Section 83.01.080, Noise.

FHWA (Federal Highway Administration). 2004. FHWA Traffic Noise Model, Version 2.5. Released April 2004.

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FTA (Federal Transit Administration). 2006. Transit Noise and Vibration Impact Assessment. July 1, 2006.

Kunzman Associates, Inc. 2016. Bloomington Option C Traffic Impact Analysis.

Wilder. 2000. Noise survey of commercial loading dock operations.

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APPENDIX A

Field Noise Measurement Data Sheets

DUDEK

FIELD NOISE MEASUREMENT DATA

PROJECT: Western Realco
PROJECT #: 8674
SITE ID: Single Family Residential
SITE ADDRESS: 11159 Cedar Avenue Bloomington, CA 92316
OBSERVER(S): Stephanie Tang
START DATE: 2/5/15
END DATE: 2/5/15
START TIME: 116 PM
END TIME: 131 PM

METEOROLOGICAL CONDITIONS

TEMP: 78° F
HUMIDITY: 21 % R.H.
WIND: CALM **LIGHT** MODERATE VARIABLE STEADY GUSTY
WINDSPD: 4 MPH
DIR.: N **NE** S SE S SW W NW
SKY: **SUNNY** **CLEAR** OVRCAST PRTLY CLDY FOG RAIN

ACOUSTIC MEASUREMENTS

MEAS. INSTRUMENT: Piccolo SLM — TYPE 1 **2** — SERIAL #: 130625008
CALIBRATOR: BSWA CA114 — SERIAL #: 490151
CALIBRATION CHECK: PRE-TEST 94.0 dBA SPL — POST-TEST 94.0 dBA SPL — WINDSCRN ✓

SETTINGS: A-WTD SLOW FAST FRONTAL RANDOM ANSI OTHER:

REC. #	BEGIN	END	Leq	Lmax	Lmin	L90	L50	L10	OTHER (SPECIFY METRIC)
M1	116pm	131pm	70.6	83.8	49.0				

COMMENTS:

SOURCE INFO AND TRAFFIC COUNTS

PRIMARY NOISE SOURCE: **TRAFFIC** AIRCRAFT RAIL INDUSTRIAL OTHER:
ROADWAY TYPE: Cedar Avenue
DIST. TO RDWY C/L OR EOP: ~95'
TRAFFIC COUNT DURATION: 15 MIN

COUNT 1 (OR RDWY 1)

DIRECTION	**NB/EB**	**SB/WB**	SPEED NB/EB	SPEED SB/WB
AUTOS	145	166		
MED TRKS	6	3		
HVY TRKS	9	14		
BUSES	2	1		
MOTRCLS	0	0		

IF COUNTING BOTH DIRECTIONS AS ONE, CHECK HERE: ____

COUNT 2 (OR RDWY 2) — MIN

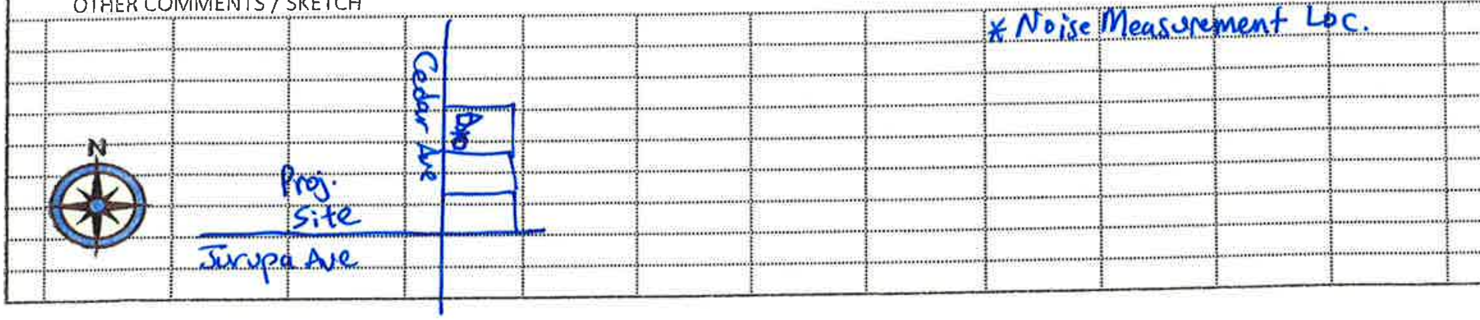
DIRECTION	NB/EB	SB/WB	SPEED NB/EB	SPEED SB/WB

SPEEDS ESTIMATED BY: RADAR / DRIVING THE PACE
POSTED SPEED LIMIT SIGNS SAY: 45 mph

OTHER NOISE SOURCES (BACKGROUND): **DIST. AIRCRAFT** RUSTLING LEAVES **DIST. BARKING DOGS** **BIRDS** DIST. INDUSTRIAL DIST. KIDS PLAYING **DIST. CONVRSTNS** / YELLING DIST. TRAFFIC (LIST RDWYS BELOW) DISTD GARDENERS/LANDSCAPING NOISE
OTHER: Rooster noises, horse passing through; dist. music; clanking on-site; vehicles passing along Cedar Ave.

DESCRIPTION / SKETCH

TERRAIN: **HARD** SOFT MIXED **FLAT** OTHER: Driveway
PHOTOS: See Attached
OTHER COMMENTS / SKETCH



M1- 11169 Cedar Avenue Bloomington, CA 92316

Photo Taken: 2/5/15

DUDEK

FIELD NOISE MEASUREMENT DATA

PROJECT: Western Realco | PROJECT #: 8674
SITE ID: Single Family Residential
SITE ADDRESS: 18579 Jurupa Ave Bloomington, CA 92316 | OBSERVER(S): Stephanie Tang
START DATE: 2/5/15 | END DATE: 2/5/15
START TIME: 1:55 pm | END TIME: 2:10 pm

METEOROLOGICAL CONDITIONS

TEMP: 79° F | HUMIDITY: 20 % R.H. | WIND: CALM (LIGHT) MODERATE
WINDSPD: 4 MPH | DIR.: N (NE) S SE S SW W NW | VARIABLE STEADY GUSTY
SKY: (SUNNY) (CLEAR) OVRCAST PRTLY CLDY FOG RAIN

ACOUSTIC MEASUREMENTS

MEAS. INSTRUMENT: Piccolo SLM | TYPE 1 (2) | SERIAL #: 130625008
CALIBRATOR: BSWA CA 114 | SERIAL #: 490151
CALIBRATION CHECK: PRE-TEST 94.0 dBA SPL | POST-TEST 94.0 dBA SPL | WINDSCRN ✓

SETTINGS: (A-WTD) (SLOW) FAST FRONTAL RANDOM ANSI OTHER:

REC. #	BEGIN	END	Leq	Lmax	Lmin	L90	L50	L10	OTHER (SPECIFY METRIC
M2	1:55pm	2:10pm	61.8	74.8	50.6				

COMMENTS

SOURCE INFO AND TRAFFIC COUNTS

PRIMARY NOISE SOURCE: (TRAFFIC) AIRCRAFT RAIL INDUSTRIAL OTHER:
ROADWAY TYPE: Jurupa Avenue | DIST. TO RDWY C/L OR EOP: ~65'
TRAFFIC COUNT DURATION: 15 MIN

COUNT 1 (OR RDWY 1)

DIRECTION	NB/(EB)	SB/(WB)	SPEED NB/EB	SPEED SB/WB
AUTOS	32	33		
MED TRKS	0	2		
HVY TRKS	0	0		
BUSES	1	0		
MOTRCLS	0	0		

IF COUNTING BOTH DIRECTIONS AS ONE, CHECK HERE ___

COUNT 2 (OR RDWY 2) — MIN ___

DIRECTION	NB/EB	SB/WB	SPEED NB/EB	SPEED SB/WB
AUTOS				
MED TRKS				
HVY TRKS				
BUSES				
MOTRCLS				

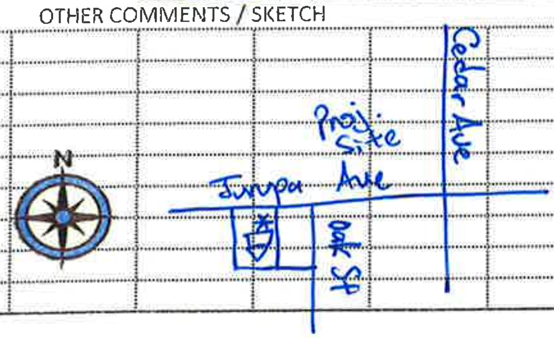
SPEEDS ESTIMATED BY: RADAR / DRIVING THE PACE
POSTED SPEED LIMIT SIGNS SAY: 40mph

OTHER NOISE SOURCES (BACKGROUND): (DIST. AIRCRAFT) RUSTLING LEAVES (DIST. BARKING DOGS) (BIRDS) DIST. INDUSTRIAL DIST. KIDS PLAYING (DIST. CONVRSTNS) YELLING (DIST. TRAFFIC (LIST RDWYS BELOW)) DISTD GARDENERS/LANDSCAPING NOISE
OTHER: Neighbor - Const. veh. hauling soils, excavator operation; rooster noises Vehicles traveling along Jurupa Avenue and Oak Street; Car honking

DESCRIPTION / SKETCH

TERRAIN: (HARD) SOFT MIXED (FLAT) OTHER: Walkway
PHOTOS: See Attached
OTHER COMMENTS / SKETCH

* Noise Measurement Loc.



M2 - 18579 Jurupa Avenue Bloomington, CA 92316
Photo Taken: 2/5/15

DUDEK

FIELD NOISE MEASUREMENT DATA

PROJECT	Western Realco	PROJECT #	8674
SITE ID	Single Family Residential		
SITE ADDRESS	11266 Linden Avenue Bloomington, CA 92316	OBSERVER(S)	Stephanie Tang
START DATE	2/5/15	END DATE	2/5/15
START TIME	225pm	END TIME	240PM

METEOROLOGICAL CONDITIONS

TEMP 79° F HUMIDITY 20 % R.H. WIND CALM (LIGHT) MODERATE

WINDSPD 4 MPH DIR. N (NE) S SE S SW W NW VARIABLE STEADY GUSTY

SKY (SUNNY) (CLEAR) OVRCAST PRTLY CLDY FOG RAIN

ACOUSTIC MEASUREMENTS

MEAS. INSTRUMENT Piccolo SLM TYPE 1 (2) SERIAL # 130625008

CALIBRATOR BSWA CA 114 SERIAL # 490151

CALIBRATION CHECK PRE-TEST 94.0 dBA SPL POST-TEST 94.0 dBA SPL WINDSCRN ✓

SETTINGS (A-WTD) (SLOW) FAST FRONTAL RANDOM ANSI OTHER:

REC. #	BEGIN	END	Leq	Lmax	Lmin	L90	L50	L10	OTHER (SPECIFY METRIC
M3	225pm	240pm	64.6	80.4	48.2				

COMMENTS

SOURCE INFO AND TRAFFIC COUNTS

PRIMARY NOISE SOURCE (TRAFFIC) AIRCRAFT RAIL INDUSTRIAL OTHER:

ROADWAY TYPE: Linden Avenue DIST. TO RDWY C/L OR EOP: ~65'

TRAFFIC COUNT DURATION: 15 MIN SPEED ___ MIN SPEED

COUNT 1 (OR RDWY 1) DIRECTION	(NB)/EB	(SB)/WB	SPEED NB/EB	SPEED SB/WB	IF COUNTING BOTH DIRECTIONS AS ONE, CHECK HERE	COUNT 2 (OR RDWY 2) NB/EB	SB/WB	SPEED NB/EB	SPEED SB/WB
AUTOS	35	32							
MED TRKS	1	0							
HVY TRKS	1	0							
BUSES	0	0							
MOTRCLS	0	0							

SPEEDS ESTIMATED BY: RADAR / DRIVING THE PACE

POSTED SPEED LIMIT SIGNS SAY: 25mph

OTHER NOISE SOURCES (BACKGROUND): (DIST. AIRCRAFT) (RUSTLING LEAVES) (DIST. BARKING DOGS) BIRDS DIST. INDUSTRIAL DIST. KIDS PLAYING DIST. CONVRSTNS / YELLING (DIST. TRAFFIC (LIST RDWYS BELOW)) (DISTD GARDENERS/LANDSCAPING NOISE)

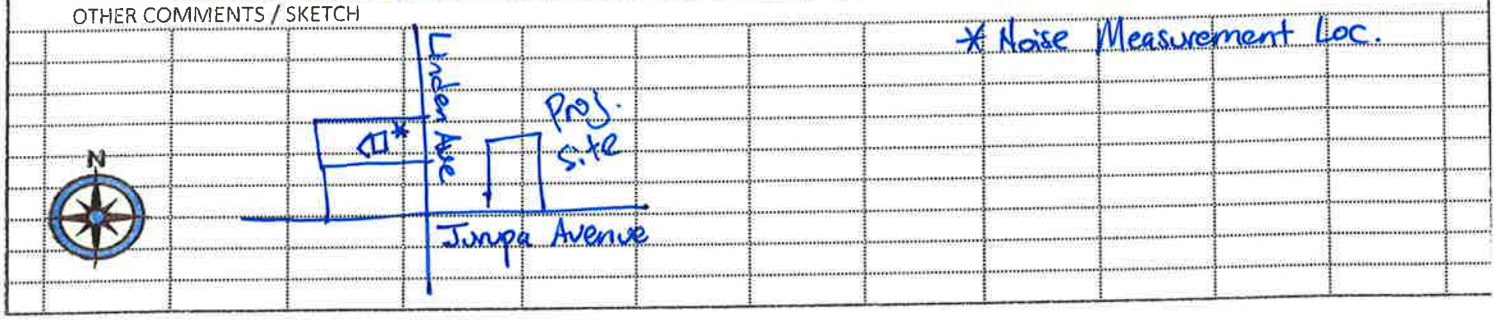
OTHER: Vehicles traveling along Linden Avenue and Jurupa Avenue

DESCRIPTION / SKETCH

TERRAIN HARD SOFT MIXED FLAT OTHER: Front Yard Grass Area

PHOTOS See Attached

OTHER COMMENTS / SKETCH



M3 - 11266 Linden Avenue Bloomington, CA 92316
Photo Taken: 2/5/15

DUDEK

FIELD NOISE MEASUREMENT DATA

PROJECT: Western Realco
PROJECT #: 8674
SITE ID: Zimmerman Elementary School
SITE ADDRESS: 11050 Linden Avenue Bloomington, CA 92316
OBSERVER(S): Stephanie Tang
START DATE: 2/5/15 END DATE: 2/5/15
START TIME: 256pm END TIME: 311pm

METEOROLOGICAL CONDITIONS
TEMP: 77° F HUMIDITY: 21 % R.H. WIND: CALM (LIGHT) MODERATE VARIABLE (STEADY) GUSTY
WINDSPD: 4 MPH DIR. N NE S SE S SW W (NW)
SKY: (SUNNY) (CLEAR) OVRCAST PRTLY CLDY FOG RAIN

ACOUSTIC MEASUREMENTS
MEAS. INSTRUMENT: Piccolo SLM TYPE 1 (2) SERIAL #: 130625008
CALIBRATOR: BSWA CA 114 SERIAL #: 490151
CALIBRATION CHECK PRE-TEST: 94.0 dBA SPL POST-TEST: 94.0 dBA SPL WINDSCRN: ✓

SETTINGS: (A-WTD) (SLOW) FAST FRONTAL RANDOM ANSI OTHER:

REC. #	BEGIN	END	Leq	Lmax	Lmin	L90	L50	L10	OTHER (SPECIFY METRIC
M4	256pm	311pm	66.6	87.4	49.0				

COMMENTS

SOURCE INFO AND TRAFFIC COUNTS
PRIMARY NOISE SOURCE: (TRAFFIC) AIRCRAFT RAIL INDUSTRIAL OTHER:
ROADWAY TYPE: Linden Avenue DIST. TO RDWY C/L OR EOP: ~100'
TRAFFIC COUNT DURATION: 15 MIN

COUNT 1 (OR RDWY 1)	NB/EB	SB/WB	SPEED NB/EB	SPEED SB/WB
AUTOS	68	34		
MED TRKS	0	0		
HVY TRKS	0	1		
BUSES	1	0		
MOTRCLS	1	0		

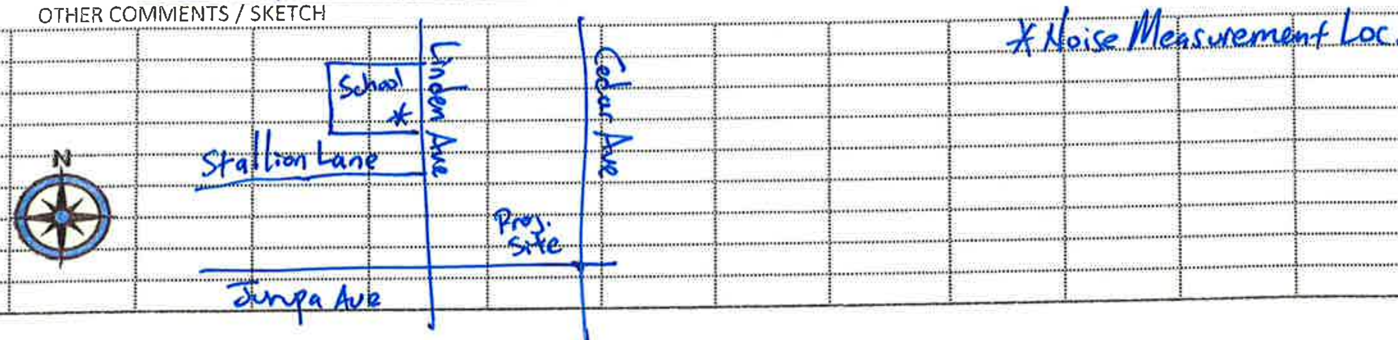
IF COUNTING BOTH DIRECTIONS AS ONE, CHECK HERE

COUNT 2 (OR RDWY 2)	NB/EB	SB/WB	SPEED NB/EB	SPEED SB/WB
AUTOS				
MED TRKS				
HVY TRKS				
BUSES				
MOTRCLS				

SPEEDS ESTIMATED BY: RADAR / DRIVING THE PACE
POSTED SPEED LIMIT SIGNS SAY: 25mph

OTHER NOISE SOURCES (BACKGROUND): (DIST. AIRCRAFT) (RUSTLING LEAVES) DIST. BARKING DOGS BIRDS DIST. INDUSTRIAL DIST. KIDS PLAYING (DIST. CONVRSTNS / YELLING) DIST. TRAFFIC (LIST RDWYS BELOW) DISTD GARDENERS/LANDSCAPING NOISE
OTHER: Skateboarding; Students playing at School; Car Engine Start

DESCRIPTION / SKETCH
TERRAIN: (HARD) SOFT MIXED (FLAT) OTHER: School Walkway
PHOTOS: See Attached
OTHER COMMENTS / SKETCH



M4 - 11050 Linden Avenue Bloomington, CA 92316
Photo Taken: 2/5/15

DUDEK

FIELD NOISE MEASUREMENT DATA

PROJECT: Western Realco
PROJECT #: 8674
SITE ID: Upland Indonesian Seventh-Day Adventist Church
SITE ADDRESS: 11100 Cedar Avenue Bloomington, CA 92316
OBSERVER(S): Stephanie Tang
START DATE: 2/5/15
END DATE: 2/5/15
START TIME: 338pm
END TIME: 353pm

METEOROLOGICAL CONDITIONS

TEMP: 75 F
HUMIDITY: 25 % R.H.
WIND: CALM / (LIGHT) / MODERATE / VARIABLE / STEADY / GUSTY
WINDSPD: 5 MPH
DIR.: N NE S SE S SW W (NW)
SKY: (SUNNY) (CLEAR) OVRCAST PRTLY CLDY FOG RAIN

ACOUSTIC MEASUREMENTS

MEAS. INSTRUMENT: Piccolo SLM
TYPE: 1 (2)
SERIAL #: 130625008
CALIBRATOR: BSWA CA 114
SERIAL #: 490151
CALIBRATION CHECK: PRE-TEST 94.0 dBA SPL
POST-TEST 94.0 dBA SPL
WINDSCRN ✓

SETTINGS: (A-WTD) (SLOW) FAST FRONTAL RANDOM ANSI OTHER:

REC. #	BEGIN	END	Leq	Lmax	Lmin	L90	L50	L10	OTHER (SPECIFY METRIC
M5	338pm	353pm	67.2	77.9	47.7				

COMMENTS

SOURCE INFO AND TRAFFIC COUNTS

PRIMARY NOISE SOURCE: (TRAFFIC) AIRCRAFT RAIL INDUSTRIAL OTHER:
ROADWAY TYPE: Cedar Avenue
DIST. TO RDWY C/L OR EOP: ~130'
TRAFFIC COUNT DURATION: 15 MIN

COUNT 1 (OR RDWY 1)

DIRECTION	(NB)/EB	(SB)/WB	SPEED NB/EB	SPEED SB/WB
AUTOS	253	209		
MED TRKS	10	6		
HVY TRKS	5	10		
BUSES	0	1		
MOTRCLS	3	1		

IF COUNTING BOTH DIRECTIONS AS ONE, CHECK HERE ___

COUNT 2 (OR RDWY 2)

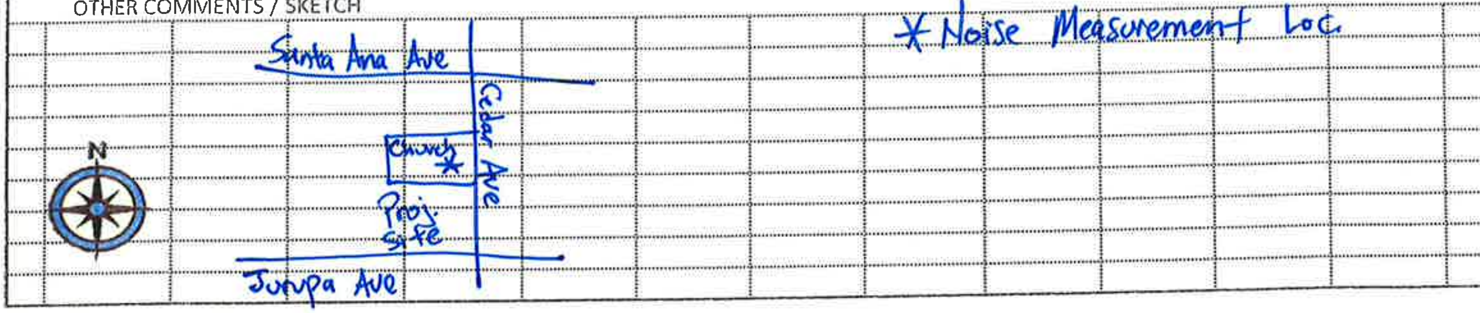
DIRECTION	NB/EB	SB/WB	SPEED NB/EB	SPEED SB/WB
AUTOS				
MED TRKS				
HVY TRKS				
BUSES				
MOTRCLS				

SPEEDS ESTIMATED BY: RADAR / DRIVING THE PACE
POSTED SPEED LIMIT SIGNS SAY: 45 mph

OTHER NOISE SOURCES (BACKGROUND): (DIST. AIRCRAFT) (RUSTLING LEAVES) DIST. BARKING DOGS (BIRDS) DIST. INDUSTRIAL DIST. KIDS PLAYING DIST. CONVRSTNS / YELLING DIST. TRAFFIC (LIST RDWYS BELOW) DISTD GARDENERS/LANDSCAPING NOISE
OTHER: Vehicles traveling along Cedar Avenue

DESCRIPTION / SKETCH

TERRAIN: (HARD) SOFT MIXED (FLAT) OTHER: Church Walkway
PHOTOS: See Attached
OTHER COMMENTS / SKETCH



M5 - 11100 Cedar Avenue Bloomington, CA 92316
Photo Taken: 2/5/15

Site 1 (LT1 Noise Measurement Data)

Rec 1 to 25 Slow Response dBA weighting 2.0 dB resolution stats

Date hh:mm:ss	LeqPeriod	Leq	SEL	Lmax	Lmin	L1%	L5%	L10%	L50%	L90%	L95%	L99%	Lmedian	Lmean	StdDev	L2%	L8%	L25%
8/9/2016 9:54	1.0 hour	65.2	100.8	86.6	43.8	73	69	67	59	51	49	47	59	59.5	6.42	73	69	65
8/9/2016 10:54	1.0 hour	65.2	100.8	86.9	44.5	73	69	67	57	51	49	47	57	58.3	6.36	71	67	63
8/9/2016 11:54	1.0 hour	64.8	100.4	83.8	45.3	75	69	67	59	51	49	45	59	58.9	6.55	73	69	63
8/9/2016 12:54	1.0 hour	65	100.6	82.9	46	73	69	69	59	51	49	47	59	59.5	6.37	73	69	65
8/9/2016 13:54	1.0 hour	64.7	100.3	79.9	45.2	75	69	67	59	51	51	47	59	59.4	6.05	73	69	63
8/9/2016 14:54	1.0 hour	65.7	101.3	84.6	47.8	75	69	67	61	53	53	49	61	60.4	5.51	73	67	65
8/9/2016 15:54	1.0 hour	66.7	102.3	89.4	49.5	75	69	69	61	55	53	51	61	61.5	5.11	73	69	65
8/9/2016 16:54	1.0 hour	65.4	101	84.4	48.7	73	71	67	61	55	53	51	61	61.1	5.24	73	69	65
8/9/2016 17:54	1.0 hour	65.5	101.1	84.2	49.8	73	69	69	61	55	53	51	61	61.3	5.26	71	69	65
8/9/2016 18:54	1.0 hour	66.1	101.7	85.7	49.4	75	71	67	61	55	53	51	61	61.3	5.35	73	69	65
8/9/2016 19:54	1.0 hour	64.4	100	81.3	45.4	73	69	67	59	53	51	49	59	59.7	5.61	71	67	63
8/9/2016 20:54	1.0 hour	63.8	99.4	82.4	46	71	69	67	59	51	49	47	59	59	5.92	71	67	63
8/9/2016 21:54	1.0 hour	63.6	99.2	84.7	45.4	73	69	67	57	47	47	45	57	57.3	6.89	71	67	63
8/9/2016 22:54	1.0 hour	61.4	97	79.1	43.7	71	67	65	55	47	45	45	55	55.1	6.69	69	65	59
8/9/2016 23:54	1.0 hour	60.3	95.9	77.8	43.2	71	65	63	51	45	43	43	51	52.3	7.34	69	63	59
8/10/2016 0:54	1.0 hour	59	94.6	80.3	42.9	69	65	61	49	43	43	43	49	50.7	7.17	67	63	55
8/10/2016 1:54	1.0 hour	59.3	94.9	76.5	42.7	69	65	63	49	43	43	43	49	51.2	7.49	67	63	57
8/10/2016 2:54	1.0 hour	61.6	97.2	77.6	43.1	71	67	65	53	45	43	43	53	53.8	7.66	71	65	59
8/10/2016 3:54	1.0 hour	66.1	101.7	83.1	46.1	75	71	69	59	51	49	47	59	59.9	7.01	73	71	65
8/10/2016 4:54	1.0 hour	67.1	102.7	91.1	49.1	75	71	71	61	53	51	49	61	61.5	6.45	73	71	67
8/10/2016 5:54	1.0 hour	67.6	103.2	83.9	50.3	75	71	71	63	55	53	51	63	63.1	5.79	73	71	67
8/10/2016 6:54	1.0 hour	66	101.6	84.5	47.6	73	71	69	61	55	53	49	61	61.7	5.6	73	69	67
8/10/2016 7:54	1.0 hour	65.6	101.2	82.7	48	73	71	69	61	53	51	49	61	60.8	5.88	71	69	65
8/10/2016 8:54	1.0 hour	64.1	99.7	83.5	45.6	73	69	67	59	51	49	47	59	59.1	5.97	71	67	63
8/10/2016 9:54	3.5 min	65.1	88.4	74.2	48	73	69	69	61	51	51	47	61	60.7	6.13	71	69	65

APPENDIX B

Construction Noise Model Input / Output

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat 8/31/2016
Case Descr Bloomington Dist'n Center - Demolition

---- Receptor #1 ----

Descriptior	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest frc	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	80	0
Excavator	No	40		80.7	80	0
Excavator	No	40		80.7	120	0
Excavator	No	40		80.7	200	0
Dozer	No	40		81.7	80	0
Dozer	No	40		81.7	120	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	85.5	78.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	76.6	72.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	73.1	69.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	68.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	77.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	74.1	70.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	85.5	81.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Descriptior	Land Use	Baselines (dBA) Daytime	Evening	Night
Acoustic Ce	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)

Concrete Saw	No	20	89.6	400	0
Excavator	No	40	80.7	400	0
Excavator	No	40	80.7	400	0
Excavator	No	40	80.7	400	0
Dozer	No	40	81.7	400	0
Dozer	No	40	81.7	400	0

			Results											
	Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	71.5	64.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	62.6	58.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	62.6	58.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	62.6	58.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	63.6	59.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	63.6	59.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	71.5	68.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat 8/31/2016
Case Descr Bloomington Dist'n Center - Site Preparation

---- Receptor #1 ----

Descriptior	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest ap	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	60	0
Dozer	No	40		81.7	80	0
Dozer	No	40		81.7	150	0
Backhoe	No	40		77.6	60	0
Front End Loader	No	40		79.1	80	0
Tractor	No	40	84		80	0
Backhoe	No	40		77.6	150	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	80.1	76.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	77.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	72.1	68.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	76	72	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	75	71	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	79.9	75.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	68	64	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	80.1	81.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Descriptior	Land Use	Baselines (dBA) Daytime	Evening	Night
Acoustic Ce	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	400	0
Dozer	No	40		81.7	400	0
Dozer	No	40		81.7	400	0
Backhoe	No	40		77.6	400	0
Front End Loader	No	40		79.1	400	0
Tractor	No	40	84		400	0
Backhoe	No	40		77.6	400	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	63.6	59.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	63.6	59.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	63.6	59.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	59.5	55.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	61	57.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	65.9	62	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	59.5	55.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	65.9	67.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat 8/31/2016
Case Descr Bloomington Dist'n Center - Grading

---- Receptor #1 ----

		Baselines (dBA)		
Descriptior	Land Use	Daytime	Evening	Night
Nearest ap	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	60	0
Excavator	No	40		80.7	80	0
Grader	No	40	85		60	0
Dozer	No	40		81.7	100	0
Scraper	No	40		83.6	80	0
Scraper	No	40		83.6	100	0
Backhoe	No	40		77.6	150	0
Front End Loader	No	40		79.1	60	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	76.6	72.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	83.4	79.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	75.6	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	79.5	75.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	77.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	68	64	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	77.5	73.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	83.4	83.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Descriptior	Land Use	Daytime	Evening	Night
Acoustic Ce	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	400	0
Excavator	No	40		80.7	400	0
Grader	No	40	85		400	0
Dozer	No	40		81.7	400	0
Scraper	No	40		83.6	400	0
Scraper	No	40		83.6	400	0
Backhoe	No	40		77.6	400	0
Front End Loader	No	40		79.1	400	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	62.6	58.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	62.6	58.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	66.9	63	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	63.6	59.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	65.5	61.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	65.5	61.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	59.5	55.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	61	57.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.9	69.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat 8/31/2016
Case Descr Bloomington Dist'n Center - Building Construction

---- Receptor #1 ----

		Baselines (dBA)		
Descriptior	Land Use	Daytime	Evening	Night
Nearest ap	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	60	0
Man Lift	No	20		74.7	80	0
Man Lift	No	20		74.7	60	0
Man Lift	No	20		74.7	100	0
Generator (<25KVA, VMS sig	No	50		72.8	80	0
Backhoe	No	40		77.6	100	0
Front End Loader	No	40		79.1	150	0
Tractor	No	40	84		60	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	79	71	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	70.6	63.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	73.1	66.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	68.7	61.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator (<25KVA, VMS sig	68.7	65.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	71.5	67.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	69.6	65.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	82.4	78.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	82.4	80.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Descriptior	Land Use	Daytime	Evening	Night
Acoustic Ce	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	400	0
Man Lift	No	20		74.7	400	0
Man Lift	No	20		74.7	400	0
Man Lift	No	20		74.7	400	0
Generator (<25KVA, VMS sig	No	50		72.8	400	0
Backhoe	No	40		77.6	400	0
Front End Loader	No	40		79.1	400	0
Tractor	No	40	84		400	0

Results

	Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	62.5	54.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	56.6	49.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	56.6	49.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	56.6	49.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator (<25KVA, VMS sig	54.7	51.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	59.5	55.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	61	57.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	65.9	62	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	65.9	65	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat 8/31/2016
Case Descr Bloomington Dist'n Center - Paving

---- Receptor #1 ----

		Baselines (dBA)		
Descriptior	Land Use	Daytime	Evening	Night
Nearest ap	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Paver	No	50		77.2	60	0
Paver	No	50		77.2	80	0
All Other Equipment > 5 HP	No	50	85		60	0
All Other Equipment > 5 HP	No	50	85		100	0
Roller	No	20		80	60	0
Roller	No	20		80	80	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	75.6	72.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	73.1	70.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	83.4	80.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	79	76	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	78.4	71.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	75.9	68.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	83.4	83	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Descriptior	Land Use	Daytime	Evening	Night
Acoustic Ce	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)

Paver	No	50		77.2	400	0
Paver	No	50		77.2	400	0
All Other Equipment > 5 HP	No	50	85		400	0
All Other Equipment > 5 HP	No	50	85		400	0
Roller	No	20		80	400	0
Roller	No	20		80	400	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	59.2	56.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	59.2	56.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	66.9	63.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	66.9	63.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	61.9	54.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	61.9	54.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.9	68.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat(8/31/2016
Case Descr Bloomington Dist'n Center - Architectural Coatings

---- Receptor #1 ----

Descriptior	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest ap	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	60	0
Pickup Truck	No	40		75	80	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	76.1	72.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	70.9	66.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	76.1	73.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Descriptior	Land Use	Baselines (dBA) Daytime	Evening	Night
Acoustic C(	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	400	0
Pickup Truck	No	40		75	400	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	59.6	55.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	56.9	53	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	59.6	57.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

APPENDIX C

Traffic Noise Modeling Input and Output Files

Traffic Noise Model (TNM®)

Input/Output

Dudek **14 July 2016**
M Greene **TNM 2.5**

INPUT: ROADWAYS
PROJECT/CONTRACT: **8674**
RUN: **Blmngtn Wstn RlcoDistCntr Ex 062316**

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Cedar Ave N of Jurupa Ave	70.0	point2	2	4,000.0	3,010.0	100.00				Average	
		point1	1	4,000.0	5,000.0	100.00					
Cedar Ave S of Jurupa Ave	70.0	point4	4	4,000.0	100.0	100.00				Average	
		point3	3	4,000.0	2,990.0	100.00					
Linden Ave N of Jurupa Ave	40.0	point6	6	3,000.0	3,010.0	100.00				Average	
		point5	5	3,000.0	5,000.0	100.00					
Linden Ave S of Jurupa Ave	40.0	point8	8	3,000.0	100.0	100.00				Average	
		point7	7	3,000.0	2,990.0	100.00					
Jurupa Ave W of Linden Ave	25.0	point9	9	1,000.0	3,000.0	100.00				Average	
		point10	10	3,000.0	3,000.0	100.00					
Jurupa Ave btwn Linden Ave and Cedar	25.0	point11	11	3,010.0	3,000.0	100.00				Average	
		point12	12	4,000.0	3,000.0	100.00					
Jurupa Ave E of Cedar Ave	25.0	point13	13	4,010.0	3,000.0	100.00				Average	
		point14	14	6,000.0	3,000.0	100.00					

Dudek 14 July 2016

M Greene TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages

PROJECT/CONTRACT: 8674

RUN: Blmngtn Wstn RlcoDistCntr Ex 062316

Roadway Name	Points Name	No.	Segment Total Volume	Autos P	Autos S	MTrucks P	MTrucks S	HTrucks P	HTrucks S	Buses P	Buses S	Motorcycles P	Motorcycles S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Cedar Ave N of Jurupa Ave	point2	2	2050	92	45	3	45	5	45	0	0	0	0
	point1	1											
Cedar Ave S of Jurupa Ave	point4	4	2020	92	45	3	45	5	45	0	0	0	0
	point3	3											
Linden Ave N of Jurupa Ave	point6	6	270	97	25	1	25	2	25	0	0	0	0
	point5	5											
Linden Ave S of Jurupa Ave	point8	8	210	97	25	1	25	2	25	0	0	0	0
	point7	7											
Jurupa Ave W of Linden Ave	point9	9	410	84	40	4	40	12	40	0	0	0	0
	point10	10											
Jurupa Ave btwn Linden Ave and Cedar	point11	11	500	84	40	4	40	12	40	0	0	0	0
	point12	12											
Jurupa Ave E of Cedar Ave	point13	13	570	84	40	4	40	12	40	0	0	0	0
	point14	14											

Dudek						**14 July 2016**						
M Greene						**TNM 2.5**						
INPUT: RECEIVERS												
PROJECT/CONTRACT:	**8674**											
RUN:	**Blmngtn Wstn RlcoDistCntr Ex 062316**											
Receiver												
Name	**No.**	**#DUs**	**Coordinates (ground)**			**Height**	**Input Sound Levels and Criteria**					**Active**
			X	**Y**	**Z**	**above**	**Existing**	**Impact Criteria**			**NR**	**in**
						Ground	**LAeq1h**	**LAeq1h**	**Sub'l**		**Goal**	**Calc.**
			ft	ft	ft	ft	dBA	dBA	dB		dB	
M1	1	1	4,100.0	3,800.0	100.00	5.00	0.00	66	10.0		8.0	Y
M2	2	1	3,500.0	2,930.0	100.00	5.00	0.00	66	10.0		8.0	Y
M3	3	1	2,950.0	3,300.0	100.00	5.00	0.00	66	10.0		8.0	Y
M4	4	1	2,900.0	4,500.0	100.00	5.00	0.00	66	10.0		8.0	Y
M5	5	1	3,850.0	4,400.0	100.00	5.00	0.00	66	10.0		8.0	Y
R1	7	1	3,050.0	2,500.0	100.00	5.00	0.00	66	10.0		8.0	Y
R2	8	1	4,100.0	2,500.0	100.00	5.00	0.00	66	10.0		8.0	Y
R3	10	1	2,500.0	2,950.0	100.00	5.00	0.00	66	10.0		8.0	Y
R4	11	1	4,500.0	2,950.0	100.00	5.00	0.00	66	10.0		8.0	Y

Dudek						**14 July 2016**						
M Greene						**TNM 2.5**						
						Calculated with TNM 2.5						
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:		**8674**										
RUN:		**Blmngtn Wstn RlcoDistCntr Ex 062316**										
BARRIER DESIGN:		**INPUT HEIGHTS**					**Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.**					
ATMOSPHERICS:		**68 deg F, 50% RH**										

Receiver												
Name	**No.**	**#DUs**	**Existing**	**No Barrier**					**With Barrier**			
			LAeq1h	**LAeq1h**		**Increase over existing**		**Type**	**Calculated**	**Noise Reduction**		
				Calculated	**Crit'n**	**Calculated**	**Crit'n Sub'l Inc**	**Impact**	**LAeq1h**	**Calculated**	**Goal**	**Calculated minus Goal**
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M1	1	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
M2	2	1	0.0	65.0	66	65.0	10	----	65.0	0.0	8	-8.0
M3	3	1	0.0	57.8	66	57.8	10	----	57.8	0.0	8	-8.0
M4	4	1	0.0	53.4	66	53.4	10	----	53.4	0.0	8	-8.0
M5	5	1	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
R1	7	1	0.0	56.3	66	56.3	10	----	56.3	0.0	8	-8.0
R2	8	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
R3	10	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
R4	11	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	9	0.0	0.0	0.0
All Impacted	4	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek **14 July 2016**
M Greene **TNM 2.5**

INPUT: ROADWAYS
PROJECT/CONTRACT: **8674**
RUN: **BlmngtnRlcoDistCntr Ex w Prj 062316**

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Cedar Ave N of Jurupa Ave	70.0	point2	2	4,000.0	3,010.0	100.00				Average	
		point1	1	4,000.0	5,000.0	100.00					
Cedar Ave S of Jurupa Ave	70.0	point4	4	4,000.0	100.0	100.00				Average	
		point3	3	4,000.0	2,990.0	100.00					
Linden Ave N of Jurupa Ave	40.0	point6	6	3,000.0	3,010.0	100.00				Average	
		point5	5	3,000.0	5,000.0	100.00					
Linden Ave S of Jurupa Ave	40.0	point8	8	3,000.0	100.0	100.00				Average	
		point7	7	3,000.0	2,990.0	100.00					
Jurupa Ave W of Linden Ave	25.0	point9	9	1,000.0	3,000.0	100.00				Average	
		point10	10	3,000.0	3,000.0	100.00					
Jurupa Ave btwn Linden Ave and Cedar	25.0	point11	11	3,010.0	3,000.0	100.00				Average	
		point12	12	4,000.0	3,000.0	100.00					
Jurupa Ave E of Cedar Ave	25.0	point13	13	4,010.0	3,000.0	100.00				Average	
		point14	14	6,000.0	3,000.0	100.00					

Dudek							**14 July 2016**							
M Greene							**TNM 2.5**							
INPUT: TRAFFIC FOR LAeq1h Percentages														
PROJECT/CONTRACT:	**8674**													
RUN:	**BlmngtnRlcoDistCntr Ex w Prj 062316**													
Roadway	**Points**													
Name	**Name**	**No.**	**Segment**											
			Total	**Autos**		**MTrucks**		**HTrucks**		**Buses**		**Motorcycles**		
			Volume	**P**	**S**	**P**	**S**	**P**	**S**	**P**	**S**	**P**	**S**	
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph	
Cedar Ave N of Jurupa Ave	point2	2	2120	91	45	3	45	6	45	0	0	0	0	
	point1	1												
Cedar Ave S of Jurupa Ave	point4	4	2040	92	45	3	45	5	45	0	0	0	0	
	point3	3												
Linden Ave N of Jurupa Ave	point6	6	270	97	25	1	25	2	25	0	0	0	0	
	point5	5												
Linden Ave S of Jurupa Ave	point8	8	210	97	25	1	25	2	25	0	0	0	0	
	point7	7												
Jurupa Ave W of Linden Ave	point9	9	410	84	40	4	40	12	40	0	0	0	0	
	point10	10												
Jurupa Ave btwn Linden Ave and Cedar	point11	11	520	84	40	4	40	12	40	0	0	0	0	
	point12	12												
Jurupa Ave E of Cedar Ave	point13	13	580	84	40	4	40	12	40	0	0	0	0	
	point14	14												

Dudek **14 July 2016**
M Greene **TNM 2.5**

INPUT: RECEIVERS
PROJECT/CONTRACT: **8674**
RUN: **BlmngtnRlcoDistCntr Ex w Prj 062316**

Receiver											
Name	**No.**	**#DUs**	**Coordinates (ground)**			**Height**	**Input Sound Levels and Criteria**				**Active**
			X	**Y**	**Z**	**above**	**Existing**	**Impact Criteria**		**NR**	**in**
						Ground	**LAeq1h**	**LAeq1h**	**Sub'l**	**Goal**	**Calc.**
			ft	ft	ft	ft	dBA	dBA	dB	dB	
M1	1	1	4,100.0	3,800.0	100.00	5.00	0.00	66	10.0	8.0	Y
M2	2	1	3,500.0	2,930.0	100.00	5.00	0.00	66	10.0	8.0	Y
M3	3	1	2,950.0	3,300.0	100.00	5.00	0.00	66	10.0	8.0	Y
M4	4	1	2,900.0	4,500.0	100.00	5.00	0.00	66	10.0	8.0	Y
M5	5	1	3,850.0	4,400.0	100.00	5.00	0.00	66	10.0	8.0	Y
R1	7	1	3,050.0	2,500.0	100.00	5.00	0.00	66	10.0	8.0	Y
R2	8	1	4,100.0	2,500.0	100.00	5.00	0.00	66	10.0	8.0	Y
R3	10	1	2,500.0	2,950.0	100.00	5.00	0.00	66	10.0	8.0	Y
R4	11	1	4,500.0	2,950.0	100.00	5.00	0.00	66	10.0	8.0	Y

Dudek | **14 July 2016**
M Greene | **TNM 2.5**
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: 8674
RUN: BlmngtnRlcoDistCntr Ex w Prj 062316
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	No Barrier LAeq1h Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M1	1	1	0.0	68.8	66	68.8	10	Snd Lvl	68.8	0.0	8	-8.0
M2	2	1	0.0	65.2	66	65.2	10	----	65.2	0.0	8	-8.0
M3	3	1	0.0	57.8	66	57.8	10	----	57.8	0.0	8	-8.0
M4	4	1	0.0	53.4	66	53.4	10	----	53.4	0.0	8	-8.0
M5	5	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0
R1	7	1	0.0	56.4	66	56.4	10	----	56.4	0.0	8	-8.0
R2	8	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
R3	10	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
R4	11	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB
All Selected	9	0.0	0.0	0.0
All Impacted	4	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek **14 July 2016**
M Greene **TNM 2.5**

INPUT: ROADWAYS
PROJECT/CONTRACT: **8674**
RUN: **BlmngtnRealco Dist Fut wo Prj 062316**

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Cedar Ave N of Jurupa Ave	70.0	point2	2	4,000.0	3,010.0	100.00				Average	
		point1	1	4,000.0	5,000.0	100.00					
Cedar Ave S of Jurupa Ave	70.0	point4	4	4,000.0	100.0	100.00				Average	
		point3	3	4,000.0	2,990.0	100.00					
Linden Ave N of Jurupa Ave	40.0	point6	6	3,000.0	3,010.0	100.00				Average	
		point5	5	3,000.0	5,000.0	100.00					
Linden Ave S of Jurupa Ave	40.0	point8	8	3,000.0	100.0	100.00				Average	
		point7	7	3,000.0	2,990.0	100.00					
Jurupa Ave W of Linden Ave	25.0	point9	9	1,000.0	3,000.0	100.00				Average	
		point10	10	3,000.0	3,000.0	100.00					
Jurupa Ave btwn Linden Ave and Cedar	25.0	point11	11	3,010.0	3,000.0	100.00				Average	
		point12	12	4,000.0	3,000.0	100.00					
Jurupa Ave E of Cedar Ave	25.0	point13	13	4,010.0	3,000.0	100.00				Average	
		point14	14	6,000.0	3,000.0	100.00					

Dudek 14 July 2016
M Greene TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 8674
RUN: BlmngtnRealco Dist Fut wo Prj 062316

Roadway Name	Points Name	No.	Segment Total Volume	Autos P	Autos S	MTrucks P	MTrucks S	HTrucks P	HTrucks S	Buses P	Buses S	Motorcycles P	Motorcycles S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Cedar Ave N of Jurupa Ave	point2	2	2150	92	45	3	45	5	45	0	0	0	0
	point1	1											
Cedar Ave S of Jurupa Ave	point4	4	2130	92	45	3	45	5	45	0	0	0	0
	point3	3											
Linden Ave N of Jurupa Ave	point6	6	280	97	25	1	25	2	25	0	0	0	0
	point5	5											
Linden Ave S of Jurupa Ave	point8	8	210	97	25	1	25	2	25	0	0	0	0
	point7	7											
Jurupa Ave W of Linden Ave	point9	9	420	84	40	4	40	12	40	0	0	0	0
	point10	10											
Jurupa Ave btwn Linden Ave and Cedar	point11	11	510	84	40	4	40	12	40	0	0	0	0
	point12	12											
Jurupa Ave E of Cedar Ave	point13	13	630	84	40	4	40	12	40	0	0	0	0
	point14	14											

Dudek | 14 July 2016
M Greene | TNM 2.5

INPUT: RECEIVERS

PROJECT/CONTRACT: 8674

RUN: BlmngtnRealco Dist Fut wo Prj 062316

Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
M1	1	1	4,100.0	3,800.0	100.00	5.00	0.00	66	10.0	8.0	Y
M2	2	1	3,500.0	2,930.0	100.00	5.00	0.00	66	10.0	8.0	Y
M3	3	1	2,950.0	3,300.0	100.00	5.00	0.00	66	10.0	8.0	Y
M4	4	1	2,900.0	4,500.0	100.00	5.00	0.00	66	10.0	8.0	Y
M5	5	1	3,850.0	4,400.0	100.00	5.00	0.00	66	10.0	8.0	Y
R1	7	1	3,050.0	2,500.0	100.00	5.00	0.00	66	10.0	8.0	Y
R2	8	1	4,100.0	2,500.0	100.00	5.00	0.00	66	10.0	8.0	Y
R3	10	1	2,500.0	2,950.0	100.00	5.00	0.00	66	10.0	8.0	Y
R4	11	1	4,500.0	2,950.0	100.00	5.00	0.00	66	10.0	8.0	Y

Dudek							**14 July 2016**					
M Greene							**TNM 2.5**					
							Calculated with TNM 2.5					
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:		**8674**										
RUN:		**BlmngtnRealco Dist Fut wo Prj 062316**										
BARRIER DESIGN:		**INPUT HEIGHTS**						**Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.**				
ATMOSPHERICS:		**68 deg F, 50% RH**										

Receiver												
Name	**No.**	**#DUs**	**Existing**	**No Barrier**					**With Barrier**			
			LAeq1h	**LAeq1h**		**Increase over existing**		**Type**	**Calculated**	**Noise Reduction**		
				Calculated	**Crit'n**	**Calculated**	**Crit'n Sub'l Inc**	**Impact**	**LAeq1h**	**Calculated**	**Goal**	**Calculated minus Goal**
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M1	1	1	0.0	68.6	66	68.6	10	Snd Lvl	68.6	0.0	8	-8.0
M2	2	1	0.0	65.1	66	65.1	10	----	65.1	0.0	8	-8.0
M3	3	1	0.0	57.9	66	57.9	10	----	57.9	0.0	8	-8.0
M4	4	1	0.0	53.5	66	53.5	10	----	53.5	0.0	8	-8.0
M5	5	1	0.0	66.4	66	66.4	10	Snd Lvl	66.4	0.0	8	-8.0
R1	7	1	0.0	56.4	66	56.4	10	----	56.4	0.0	8	-8.0
R2	8	1	0.0	68.6	66	68.6	10	Snd Lvl	68.6	0.0	8	-8.0
R3	10	1	0.0	65.4	66	65.4	10	----	65.4	0.0	8	-8.0
R4	11	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	9	0.0	0.0	0.0
All Impacted	4	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek					**14 July 2016**						
M Greene					**TNM 2.5**						
INPUT: ROADWAYS							**Average pavement type shall be used unless**				
PROJECT/CONTRACT:	**8674**						**a State highway agency substantiates the use**				
RUN:	**Blmngtn RealcoDistCntr Ft w Prj 062316**						**of a different type with the approval of FHWA**				
Roadway		**Points**									
Name	**Width**	**Name**	**No.**	**Coordinates (pavement)**			**Flow Control**			**Segment**	
				X	**Y**	**Z**	**Control Device**	**Speed Constraint**	**Percent Vehicles Affected**	**Pvmt Type**	**On Struct?**
	ft			ft	ft	ft		mph	%		
Cedar Ave N of Jurupa Ave	70.0	point2	2	4,000.0	3,010.0	100.00				Average	
		point1	1	4,000.0	5,000.0	100.00					
Cedar Ave S of Jurupa Ave	70.0	point4	4	4,000.0	100.0	100.00				Average	
		point3	3	4,000.0	2,990.0	100.00					
Linden Ave N of Jurupa Ave	40.0	point6	6	3,000.0	3,010.0	100.00				Average	
		point5	5	3,000.0	5,000.0	100.00					
Linden Ave S of Jurupa Ave	40.0	point8	8	3,000.0	100.0	100.00				Average	
		point7	7	3,000.0	2,990.0	100.00					
Jurupa Ave W of Linden Ave	25.0	point9	9	1,000.0	3,000.0	100.00				Average	
		point10	10	3,000.0	3,000.0	100.00					
Jurupa Ave btwn Linden Ave and Cedar	25.0	point11	11	3,010.0	3,000.0	100.00				Average	
		point12	12	4,000.0	3,000.0	100.00					
Jurupa Ave E of Cedar Ave	25.0	point13	13	4,010.0	3,000.0	100.00				Average	
		point14	14	6,000.0	3,000.0	100.00					

Dudek **14 July 2016**
M Greene **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Percentages

PROJECT/CONTRACT: **8674**

RUN: **Blmngtn RealcoDistCntr Ft w Prj 062316**

Roadway Name	Points Name	No.	Segment Total Volume veh/hr	Autos P %	Autos S mph	MTrucks P %	MTrucks S mph	HTrucks P %	HTrucks S mph	Buses P %	Buses S mph	Motorcycles P %	Motorcycles S mph
Cedar Ave N of Jurupa Ave	point2	2	2220	91	45	3	45	6	45	0	0	0	0
	point1	1											
Cedar Ave S of Jurupa Ave	point4	4	2150	92	45	3	45	5	45	0	0	0	0
	point3	3											
Linden Ave N of Jurupa Ave	point6	6	280	97	25	1	25	2	25	0	0	0	0
	point5	5											
Linden Ave S of Jurupa Ave	point8	8	210	97	25	1	25	2	25	0	0	0	0
	point7	7											
Jurupa Ave W of Linden Ave	point9	9	420	84	40	4	40	12	40	0	0	0	0
	point10	10											
Jurupa Ave btwn Linden Ave and Cedar	point11	11	530	84	40	4	40	12	40	0	0	0	0
	point12	12											
Jurupa Ave E of Cedar Ave	point13	13	640	84	40	4	40	12	40	0	0	0	0
	point14	14											

Dudek **14 July 2016**
M Greene **TNM 2.5**

INPUT: RECEIVERS
PROJECT/CONTRACT: **8674**
RUN: **Blmngtn RealcoDistCntr Ft w Prj 062316**

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
M1	1	1	4,100.0	3,800.0	100.00	5.00	0.00	66	10.0	8.0	Y
M2	2	1	3,500.0	2,930.0	100.00	5.00	0.00	66	10.0	8.0	Y
M3	3	1	2,950.0	3,300.0	100.00	5.00	0.00	66	10.0	8.0	Y
M4	4	1	2,900.0	4,500.0	100.00	5.00	0.00	66	10.0	8.0	Y
M5	5	1	3,850.0	4,400.0	100.00	5.00	0.00	66	10.0	8.0	Y
R1	7	1	3,050.0	2,500.0	100.00	5.00	0.00	66	10.0	8.0	Y
R2	8	1	4,100.0	2,500.0	100.00	5.00	0.00	66	10.0	8.0	Y
R3	10	1	2,500.0	2,950.0	100.00	5.00	0.00	66	10.0	8.0	Y
R4	11	1	4,500.0	2,950.0	100.00	5.00	0.00	66	10.0	8.0	Y

Dudek | **14 July 2016**
M Greene | **TNM 2.5**
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: 8674
RUN: Blmngtn RealcoDistCntr Ft w Prj 062316
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	No Barrier LAeq1h Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Noise Reduction Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M1	1	1	0.0	69.0	66	69.0	10	Snd Lvl	69.0	0.0	8	-8.0
M2	2	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
M3	3	1	0.0	58.0	66	58.0	10	----	58.0	0.0	8	-8.0
M4	4	1	0.0	53.6	66	53.6	10	----	53.6	0.0	8	-8.0
M5	5	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0
R1	7	1	0.0	56.4	66	56.4	10	----	56.4	0.0	8	-8.0
R2	8	1	0.0	68.7	66	68.7	10	Snd Lvl	68.7	0.0	8	-8.0
R3	10	1	0.0	65.4	66	65.4	10	----	65.4	0.0	8	-8.0
R4	11	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB
All Selected	9	0.0	0.0	0.0
All Impacted	4	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

APPENDIX D

On-Site Noise Modeling Files

Noise Level Predictions from On-Site Activities

Linden Avenue Residences West of Project Site

Noise Source	Reference Noise Level (dBA)[1]	Reference distance (ft)	Distance to Receiver	Noise Level at Receiver (dBA)	Shielding Atten (dBA)	Excess Attenuation (dBA)	Noise Level at Receiver with Attenuation (dBA)	Level of Activity	Duration of Activity (Fraction of Hour)	Occurences / Hr.	Duration (min.s / hour) Total	Leq Calculation (t/60)10^(L/10)*n
S-1, Loading Dock Back-In	66.0	50	466	46.6	6.2	0.7	39.7	50% of 12 trucks/hr@ 90 seconds	0.03	6	9.00	31.4
S-2, Loading Dock Pull-Out	73.2	50	466	53.8	6.2	0.7	46.9	50% of 5 trucks/hr@ 25 seconds	0.01	2.5	1.04	29.3
S-3, Trash Compactor - Near	68.0	3	188	32.1	6.2	0.3	25.6	2 hours/day	0.08	1	5.00	14.8
S-4, Forklift (inside)	73.8	50	454	54.6	10.0	0.7	43.9	50% of 40 forklifts/hr @45 seconds	0.01	20	15.00	37.9
S-5, Truck Drive-By - Near	73.2	50	112	66.2	0.0	0.2	66.0	10% of 17 trucks/hr @ 10 seconds	0.003	1.7	0.28	42.8
S-6, Rooftop Ventilation	80.0	3	903	30.4	11.5	1.4	17.4	Continuous during the day and night	1.00	1	60.00	17.4
S-7, Trash Compactor - Far	68.0	3	1105	16.7	6.2	1.8	8.7	2 hours/day	0.08	1	5.00	-2.1
S-8, Truck Drive-By - Far	73.2	50	1115	46.2	6.2	1.8	38.3	50% of 17 trucks/hr @ 25 seconds	0.01	8.5	3.54	26.0
S-9, Passenger Car Parking Noise	49.0	100	690	32.3	0.0	1.1	31.2	25% of Peak-Hour Passenger Trips (65 Total)	1.00	1	15.00	25.1
								Leq (dBA) - Worst-Case				**44.5**

1 - Source: Wilder, 2000. Noise survey of commercial loading dock operations.

Noise Level Predictions from On-Site Activities

Jurupa Avenue Residences South of Project Site												
Noise Source	Reference Noise Level (dBA)[1]	Reference distance (ft)	Distance to Receiver	Noise Level at Receiver (dBA)	Shielding Atten (dBA)	Excess Attenuation (dBA)	Noise Level at Receiver with Attenuation (dBA)	Level of Activity	Duration of Activity (Fraction of Hour)	Occurences / Hr.	Duration (min.s / hour) Total	Leq Calculation (t/60)10^(L/10)*n
S-1, Loading Dock Back-In	66.0	50	500	46.0	0.0	0.8	45.2	50% of 12 trucks/hr@ 90 seconds	0.03	6	9.00	37.0
S-2, Loading Dock Pull-Out	73.2	50	500	53.2	0.0	0.8	52.4	50% of 5 trucks/hr@ 25 seconds	0.01	2.5	1.04	34.8
S-3, Trash Compactor - Near	68.0	3	530	23.1	0.0	0.8	22.2	2 hours/day	0.08	1	5.00	11.4
S-4, Forklift (inside)	73.8	50	540	53.1	10.0	0.9	42.3	50% of 40 forklifts/hr @45 seconds	0.01	20	15.00	36.2
S-5, Truck Drive-By - Near	73.2	50	270	58.6	0.0	0.4	58.1	25% of 17 trucks/hr @ 10 seconds	0.003	4.25	0.71	38.8
S-6, Rooftop Ventilation	80.0	3	850	31.0	11.5	1.4	18.0	Continuous during the day and night	1.00	1	60.00	18.0
S-7, Trash Compactor - Far	68.0	3	950	18.0	0.0	1.5	16.5	2 hours/day	0.08	1	5.00	5.7
S-8, Truck Drive-By - Far	73.2	50	884	48.3	0.0	1.4	46.8	50% of 17 trucks/hr @ 25 seconds	0.01	8.5	3.54	34.5
S-9, Passenger Car Parking Noise	49.0	100	285	39.9	0.0	0.5	39.5	25% of Peak-Hour Passenger Trips (65 Total)	1.00	1	15.00	33.5
								Leq (dBA) - Worst-Case				**44.0**

1 - Source: Wilder, 2000. Noise survey of commercial loading dock operations.

Noise Level Predictions from On-Site Activities

Cedar Avenue Residences East of Project Site												
Noise Source	Reference Noise Level (dBA)[1]	Reference distance (ft)	Distance to Receiver	Noise Level at Receiver (dBA)	Shielding Atten (dBA)	Excess Attenuation (dBA)	Noise Level at Receiver with Attenuation (dBA)	Level of Activity	Duration of Activity (Fraction of Hour)	Occurences / Hr.	Duration (min.s / hour) Total	Leq Calculation (t/60)10^(L/10)*n
S-1, Loading Dock Back-In	66.0	50	500	46.0	10.0	0.8	35.2	50% of 12 trucks/hr@ 90 seconds	0.03	6	9.00	27.0
S-2, Loading Dock Pull-Out	73.2	50	500	53.2	10.0	0.8	42.4	50% of 5 trucks/hr@ 25 seconds	0.01	2.5	1.04	24.8
S-3, Trash Compactor - Near	68.0	3	530	23.1	10.0	0.8	12.2	2 hours/day	0.08	1	5.00	1.4
S-4, Forklift (inside)	73.8	50	540	53.1	10.0	0.9	42.3	50% of 40 forklifts/hr @45 seconds	0.01	20	15.00	36.2
S-5, Truck Drive-By - Near	73.2	50	270	58.6	0.0	0.4	58.1	25% of 17 trucks/hr @ 10 seconds	0.003	4.25	0.71	38.8
S-6, Rooftop Ventilation	80.0	3	850	31.0	11.5	1.4	18.0	Continuous during the day and night	1.00	1	60.00	18.0
S-7, Trash Compactor - Far	68.0	3	950	18.0	10.0	1.5	6.5	2 hours/day	0.08	1	5.00	-4.3
S-8, Truck Drive-By - Far	73.2	50	884	48.3	10.0	1.4	36.8	50% of 17 trucks/hr @ 10 seconds	0.003	8.5	1.42	20.6
S-9, Passenger Car Parking Noise	49.0	100	185	43.7	0.0	0.3	43.4	20% of Peak-Hour Passenger Trips (65 Total)	1.00	1	12.00	36.4
								Leq (dBA) - Worst-Case				**42.4**

Noise Level Predictions from On-Site Activities

1 - Source: Wilder, 2000. Noise survey of commercial loading dock operations.

Noise Level Predictions from On-Site Activities

Elementary School Northwest of Project Site													
Noise Source	Reference Noise Level (dBA) [1]	Reference distance (ft)	Distance to Receiver	Noise Level at Receiver (dBA)	Shielding Atten (dBA)	Excess Attenuation (dBA)	Noise Level at Receiver with Attenuation (dBA)	Level of Activity	Duration of Activity (Fraction of Hour)	Occurences / Hr.	Duration (min.s / hour) Total	Leq Calculation (t/60)10^(L/10)*n
S-1, Loading Dock Back-In	66.0	50	594	44.5	6.2	1.0	37.4	50% of 12 trucks/hr@ 90 seconds	0.03	6	9.00	29.1
S-2, Loading Dock Pull-Out	73.2	50	594	51.7	6.2	1.0	44.6	50% of 5 trucks/hr@ 25 seconds	0.01	2.5	1.04	27.0
S-3, Trash Compactor - Near	68.0	3	288	28.4	6.2	0.5	21.7	2 hours/day	0.08	1	5.00	10.9
S-4, Forklift (inside)	73.8	50	582	52.5	10.0	0.9	41.5	50% of 40 forklifts/hr @45 seconds	0.01	20	15.00	35.5
S-5, Truck Drive-By - Near	73.2	50	212	60.7	5.0	0.3	55.3	10% of 17 trucks/hr @ 10 seconds	0.003	1.7	0.28	32.0
S-6, Rooftop Ventilation	80.0	3	1007	29.5	11.5	1.6	16.3	Continuous during the day and night	1.00	1	60.00	16.3
S-7, Trash Compactor - Far	68.0	3	1205	15.9	6.2	1.9	7.8	2 hours/day	0.08	1	5.00	-3.0
S-8, Truck Drive-By - Far	73.2	50	1215	45.5	6.2	1.9	37.4	50% of 17 trucks/hr @ 10 seconds	0.003	8.5	1.42	21.1
S-9, Passenger Car Parking Noise	49.0	100	1300	26.8	10.0	2.1	14.7	20% of Peak-Hour Passenger Trips (65 Total)	1.00	1	12.00	7.7
								Leq (dBA) - Worst-Case				**38.2**

1 - Source: Wilder, 2000. Noise survey of commercial loading dock operations.

Noise Level Predictions from On-Site Activities

Church North of Project Site

Noise Source	Reference Noise Level (dBA)[1]	Reference distance (ft)	Distance to Receiver	Noise Level at Receiver (dBA)	Shielding Atten (dBA)	Excess Attenuation (dBA)	Noise Level at Receiver with Attenuation (dBA)	Level of Activity	Duration of Activity (Fraction of Hour)	Occurences / Hr.	Duration (min.s / hour) Total	Leq Calculation (t/60)10^(L/10)*n
S-1, Loading Dock Back-In	66.0	50	727	42.7	6.2	1.2	35.4	50% of 12 trucks/hr@ 90 seconds	0.03	6	9.00	27.2
S-2, Loading Dock Pull-Out	73.2	50	727	49.9	6.2	1.2	42.6	50% of 5 trucks/hr@ 25 seconds	0.01	2.5	1.04	25.0
S-3, Trash Compactor - Near	68.0	3	420	25.1	6.2	0.7	18.2	2 hours/day	0.08	1	5.00	7.4
S-4, Forklift (inside)	73.8	50	704	50.8	10.0	1.1	39.7	50% of 40 forklifts/hr @45 seconds	0.01	20	15.00	33.7
S-5, Truck Drive-By - Near	73.2	50	336	56.7	5.0	0.5	51.1	50% of 17 trucks/hr @ 10 seconds	0.003	8.5	1.42	34.8
S-6, Rooftop Ventilation	80.0	3	320	39.4	11.5	0.5	27.4	Continuous during the day and night	1.00	1	60.00	27.4
S-7, Trash Compactor - Far	68.0	3	1250	15.6	6.2	2.0	7.4	2 hours/day	0.08	1	5.00	-3.4
S-8, Truck Drive-By - Far	73.2	50	590	51.8	5.0	0.9	45.8	25% of 17 trucks/hr @ 10 seconds	0.003	4.25	0.71	26.5
S-9, Passenger Car Parking Noise	49.0	100	240	41.4	6.2	0.4	34.8	20% of Peak-Hour Passenger Trips (65 Total)	1.00	1	12.00	27.9
								Leq (dBA) - Worst-Case				**38.9**

1 - Source: Wilder, 2000. Noise survey of commercial loading dock operations.

Parking Lot Noise Sources at 100 Feet						
Source	Level (dBA)	Assumed duration (seconds) per car	Quantity per Hour	Total Duration (seconds)	Fraction of Hour	Leq (dBA)
Autos at 14 mph	44	60	65	3900	1.00	44.3
Car Alarm Signal	63	10	1	10	0.00	37.4
Car Alarm Chirp	48	0.1	65	6.5	0.00	20.6
Car Horns	63	2	2	4	0.00	33.5
Door Slams	58	0.1	98	9.75	0.00	32.3
Talking	30	60	33	1950	0.54	27.3
Radios	58	15	16	243.75	0.07	46.3

Source: Gordon Bricken & Associates, 1996. Estimates based on actual noise measurements taken at various parking lots.

Total 49.0

RAY-TRACE PROGRAM (FOR A POINT-SOURCE)

Uses the Equation: $(A_{e4})_{point}$=20*log[(2*pi*N)$^{1/2}$/tanh(2*pi*N)$^{1/2}$]+5dB

(Ref. Pg.174, Noise and Vibration Control, L.L. Beranek Editor, 1971 Ed.

Project: Western Realco - Bloomington
Date: 7/11/16
By: MGG

Please Enter: Using English (E) units or Metric (M) units ? E

Ray Trace Number/Description	Source-Receiver Distance (ft. or m)	Source Base Elev. (ft. or m)	Source Height above Ground (ft. or m)	Receiver Base Elev. (ft. or m)	Receiver Height above Ground (ft. or m)	Horizontal Barrier Dist. (in ref. to source) (ft. or m)	Barrier Base Elev. (ft. or m)	Barrier Height (ft. or m)	Dominant Freq.(Hz)	Source-Rcvr Straight-Line Dist. (ft. or m)	Source-Top-of-Barrier Dist. (ft. or m)	Receiver-Top-of-Barrier Dist. (ft. or m)	Lambda	N_{max}	AE $_{(barriers)}$ (dB)
1. Source Truck Drive By Near	336.0	100.0	8.0	100.0	5.0	63.0	100.0	**8.0**	500.0	336.0	63.0	273.0	2.3	0.0	**5.0**
2. Source Truck Back in / Pull out	466.2	95.0	8.0	100.0	5.0	380.0	100.0	**8.0**	500.0	466.2	380.0	86.2	2.3	0.1	**6.2**
3. Rooftop Ventilation Typ	850.0	133.0	5.0	100.0	5.0	320.0	133.0	**10.0**	500.0	850.6	320.0	531.4	2.3	0.7	**11.5**
4. Source Shielding from Building for Eastern Receivers	500.0	100.0	8.0	100.0	5.0	200.0	100.0	**40.0**	500.0	500.0	202.5	302.0	2.3	4.1	**19.1**

APPENDIX E

Resume

Mike Greene, INCE

Environmental Specialist/Acoustician

EDUCATION
University of California, San Diego
BS, Applied Mechanics, 1985

CERTIFICATIONS
Board Certified, Institute of Noise Control Engineering (INCE Bd. Cert.)
County of San Diego–Approved

PROFESSIONAL AFFILIATIONS
Transportation Research Board, ADC40 Subcommittee

Mike Greene is an environmental specialist/acoustician with more than 26 years' professional experience in acoustical analysis and noise control engineering. He has conducted and participated in noise and vibration analyses for hundreds of transportation, commercial, industrial, and residential developments throughout California and the United States.

As a project or task manager, Mr. Greene has conducted noise studies for industrial and commercial facilities, ranging from power generation projects to hospitals and super-speedway facilities. He is experienced in the modeling of existing and future roadway noise impacts using the Federal Highway Administration's (FHWA) Traffic Noise Model (TNM®) and is experienced with the use of both SoundPLAN and CadnaA, computer software programs for prediction and assessment of noise levels in the vicinity of industrial facilities and other noise sources such as roadways, railways and airports.

Project Experience

Development

Sunroad East Harbor Island Hotel Draft Environmental Impact Report (EIR) and Port Master Plan Amendment, Port of San Diego, California. Served as task manager to conduct a noise analysis that included noise measurements, on-site and off-site traffic and construction noise impact assessment, in addition to other on-site operational noises, such as heating, ventilation, and air conditioning (HVAC), parking lots, etc., and effects from nearby San Diego International Airport. The results of the analysis were summarized in a technical report and in the noise section of the EIR.

Rider Distribution Warehouse Technical Studies and EIR, Aiere Property Group, Riverside County, California. Responsible for noise measurement, analysis, and reporting of potential effects on the noise environment from the project. Construction noise (which included potential rock blasting) and operational noise from warehouse and truck operations were addressed for this project which was located near a nature preserve area and residences.

Tejon Mountain Village EIR, Tejon Ranch Company, Tejon, California. Conducted the noise analysis for the EIR for Tejon Mountain Village, a proposed resort community located near the Grapevine in northern Los Angeles County. Noise measurements of existing ambient noise levels were conducted in the vicinity of the Interstate (I-) 5 freeway as well as in the more remote portions of the project site. Traffic noise was modeled using the TNM® noise model. Additionally, potential for noise impacts from a distant sand and gravel mine was assessed, as well as from construction noise of the project itself.

Coronado Yacht Club Redevelopment and Expansion EIR, Port of San Diego, California. Served as noise task manager to provide guidance and oversight of the noise analysis and reporting of results for the proposed improvements to the Coronado Yacht Club.

San Diego Convention Center EIR, Port of San Diego, California. Served as noise task manager to provide guidance and oversight of the noise analysis and reporting of results for the proposed expansion of the San Diego Convention Center. Issues included potential noise effects from construction activities as well as proposed outdoor events overlooking the harbor and Coronado Island residents.

San Pedro Waterfront EIS (Environmental Impact Statement)/EIR, Port of Los Angeles, California. As noise task manager, was responsible for the successful completion of the noise analysis. Managed and supervised the noise measurements, modeling, analysis and results reporting. Primary issues of concern included potential effects from traffic and construction noise.

Wilmington Waterfront EIR, Port of Los Angeles, California. Responsible for the successful completion of the noise analysis for this complex project. Conducted and supervised the noise measurements, modeling, analysis and results reporting, which involved analysis of potential effects from traffic, freight rail, light rail, industrial and construction noise.

Education

EIR for Campus Master Plan and Student Housing, California State University, Dominguez Hills, Carson, California. Responsible for the completion of the noise analysis and reporting for the project. Supervised the noise measurements, modeling, analysis and results reporting, which involved analysis of potential effects from traffic, on-campus facilities, and operations and construction noise.

Multiple School Projects, Los Angeles Unified School District, California. Noise analyses were conducted for several proposed school construction projects as part of an on-call environmental consulting contract for the district. Noise studies were conducted for L.A. Unified School District High Schools 13, 9, and 12. The analyses included noise measurements of ambient conditions and traffic noise impact analysis to estimate potential noise effects at both existing noise-sensitive land uses and proposed on-site receptors. Additionally, noise during construction and operation (such as from school athletic fields and stadiums) was assessed. The results of the noise studies were summarized in noise technical reports.

Energy

Haynes Generating Station Units 3–6 Demolition Project, Los Angeles Department of Water and Power (LADWP), Long Beach, California. The LADWP proposes to remove the existing Haynes Generating Station electrical generation Units 3–6 from the Haynes facility site, making space for a potential future repowering project. The proposed project would include the demolition of the units and ancillary facilities. Dudek is preparing the noise analysis of potential noise and vibration impacts during the demolition process, which is anticipated to be a 4-year endeavor.

Scattergood Generating Station Project, LADWP, El Segundo, California. Preparing the noise section of the EIR for the final phase of the ongoing repower project. In conjunction with this work, Dudek has also been providing direct support to LADWP staff in evaluating and conducting noise measurements of the current noise environment, specifically relating to the recent installation of several new units and any resultant noise increase in the noise levels at adjacent noise-sensitive land uses.

El Segundo Power Redevelopment Project, NRG/Dynegy, El Segundo, California. Conducted the noise analysis for a proposed 630-megawatt (MW) power plant. Project would replace two aging power units with a newer, more efficient combined-cycle (combustion turbines and steam turbine) plant.

Responsible for the preparation of the noise analysis, a section of the project's Application for Certification, response to comments, and oral and written testimony before the California Energy Commission.

Weymouth Filtration Plant Solar Project, Metropolitan Water District, La Verne, California. Conducted the noise study for the Initial Study/Mitigated Negative Declaration (IS/MND) for this project. The primary issue with respect to noise from the project was potential effects at nearby residences and other land uses from construction activities associated with the proposed project.

Lake Skinner Solar Project, Metropolitan Water District, Riverside County, California. Conducted the noise study for the IS/MND for this project, located in Riverside County. The primary issue with respect to noise was potential effects at adjacent residences from construction activities associated with the proposed project.

OceanWay Secure Energy Project EIS/EIR for Woodside Natural Gas Deepwater Port, Amec Foster Wheeler, Los Angeles County, California. Responsible for the noise and vibration section of the EIS/EIR of this proposed liquefied natural gas (LNG) project. The potential noise/vibration effects of onshore construction and operations were assessed with respect to local, state and federal standards.

Transportation

Meadowpass Road Extension EIR, City of Walnut, California. Responsible for the measurement, analysis, and reporting. The primary issue for this project with respect to noise was potential effects from traffic at nearby residences as a result of the construction of the road extension.

1-15 Widening from San Bernardino to 1-215 EIR/EIS, Transportation Commission, County of Riverside, California. Potential noise increases at adjacent noise-sensitive land uses were addressed pursuant to the FHWA and California Department of Transportation (Caltrans) guidelines. Noise measurements were conducted at representative noise-sensitive land uses along the 43.5-mile project alignment. Noise modeling (TNM® Version 2.5) was conducted in order to assess the changes in future traffic noise levels resulting from the proposed improvements, to determine existing and future traffic noise impacts and to provide noise abatement design guidance as needed. The results of the noise study were summarized in a noise study report and noise abatement decision report pursuant to Caltrans Technical Noise Supplement (TeNS) and noise protocol guidance.

State Route (SR-) 2 Freeway Terminus IS/Environmental Assessment (EA), Metro, Los Angeles, California. As part of this joint National Environmental Policy Act (NEPA)/California Environmental Quality Act (CEQA) document, the project was analyzed at an equal level of detail for the No Action alternative and all five project alternatives. The analyses were conducted in accordance with guidelines set forth in the Caltrans Traffic Noise Protocol and TeNS handbooks. The study included noise measurements of ambient conditions adjacent to the project alignment, traffic noise impact analysis (using TNM® Version 2.5) to estimate potential noise effects at existing noise-sensitive receptors, and noise during construction. Results were summarized in a noise study report pursuant to Caltrans TeNS guidance.

Northern Canoga Extension of the Orange Line EIR, Metro, Reseda, California. Project entailed noise measurements and subsequent noise analysis of Metro bus operations on rubberized asphalt concrete (RAC) and non-RAC busway pavement to determine the benefit provided by RAC. Because differences in the noise levels were not expected to be substantial and because of site conditions, the design of the measurement setups was crucial. Site selection and details of the measurement procedures, including coordination of a dedicated test bus and driver, was an important part of the study. Simultaneous measurements at multiple locations were conducted from approximately 1 a.m. to 4 a.m. to reduce the influence of background noise. Noise measurement methodology, analysis results, and conclusions were summarized in a technical memorandum to the client.

Busway and Bus Rapid Transit Projects, Massachusetts Bay Transportation Authority, Boston. Conducted and participated in noise analyses for Busway and Bus-Rapid Transit (BRT) projects using Federal Transit Administration (FTA) methodologies and standards. The project involved the construction of a proposed BRT project in downtown Boston. Analyzed potential noise and vibration impacts at adjacent sensitive receptors from construction and operation using FTA methodologies. In addition, worked on similar projects in Portland, Oregon, and near Dallas, Texas.

Water/Wastewater

New Evans Reservoir IS/MND, City of Riverside Public Utilities Department, California. Responsible for the measurement, analysis, and reporting of noise for this IS/MND. The primary issue for this project with respect to noise was construction (trenching) along the pipeline alignment adjacent to noise-sensitive land receptors.

Recycled Water System Capital Improvement Project EIR, Otay Water District, Otay Mesa, California. Responsible for the noise analysis for this ongoing project involving the construction of three recycled water pipelines by the Otay Water District. The potential effect of noise from construction activities was the primary issue with regard to noise for this project. Noise levels at adjacent noise-sensitive uses were predicted and compared with relevant thresholds of significance, and mitigation measures were recommended as necessary to reduce noise to a level below significance.

Publications

Burge, P., Martin, C., Greene, M. 2016. Greene, M. 2011. "Review and Comparison of State-Wide Policies Across the U.S." New England Noise-Con 2016. Institute of Noise Control Engineering.

Greene, M. 2015. "Infrasound and Low-Frequency Noise Measurements at a Solar Plant." Inter-Noise 2015. Institute of Noise Control Engineering

Greene, M., Hardie, P. 2015. "Rail Crossing Quiet Zones: Life-Cycle of a Project from the Noise Perspective." Inter-Noise 2015. Institute of Noise Control Engineering

Greene, M. 2011. "Noise Assessment of an Aquatics Facility in a Residential Area." Joint Institute of Noise Control Engineering/Transportation Research Board ADC 40 Annual Summer Conference.

Greene, M. 2011. "Shake, Rattle & Roll Revisited: Results of Two Vibration Measurement Studies Near Large, Heavily-Traveled Freeways." Joint Institute of Noise Control Engineering/Transportation Research Board ADC 40 Annual Summer Conference.

Greene, M. 2009. "Shake, Rattle and Roll: Results of a Vibration Study Near a Large, Heavily-Traveled Freeway." Transportation Research Board ADC 40 Annual Summer Conference.

Greene, M. 2008. "Case Study and Lessons Learned: Preliminary Determination of Quiet Zone Benefitted Area." Transportation Research Board ADC 40 Annual Summer Conference.

Greene, M. 2008. "Does Installation of a Traffic Signal Cause Increased Traffic Noise? Pre- and Post-Installation Noise Measurement Results." Transportation Research Board ADC 40 Annual Summer Conference.

Greene, M. 2004. "Multiple Analysis and Measurement Methods to Confirm the Absence of Noise Impacts from a Power Plant." Transportation Research Board and the National Conference on Noise Control Engineering (NOISE-CON 2004).

Greene, M. 2002. "Typical Diurnal Traffic Noise Patterns for a Variety of Roadway Types." Proceedings of the 2002 International Congress and Exposition on Noise Control Engineering (Inter-Noise 2002).

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Greene, M. 2000. "Determination of Insertion Loss for Classrooms at a High School." Proceedings of the 140th Meeting of the Acoustical Society of America and the National Conference on Noise Control Engineering (NOISE-CON 2000).

Greene, M. 1997. "Case Study: Noise Analysis of Operations from an Existing Mine at a Nearby Proposed Residential/Recreational Development." Proceedings of the 1997 National Conference on Noise Control Engineering (NOISE-CON 1997).

Greene, M. 1991. "P.C. Based Program for Air Quality Calculations." Proceedings of the Institute of Environmental Sciences Technical Meeting.