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Noise Impact Analysis Report
Dedeaux Industrial Center Project
City of Rialto, San Bernardino County, California

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Dedeaux Properties

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ACRONYMS AND ABBREVIATIONS

ADA	Americans with Disabilities Act
ADT	average daily traffic
ANSI	American National Standards Institute
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dB	decibel
dBA	A-weighted decibel
EPA	United States Environmental Protection Agency
FCS	FirstCarbon Solutions
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GPA	General Plan Amendment
in/sec	inch per second
L_{dn}	day-night average sound level
L_{eq}	equivalent continuous sound level
L_{max}	maximum noise/sound level
OSHA	Occupational Safety and Health Administration
PPV	peak particle velocity
rms	root mean square
SEL	Single Event Level
VdB	vibration in decibels

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SECTION 1: INTRODUCTION

1.1 - Purpose of Analysis and Study Objectives

This Noise Impact Analysis Report has been prepared by FirstCarbon Solutions (FCS) to determine and document the off-site and on-site noise impacts associated with the proposed Dedeaux Industrial Center Project (proposed project). The following is provided in this report:

- A description of the study area, project site, and proposed project
- Information regarding the fundamentals of noise and vibration
- A description of the local noise guidelines and standards
- A description of the existing noise environment
- An analysis of the potential short-term, construction-related noise and vibration impacts from the proposed project
- An analysis of long-term, operations-related noise and vibration impacts from the proposed project

1.2 - Project Summary

1.2.1 - Site Location

The project site is located in the City of Rialto, in San Bernardino County, California. Rialto is surrounded by San Bernardino to the north, Muscoy and San Bernardino to the east, parts of Bloomington, Colton, Riverside, and Grand Terrace to the south, and Fontana to the west (Exhibit 1). Regional access to the site is provided via Interstate 215 (I-215) at the West 5th Street exit, and via I-10 at the South Riverside Avenue and Cedar Avenue exits. Local access to the site is provided via West Merrill Avenue, South Yucca Avenue, and South Cactus Avenue.

The 3.51-acre project site is located at 473 South Yucca Avenue, east of South Cactus Avenue, and north of Merrill Avenue, and consists of Assessor's Parcel Numbers (APNs) 0131-011-029, -030, -031, -033, and -034 (Exhibit 2). The project site is located within Township 1 South, Range 5 West, Section 11of the *Fontana, California* United States Geological Survey (USGS) 7.5-minute Topographic Quadrangle Map.

1.2.2 - Project Description

The project includes the proposed construction of a 36,500-square-foot warehouse with a 2,000-square-foot ground floor office, 2,000-square-foot mezzanine, and 23 dock doors (Exhibit 3). A total of 20 trailer parking spaces and 12 vehicle spaces would be provided at the northern portion of the site, and a parking lot with 23 vehicle spaces would be available at the southern portion of the site frontage West Merrill Avenue. Total vehicle parking would consist of 40 spaces, which includes 2 Americans with Disabilities Act (ADA) accessible spaces. The site would include a 25-foot building setback from South Yucca Avenue, and a 10-foot landscaping setback at the northern portion of the site along the trailer parking lot. At the southern parking lot, a 10-foot landscaping setback would be established at the eastern boundary along the San Bernardino Flood Control District canal, in addition to a 15-foot landscaping setback along the project's frontage on West Merrill Avenue. The project would include 22,150 square feet of landscaping, and a tilt up concrete trash enclosure would be located near the southeast corner of the project site. The proposed project would repurpose the existing project site, which would include paving the existing gravel yard with 6-inch-thick concrete, constructing new sidewalks, repairing the two existing driveways along the eastern side of Yucca Avenue, and installing a concrete tilt up screen wall surrounding the proposed project.

Hours of operation for the proposed project would be from 7:00 a.m. to 7:00 p.m., 7-days a week. The proposed project would include approximately 15-25 employees. Anticipated potential users would include warehouse operators, long-term storage, e-commerce fulfillment, and last mile users. Two access points to the site are proposed via one driveway along West Merrill Avenue and the other at the cul-de-sac on South Yucca Avenue. Additionally, two gates (one to the north and one to the south) would be utilized for internal project circulation.

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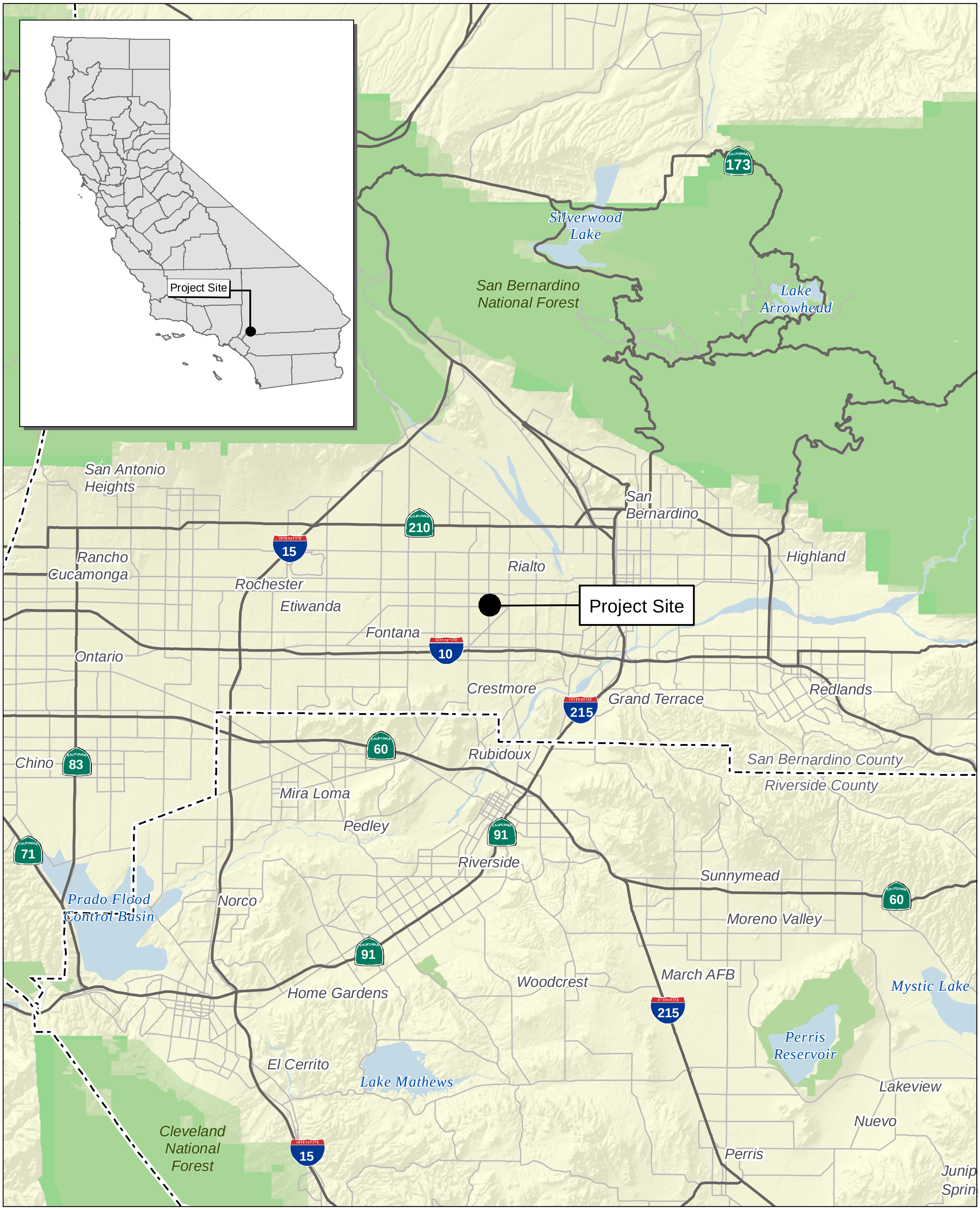

Source: Census 2000 Data, The CaSIL

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5 2.5 0 5 Miles

Exhibit 1
Regional Location Map

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CITY OF RIALTO
DEDEAUX INDUSTRIAL CENTER PROJECT
NOISE IMPACT ANALYSIS REPORT

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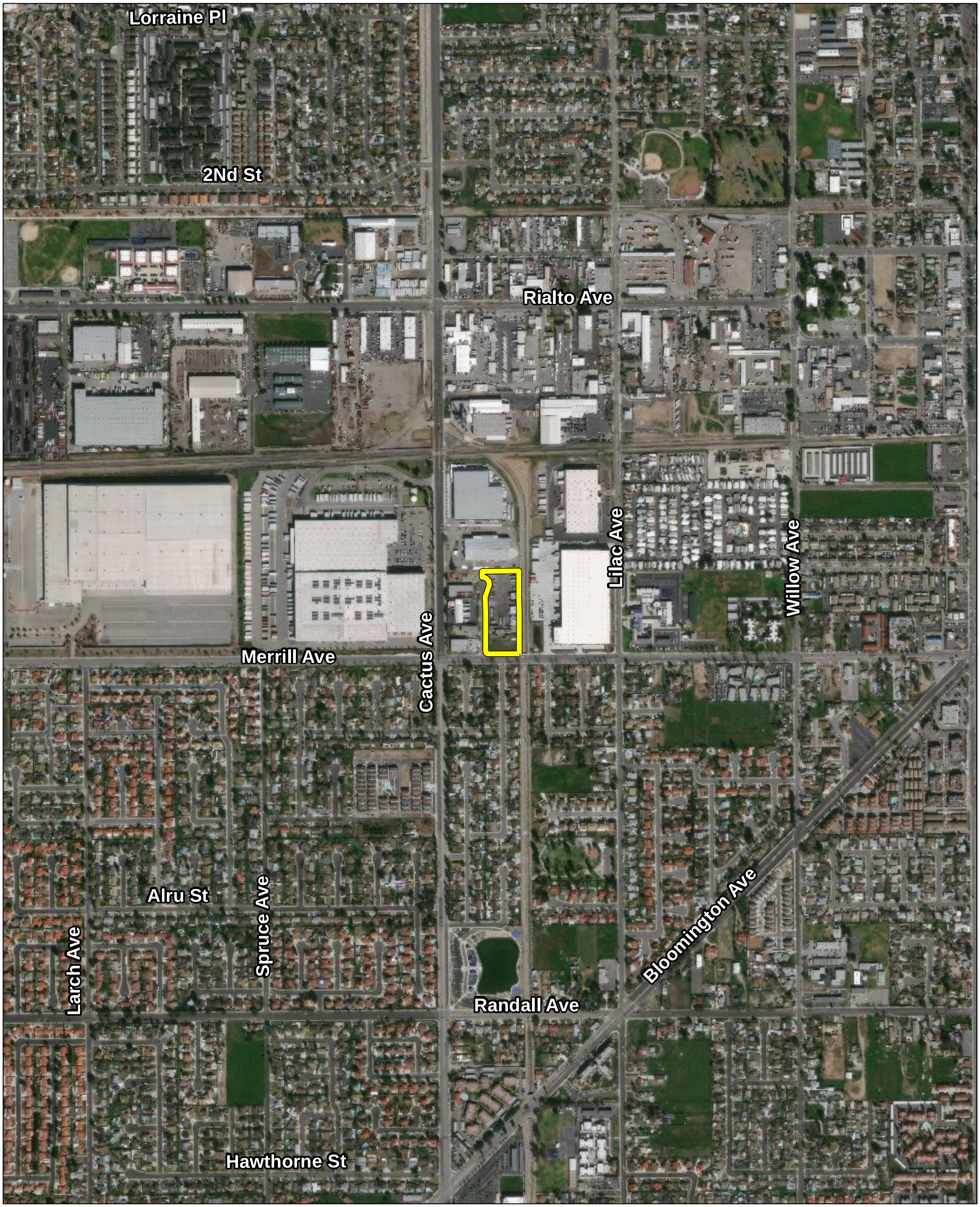

Source: ESRI Aerial Imagery.

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1,000 500 0 1,000
Feet

Exhibit2
Local Vicinity Map

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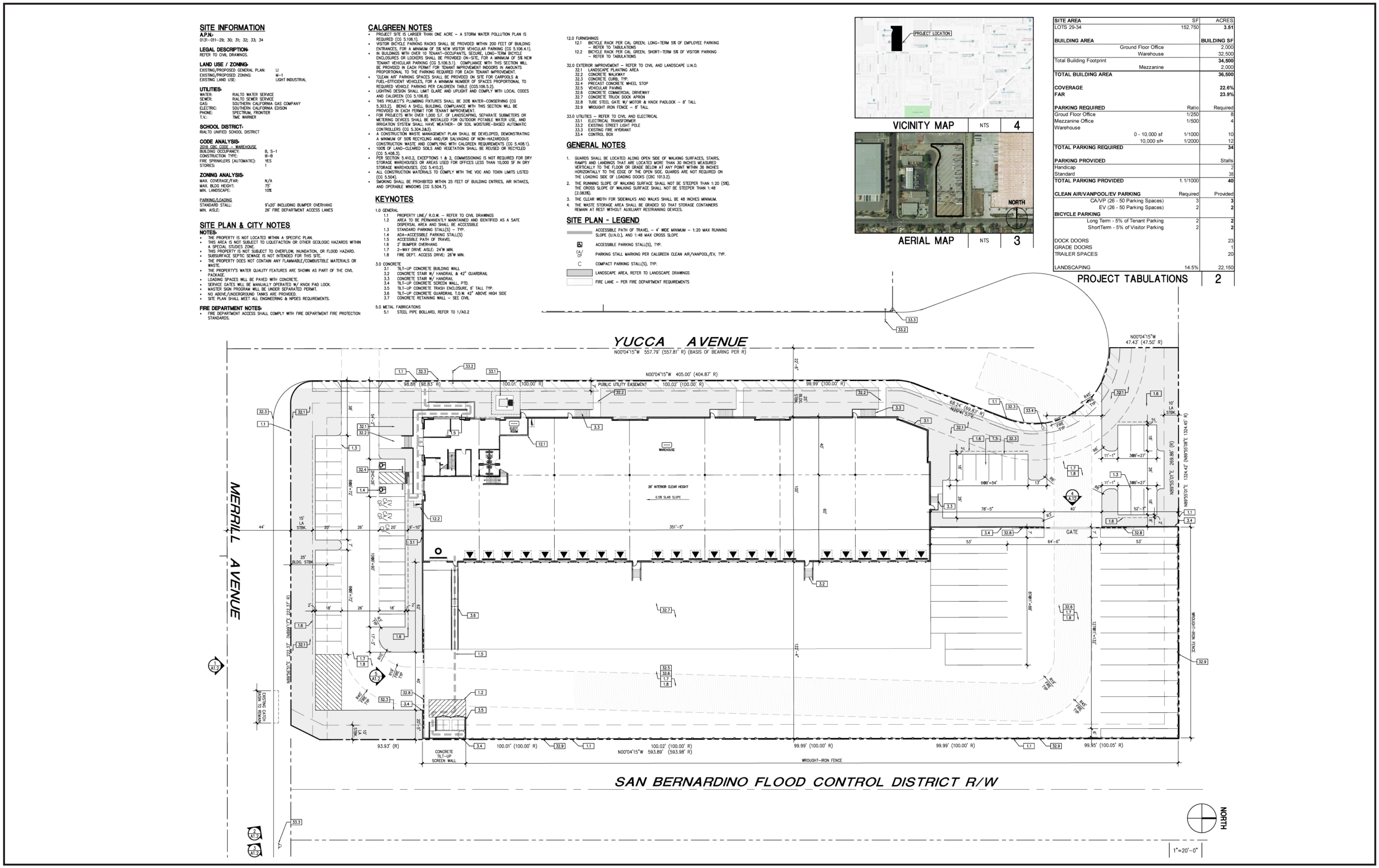

Source: GAA Architects, March 19, 2020.

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Exhibit 3
Site Plan

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SECTION 2: NOISE AND VIBRATION FUNDAMENTALS

2.1 - Characteristics of Noise

Noise is generally defined as unwanted or objectionable sound. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm, or when it has adverse effects on health. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and in the extreme, hearing impairment. Noise effects can be caused by pitch or loudness. *Pitch* is the number of complete vibrations or cycles per second of a wave that result in the range of tone from high to low; higher-pitched sounds are louder to humans than lower-pitched sounds. *Loudness* is the intensity or amplitude of sound.

Sound is produced by the vibration of sound pressure waves in the air. Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels. The decibel (dB) is a logarithmic unit, which expresses the ratio of the sound pressure level being measured to a standard reference level. The 0 point on the dB scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Changes of 3 dB or less are only perceptible in laboratory environments. Audible increases in noise levels generally refer to a change of 3 dB or more, as this level has been found to be barely perceptible to the human ear in outdoor environments. Only audible changes in existing ambient or background noise levels are considered potentially significant.

The human ear is not equally sensitive to all frequencies within the audible sound spectrum, so sound pressure level measurements can be weighted to better represent frequency-based sensitivity of average healthy human hearing. One such specific “filtering” of sound is called “A-weighting.” A-weighted decibels (dBA) approximate the subjective response of the human ear to a broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies that are audible to the human ear. Because decibels are logarithmic units, they cannot be added or subtracted by ordinary arithmetic means. For example, if one noise source produces a noise level of 70 dB, the addition of another noise source with the same noise level would not produce 140 dB; rather, they would combine to produce a noise level of 73 dB.

As noise spreads from a source, it loses energy so that the farther away the noise receiver is from the noise source, the lower the perceived noise level. Noise levels diminish or attenuate as distance from the source increases based on an inverse square rule, depending on how the noise source is physically configured. Noise levels from a single-point source, such as a single piece of construction equipment at ground level, attenuate at a rate of 6 dB for each doubling of distance (between the single-point source of noise and the noise-sensitive receptor of concern). Heavily traveled roads with few gaps in traffic behave as continuous line sources and attenuate roughly at a rate of 3 dB per doubling of distance.

2.1.1 - Noise Descriptors

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. Equivalent continuous sound level (L_{eq}) is the total sound energy of time-varying noise over a sample period. However, the predominant rating scales for human communities in the State of California are the L_{eq} and community noise equivalent level (CNEL) or the day-night average level (L_{dn}) based on dBA. CNEL is the time-varying noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and a 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale but without the adjustment for events occurring during the evening hours. CNEL and L_{dn} are within 1 dBA of each other and are normally exchangeable. The noise adjustments are added to the noise events occurring during the more sensitive hours.

Other noise rating scales of importance when assessing the annoyance factor include the maximum noise level (L_{max}), which is the highest exponential time-averaged sound level that occurs during a stated time period. The noise environments discussed in this analysis are specified in terms of maximum levels denoted by L_{max} for short-term noise impacts. L_{max} reflects peak operating conditions and addresses the annoying aspects of intermittent noise.

2.1.2 - Noise Propagation

From the noise source to the receiver, noise changes both in level and frequency spectrum. The most obvious is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on whether the source is a point or line source, as well as ground absorption, atmospheric conditions (wind, temperature gradients, and humidity) and refraction, and shielding by natural and manmade features. Sound from point sources, such as an air conditioning condenser, a piece of construction equipment, or an idling truck, radiates uniformly outward as it travels away from the source in a spherical pattern.

The attenuation or sound drop-off rate is dependent on the conditions of the land between the noise source and receiver. To account for this ground-effect attenuation (absorption), two types of site conditions are commonly used in noise models: soft-site and hard-site conditions. Soft-site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. For point sources, a drop-off rate of 7.5 dBA per each doubling of the distance (dBA/DD) is typically observed over soft ground with landscaping, as compared with a 6 dBA/DD drop-off rate over hard ground such as asphalt, concrete, stone and very hard packed earth. For line sources, such as traffic noise on a roadway, a 4.5 dBA/DD is typically observed for soft-site conditions compared to the 3 dBA/DD drop-off rate for hard-site conditions. Table 1 briefly defines these measurement descriptors and other sound terminology used in this section.

Table 1: Sound Terminology

Term	Definition
Sound	A vibratory disturbance created by a vibrating object which, when transmitted by pressure waves through a medium such as air, can be detected by a receiving mechanism such as the human ear or a microphone.
Noise	Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
Ambient Noise	The composite of noise from all sources near and far in a given environment.
Decibel (dB)	A unitless measure of sound on a logarithmic scale, which represents the squared ratio of sound-pressure amplitude to a reference sound pressure. The reference pressure is 20 micropascals, representing the threshold of human hearing (0 dB).
A-Weighted Decibel (dBA)	An overall frequency-weighted sound level that approximates the frequency response of the human ear.
Equivalent Noise Level (L_{eq})	The average sound energy occurring over a specified time period. In effect, L_{eq} is the steady-state sound level that in a stated period would contain the same acoustical energy as the time-varying sound that actually occurs during the same period.
Maximum and Minimum Noise Levels (L_{max} and L_{min})	The maximum or minimum instantaneous sound level measured during a measurement period.
Day-Night Level (DNL or L_{dn})	The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring between 10:00 p.m. and 7:00 a.m. (nighttime).
Community Noise Equivalent Level (CNEL)	The energy average of the A-weighted sound levels occurring during a 24-hour period, with 5 dB added to the A-weighted sound levels occurring between 7:00 p.m. and 10:00 p.m. and 10 dB added to the A-weighted sound levels occurring between 10:00 p.m. and 7:00 a.m.
Source: Data compiled by FCS 2020.	

2.1.3 - Traffic Noise

The level of traffic noise depends on the three primary factors: (1) the volume of the traffic, (2) the speed of the traffic, and (3) the number of trucks in the flow of traffic. Generally, the loudness of traffic noise is increased by heavier traffic volumes, higher speeds, and greater number of trucks. Vehicle noise is a combination of the noise produced by the engine, exhaust, and tires. Because of the logarithmic nature of noise levels, a doubling of the traffic volume (assuming that the speed and truck mix do not change) results in a noise level increase of 3 dBA. Based on the Federal Highway Administration (FHWA) community noise assessment criteria, this change is "barely perceptible."

For reference, a doubling of perceived noise levels would require an increase of approximately 10 dBA. The truck mix on a given roadway also has an effect on community noise levels. As the number of heavy trucks increases and becomes a larger percentage of the vehicle mix, adjacent noise levels increase.

2.1.4 - Stationary Noise

A stationary noise producer is any entity in a fixed location that emits noise. Examples of stationary noise sources include machinery, engines, energy production, and other mechanical or powered equipment and activities such as loading and unloading or public assembly that may occur at commercial, industrial, manufacturing, or institutional facilities. Furthermore, while noise generated by the use of motor vehicles over public roads is preempted from local regulation, the use of these vehicles is considered a stationary noise source when operated on private property such as at a construction-site, a truck terminal, or warehousing facility.

The effects of stationary noise depend on factors such as characteristics of the equipment and operations, distance and pathway between the generator and receptor, and weather. Stationary noise sources may be regulated at the point of manufacture (e.g., equipment or engines), with limitations on the hours of operation, or with provision of intervening structures, barriers, or topography.

Construction activities are a common source of stationary noise. Construction-period noise levels are higher than background ambient noise levels but eventually cease once construction is complete. Construction is performed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on each construction-site and, therefore, would change the noise levels as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction related noise ranges to be categorized by work phase. Table 2 shows typical noise levels of construction equipment as measured at a distance of 50 feet from the operating equipment.

Table 2: Typical Construction Equipment Maximum Noise Levels, L_{max}

Type of Equipment	Impact Device? (Yes/No)	Specification Maximum Sound Levels for Analysis (dBA at 50 feet)
Impact Pile Driver	Yes	95
Auger Drill Rig	No	85
Vibratory Pile Driver	No	95
Jackhammers	Yes	85
Pneumatic Tools	No	85
Pumps	No	77
Scrapers	No	85
Cranes	No	85
Portable Generators	No	82
Rollers	No	85

Type of Equipment	Impact Device? (Yes/No)	Specification Maximum Sound Levels for Analysis (dBA at 50 feet)
Dozers	No	85
Tractors	No	84
Front-End Loaders	No	80
Backhoe	No	80
Excavators	No	85
Graders	No	85
Air Compressors	No	80
Dump Truck	No	84
Concrete Mixer Truck	No	85
Pickup Truck	No	55
Source: Federal Highway Administration (FHWA). 2006. Highway Construction Noise Handbook. August.		

2.1.5 - Noise from Multiple Sources

Because sound pressure levels in decibels are based on a logarithmic scale, they cannot be added or subtracted in the usual arithmetical way. Therefore, sound pressure levels in decibels are logarithmically added on an energy summation basis. In other words, adding a new noise source to an existing noise source, both producing noise at the same level, will not double the noise level. Instead, if the difference between two noise sources is 10 dBA or more, the louder noise source will dominate, and the resultant noise level will be equal to the noise level of the louder source. In general, if the difference between two noise sources is 0–1 dBA, the resultant noise level will be 3 dBA higher than the louder noise source, or both sources if they are equal. If the difference between two noise sources is 2–3 dBA, the resultant noise level will be 2 dBA above the louder noise source. If the difference between two noise sources is 4–10 dBA, the resultant noise level will be 1 dBA higher than the louder noise source.

2.2 - Characteristics of Groundborne Vibration and Noise

Groundborne vibration consists of rapidly fluctuating motion through a solid medium, specifically the ground, that has an average motion of zero and in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. The effects of groundborne vibration typically only causes a nuisance to people, but in extreme cases, excessive groundborne vibration has the potential to cause structural damage to buildings. Although groundborne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Groundborne noise is an effect of groundborne vibration and only exists indoors, since it is produced from noise radiated from the motion of the walls and floors of a room and may also consist of the rattling of windows or dishes on shelves.

Several different methods are used to quantify vibration amplitude such as the maximum instantaneous peak in the vibrations velocity, which is known as the peak particle velocity (PPV) or the root mean square (rms) amplitude of the vibration velocity. Because of the typically small amplitudes of vibrations, vibration velocity is often expressed in decibels—denoted as LV—and is based on the reference quantity of 1 micro inch per second. To distinguish these vibration levels referenced in decibels from noise levels referenced in decibels, the unit is written as "VdB."

Although groundborne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. When assessing annoyance from groundborne vibration, vibration is typically expressed as rms velocity in units of decibels of 1 micro-inch per second, with the unit written in VdB. Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. Human perception to vibration starts at levels as low as 67 VdB. Annoyance due to vibration in residential settings starts at approximately 70 VdB.

Off-site sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible groundborne noise or vibration. Construction activities, such as blasting, pile driving and operating heavy earthmoving equipment, are common sources of groundborne vibration. Construction vibration impacts on building structures are generally assessed in terms of PPV. Typical vibration source levels from construction equipment are shown in Table 3.

Table 3: Vibration Levels of Construction Equipment

Construction Equipment	PPV at 25 Feet (inches/second)	rms Velocity in Decibels (VdB) at 25 Feet
Water Trucks	0.001	57
Scraper	0.002	58
Bulldozer—small	0.003	58
Jackhammer	0.035	79
Concrete Mixer	0.046	81
Concrete Pump	0.046	81
Paver	0.046	81
Pickup Truck	0.046	81
Auger Drill Rig	0.051	82
Backhoe	0.051	82
Crane (Mobile)	0.051	82
Excavator	0.051	82
Grader	0.051	82
Loader	0.051	82
Loaded Trucks	0.076	86
Bulldozer—Large	0.089	87
Caisson drilling	0.089	87

Construction Equipment	PPV at 25 Feet (inches/second)	rms Velocity in Decibels (VdB) at 25 Feet
Vibratory Roller (small)	0.101	88
Compactor	0.138	90
Clam shovel drop	0.202	94
Vibratory Roller (large)	0.210	94
Pile Driver (impact-typical)	0.644	104
Pile Driver (impact-upper range)	1.518	112
Source: Compilation of scientific and academic literature, generated by the Federal Transit Administration (FTA) and Federal Highway Administration (FHWA).		

The propagation of groundborne vibration is not as simple to model as airborne noise. This is because noise in the air travels through a relatively uniform medium, while groundborne vibrations travel through the earth, which may contain significant geological differences. Factors that influence groundborne vibration include:

- **Vibration source:** Type of activity or equipment, such as impact or mobile, and depth of vibration source;
- **Vibration path:** Soil type, rock layers, soil layering, depth to water table, and frost depth; and
- **Vibration receiver:** Foundation type, building construction, and acoustical absorption.

Among these factors that influence groundborne vibration, there are significant differences in the vibration characteristics when the source is underground compared to at the ground surface. In addition, soil conditions are known to have a strong influence on the levels of groundborne vibration. Among the most important factors are the stiffness and internal damping of the soil and the depth to bedrock. Vibration propagation is more efficient in stiff clay soils than in loose sandy soils, and shallow rock seems to concentrate the vibration energy close to the surface and can result in groundborne vibration problems at large distance from the source. Factors such as layering of the soil and depth to the water table can have significant effects on the propagation of groundborne vibration. Soft, loose, sandy soils tend to attenuate more vibration energy than hard, rocky materials. Vibration propagation through groundwater is more efficient than through sandy soils. There are three main types of vibration propagation: surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wave front, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wave front. However, unlike P-waves, the particle motion is transverse, or side-to-side and perpendicular to the direction of propagation.

As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil type, but it has been shown to be effective enough for screening purposes, in order to identify potential vibration impacts that may need to be studied through actual field tests. The vibration level (calculated below as PPV) at a distance from a point source can generally be calculated using the vibration reference equation:

$$PPV = PPV_{ref} * (25/D)^n \text{ (in/sec)}$$

Where:

PPV_{ref} = reference measurement at 25 feet from vibration source
D = distance from equipment to property line
n = vibration attenuation rate through ground

According to Section 7 of the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual, an "n" value of 1.5 is recommended to calculate vibration propagation through typical soil conditions.[1]

[1] Federal Transit Administration (FTA). 2018. Transit Noise and Vibration Impact Assessment Manual. September.

SECTION 3: REGULATORY SETTING

3.1 - Federal Regulations

3.1.1 - United States Environmental Protection Agency

In 1972, Congress enacted the Noise Control Act. This act authorized the United States Environmental Protection Agency (EPA) to publish descriptive data on the effects of noise and establish levels of sound "requisite to protect the public welfare with an adequate margin of safety." These levels are separated into health (hearing loss levels) and welfare (annoyance levels) categories, as shown in Table 4. The EPA cautions that these identified levels are not standards because they do not take into account the cost or feasibility of the levels.

For protection against hearing loss, 96 percent of the population would be protected if sound levels are less than or equal to an $L_{eq(24)}$ of 70 dBA. The EPA activity and interference guidelines are designed to ensure reliable speech communication at about 5 feet in the outdoor environment. For outdoor and indoor environments, interference with activity and annoyance should not occur if levels are below 55 dBA and 45 dBA, respectively.

Table 4: Summary of EPA Recommended Noise Levels to Protect Public Welfare

Effect	Level	Area
Hearing loss	$L_{eq}(24) \leq 70$ dB	All areas
Outdoor activity interference and annoyance	$L_{dn} \leq 55$ dB	Outdoors in residential areas, farms, and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use.
	$L_{eq}(24) \leq 55$ dB	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	$L_{eq} \leq 45$ dB	Indoor residential areas.
	$L_{eq}(24) \leq 45$ dB	Other indoor areas with human activities such as schools, etc.

Note:
(24) signifies an L_{eq} duration of 24 hours.
Source: United States Environmental Protection Agency. 1978. Protective Noise Levels, EPA 550/9-79-100. November.

3.1.2 - Federal Transit Administration

The FTA has established industry accepted standards for vibration impact criteria and impact assessment. These guidelines are published in its Transit Noise and Vibration Impact Assessment

Manual.[2] The FTA guidelines include thresholds for construction vibration impacts for various structural categories as shown in Table 5.

Table 5: Federal Transit Administration Construction Vibration Impact Criteria

Building Category	PPV (in/sec)	Approximate VdB
I. Reinforced—Concrete, Steel or Timber (no plaster)	0.5	102
II. Engineered Concrete and Masonry (no plaster)	0.3	98
III. Non Engineer Timber and Masonry Buildings	0.2	94
IV. Buildings Extremely Susceptible to Vibration Damage	0.12	90

Note:
VdB = vibration measured as rms velocity in decibels of 1 micro-inch per second
Source: Federal Transit Administration (FTA). 2018. Transit Noise and Vibration Impact Assessment Manual. September.

3.2 - State Regulations

The State of California has established regulations that help prevent adverse impacts to occupants of buildings located near noise sources. Referred to as the "State Noise Insulation Standard," it requires buildings to meet performance standards through design and/or building materials that would offset any noise source in the vicinity of the receptor. State regulations include requirements for the construction of new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings that are intended to limit the extent of noise transmitted into habitable spaces. These requirements are found in the California Code of Regulations, Title 24 (known as the Building Standards Administrative Code), Part 2 (known as the California Building Code), Appendix Chapters 12 and 12A. For limiting noise transmitted between adjacent dwelling units, the noise insulation standards specify the extent to which walls, doors, and floor-ceiling assemblies must block or absorb sound. For limiting noise from exterior noise sources, the noise insulation standards set an interior standard of 45 dBA CNEL in any habitable room with all doors and windows closed. In addition, the standards require preparation of an acoustical analysis demonstrating the manner in which dwelling units have been designed to meet this interior standard, where such units are proposed in an area with exterior noise levels greater than 60 dBA CNEL.

The proposed project does not include any type of residential development. Therefore, these standards are not applicable to the proposed project. However, the State has established land use compatibility guidelines for determining acceptable noise levels for specified land uses, including industrial type land uses such as the proposed project, which the City of Rialto has adopted as described below.

[2] Federal Transit Administration (FTA). 2018. Transit Noise and Vibration Impact Assessment Manual. September.

3.3 - Local Regulations

The project site is located within the City of Rialto, in San Bernardino County, California. The City of Rialto addresses noise in the Noise Element of the Rialto General Plan[3] and in the Rialto Municipal Code.[4]

3.3.1 - Rialto General Plan

The City of Rialto establishes land use compatibility standards and noise policies in the Safety and Noise Chapter in the Rialto General Plan. Policies most relevant to the proposed project site include the following:

Goal 5-10: Minimize the impact of point source and ambient noise levels throughout the community.

- Policy 5-10.3: Ensure that acceptable noise levels are maintained near schools, hospitals, and other noise sensitive areas in accordance with Municipal Code and noise standards contained in Exhibit 5-5 of the General Plan.
- Policy 5-10.4: Limit the hours of operation at all noise generation sources that are adjacent to noise-sensitive areas.
- Policy 5-10.5: Require all exterior noise sources (construction operations, air compressors, pumps, fans, and leaf blowers) to use available noise suppression devices and techniques to reduce exterior noise to acceptable levels that are compatible with adjacent land uses.

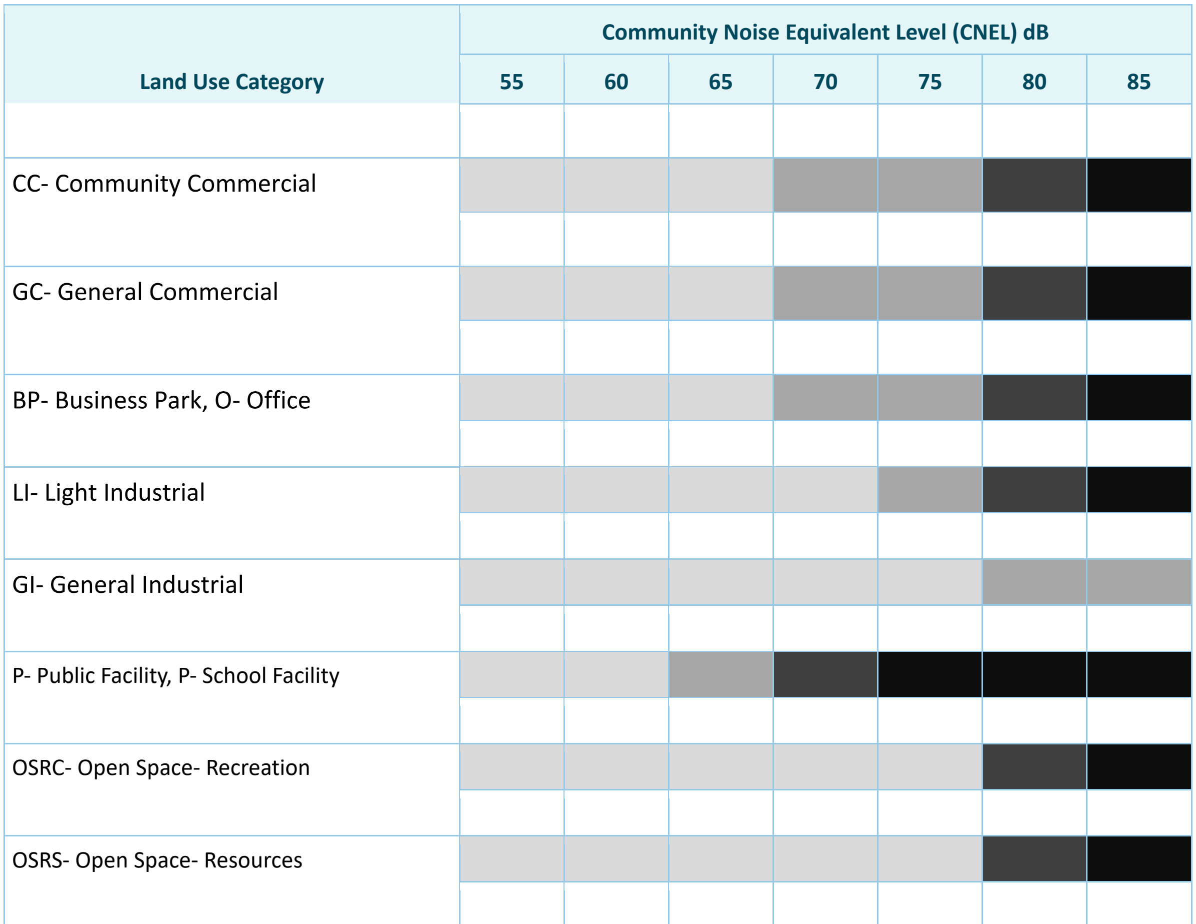
The General Plan Land Use Compatibility Standards for Community Noise Environments are shown in Table 6. The land use category listed in the General Plan Land Use Compatibility Standards that applies to the proposed project is Light Industrial. Under this designation, 70 dBA CNEL is considered to be the "normally acceptable" noise level for this type of new land use development.

Table 6: Land Use Compatibility Standards for Community Noise Environments

Land Use Category	Community Noise Equivalent Level (CNEL) dB						
	55	60	65	70	75	80	85
R2- Residential 2, R6- Residential 6							
R12- Residential 12							
R21- Residential21, R-45, Residential 45							
DMU- Downtown Mixed-Use							

3 City of Rialto. 2010. Rialto General Plan. December. Website: https://www.yourrialto.com/wp-content/uploads/2016/08/General-Plan-Update-2010.pdf. Accessed November 18, 2019.

4 City of Rialto. 2019. Rialto Municipal Code, Chapter 9, Noise. Website: https://library.municode.com/ca/rialto/codes/code_of_ordinances. Accessed November 18, 2019.



NORMALLY ACCEPTABLE
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction.

NORMALLY UNACCEPTABLE
New development should be discouraged, if not, a detailed analysis of noise reduction requirements must be made.

CONDITIONALLY ACCEPTABLE
New development should be undertaken only after detailed analysis of the noise reduction requirements are made.

CLEARLY UNACCEPTABLE
New development clearly should not be undertaken.

Source: City of Rialto. 2010. Rialto General Plan, Chapter 5: The Safety and Noise Chapter. December. Website: https://www.yourrialto.com/wp-content/uploads/2016/08/General-Plan-Update-2010.pdf. Accessed November 18, 2019.

Rialto Municipal Code

The City of Rialto establishes hours of operation and permissible construction hours in Chapter 9.50: Noise Control of the City's Municipal Code. Provisions from this ordinance that are applicable to the proposed project are summarized below:

Controlled Hours of Operation (Section 9.50.050)

According to this ordinance, it is unlawful for any person to engage in the following activities other than between the hours of 7:00 a.m. and 8:00 p.m. in all zones:

- Load or unload any vehicle, or operate or permit the use of dollies, carts, forklifts, or other wheeled equipment that causes any impulsive sound, raucous or unnecessary noise within one thousand feet of a residence;
- Operate or permit the use of any motor vehicle with a gross vehicle weight rating in excess of ten thousand pounds, or of any auxiliary equipment attached to such a vehicle, including but not limited to refrigerated truck compressors, for a period longer than fifteen minutes in any hour while the vehicle is stationary and on a public right-of-way or public space except when movement of the vehicle is restricted by other traffic;

Disturbances from Construction Activity (Section 9.50.070)

A. No person shall be engaged or employed, or cause any other person to be engaged or employed, in any work of construction, erection, alteration, repair, addition, movement, demolition, or improvement to any building or structure except within the hours provided for by subsection B of this section.

B. The permitted hours for such construction work are as follows:

October 1 through April 30:

Monday—Friday	7:00 a.m. to 5:30 p.m.
Saturday	8:00 a.m. to 5:00 p.m.
Sunday	No permissible hours
State holidays	No permissible hours

May 1 through September 30:

Monday—Friday	7:00 a.m. to 5:30 p.m.
Saturday	8:00 a.m. to 5:00 p.m.
Sunday	No permissible hours
State holidays	No permissible hours

C. For purposes of this section, the following definitions shall apply:

- "Building" means any structure used or intended for supporting or sheltering any use or occupancy.
- "Structure" means that which is built or constructed, an edifice or building of any kind, or any piece of work artificially built up or composed of parts joined together in some definite manner.

D. For purposes of this section, the following exceptions shall apply:

- Emergency repair of existing installations, equipment, or appliances; and
- Such work that complies with the terms and conditions of a written early work permit issued by the city manager or his or her designee upon a showing of a sufficient need and justification for the permit due to hot or inclement weather, the use of an unusually long process material, or other circumstances of an unusual and compelling nature.

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SECTION 4: EXISTING NOISE CONDITIONS

The proposed project site is located within the City of Rialto, in San Bernardino County, California. Surrounding the project site are light industrial land uses to the west, north and east and single-family residential land uses to the south. The dominant noise source in the project vicinity is traffic noise from Merrill Avenue, which runs along the southern boundary of the project site.

The existing noise levels on the project site were documented through a noise monitoring effort performed at the project site. Two short-term noise measurements (15 minutes each) were taken on Tuesday, December 17, 2019, between 3:00 p.m. and 4:00 p.m. These short-term noise measurements are summarized in Table 7. The noise measurement locations are shown in Exhibit 1, and the noise monitoring survey data sheets are provided in Appendix A.

Noise measurement ST-1 was taken in the southwest corner of the project site, northeast of the Yucca Avenue and Merrill Avenue intersection. The resulting measurement showed that ambient noise levels at this location averaged 66.1 dBA L_{eq}. As was observed by the technician at the time of the noise measurement, the dominant noise source in the project vicinity was from vehicle traffic along Merrill Avenue.

Noise measurement ST-2 was taken south of the project site, on the south side of Merrill Avenue, approximately 20 feet west of the corner of Iris Avenue and Merrill Avenue. The resulting measurement showed that ambient noise levels at this location averaged 65.9 dBA L_{eq}. As was observed by the technician at the time of the noise measurement, the dominant noise source in the project vicinity was from vehicle traffic along Merrill Avenue.

Table 7: Short-term Noise Monitoring Summary

Site Location	Description	L_{eq}	L_{max}	L_{min}
ST-1	Northeast corner of intersection of Yucca Avenue and Merrill Avenue.	66.1	81.2	52.4
ST-2	South side of Merrill Avenue, approximately 20 feet west of the corner of Iris Avenue and Merrill Avenue.	65.9	77.5	54.9
Source: FCS 2019.				

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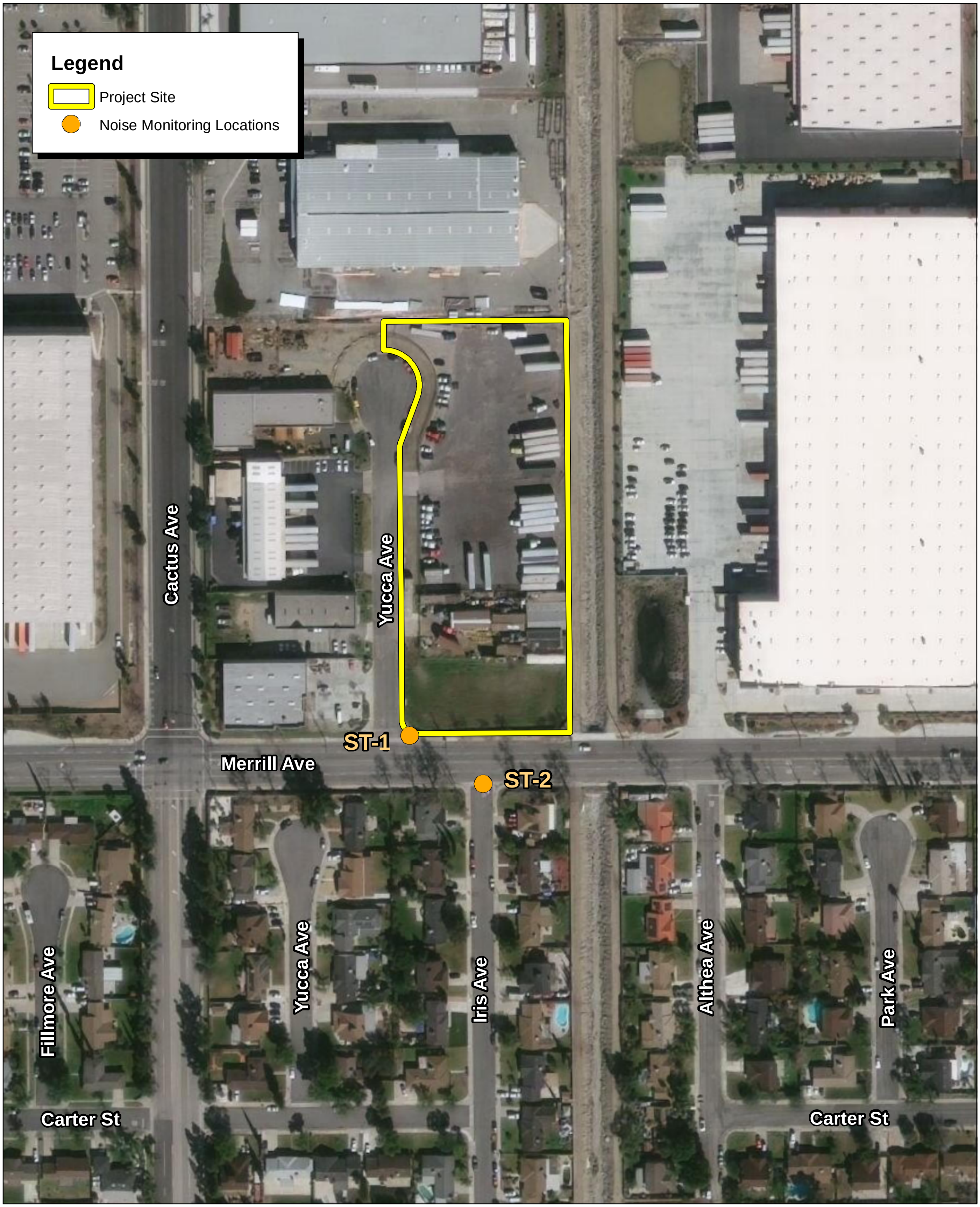

Source: ESRI Aerial Imagery.

FIRSTCARBON SOLUTIONS™

200 100 0 200 Feet

Exhibit 4
Noise Monitoring Locations

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SECTION 5: THRESHOLDS OF SIGNIFICANCE AND IMPACT ANALYSIS

5.1 - Thresholds of Significance

According to the California Environmental Quality Act (CEQA) Guidelines, updated Appendix G (2019), to determine whether impacts related to noise and vibration are significant environmental effects, the following questions are analyzed and evaluated.

It should be noted that the significance criteria question (a), below, is from the Land Use and Planning section of the CEQA Guidelines Appendix G checklist questions. However, this question addresses impacts related to conflicts with land use plans, which would include project-related conflicts to the noise land use compatibility standards of the Noise Element of the Rialto General Plan. Therefore, these impacts are addressed here.

Would the proposed plan:

a) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

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

c) Generate excessive groundborne vibration or groundborne noise levels?

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

5.2 - Noise Levels That Would Conflict with Any Land Use Plan, Policy, Or Regulation

A significant impact would occur if the project would result in a conflict with the City's adopted land use compatibility standards. The Rialto General Plan indicates that for light industrial land use developments, environments with ambient noise levels ranging up to 70 dBA CNEL are considered "normally acceptable."

The ambient noise environment of the project site has been documented through the ambient noise monitoring effort.

As shown in Table 7, measured daytime average noise levels on the project site range up to approximately 66 dBA L_{eq}. These noise levels are within the City's "Normally Acceptable" threshold of 70 dBA CNEL for light industrial land use developments. Therefore, implementation of the proposed project would not result in a conflict with the City's land use compatibility standards, and this impact would be less than significant.

5.3 - Substantial Noise Increase in Excess of Standards

5.3.1 - Construction Noise Impacts

For purposes of this analysis, a significant impact would occur if construction activities would result in a substantial temporary increase in ambient noise levels outside of the City's permissible hours for construction that would result in annoyance or sleep disturbance of nearby sensitive receptors. Permissible construction hours are from 7:00 a.m. to 5:30 p.m. on weekdays, and 8:00 a.m. to 5:00 p.m. on Saturdays from October 1 through April 30, and 6:00 a.m. to 7:00 p.m. on weekdays, and 8:00 a.m. to 5:00 p.m. on Saturdays from May 1 through April 30. Construction activities are not permitted on Sundays or State holidays.

Construction-related Traffic Noise

Noise impacts from construction activities associated with the project would be a function of the noise generated by construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities. One type of short-term noise impact that could occur during project construction would result from the increase in traffic flow on local streets, associated with the transport of workers, equipment, and materials to and from the project site. The transport of workers and construction equipment and materials to the project site would incrementally increase noise levels on access roads leading to the site. Because workers and construction equipment would use existing routes, noise from passing trucks would be similar to existing vehicle-generated noise on these local roadways. Typically, a doubling of the Average Daily Trip (ADT) hourly volumes on a roadway segment is required in order to result in an increase of 3 dBA in traffic noise levels; which, as discussed in the characteristics of nose discussion above, is the lowest change that can be perceptible to the human ear in outdoor environments. Project-related construction trips would not be expected to double the hourly or daily traffic volumes along any roadway segment in the project vicinity. For this reason, short-term intermittent noise from construction trips would not be expected to result in a perceptible increase in hourly- or daily-average traffic noise levels in the project vicinity. Therefore, short-term construction-related noise impacts associated with the transportation of workers and equipment to the project site would be less than significant.

Construction Equipment Operational Noise

The second type of short-term noise impact is related to noise generated during construction on the project site. Construction is completed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on the site and, therefore, the noise levels surrounding the site as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction related noise ranges to be categorized by work phase. Table 1 lists typical construction equipment noise levels, based on a distance of 50 feet between the equipment and a noise receptor. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full-power operation followed by 3 or 4 minutes at lower power settings. Impact equipment such as pile drivers are not expected to be used during construction of this project.

The site preparation phase, which includes excavation and grading of the site, tends to generate the highest noise levels because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery and compacting equipment, such as bulldozers, draglines, backhoes, front loaders, roller compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full power operation followed by 3 or 4 minutes at lower power settings.

Construction of the project is expected to require the use of scrapers, bulldozers, water trucks, haul trucks, and pickup trucks. Based on the information provided in Table 2, the maximum noise level generated by each scraper is assumed to be 85 dBA L_{max} at 50 feet from this equipment. Each bulldozer would also generate 85 dBA L_{max} at 50 feet. The maximum noise level generated by graders is approximately 85 dBA L_{max} at 50 feet. A characteristic of sound is that each doubling of sound sources with equal strength increases a sound level by 3 dBA. Assuming that each piece of construction equipment operates at some distance from the other equipment, a reasonable worst-case combined noise level during this phase of construction would be 90 dBA L_{max} at a distance of 50 feet from the acoustic center of a construction area. This would result in a reasonable worst-case hourly average of 86 dBA L_{eq}. The acoustic center reference is used, because construction equipment must operate at some distance from one another on a project site, and the combined noise level as measured at a point equidistant from the sources would (acoustic center) be the worst-case maximum noise level. The effect on sensitive receptors is evaluated below.

The closest noise-sensitive receptor to the project site is the single-family residence located south of the southwestern corner of the project site, along Merrill Avenue. The façade of this closest home would be located approximately 150 feet from the acoustic center of construction activity where multiple pieces of heavy construction equipment would operate simultaneously. At this distance, construction noise levels could range up to approximately 80 dBA L_{max}, with a relative worst-case hourly average of 76 dBA L_{eq} at this receptor. These noise levels could occur temporarily under the reasonable worst-case scenario of multiple pieces of heavy construction equipment operating simultaneously in relatively the same locations at the nearest project boundary for an hour period.

Although there could be a relatively high single event noise exposure potential causing an intermittent noise nuisance, the effect of construction activities on longer-term (hourly or daily) ambient noise levels would be small but could result in a temporary increase in ambient noise levels in the project vicinity that could result in annoyance or sleep disturbance of nearby sensitive receptors. However, Section 9.50.070 of the Rialto Municipal Code restricts permissible hours of construction to between the hours of 7:00 a.m. to 5:30 p.m. Monday through Friday, and between the hours of 8:00 a.m. to 5:00 p.m. on Saturday from October 1 through April 30, and 6:00 a.m. to 7:00 p.m. Monday through Friday, and between the hours of 8:00 a.m. to 5:00 p.m. on Saturday from May 1 through September 30. Therefore, compliance with the City's permissible hours of construction would ensure that construction noise would not result in a substantial temporary increase in ambient noise levels that would result in annoyance or sleep disturbance of nearby sensitive receptors; hence, less than significant construction noise impacts would occur.

5.3.2 - Mobile Source Operational Noise Impacts

A significant impact would occur if implementation of the proposed project would result in a substantial increase in traffic noise levels compared with traffic noise levels existing without the project. Typically, a doubling of the ADT hourly volumes on a roadway segment is required in order to result in an increase of 3 dBA in traffic noise levels; which, as discussed in the characteristics of nose discussion above, is the lowest change that can be perceptible to the human ear in outdoor environments. Therefore, for purposes of this analysis, a doubling of the existing ADT volumes would result in a substantial permanent increase in traffic noise levels.

Based on the traffic analysis prepared for the project, the project would generate an average of 134 trips per day, including 12 AM peak-hour trips and 12 PM peak-hour trips.[5] These average daily and peak-hour project trips would not result in a doubling of the average daily trips along West Merrill Avenue or any other roadway segment in the project vicinity. Therefore, the increase in traffic noise resulting from project operations would not be perceptible along any roadway segment in the project vicinity. Therefore, implementation of the project would not result in a substantial increase in traffic noise levels compared with traffic noise levels existing without the project.

5.3.3 - Stationary Source Operational Noise Impacts

A significant impact would occur if operational noise levels generated by stationary noise sources at the proposed project site would result in a substantial permanent increase in ambient noise levels in excess of existing ambient noise levels. The City of Rialto does not define what constitutes a substantial noise increase. As noted in the characteristics of noise discussion, audible increases in noise levels generally refer to a change of 3 dBA or more, as this level has been found to be barely perceptible to the human ear in outdoor environments. Therefore, for purposes of this analysis, an increase of more than 3 dBA above the applicable noise performance thresholds would be considered a substantial permanent increase in ambient noise levels.

The proposed project would generate noise from parking lot activities, new exterior mechanical equipment sources, such as rooftop ventilation systems on proposed industrial uses, and from truck loading and unloading activities. Potential impacts from these noise sources are discussed below.

Parking Lot Activities

Typical parking lot activities include people conversing, doors shutting, and vehicles idling which generate noise levels ranging from approximately 60 dBA to 70 dBA L_{max} at 50 feet. These activities are expected to occur sporadically throughout the day, as visitors and staff arrive and leave parking lot areas at the project site.

The nearest noise-sensitive receptor to the parking areas associated with the proposed project are the single-family residential land uses located south of the project site, across Merrill Avenue. These residences would be located approximately 140 feet from the acoustic center of parking lot activities at the project site. With the distance attenuation and shielding provided by the residential block walls along the property line adjoining Merrill Avenue, noise levels associated with daily parking lot

[5] Urban Crossroads. 2020. Dedeaux Industrial Center Traffic Impact Analysis – Scoping Agreement. May 8.

activities would attenuate to approximately 55 dBA L_{max} at the nearest residential façade or backyard active use areas. Assuming a reasonable worst-case scenario of one parking movement for every parking stall within a single hour would result in an hourly average noise level of 43 dBA L_{eq} as measured at the nearest residential receptor façade or backyard outdoor active use areas.

The existing measured ambient noise level at the nearest residential receptor is documented by the short-term noise measurement ST-2 to range up to 65.9 dBA L_{eq}, with maximum noise levels of 77.5 dBA L_{max}. Therefore, parking lot noise levels would not exceed existing ambient noise levels as measured at the nearest residential receptor and would not result in a substantial permanent increase in ambient noise levels in the project vicinity. Because the proposed project would not generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, the impact of noise produced by project-related parking lot activities to off-site sensitive receptors would be less than significant.

Mechanical Equipment Operations

At the time of preparation of this analysis, details were not available pertaining to the proposed rooftop mechanical ventilation systems for the project; therefore, a reference noise level for typical rooftop mechanical ventilation systems was used. Noise levels from typical rooftop mechanical ventilation equipment are anticipated to range up to approximately 60 dBA L_{eq} at a distance of 25 feet. Rooftop mechanical ventilation systems could be located approximately 195 feet from the nearest noise sensitive receptor, which is a single-family residence south of the project site. Noise generated by typical rooftop mechanical ventilation equipment would attenuate (due to distance attenuation and shielding provided by the rooftop parapet) to below 36 dBA L_{eq}. The existing measured ambient noise level at the nearest residential receptor is documented by the short-term noise measurement ST-2 averaged 65.9 dBA L_{eq}. Therefore, noise levels from proposed mechanical ventilation equipment operations would not exceed existing ambient noise levels as measured at the nearest residential receptor and would not result in a substantial permanent increase in ambient noise levels in the project vicinity. Because the project would not generate a substantial temporary or permanent increase in ambient noise levels in the project vicinity in excess of standards established in the local general plan or noise ordinance, the impact of noise produced by proposed mechanical ventilation equipment operations to off-site sensitive receptors would be less than significant.

Truck Loading Activities

Noise would be also generated by truck loading and unloading activities at the loading docks along the eastern side of the proposed building. Hours of operation for the proposed project would be from 7:00 a.m. to 7:00 a.m., 7-days a week. According to the City's Noise Ordinance Section 9.50.050, it is unlawful for any person to engage in loading/unloading activities that causes any impulsive sound, raucous or unnecessary noise within one thousand feet of a residence other than between the hours of 7:00 a.m. and 8:00 p.m.

Typical noise levels from truck loading and unloading activity can range from 70 dBA to 80 dBA L_{max} as measured at 50 feet. The project would include a 14-foot-high concrete screening wall along the majority of the southern boundary of the proposed loading and unloading area. This screening wall would block the line of sight from the majority of loading docks to the residential land uses south of Merrill Avenue, and would provide a minimum of 12 dBA shielding reduction. Additionally, there is a 6-foot-high wall along the northern property line of each of the nearest residences south of Merrill Avenue. The nearest single-family residence is located more than 200 feet from the southernmost proposed loading dock. Due to distance attenuation, and with shielding reduction provided by the 14-foot proposed screening wall and the 6-foot existing wall at the residential property line, noise levels from truck loading and unloading activities would attenuate to below 56 dBA L_{max} at the nearest residential façade or backyard active use areas.

Based on the EPA's Protective Noise Levels, with a combination of walls, doors, and windows, standard construction in accordance with building code requirements for residential developments in southern California would provide a minimum 24 dBA in exterior-to-interior noise reduction with windows closed and 12 dBA or more with windows open.[6] Therefore, as measured in the interior of this nearest residence, noise levels from truck loading and unloading activities would attenuate to below 44 dBA L_{max} with windows open, and to below 32 dBA L_{max} with windows closed. Such noise levels are not considered to be "impulsive sound, raucous or unnecessary noise;" therefore, the proposed project would not be required to comply with the restricted hours for loading/unloading activities.

The existing measured ambient noise level at the nearest residential receptor is documented by the short-term noise measurement ST-2 to range up to 65.9 dBA L_{eq}, with maximum noise levels of 77.5 dBA L_{max}. Therefore, operational truck loading activity noise levels would not exceed existing ambient noise levels as measured at the nearest residential receptor and would not result in a substantial permanent increase in ambient noise levels in the project vicinity. Because the project would not generate a substantial temporary or permanent increase in ambient noise levels in the project vicinity in excess of standards established in the local general plan or noise ordinance, the impact of noise produced by operational truck loading activities to off-site sensitive receptors would be less than significant.

Therefore, there would be no impact from noise generated from stationary operational noise sources.

5.4 - Groundborne Vibration/Noise Levels

This section analyzes both construction and operational groundborne vibration and noise impacts. Groundborne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. Vibrating objects in contact with the ground radiate vibration waves through various soil and rock strata to the foundations of nearby buildings. Groundborne noise is generated when vibrating building components radiate sound, or noise generated by groundborne vibration. In general, if groundborne vibration levels do not exceed levels considered to be perceptible, then

[6] EPA 550/9-79-100, November 1978

groundborne noise levels would not be perceptible in most interior environments. Therefore, this analysis focuses on determining exceedances of groundborne vibration levels.

The City of Rialto has not adopted criteria for groundborne vibration impacts. Therefore, for purposes of this analysis, the FTA's vibration impact criteria are utilized. The FTA has established industry accepted standards for vibration impact criteria and impact assessment. These guidelines are published in its Transit Noise and Vibration Impact Assessment Manual.[7] These guidelines are summarized in Table 5.

5.4.1 - Short-term Construction Vibration Impacts

A significant impact would occur if existing structures at the project site or in the project vicinity would be exposed to groundborne vibration levels in excess of levels established by the FTA's Construction Vibration Impact Criteria for the listed type of structure, as shown in Table 5.

Of the variety of equipment used during construction, the small vibratory rollers that are anticipated to be used in the site preparation phase of construction would produce the greatest groundborne vibration levels. Small vibratory rollers produce groundborne vibration levels ranging up to 0.101 inch per second (in/sec) PPV at 25 feet from the operating equipment.

The nearest off-site receptor to the project site is the industrial building located west of the project site, across South Yucca Avenue. The façade of this building would be located approximately 90 feet from the nearest construction footprint where the heaviest construction equipment would potentially operate. At this distance, groundborne vibration levels would range up to 0.015 PPV from operation of the types of equipment that would produce the highest vibration levels. This is well below the FTA's Construction Vibration Impact Criteria of 0.3 PPV for this type of structure, a building of engineered concrete and masonry construction. Therefore, the impact of short-term groundborne vibration associated with construction to off-site receptors would be less than significant.

5.4.2 - Operational Vibration Impacts

Implementation of the project would not include any permanent sources that would expose persons in the project vicinity to groundborne vibration levels that could be perceptible without instruments at any existing sensitive land use in the project vicinity. In addition, there are no existing significant permanent sources of groundborne vibration in the project vicinity to which the proposed project would be exposed. Therefore, project operational groundborne vibration level impacts would be considered less than significant.

5.5 - Excessive Noise Levels from Airport Activity

A significant impact would occur if the proposed project would expose people residing or working in the project area to excessive noise levels for a project located in the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport.

[7] Federal Transit Administration (FTA). 2018. Transit Noise and Vibration Impact Assessment Manual. September.

The project site is not located within the vicinity of a private airstrip. The nearest public airport to the project site is the San Bernardino International Airport, located approximately 7 miles east of the project site. Because of the distance of the project site from the airport runways, the project site is located outside of the 65 dBA CNEL airport noise contours. While aircraft noise is occasionally audible on the project site from aircraft flyovers, aircraft noise associated with nearby airport activity would not expose people residing or working near the project site to excessive noise levels. Therefore, implementation of the project would not expose persons residing or working in the project vicinity to noise levels from airport activity that would be in excess of normally acceptable standards for the proposed land use development, and no impact would occur.

Appendix A: Noise Monitoring and Modeling Data

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Project Number: 4996.0012 Sheet 1 of 2
Project Name: Yucca Avenue
Test Personnel: Kevin Bolland

Noise Measurement Survey

Site Number: ST-1 Date: 12/17/2019 Time: From 301 pm To 316 pm

Site Location:
Northeast corner of intersection of Yucca Avenue and Merrill Avenue

Primary Noise Sources: Traffic on Merrill Avenue.

Measurement Results

	dBA
Leq	66.1
Lmax	81.2
Lmin	52.4
L5	71.6
L10	69.7
L50	62.3
L90	56.1
Ldn	66.1
CNEL	66.1

Observed Noise Sources/Events

Time	Noise Source/Event	dBA
303	Passing cars	73.2
307	passing cars	74.1
308	passing Truck	78.5
308	passing Truck	81.1
311	passing cars	73.3
312	passing motorcycle	73.2

Comments: Windy Conditions

Equipment: Larson Davis LXT Measured Difference: -0.01 dBA
Settings: A-Weighted☐ Other☐ Slow☐ Fast☐ Windscreen☑

Atmospheric Conditions:

Maximum Wind Velocity (mph)	Average Wind Velocity (mph)	Temperature (F)	Relative Humidity (%)	
25		61	13	
Comments:				

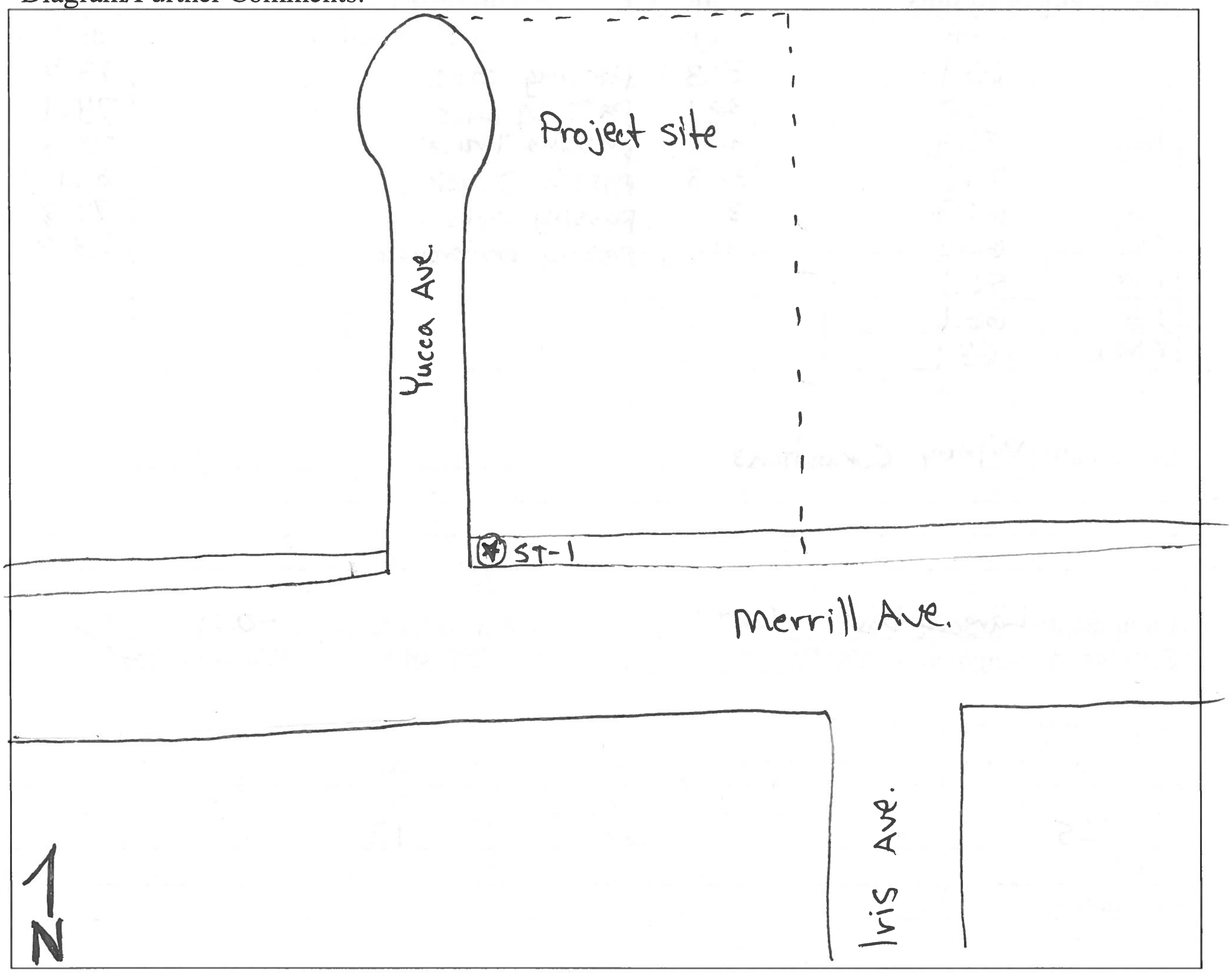
Photos Taken:

Photo Number	Location/Description
1	Facing North
2	Facing East
3	Facing South
4	Facing West

Traffic Description:

Roadway	# Lanes	Posted Speed	Average Speed	NB/EB Counts	SB/WB Counts
Merrill Ave.	4				
Yucca Ave	2				

Diagram/Further Comments:



Project Number: 4996.0012
Project Name: Yucca Avenue
Test Personnel: Kevin Bolland

Sheet 2 of 2

Noise Measurement Survey

Site Number: ST-2 Date: 12/17/2019 Time: From 322 pm To 337 pm

Site Location:
South Side of Merrill Avenue, approximately 20 feet West of the corner of Iris Avenue and Merrill Avenue

Primary Noise Sources: Traffic on Merrill Avenue

Measurement Results

	dBA
Leq	65.9
Lmax	77.5
Lmin	54.9
L5	71.0
L10	69.0
L50	63.9
L90	58.9
Ldn	65.9
CNEL	65.9

Observed Noise Sources/Events

Time	Noise Source/Event	dBA
325	Passing cars	73.4
327	Passing cars	72.1
328	Passing cars	73.2
329	Passing Cars	70.2
330	Passing Truck	74.0
331	passing cars	71.5
332	Passing cars	73.5
335	passing Truck	77.4

Comments: Windy...

Equipment: Larson Davis LXT
Settings: A-Weighted☐ Other☐

Measured Difference: 0.01 dBA
Slow☐ Fast☐ Windscreen☑

Atmospheric Conditions:

Maximum Wind Velocity (mph)	Average Wind Velocity (mph)	Temperature (F)	Relative Humidity (%)	
25				
Comments:				

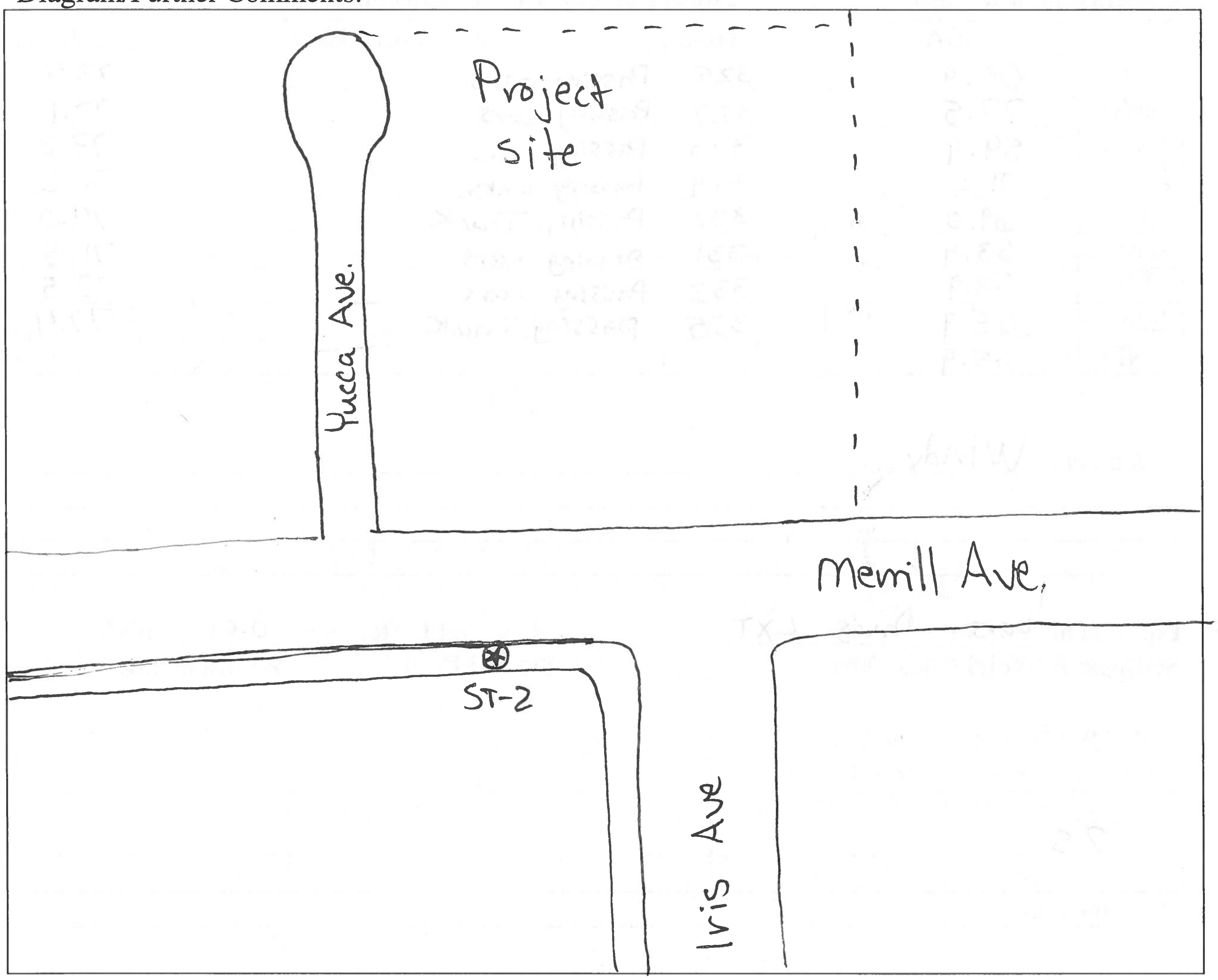
Photos Taken:

Photo Number	Location/Description
1	Facing North
2	Facing East
3	Facing South
4	Facing West
5	Sound Wall along Residential homes

Traffic Description:

Roadway	# Lanes	Posted Speed	Average Speed	NB/EB Counts	SB/WB Counts
Merrill Ave	4				

Diagram/Further Comments:



Summary			
Filename	LxT_Data.438		
Serial Number	4228		
Model	SoundTrack LxT®		
Firmware Version	2.206		
User			
Location			
Job Description			
Note			
Measurement Description			
Start	17/12/2019 15:02:03		
Stop	17/12/2019 15:17:08		
Duration	0:15:05.3		
Run Time	0:15:05.3		
Pause	0:00:00.0		
Pre Calibration	17/12/2019 15:01:30		
Post Calibration	None		
Calibration Deviation	---		
Overall Settings			
RMS Weight	A Weighting		
Peak Weight	A Weighting		
Detector	Slow		
Preamp	PRMLxT2L		
Microphone Correction	Off		
Integration Method	Exponential		
Overload	124.6 dB		
	A	**C**	**Z**
Under Range Peak	**80.8**	77.8	82.8 dB
Under Range Limit	**27.1**	27.1	31.7 dB
Noise Floor	18.0	17.9	22.6 dB
Results			
LASeq	66.1 dB		
LASE	95.7 dB		
EAS	414.411 µPa²h		
EAS8	13.184 mPa²h		
EAS40	65.918 mPa²h		
LApeak (max)	17/12/2019 15:10:34	114.8 dB	
LASmax	17/12/2019 15:09:43	81.2 dB	
LASmin	17/12/2019 15:14:32	52.4 dB	
SEA	-99.9 dB		
LAS > 85.0 dB (Exceedence Counts / Duration)	0	0.0 s	
LAS > 115.0 dB (Exceedence Counts / Duration)	0	0.0 s	
LApeak > 135.0 dB (Exceedence Counts / Duration)	0	0.0 s	
LApeak > 137.0 dB (Exceedence Counts / Duration)	0	0.0 s	
LApeak > 140.0 dB (Exceedence Counts / Duration)	0	0.0 s	

Community Noise	**Ldn**	**LDay 07:00-22:00**	**LNight 22:00-07:00**	**Lden**	**LDay 07:00-19:00**	**LEvening 19:00-22:00**	**LNight 22:00-07:00**
	66.1	66.1	-99.9	66.1	66.1	-99.9	-99.9

LCSeq	85.8 dB	
LASeq	66.1 dB	
LCSeq - LASeq	19.6 dB	
LAIeq	69.6 dB	
LAeq	66.2 dB	
LAIeq - LAeq	3.4 dB	
# Overloads	5	
Overload Duration	10.3 s	
Dose Settings		
Dose Name	OSHA-1	OSHA-2
Exch. Rate	5	5 dB
Threshold	90	80 dB
Criterion Level	90	90 dB
Criterion Duration	8	8 h
Results		
Dose	-99.9	0.00 %
Projected Dose	-99.9	0.04 %
TWA (Projected)	-99.9	32.9 dB
TWA (t)	-99.9	8.0 dB
Lep (t)	51.1	51.1 dB
Statistics		
LAS5.00	71.6 dB	
LAS10.00	69.7 dB	
LAS33.30	64.9 dB	
LAS50.00	62.3 dB	
LAS75.00	58.6 dB	
LAS90.00	56.1 dB	

Summary	
Filename	LxT_Data.439
Serial Number	4228
Model	SoundTrack LxT®
Firmware Version	2.206
User	
Location	
Job Description	
Note	
Measurement Description	
Start	17/12/2019 15:22:17
Stop	17/12/2019 15:37:39
Duration	0:15:21.4
Run Time	0:15:21.4
Pause	0:00:00.0
Pre Calibration	17/12/2019 15:21:44
Post Calibration	None
Calibration Deviation	---

Overall Settings			
RMS Weight	A Weighting		
Peak Weight	A Weighting		
Detector	Slow		
Preamp	PRMLxT2L		
Microphone Correction	Off		
Integration Method	Exponential		
Overload	124.6 dB		
	A	**C**	**Z**
Under Range Peak	**80.7**	77.7	82.7 dB
Under Range Limit	**27.1**	27.1	31.7 dB
Noise Floor	18.0	17.9	22.6 dB

Results		
LASeq	65.9 dB	
LASE	95.6 dB	
EAS	400.552 µPa²h	
EAS8	12.520 mPa²h	
EAS40	62.600 mPa²h	
LApeak (max)	17/12/2019 15:22:50	102.2 dB
LASmax	17/12/2019 15:37:14	77.5 dB
LASmin	17/12/2019 15:36:46	54.9 dB
SEA	-99.9 dB	
LAS > 85.0 dB (Exceedence Counts / Duration)	0	0.0 s
LAS > 115.0 dB (Exceedence Counts / Duration)	0	0.0 s
LApeak > 135.0 dB (Exceedence Counts / Duration)	0	0.0 s
LApeak > 137.0 dB (Exceedence Counts / Duration)	0	0.0 s
LApeak > 140.0 dB (Exceedence Counts / Duration)	0	0.0 s

Community Noise	**Ldn**	**LDay 07:00-22:00**	**LNight 22:00-07:00**	**Lden**	**LDay 07:00-19:00**	**LEvening 19:00-22:00**	**LNight 22:00-07:00**
	65.9	65.9	-99.9	65.9	65.9	-99.9	-99.9
LCSeq	81.5 dB						
LASeq	65.9 dB						
LCSeq - LASeq	15.5 dB						
LAIeq	67.8 dB						
LAeq	65.9 dB						
LAIeq - LAeq	1.9 dB						
# Overloads	0						
Overload Duration	0.0 s						

Dose Settings		
Dose Name	OSHA-1	OSHA-2
Exch. Rate	5	5 dB
Threshold	90	80 dB
Criterion Level	90	90 dB
Criterion Duration	8	8 h
Results		
Dose	-99.9	-99.9 %
Projected Dose	-99.9	-99.9 %
TWA (Projected)	-99.9	-99.9 dB
TWA (t)	-99.9	-99.9 dB
Lep (t)	51.0	51.0 dB

Statistics	
LAS5.00	71.0 dB
LAS10.00	69.0 dB
LAS33.30	65.7 dB
LAS50.00	63.9 dB
LAS75.00	61.1 dB
LAS90.00	58.9 dB

Parking Lot activity

Receptor: Closest Residence to the South

No.	Equipment Description	Reference (dBA) 50 ft Lmax	Quantity	Usage factor[1]	Distance to Receptor	Ground Effect[2]	Shielding (dBA)[3]	Calculated (dBA) Lmax	Calculated (dBA) Leq	Energy
1	parking lot activity	70	5	1	140	1	6	55.1	37.6	5721.315669
2	parking lot activity	70	6	1	150	1	6	54.5	37.5	5581.969848
3	parking lot activity	70	6	1	160	1	6	53.9	36.6	4599.401425
4	parking lot activity	70	6	1	170	1	6	53.4	35.8	3834.550832
5										
6										
7										
8										
9										
10										
									Leq	**43**

Notes:
[1] Percentage of time activity occurs each hour
[2] Soft ground terrain between project site and receptor.
[3] Shielding due to existing block soundwall
[4] Calculated Lmax is the Loudest value.

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