Acoustical Assessment

Bridge Point Upland Project
City of Upland, California

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LIST OF ABBREVIATED TERMS

ADT	average daily traffic
BNL	basic noise level
CEQA	California Environmental Quality Act
CL	centerline
CNEL	community equivalent noise level
cy	cubic yards
dB	decibel
dB	decibel
dBA	A-weighted sound level
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
ft	foot/feet
FTA	Federal Transit Administration
HVAC	heating ventilation and air conditioning
Hz	hertz
in/sec	inches per second
L_{dn}	day-night noise level
L_{eq}	equivalent noise level
L_{max}	maximum noise level
L_{min}	minimum noise level
mph	miles per hour
PPV	peak particle velocity
RMS	root mean square
sf	square foot
µPa	micropascals
VdB	vibration velocity level

1 INTRODUCTION

This report documents the results of an Acoustical Assessment completed for the Bridge Point Upland Project. The purpose of this Acoustical Assessment is to evaluate the potential construction and operational noise and vibration levels associated with the proposed Project and determine the level of impact the Project would have on the environment.

1.1 Project Location

The Bridge Point Upland Project (proposed Project) is located in the City of Upland north of Interstate 10 (I-10), south of State Route 210 (SR-210), west of Interstate 15 (I-15), and east of State Route 57 (SR-57) as depicted in Exhibit 1: Regional Vicinity. The overall Project site is located on approximately 50.25 acres northeast of Central Avenue and Foothill Boulevard, as depicted in Exhibit 2: Site Vicinity.

The Project site is in a predominately industrial and commercial area. The land uses surrounding the Project site consist of a mix of uses including industrial, commercial, residential, an airport, and a major transportation corridor. Properties zoned for Highway Commercial uses are located immediately south of the site. Foothill Boulevard is located farther south of the site. Foothill Boulevard is located further south of the site. Cable Airport is located directly north of the site and a portion of the airport, along with industrial uses are located west of the site. Commercial uses, including a Lowe's Home Improvement Store and a commercial shopping center, are located east of the site.

1.2 Project Description

The proposed Project is comprised of one warehouse/ parcel delivery service building with an ancillary office/retail space on approximately 50.25 acres as shown in Exhibit 3: Site Plan. The Project site is located on Assessor Parcel Nos. (APN) 1006-351-09, 1006-351-10, 1006-572-11, 1006-551-12, 1006-551-22, and 1006-574-10. Project entitlement includes a Design Review and Site Plan Review application; a Lot Line Adjustment; and a determination from the Airport Land Use Committee that the Project is compatible with the Cable Airport Land Use Compatibility Plan.

The Project building is proposed to be one level and total approximately 201,096 square feet (sf), of which approximately 191,096 sf would be warehouse/parcel delivery uses and 10,000 sf would be office/retail uses. The office/retail component would include an office area for employees, and a small area for visitors to pick up pre-ordered packages. To be conservative, this analysis evaluates a maximum development scenario that includes a 276,250 sf building.

The western building frontage would include 16 dock-hi doors for trucks, and 8 van loading doors would be located on both the northern and southern building frontages. The Project would require a minimum of 220 automobile parking spaces. Trailer parking for the warehouse building would include approximately 12 stalls and an additional 1,104 van parking stalls would be located on-site.

Building Design

The warehouse/parcel delivery service building is designed as a class A building. The building architecture features a modern aesthetic including glazing with brow projections to focus attention on the entries and street frontages. The major building material is concrete which lends itself to a modern palette with reveals to enhance the building architecture. The building would have a maximum height of approximately 44 feet with parapets and façade, which would provide depth and shadowing and points of visual interest for the architecture. This relief in the design also provides locations for accents in the landscape design.

Access and Parking

Vehicular access to the Project would be provided via 13th Street, the north leg of Central Avenue/Foothill Boulevard, and two right-in/right-out driveways on Foothill Boulevard. The driveway on 13th Street would provide access to automobiles and vans only; trucks would access the site only via the driveway at the north leg of Central Avenue/Foothill Boulevard. Street improvements would be provided along Foothill Boulevard at the Project frontage to include improvements to curbs, gutters, sidewalks, street lights, traffic signal equipment and signing and striping as required. Street improvements would also be made to Central Avenue and 13th Street.

Landscaping

The Project would be landscaped along all four frontages of the site, including landscaped slopes along the western and southern portions of the site. Landscaping would also be installed throughout the parking areas. The conceptual landscape design would feature California drought tolerant and native species in an aesthetically pleasing and colorful palette.

The Project building would include 455,380 sf of landscaping, which would account for more than 21 percent in landscape coverage, more than four times the City's minimum requirement of 5 percent. The warehouse/parcel delivery service building would be setback more than 200 feet on the southern building frontage and would exceed minimum setback requirements of 5 feet for front and side setbacks and rear setbacks of 10 feet.

Construction

Construction of the proposed Project is expected to commence in the first quarter of 2020 with a construction duration of approximately 7 months. Project construction would be completed in one phase with buildout by the third quarter of 2020. Total excavation and fill of soils for the proposed Project is mostly balanced with approximately 431 cubic yards (cy) of exported soil.

Existing Project Site

The Project site consists of both disturbed land on the western portion of the site and undeveloped land on the eastern portion of the site. The disturbed portion of the land is used for outdoor dirt, sand, gravel and rock stockpiling, processing and crushing; the existing stockpiles are being processed and removed by the current operator as part of existing operations, and the removal of those materials is not a part of the Project. No structures are currently located on the site. There is existing utility access (water, sewer, electricity, gas) located in the immediate vicinity of the proposed Project and these services would be extended to the site to serve the proposed Project.

Exhibit 1: Regional Vicinity

Exhibit 2: Site Vicinity

Source: Google Maps, 2018.

Exhibit 3: Site Plan

Source: Herdman Architecture and Design, 2019.

Not to Scale

2 ACOUSTIC FUNDAMENTALS

2.1 Sound and Environmental Noise

Acoustics is the science of sound. Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a medium (e.g., air) to human (or animal) ear. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second, or hertz (Hz).

Noise is defined as loud, unexpected, or annoying sound. In acoustics, the fundamental model consists of a noise source, a receptor, and the propagation path between the two. The loudness of the noise source, obstructions, or atmospheric factors affecting the propagation path, determine the perceived sound level and noise characteristics at the receptor. Acoustics deal primarily with the propagation and control of sound. A typical noise environment consists of a base of steady background noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources. These sources can vary from an occasional aircraft or train passing by to continuous noise from traffic on a major highway. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a large range of numbers. To avoid this, the decibel (dB) scale was devised. The dB scale uses the hearing threshold of 20 micropascals (µPa) as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The dB scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels correspond closely to human perception of relative loudness. Table 1: Typical Noise Levels, provides typical noise levels.

Table 1: Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	– 110 –	Rock Band
Jet fly-over at 1,000 feet		
	– 100 –	
Gas lawnmower at 3 feet		
	– 90 –	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	– 80 –	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower, 100 feet	**– 70 –**	Vacuum cleaner at 10 feet
Commercial area		Normal Speech at 3 feet
Heavy traffic at 300 feet	**– 60 –**	
		Large business office
Quiet urban daytime	**– 50 –**	Dishwasher in next room
Quiet urban nighttime	**– 40 –**	Theater, large conference room (background)
Quiet suburban nighttime		
	– 30 –	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	– 20 –	
		Broadcast/recording studio
	– 10 –	
Lowest threshold of human hearing	**– 0 –**	Lowest threshold of human hearing

Source: California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.

Noise Descriptors

The dB scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. The equivalent noise level (L_{eq}) is the average noise level averaged over the measurement period, while the day-night noise level (L_{dn}) and Community Equivalent Noise Level (CNEL) are measures of energy average during a 24-hour period, with dB weighted sound levels from 7:00 p.m. to 7:00 a.m. Most commonly, environmental sounds are described in terms of an average level (L_{eq}) that has the same acoustical energy as the summation of all the time-varying events. Each is applicable to this analysis and defined in Table 2: Definitions of Acoustical Terms.

Table 2: Definitions of Acoustical Terms

Term	Definitions
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in μPa (or 20 micronewtons per square meter), where 1 pascals is the pressure resulting from a force of 1 newton exerted over an area of 1 square meter. The sound pressure level is expressed in dB as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 μPa). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level (dBA)	The sound pressure level in dB as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level (L_{eq})	The average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
Maximum Noise Level (L_{max}) Minimum Noise Level (L_{min})	The maximum and minimum dBA during the measurement period.
Exceeded Noise Levels (L_{01}, L_{10}, L_{50}, L_{90})	The dBA values that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day-Night Noise Level (L_{dn})	A 24-hour average L_{eq} with a 10 dBA weighting added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity at nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
Community Noise Equivalent Level (CNEL)	A 24-hour average L_{eq} with a 5 dBA weighting during the hours of 7:00 a.m. to 10:00 a.m. and a 10 dBA weighting added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.7 dBA CNEL.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

The A-weighted decibel (dBA) sound level scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends on the distance between the receptor and the noise source.

A-Weighted Decibels

The perceived loudness of sounds is dependent on many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable and can be approximated by dBA values. There is a strong correlation between dBA and the way the human ear perceives sound. For this reason, the dBA has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of dBA, but are expressed as dB, unless otherwise noted.

Addition of Decibels

The dB scale is logarithmic, not linear, and therefore sound levels cannot be added or subtracted through ordinary arithmetic. Two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic dB is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70 dBA sound is half as loud as an 80 dBA sound and twice as loud as a 60 dBA sound. When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dBA higher than one source under the same conditions. Under the dB scale, three sources of equal loudness together would produce an increase of 5 dBA.

Sound Propagation and Attenuation

Sound spreads (propagates uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6 dB for each doubling of distance from a stationary or point source. Sound from a line source, such as a highway, propagates outward in a cylindrical pattern. Sound levels attenuate at a rate of approximately 3 dB for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics. No excess attenuation is assumed for hard surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed. For line sources, an overall attenuation rate of 3 dB per doubling of distance is assumed.

Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The manner in which older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units is generally 30 dBA or more.

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet, suburban, residential streets with noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Regarding increases in dBA, the following relationships should be noted:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived by humans.
- Outside of the laboratory, a 3 dBA change is considered a just-perceivable difference.
- A change in level of at least 5 dBA is required before any noticeable change in community response would be expected. An increase of 5 dBA is typically considered substantial.
- A 10 dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

Effects of Noise on People

Hearing Loss

While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise, but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise. The Occupational Safety and Health Administration has a noise exposure standard that is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over 8 hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. A noise level of about 55 dBA L_{dn} is the threshold at which a substantial percentage of people begin to report annoyance[1].

2.2 Groundborne Vibration

Sources of groundborne vibrations include natural phenomena (earthquakes, volcanic eruptions, sea waves, landslides, etc.) or man-made causes (explosions, machinery, traffic, trains, construction equipment, etc.). Vibration sources may be continuous (e.g., factory machinery) or transient (e.g., explosions). Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One is the peak particle velocity (PPV); another is the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. The RMS velocity is defined as the average of the squared amplitude of the signal. The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration.

Table 3: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations, displays the reactions of people and the effects on buildings produced by continuous vibration levels. The annoyance levels shown in the table should be interpreted with care since vibration may be found to be annoying at much lower levels than those listed, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high noise environments, which are more prevalent where groundborne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

Table 3: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations

Peak Particle Velocity (in/sec)	Approximate Vibration Velocity Level (VdB)	Human Reaction	Effect on Buildings
0.006-0.019	64-74	Range of threshold of perception	Vibrations unlikely to cause damage of any type
0.08	87	Vibrations readily perceptible	Recommended upper level to which ruins and ancient monuments should be subjected
0.1	92	Level at which continuous vibrations may begin to annoy people, particularly those involved in vibration sensitive activities	Virtually no risk of architectural damage to normal buildings
0.2	94	Vibrations may begin to annoy people in buildings	Threshold at which there is a risk of architectural damage to normal dwellings
0.4-0.6	98-104	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Architectural damage and possibly minor structural damage

Source: California Department of Transportation, *Transportation and Construction-Induced Vibration Guidance Manual*, 2004.

[1] Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, August 1992.

Ground vibration can be a concern in instances where buildings shake and substantial rumblings occur. However, it is unusual for vibration from typical urban sources such as buses and heavy trucks to be perceptible. Common sources for groundborne vibration are planes, trains, and construction activities such as earth-moving which requires the use of heavy-duty earth moving equipment. For the purposes of this analysis, a PPV descriptor with units of inches per second (in/sec) is used to evaluate construction-generated vibration for building damage and human complaints.

3 REGULATORY SETTING

To limit population exposure to physically or psychologically damaging as well as intrusive noise levels, the Federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise.

3.1 State of California

California Government Code

California Government Code Section 65302(f) mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines established by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of "normally acceptable", "conditionally acceptable", "normally unacceptable", and "clearly unacceptable" noise levels for various land use types. Single-family homes are "normally acceptable" in exterior noise environments up to 60 CNEL and "conditionally acceptable" up to 70 CNEL. Multiple-family residential uses are "normally acceptable" up to 65 CNEL and "conditionally acceptable" up to 70 CNEL. Schools, libraries, and churches are "normally acceptable" up to 70 CNEL, as are office buildings and business, commercial, and professional uses.

Title 24 – Building Code

The State's noise insulation standards are codified in the California Code of Regulations, Title 24: Part 1, Building Standards Administrative Code, and Part 2, California Building Code. These noise standards are applied to new construction in California for interior noise compatibility from exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, or hospitals, are located near major transportation noise sources, and where such noise sources create an exterior noise level of 65 dBA CNEL or higher. Acoustical studies that accompany building plans must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new multi-family residential buildings, the acceptable interior noise limit for new construction is 45 dBA CNEL.

3.2 LOCAL

City of Upland General Plan

Upland protects residents, the labor force, and visitors from the harmful effects of noise by establishing exterior and interior noise standards. Higher exterior noise standards are permitted for mixed-use and residential infill projects, as long as the interior noise standard is maintained. The City's General Plan Safety Element Policies mitigate noise by requiring the implementation of noise reduction techniques in site design and construction to ensure the compatibility of uses. Mobile sources of noise, such as vehicles and aircraft, are also regulated by the enforcement of Upland's noise standards.

Goal SAF-1: Upland is protected from interior and exterior noise levels that cause harm to safety, health and well-being.

Policy SAF-1.1: Require noise mitigation for all development where the projected exterior noise levels exceed those shown in Table 4: Exterior Noise Compatibility Standards, to the extent feasible.

Table 4: Exterior Noise Compatibility Standards

Land Use Type	**Highest Level of Noise Exposure that is Regarded as "Normally Acceptable" (L_{dn} or CNEL)**
Residential – Low Density Single-Family, Duplex, Mobile Homes	60 dBA
Residential – Multi-Family	65 dBA
Mixed-Use	70 dBA
Transient Lodging – Hotels, Motels	65 dBA
Schools, Libraries, Churches, Hospitals, Nursing Homes	70 dBA
Auditoriums, Concert Halls, Amphitheaters	Mitigation based on site-specific study
Sports Arena, Outdoors Spectator Sports	Mitigation based on site-specific study
Playgrounds, Neighborhood Parks	70 dBA
Golf Courses, Riding Stables, Water Recreation, Cemeteries	75 dBA
Office Buildings – Commercial, Office/Professional	70 dBA
Industrial, Manufacturing, Utilities, Agriculture	75 dBA
Source: City of Upland, *General Plan*, 2015.	

Policy SAF-1.3: Require new development to include noise mitigation to assure acceptable interior noise levels appropriate to the land use type: 45 dBA Ldn for residential, transient lodgings, hospitals, nursing homes, and other uses where people normally sleep; and 45 dBA Ldn (peak hour) for office buildings and similar uses.

Policy SAF-1.4: Prevent noise-sensitive land uses (schools, medical centers and hospitals, senior centers, and residences) from locating in areas with noise levels that exceed those considered normally acceptable for each land use unless measures can be implemented to reduce noise to acceptable levels.

Policy SAF-1.5: Require a noise impact study to evaluate impacts of projects that may exceed 65 Ldn as part of the design review process.

Policy SAF-1.6: Require an acoustical study for all new residential developments that lie within the 65 Ldn noise contour on the Future Noise Contour Map, to ensure indoor levels will not exceed City standards. In addition, the City shall continue to enforce the California Building Code for indoor noise levels.

Policy SAF-1.7: Require measures that attenuate exterior and/or interior noise levels to acceptable levels to be incorporated into all development projects where current and/or future outdoor noise levels may be unacceptable. Require noise reduction features, the focus of which shall be on site design techniques, so long as they do not conflict with the goals of the Community Character Element. Techniques include:

A. Designing landscaped building setbacks to serve as a buffer between the noise source and receptor.

B. Placing noise-tolerant land uses such as parking lots, maintenance facilities, and utility areas between the noise source and receptor.

C. Orienting buildings to shield noise-sensitive outdoor spaces from a noise source.

D. Locating bedrooms or balconies on the sides of buildings facing away from noise sources.

E. Utilizing noise barriers, such as landscaped berms, to reduce adverse noise levels in noise-sensitive outdoor activity areas, avoiding sound walls wherever possible.

City of Upland Municipal Code

The City's noise regulations are included in Chapter 9.40 of the Upland Municipal Code, also known as the Noise Ordinance. Within the City, the Noise Ordinance governs operational noise generated between two properties and does not regulate noise from transportation sources, such as traffic, aircraft, and railways. Upland Municipal Code Section 9.40.070 establishes the exterior noise standards for residential uses, while Upland Municipal Code Section 9.40.080 establishes the exterior noise standards for nonresidential uses. Exterior noise should be measured on the exterior of the properties, and no noise level should exceed the levels presented in Table 5: City of Upland Residential Exterior Noise Limits. Upland Municipal Code Section 9.40.080 states that for nonresidential properties, no noise level should exceed the respective base ambient noise levels of 65 dBA at any time for uses not specified, and 75 dBA at any time for industrial and commercial uses.

Table 5: City of Upland Residential Exterior Noise Limits

Maximum Time of Exposure	Noise Metric[1]	Noise Level Not to Be Exceeded[2]	
		7:00 a.m. to 10:00 p.m. (Daytime)	10:00 p.m. to 7:00 a.m. (Nighttime)
30 Minutes / Hour	L_{50}	55 dBA	45 dBA
15 Minutes / Hour	L_{25}	60 dBA	50 dBA
5 Minutes / Hour	L_{8}	65 dBA	55 dBA
1 Minute / Hour	L_{2}	70 dBA	60 dBA
Any Period of Time	L_{max}	75 dBA	65 dBA

Notes:
[1] Noise levels that are equaled or exceeded by a fluctuating sound level (in this table) 50 percent, 25 percent, 8 percent, and 2 percent of the stated time period.
[2] The noise standards apply to stationary sources only.

Source: City of Upland, *Upland Municipal Code*, October 2018.

4 EXISTING CONDITIONS

4.1 Existing Noise Levels

Upland is impacted by various noise sources. Mobile sources of noise, especially cars and trucks, are the most common and significant sources of noise in most communities. Other sources of noise are the various land uses (i.e., residential, commercial, institutional, and recreational and parks activities) throughout the City that generate stationary-source noise. The Cable Airport is located immediately adjacent to the Project site on the north and west sides of the Project.

Mobile Sources

Existing roadway noise levels were calculated for the roadway segments in the Project vicinity. This task was accomplished using the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108) and existing traffic volumes from the Project traffic analysis (prepared by Translutions, 2019). The noise prediction model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, and site environmental conditions. The average vehicle noise rates (also referred to as energy rates) used in the FHWA model have been modified to reflect average vehicle noise rates identified for California by the California Department of Transportation (Caltrans). The Caltrans data indicates that California automobile noise is 0.8 to 1.0 dBA higher than national levels and that medium and heavy truck noise is 0.3 to 3.0 dBA lower than national levels[2]. The average daily noise levels along roadway segments in proximity to the Project site are included in Table 6: Existing Traffic Noise Levels.

Table 6: Existing Traffic Noise Levels

Roadway Segment	ADT	dBA CNEL at 100 feet from Roadway Centerline
Baseline Road, Monte Vista Avenue to SR-210 Ramps	23,525	69.2
Baseline Road, SR-210 Ramps to Benson Avenue	26,990	69.8
Foothill Boulevard, Monte Vista Avenue to Central Avenue	18,855	68.3
Foothill Boulevard, Central Avenue to Project Driveway	10,515	65.7
Foothill Boulevard, Project Driveway to Benson Avenue	9,885	65.4
Monte Vista Avenue, Baseline Road to Foothill Boulevard	16,665	67.6
Central Avenue, Foothill Boulevard to 11th Street	10,350	64.6
Central Avenue, 11th Street to Arrow Route	11,790	65.1
Central Avenue, Arrow Route to Arrow Highway	15,970	66.4
Central Avenue, Arrow Highway to Moreno Street	21,670	67.7
Central Avenue, Moreno Street to I-10 Ramps	32,665	69.4
Benson Avenue, Baseline Road to 15th Street	16,930	67.4
Benson Avenue, 15th Street to 13th Street	16,420	67.2
Benson Avenue, 13th Street to Foothill Boulevard	17,380	67.4
ADT = average daily trips; dBA = A-weighted decibels; CNEL = community noise equivalent level		
Source: Based on traffic data within the *Foothill Boulevard Warehouse Traffic Impact Analysis*, prepared by Translutions, October 2019. Refer to Appendix B for traffic noise modeling assumptions and results.		

As depicted in Table 6, the existing traffic-generated noise level on Project-vicinity roadways ranges from 64.6 to 69.8 dBA CNEL at 100 feet from the centerline. The traffic highest noise levels occur along Baseline

[2] California Department of Transportation, *California Vehicle Noise Emission Levels*, 1987.

Road from the SR-210 ramps to Benson Avenue. As previously described, CNEL is 24-hour average noise level with a 5-dBA weighting during the hours of 7:00 p.m. to 10:00 p.m. and a 10-dBA weighting added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively.

Stationary Sources

The primary sources of stationary noise in the Project vicinity are those associated with the operations of adjacent general industrial uses and Cable Airport adjacent to the Project site. The noise associated with these sources may represent a single-event noise occurrence, short-term, or long-term/continuous noise.

4.2 Sensitive Receptors

Noise exposure standards and guidelines for various types of land uses reflect the varying noise sensitivities associated with each of these uses. Residences, hospitals, schools, guest lodging, libraries, and churches are treated as the most sensitive to noise intrusion and therefore have more stringent noise exposure targets than do other uses, such as manufacturing or agricultural uses that are not subject to impacts such as sleep disturbance. Sensitive receptors near the Project site include multi-family residences approximately 1,040 feet southeast of the site, a church approximately 1,050 feet south of the site, and single-family housing approximately 1,190 feet east of the site. Table 7: Sensitive Receptors, lists the distances and locations of sensitive receptors within the Project vicinity. The distances depicted in Table 7 are based on the distance from the Project site to the vicinity sensitive receptors.

Table 7: Sensitive Receptors

Receptor Type/Description	Distance and Direction from the Project Site
MG Parkview Apartments	1,040 feet southeast
Middle East Gospel Outreach	1,050 feet south
Single Family Residential Neighborhood	1,190 feet east
California Optical	1,250 feet northeast
Multi-Family Residential Neighborhood	1,270 feet east
Ovation School of the Performing Arts	1,300 feet northeast
Prime Time Dance School of the Arts	1,550 feet south
Cabrillo Elementary School	1,570 feet southeast
North Upland Terrace Apartments	1,710 feet southeast
Single Family Residential Neighborhood	1,860 feet northeast
Single Family Residential Neighborhood	1,880 feet southeast
Cabrillo Park	1,920 feet southeast
Corporate Center Office Buildings	1,990 feet west
Park Central Apartments	2,030 feet south
Greenbelt Park	2,350 feet northeast

4.3 Noise Measurements

The Project site is currently vacant with no existing structures; however, stockpiles of sand and gravel remain on-site. The site is bounded by an airport to the north, a building supply store to the east, Foothill Boulevard to the south, as well as industrial and commercial uses to the west. To quantify existing ambient noise levels in the Project area, Kimley-Horn conducted four short-term noise measurements on October 18, 2018, see Appendix A: Existing Ambient Noise Measurements. The noise measurement sites were representative of typical existing noise exposure within and immediately adjacent to the Project site, see Exhibit 4: Noise Measurement Locations. The 10-minute measurements were taken between 10:30 a.m.

and 12:00 p.m. Short-term L_{eq} measurements are considered representative of the noise levels throughout the day. The average noise levels and sources of noise measured at each location are listed in Table 8: Existing Noise Measurements.

Table 8: Existing Noise Measurements

Site #	Location	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	Time
1	At the southwestern corner of the Aviation Drive and Airport Drive intersection	67.5	52.8	81.6	10:30 a.m.
2	Along the south side of Foothill Boulevard, approximately 450 feet east of Central Avenue	73.5	57.9	85.4	11:02 a.m.
3	At the northwestern corner of the Foothill Boulevard and Lowe's Entrance intersection	66.4	48.5	82.8	11:18 a.m.
4	Along the south side of 13th Street, approximately 350 feet west of Benson Avenue	58.4	45.3	76.8	11:40 a.m.
Source: Noise measurements taken by Kimley-Horn and Associates, October 18, 2018. See Appendix A for noise measurement results.					

Exhibit 4: Noise Measurement Locations

Source: Google Maps, 2018.

5 SIGNIFICANCE CRITERIA AND METHODOLOGY

5.1 CEQA Thresholds

Based upon the criteria derived from Appendix G of the California Environmental Quality Act (CEQA) Guidelines, a project normally would have a significant effect on the environment if it would:

- 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;
- Generate excessive groundborne vibration or groundborne noise levels; and
- 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, expose people residing or working in the project area to excessive noise levels.

5.2 Methodology

This analysis of the Existing and With Project noise environments is based on noise prediction modeling and empirical observations. Construction noise levels were based on typical noise levels generated by construction equipment published by the Federal Transit Administration. The traffic noise levels on the Project vicinity roadways were calculated using the FHWA Highway Noise Prediction Model (FHWA-RD-77-108). Groundborne vibration levels associated with construction-related activities for the Project were evaluated utilizing typical groundborne vibration levels associated with construction equipment, obtained from Federal Transit Administration published data for construction equipment. Potential groundborne vibration impacts related to structural damage and human annoyance were evaluated, considering the distance from construction activities to nearby land uses and typically applied criteria for structural damage and human annoyance.

6 POTENTIAL IMPACTS AND MITIGATION

6.1 Acoustical Impacts

Threshold 6.1 Would the Project 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?

Construction

Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g., land clearing, grading, excavation, paving). Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. During construction, exterior noise levels could affect the residential neighborhoods near the construction site. At the nearest, Project construction would occur at 1,040 feet from existing apartments. However, it is acknowledged that construction activities would occur throughout the Project site and would not be concentrated at the point closest to the sensitive receptors.

Construction activities would include site preparation, grading, building construction, paving, and architectural coating. Such activities would require graders, scrapers, and tractors during site preparation; graders, dozers, and tractors during grading; cranes, forklifts, generators, tractors, and welders during building construction; pavers, rollers, mixers, tractors, and paving equipment during paving; and air compressors during architectural coating. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full power operation followed by 3 to 4 minutes at lower power settings. Other primary sources of acoustical disturbance would be random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts). Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. Typical noise levels associated with individual construction equipment are listed in Table 9: Typical Construction Noise Levels.

Table 9: Typical Construction Noise Levels

Equipment	Typical Noise Level (dBA) at 50 Feet from Source	Typical Noise Level (dBA) at 100 Feet from Source[1]
Air Compressor	80	74
Backhoe	80	74
Compactor	82	76
Concrete Mixer	85	77
Concrete Pump	82	76
Concrete Vibrator	76	79
Crane, Derrick	88	76
Crane, Mobile	83	70
Dozer	85	82
Generator	82	77
Grader	85	79
Impact Wrench	85	76
Jack Hammer	88	79
Loader	80	79
Paver	85	82
Pile-driver (Impact)	101	74
Pile-driver (Sonic)	95	79

Table 9: Typical Construction Noise Levels		
Equipment	**Typical Noise Level (dBA) at 50 Feet from Source**	**Typical Noise Level (dBA) at 100 Feet from Source[1]**
Pneumatic Tool	85	95
Pump	77	89
Roller	85	79
Saw	76	71
Scraper	85	84
Shovel	82	89
Truck	84	79

Note:
1) Calculated using the inverse square law formula for sound attenuation: $dBA_2 = dBA_1+20Log(d_1/d_2)$
Where: dBA_2 = estimated noise level at receptor; dBA_1 = reference noise level; d_1 = reference distance; d_2 = receptor location distance
Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.

As shown in Table 9, exterior noise levels could affect the nearest existing sensitive receptors in the vicinity. Sensitive uses in the Project site vicinity include residential uses approximately 1,040 feet to the southeast. Based on the discussion above, if the noisiest piece of equipment is operated at the closest point to the nearest use (i.e., the adjacent commercial and industrial uses), the exterior noise level at that use could reach 76 dBA, with the sensitive receptors in the area receiving lesser noise levels as they are further away. It should be noted that this is a maximum level and would be limited to short periods of time when equipment is closest to adjacent uses. Due to intervening structures and distance attenuation, these sensitive uses would not be exposed to elevated noise levels during Project construction. Construction noise would be acoustically dispersed throughout the Project site and not concentrated in one area near surrounding sensitive uses. Although construction noise is exempt between the hours of 7:00 a.m. and 6:00 p.m. Monday through Friday, the Project would nonetheless include project design features (PDF) (refer to PDF NOI-1) that would reduce construction noise levels. With the implementation of the project design features set forth below, Project construction would not generate a substantial temporary increase in ambient noise levels in the vicinity of the Project in excess of standards established in the City's General Plan or noise ordinance. The City's Noise Ordinance does not establish quantitative construction noise standards. Instead, the Noise Ordinance has established allowable hours of construction. Pursuant to the Upland Municipal Code Section 9.40.100, unless an exception is approved, construction hours are limited to between 7:00 a.m. and 6:00 p.m. on weekdays. Specifically, Municipal Code Section 9.40.100(M) indicates that construction is prohibited except between the hours of 7:00 a.m. and 6:00 p.m. on weekdays. These permitted hours of construction are required in recognition that construction activities undertaken during daytime hours are a typical part of living in an urban environment and do not cause a significant disruption.

Construction activities may also cause increased noise along access routes to and from the site due to movement of equipment and workers. The Project could require approximately 431 cubic yards of soil export that would require approximately 54 truck trips. Implementation of PDF NOI-1 would further minimize impacts from construction noise as it requires construction equipment to be equipped with properly operating and maintained mufflers and other state required noise attenuation devices. Thus, upon implementation of PDF NOI-1, a less than significant noise impact would result from construction activities.

Operations

Implementation of the proposed Project would create new sources of noise in the Project vicinity. The major noise sources associated with the Project that would potentially impact existing and future nearby residences include the following:

- Mechanical equipment (i.e., trash compactors, air conditioners, etc.);
- Slow moving trucks on the Project site, approaching and leaving the loading areas;
- Activities at the loading areas (i.e., maneuvering and idling trucks, equipment noise);
- Parking areas (i.e., car door slamming, car radios, engine start-up, and car pass-by); and
- Off-Site Traffic Noise

Mechanical Equipment

The Project is surrounded by industrial and residential uses. The nearest sensitive receptors to the Project site are the residences 1,040 feet southeast of the Project site. Potential stationary noise sources related to long-term operations in the Project site would include mechanical equipment. Mechanical equipment (e.g., heating ventilation and air conditioning [HVAC] equipment) typically generates noise levels of approximately 50 to 60 dBA at 50 feet. HVAC equipment is expected to be roof-mounted at a minimum distance of approximately 1,040 feet from the closest sensitive receptors to the southeast. The closest adjacent commercial/industrial uses would be approximately 200 feet away. Typical noise levels from HVAC equipment at 200 feet are approximately 48 dBA, which is less than a perceptible difference in noise level when compared to existing noise levels of 58 dBA (refer to Table 9) and would also be below the City's 75 dBA noise standard for commercial and industrial uses. Additionally, roof-mounted HVAC equipment is anticipated to be installed closer to the middle of the building and the distance to sensitive receptors will likely be farther, which will reduce noise levels. Furthermore, equipment will likely be located behind a parapet for additional noise attenuation. Operation of mechanical equipment would not increase ambient noise levels beyond the acceptable compatible land use noise levels. Therefore, the proposed Project would result in a less than significant impact related to stationary noise levels.

Truck and Loading Dock Noise

The proposed Project would include one building with 16 loading docks and 16 van loading doors. Loading and unloading activities would occur on the north, south, and west sides of the proposed building. Typically, noise levels associated with truck and van loading generate a noise level of 68 dBA at a distance of 50 feet. The closest residences would be located approximately 1,040 feet southeast of the loading areas and would experience truck and van noise levels of approximately 42 dBA, which is below the 55 dBA exterior residential noise standard designated in the Municipal Code. Noise levels at the closest industrial and commercial uses located approximately 150 feet away would be 59 dBA which is below the City's 75 dBA standard for these uses. This noise level would be further attenuated by intervening structures and topography. Noise levels associated with trucks, vans, and loading/unloading activities would be less than significant.

Parking Noise

The proposed Project would accommodate the need for parking. Traffic associated with parking lots is typically not of sufficient volume to exceed community noise standards, which are based on a time-averaged scale such as the CNEL scale. The instantaneous maximum sound levels generated by a car door slamming, engine starting up, and car pass-bys range from 60 to 63 dBA and may be an annoyance to adjacent noise-sensitive receptors. Conversations in parking areas may also be an annoyance to adjacent sensitive receptors. Sound levels of speech typically range from 33 dBA at 50 feet for normal speech to 50 dBA at 50 feet for very loud speech. It should be noted that parking lot noises are instantaneous noise levels compared to noise standards in the hourly L_{eq} metric, which are averaged over the entire duration of a time period.

Parking lot noise would occur within the surface parking lot on-site. It is also noted that parking lot noise occurs at the adjacent properties under existing conditions. Parking lot noise would be consistent with the existing noise in the vicinity and would be partially masked by background noise from air traffic to the north of the site and vehicle traffic along Foothill Boulevard. Actual noise levels over time resulting from parking lot activities is anticipated to be far below the City's noise guidelines. Therefore, noise impacts from parking lots would be less than significant.

Off-Site Traffic Noise

Future development generated by the proposed Project would result in additional traffic on adjacent roadways, thereby increasing vehicular noise near existing and proposed land uses. Based on the Traffic Impact Analysis, the proposed Project would generate 2,483 total daily trips (2,583 passenger car equivalent trips). The Operational Year "2020 Without Project" and "2020 Plus Project" scenarios are compared in Table 10: Operational Year 2020 Traffic Noise Levels.

As shown in Table 11, roadway noise levels would range from 66.0 dBA to 70.7 under "2020 Without Project" conditions and from 66.5 dBA to 70.7 dBA under "2020 Plus Project" conditions. The highest increase in noise levels would occur along Central Avenue. As shown in Table 10, Central Avenue is expected to experience an increase in ambient noise levels of 0.7 dBA for two roadway segments. The segment from Foothill Boulevard to 11th Street would increase to 66.7 dBA and the segment from 11th Street to Arrow Route would increase to 67.3 dBA. However, the increase of 0.7 dBA would be below the perceptible noise level change of 3.0 dBA. Additionally, these noise levels are all below the City's 75 dBA standard for industrial uses and 70 dBA standard for commercial uses along this roadway segment. The remainder of the Project -related traffic noise increases would also be below 3.0 dBA, which is not perceptible. Therefore, no significant impacts would occur.

Table 10: Opening Year 2020 Traffic Noise Levels							
Roadway Segment	**2020 Without Project**		**2020 Plus Project**		**Change**	**Applicable Noise Standard (dBA)** [1]	**Significant Impacts**[2]
	ADT	**dBA CNEL at 100 feet from Roadway Centerline**	**ADT**	**dBA CNEL at 100 feet from Roadway Centerline**			
Baseline Road							
Monte Vista Avenue to SR-210 Ramps	28,815	70.1	28,815	70.2	0.1	60	No
SR-210 Ramps to Benson Avenue	32,430	70.6	32,620	70.7	0.1	60	No
Foothill Boulevard							
Monte Vista Avenue to Central Avenue	22,730	69.1	22,940	69.2	0.1	70	No
Central Avenue to Project Driveway	12,930	66.6	13,130	66.7	0.1	70	No
Project Driveway to Benson Avenue	12,270	66.3	12,755	66.5	0.2	70	No
Monte Vista Avenue							
Baseline Road to Foothill Boulevard	21,015	68.6	21,090	68.8	0.2	60	No
Central Avenue							
Foothill Boulevard to 11th Street	14,155	66.0	14,525	66.7	0.7	70	No
11th Street to Arrow Route	16,630	66.6	17,275	67.3	0.7	60	No
Arrow Route to Arrow Highway	21,655	67.7	22,265	68.3	0.6	60	No
Arrow Highway to Moreno Street	29,340	69.0	29,910	69.4	0.4	60	No
Moreno Street to I-10 Ramps	40,890	70.4	41,390	70.6	0.2	60	No
Benson Avenue							
Baseline Road to 15th Street	21,380	68.4	21,690	68.8	0.4	60	No
15th Street to 13th Street	20,685	68.2	20,975	68.6	0.4	60	No
13th Street to Foothill Boulevard	21,650	68.4	21,650	68.7	0.3	60	No

ADT = average daily trips; dBA = A-weighted decibels; CNEL = community noise equivalent level

Notes:
1. Although some roadway segments may be adjacent to various land uses with different noise standards, the most conservative noise standards are reported.
2. With Project noise levels must exceed the applicable noise standard and result in a 3.0 dBA increase to result in a significant impact.

Source: Based on traffic data within the *Foothill Boulevard Warehouse Traffic Impact Analysis*, prepared by Translutions, October 2019. Refer to Appendix B for traffic noise modeling assumptions and results.

The Horizon Year "2040 Without Project" and "2040 Plus Project" scenarios were also compared. As shown in Table 11: Horizon Year 2040 Traffic Noise Levels, roadway noise levels would range from 66.5 dBA to 71.0 dBA under "2040 Without Project" conditions and from 66.9 dBA to 71.1 dBA under "2040 Plus Project" conditions. As shown in Table 11, the highest noise levels would occur along Central Avenue. As shown in Table 11, Central Avenue is expected to experience an increase in ambient noise levels of up to 0.7 dBA from Foothill Boulevard to 11th Street. This level is below the perceptible noise level change of 3.0 dBA and the resulting noise level is 67.2 dBA, which is below the City's 75 dBA standard for industrial uses and 70 dBA standard for commercial uses along this roadway segment. The remainder of the Project-related traffic noise increases would be below 3.0 dBA, which is not perceptible. Therefore, no significant impacts would occur.

Table 11: Horizon Year 2040 Traffic Noise Levels							
Roadway Segment	2040 Without Project		2040 Plus Project		Change	Applicable Noise Standard (dBA) [1]	Significant Impacts[2]
	ADT	dBA CNEL at 100 feet from Roadway Centerline	ADT	dBA CNEL at 100 feet from Roadway Centerline			
Baseline Road							
Monte Vista Avenue to SR-210 Ramps	33,710	70.8	33,710	70.8	0.0	60	No
SR-210 Ramps to Benson Avenue	35,920	71.0	36,110	71.1	0.1	60	No
Foothill Boulevard							
Monte Vista Avenue to Central Avenue	24,825	69.5	25,035	69.6	0.1	70	No
Central Avenue to Project Driveway	13,615	66.8	13,815	66.9	0.1	70	No
Project Driveway to Benson Avenue	13,340	66.7	13,825	66.9	0.2	70	No
Monte Vista Avenue							
Baseline Road to Foothill Boulevard	22,450	68.9	22,525	69.1	0.2	60	No
Central Avenue							
Foothill Boulevard to 11th Street	16,020	66.5	16,390	67.2	0.7	70	No
11th Street to Arrow Route	18,430	67.1	19,075	67.7	0.6	60	No
Arrow Route to Arrow Highway	19,020	67.2	19,630	67.7	0.5	60	No
Arrow Highway to Moreno Street	26,460	68.6	27,030	69.0	0.4	60	No
Moreno Street to I-10 Ramps	38,775	70.2	39,275	70.4	0.2	60	No
Benson Avenue							
Baseline Road to 15th Street	23,335	68.8	23,645	69.1	0.3	60	No
15th Street to 13th Street	19,925	68.0	20,215	68.5	0.5	60	No
13th Street to Foothill Boulevard	20,820	68.2	20,820	68.5	0.3	60	No
ADT = average daily trips; dBA = A-weighted decibels; CNEL = community noise equivalent level							
Notes: 1. Although some roadway segments may be adjacent to various land uses with different noise standards, the most conservative noise standards are reported. 2. With Project noise levels must exceed the applicable noise standard and result in a 3.0 dBA increase to result in a significant impact.							
Source: Based on traffic data within the *Foothill Boulevard Warehouse Traffic Impact Analysis*, prepared by Translutions, October 2019. Refer to Appendix B for traffic noise modeling assumptions and results.							

Project Design Features:

PDF NOI-1 A construction management plan shall be implemented prior to Grading Permit issuance which shall contain the following elements:

- Construction contracts specify that all construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers and other state required noise attenuation devices.
- Property owners and occupants located within 300 feet of the Project boundary shall be sent a notice, at least 15 days prior to commencement of construction of each phase, regarding the construction schedule of the proposed Project. A sign, legible at a distance of 50 feet shall also be posted at the Project construction site. All notices and signs shall be reviewed and approved by the City of Upland Development Services Department, prior to mailing or posting and shall indicate the dates and duration of construction activities, as well as provide a contact name and a telephone number where residents can inquire about the construction process and register complaints.
- Prior to issuance of any Grading or Building Permit, the Project Applicant shall demonstrate to the satisfaction of the City Engineer that construction noise reduction

methods shall be used where feasible. These reduction methods include shutting off idling equipment, installing temporary acoustic barriers around stationary construction noise sources, maximizing the distance between construction equipment staging areas and occupied residential areas, and electric air compressors and similar power tools.

- Construction haul routes shall be designed to avoid noise sensitive uses (e.g., residences, convalescent homes, etc.), to the extent feasible.
- During construction, stationary construction equipment shall be placed such that emitted noise is directed away from sensitive noise receivers.
- Construction activities shall not take place outside of the allowable hours specified by the City's *Municipal Code Chapter 9.40.100(M)* (allowable construction hours are between 7:00 a.m. and 6:00 p.m. on weekdays).

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Threshold 6.2 Would the Project expose persons to or generate excessive ground borne vibration or ground borne noise levels?

Increases in groundborne vibration levels attributable to the proposed Project would be primarily associated with short-term construction-related activities. Construction on the Project site would have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and the operations involved.

The Federal Transit Administration (FTA) guidelines set forth in their 2018 Transit Noise and Vibration Assessment Manual are used to evaluate potential impacts related to construction vibration for both potential building damage and human annoyance. Vibration impacts associated with human annoyance are evaluated in vibration decibels (VdB) (the vibration velocity level in decibel scale), while vibration impacts associated with building damage is evaluated. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. Building damage can be cosmetic or structural.

Based on the FTA guidance, groundborne vibration could result in building damage if any of the following were to occur:

- Project construction activities cause groundborne vibration levels to exceed 0.5 in/sec PPV at the nearest offsite reinforced-concrete, steel, or timber building.
- Project construction activities cause groundborne vibration levels to exceed 0.3 in/sec PPV at the nearest offsite engineered concrete and masonry building.
- Project construction activities cause groundborne vibration levels to exceed 0.2 in/sec PPV at the nearest offsite non-engineered timber building.
- Project construction activities cause groundborne vibration levels to exceed 0.12 in/sec PPV at buildings extremely susceptible to vibration damage, such as historic buildings.

Based on FTA guidance, construction vibration could be perceived as annoying to humans if any of the following were to occur:

- Project construction activities cause groundborne vibration levels to exceed 72 VdB at off-site sensitive uses, including residential uses.

Table 12: Typical Construction Equipment Vibration Levels, lists vibration levels at 25 feet for typical construction equipment. Groundborne vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. As indicated in Table 12, based on FTA data, vibration velocities from typical heavy construction equipment operations that would be used during Project construction range from 0.003 to 0.089 in/sec PPV at 25 feet from the source of activity.

Table 12: Typical Construction Equipment Vibration Levels

Equipment	Peak Particle Velocity at 25 Feet (in/sec)	Peak Particle Velocity at 100 Feet (in/sec)[1]	Approximate VdB at 25 Feet	Approximate VdB at 100 Feet
Large Bulldozer	0.089	0.011	87	69
Caisson Drilling	0.089	0.011	87	69
Loaded Trucks	0.076	0.010	86	68
Jackhammer	0.035	0.004	79	61
Small Bulldozer/Tractors	0.003	0.000	58	41

Notes:
Calculated using the following formula: PPVequip = PPVref x (25/D)1.5
Where: PPVequip = the peak particle velocity in in/sec of the equipment adjusted for the distance
PPVref = the reference vibration level in in/sec from Table 7-4 of the Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018.
D = the distance from the equipment to the receiver

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

The nearest sensitive receptors are the residential uses approximately 1,040 feet to the southeast and the nearest structures (commercial buildings) are approximately 100 feet from the closest active construction zone. Using the calculation shown in Table 12, at 100 feet the vibration velocities from construction equipment would not exceed 0.011 in/sec PPV, which is well below the FTA's 0.20 PPV threshold. Construction equipment would also not exceed the human annoyance standard of 72 VdB. It can be assumed that at a greater distance this vibration velocity would be even less. Therefore, at 200 feet, vibration levels would be reduced further. It is also acknowledged that construction activities would occur throughout the Project site and would not be concentrated at the point closest to the nearest residential structure. Therefore, vibration impacts associated with the proposed Project would be less than significant.

Once operational, the Project would not be a source of groundborne vibration. Operations of the proposed Project would include truck deliveries. Due to the rapid drop-off rate of ground-borne vibration and the short duration of the associated events, vehicular traffic-induced ground-borne vibration is rarely perceptible beyond the roadway right-of-way, and rarely results in vibration levels that cause damage to buildings in the vicinity. Table 12 shows that the loaded trucks would have a PPV of 0.076 in/sec and generate 86 VdB at 25 feet. As noted above, the closest adjacent uses would be more than 100 feet away and sensitive uses would be approximately 1,040 feet from the project site but could be approximately 100 feet from the potential truck routes accessed by Project trucks. At 100 feet, worst case truck vibration levels would be reduced to 0.010 in/sec PPV and 68 VdB and would not exceed FTA thresholds for building damage or annoyance. Impacts would be less than significant in this regard.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Threshold 6.3 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?

The Cable Airport is the nearest airport in the immediate area, located directly adjacent to the Project site along the northern and western limits of the site. A review of the Cable Airport Comprehensive Airport Land Use Plan[3], shows the Project site located within noise impact zones. The Project site is currently exposed to noise levels greater than 65 dBA closest to the airstrip and noise levels between 60-65 dBA further from the airstrip. As indicated in Table 4, above, the City's General Plan designates noise levels at industrial uses to be normally acceptable up to 75 dBA. Therefore, airport noise impacts would be less than significant.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Cumulative Noise Impacts

A significant impact would result only if both the combined and incremental effects criteria have been exceeded. If both the combined and incremental effects criteria are exceeded, the applicable noise and land use compatibility standards must also be exceeded. Noise is a localized phenomenon and reduces as distance from the source increases. Consequently, only the proposed Project and growth due to occur in the Project site's general vicinity would contribute to cumulative noise impacts. Table 13: Cumulative Noise Scenario, lists the traffic noise effects along roadway segments in the Project vicinity for "Existing", "2040 Without Project", and "2040 Plus Project" conditions, including incremental and net cumulative impacts. As described in the Project Traffic Impact Analysis, future year traffic volumes include cumulative projects as well as ambient growth. The highest increase in noise levels would occur along Central Avenue. As shown in Table 13, Central Avenue (from Foothill Blvd. to 11th Street and 11th Street to Arrow Route) is expected to experience an increase in ambient noise levels of up to 2.6 dBA by the year 2040 with the addition of the Project. Additionally, the combined effects for these segments would result in an increase of up to 0.7 dBA for Foothill Boulevard to 11th Street. However, the resulting noise level is 67.2 dBA, which is below the City's 75 dBA standard for industrial uses and 70 dBA standard for commercial uses along this roadway segment. The remainder of the Project-related traffic noise increases would be below the combined and incremental effects criteria. Therefore, no significant impacts would occur.

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[3] Cable Airport, *Comprehensive Airport Land Use Plan*, 1981.

Table 13: Cumulative Noise Scenario

Roadway Segment	dBA@ 100 ft from Road CL: Existing	dBA@ 100 ft from Road CL: 2040 Without Project	dBA@ 100 ft from Road CL: 2040 With Project	Combined Effects Difference Existing and 2040 Plus Project	Incremental Effects Difference 2040 Without Project and Plus Project	Applicable Noise Standard (dBA)[1]	Cumulative Significant Impact?
Baseline Road							
Monte Vista Ave.to SR-210 Ramps	69.2	70.8	70.8	1.6	0.0	60	No
SR-210 Ramps to Benson Ave.	69.8	71.0	71.1	1.3	0.1	60	No
Foothill Boulevard							
Monte Vista Ave. to Central Ave.	68.3	69.5	69.6	1.3	0.1	70	No
Central Ave.to Project Driveway	65.7	66.8	66.9	1.2	0.1	70	No
Project Driveway to Benson Ave.	65.4	66.7	66.9	1.5	0.2	70	No
Monte Vista Avenue							
Baseline Rd. to Foothill Blvd.	67.6	68.9	69.1	1.5	0.2	60	No
Central Avenue							
Foothill Blvd. to 11th Street	64.6	66.5	67.2	2.6	0.7	70	No
11th Street to Arrow Route	65.1	67.1	67.7	2.6	0.6	60	No
Arrow Route to Arrow Highway	66.4	67.2	67.7	1.3	0.5	60	No
Arrow Highway to Moreno Street	67.7	68.6	69.0	1.3	0.4	60	No
Moreno Street to I-10 Ramps	69.4	70.2	70.4	1.0	0.2	60	No
Benson Avenue							
Baseline Road to 15th Street	67.4	68.8	69.1	1.7	0.3	60	No
15th Street to 13th Street	67.2	68.0	68.5	1.3	0.5	60	No
13th Street to Foothill Blvd.	67.4	68.2	68.5	1.1	0.3	60	No

Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level

Notes:
1. Although some roadway segments may be adjacent to various land uses with different noise standards, the most conservative noise standards are reported.
2. With Project noise levels must exceed the applicable noise standard and result in a 3.0 dBA increase to result in a significant impact.

Source: Based on traffic data within the *Foothill Boulevard Warehouse Traffic Impact Analysis*, prepared by Translutions, October 2019. Refer to Appendix B for traffic noise modeling assumptions and results.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

7 REFERENCES

1. California Department of Transportation, *California Vehicle Noise Emission Levels*, 1987.
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3. California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.
4. California Department of Transportation, *Transportation Related Earthborne Vibrations*, 2002.
5. California Department of Transportation, *Transportation and Construction-Induced Vibration Guidance Manual*, 2004.
6. City of Upland, *General Plan*, 2015.
7. City of Upland, *Municipal Code*, 2018.
8. Federal Highway Administration, *Roadway Construction Noise Model*, 2006.
9. Federal Highway Administration, *Roadway Construction Noise Model User's Guide Final Report*, 2006.
10. Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, August 1992.
11. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Guidelines*, 2006.
12. Herdman Architecture and Design, *Site Plan,* 2019.
13. West Valley Planning Agency Airport Land Use Commission, *Cable Airport Comprehensive Airport Land Use Plan*, 1981.
14. Translutions, Inc., *Foothill Boulevard Warehouse Traffic Impact Analysis,* October 2019.
15. United States Environmental Protection Agency, *Protective Noise Levels (EPA 550/9-79-100)*, November 1979.

Appendix A

Existing Ambient Noise Measurements

Noise Measurement Field Data

Project:	Bridge Upland	**Job Number:**	195087002
Site No.:	1	**Date:**	10/18/2018
Analyst:	Josh Cortez	**Time:**	10:30 AM
Location:			
Noise Sources:	Traffic		
Comments:			

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
67.5	52.8	81.6	103.7

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	82
Wind (mph):	< 5
Sky:	Clear
Bar. Pressure:	30.01
Humidity:	41%

Photo:

Kimley»Horn

Summary

File Name on Meter	RC4.007
File Name on PC	SLM_0005586_RC4_007.00.ldbin
Serial Number	0005586
Model	SoundExpert® LxT
Firmware Version	2.302
User	Josh Cortez
Location	Upland
Job Description	
Note	

Measurement

Description	
Start	2018-10-18 10:30:59
Stop	2018-10-18 10:40:59
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre Calibration	2018-10-17 10:45:14
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting		
Peak Weight	Z Weighting		
Detector	Slow		
Preamp	PRMLxT1L		
Microphone Correction	Off		
Integration Method	Linear		
OBA Range	Normal		
OBA Bandwidth	1/1 and 1/3		
OBA Freq. Weighting	Z Weighting		
OBA Max Spectrum	At LMax		
Overload	122.1	dB	
	A		**C**
Under Range Peak	78.3		75.3
Under Range Limit	**27.3**		26.0
Noise Floor	16.9		16.8

Results

LA_{eq}	67.5	dB	
LAE	95.3	dB	
EA	372.428	µPa²h	
$LZ_{peak\ (max)}$	2018-10-18 10:40:16		103.7
LAS_{max}	2018-10-18 10:40:43		81.6
LAS_{min}	2018-10-18 10:35:38		52.8
SEA	-99.9	dB	

LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0
LZpeak > 135.0 dB (Exceedance Counts / Duration)	0	0.0
LZpeak > 137.0 dB (Exceedance Counts / Duration)	0	0.0
LZpeak > 140.0 dB (Exceedance Counts / Duration)	0	0.0

Community Noise	**Ldn**	**LDay 07:00-22:00**
	67.5	67.5

LCeq	78.5 dB
LAeq	67.5 dB
LCeq - LAeq	11.0 dB
LAIeq	69.4 dB
LAeq	67.5 dB
LAIeq - LAeq	1.9 dB

	A	
	dB	**Time Stamp**
Leq	67.5	
LS(max)	81.6	2018/10/18 10:40:43
LS(min)	52.8	2018/10/18 10:35:38
LPeak(max)		

# Overloads	0
Overload Duration	0.0 s
# OBA Overloads	0
OBA Overload Duration	0.0 s

Statistics

LAS5.00	75.1 dB
LAS10.00	71.6 dB
LAS33.30	62.3 dB
LAS50.00	59.2 dB
LAS66.60	56.8 dB
LAS90.00	54.7 dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**
PRMLxT1L	2018-10-17 10:45:14	-28.3
PRMLxT1L	2018-10-11 08:06:09	-28.2
PRMLxT1L	2018-10-05 08:10:06	-28.3
PRMLxT1L	2018-10-04 08:01:40	-28.2
PRMLxT1L	2018-09-27 16:19:28	-28.2
PRMLxT1L	2018-09-25 11:38:46	-28.2
PRMLxT1L	2018-09-19 15:56:09	-28.2
PRMLxT1L	2018-09-19 08:15:07	-28.3
PRMLxT1L	2018-09-14 08:35:45	-28.2
PRMLxT1L	2018-09-12 16:50:02	-28.3

Noise Measurement Field Data

Project:	Bridge Upland	**Job Number:**	195087002
Site No.:	2	**Date:**	10/18/2018
Analyst:	Josh Cortez	**Time:**	11:02 AM
Location:			
Noise Sources:	Traffic		
Comments:			

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
73.5	57.9	85.4	104.3

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	82
Wind (mph):	< 5
Sky:	Clear
Bar. Pressure:	30.01
Humidity:	41%

Photo:

Kimley»Horn

Summary

File Name on Meter	RC4.008	
File Name on PC	SLM_0005586_RC4_008.00.ldbin	
Serial Number	0005586	
Model	SoundExpert® LxT	
Firmware Version	2.302	
User	Josh Cortez	
Location	Upland	
Job Description		
Note		

Measurement

Description		
Start	2018-10-18 11:02:01	
Stop	2018-10-18 11:12:01	
Duration	00:10:00.0	
Run Time	00:10:00.0	
Pause	00:00:00.0	
Pre Calibration	2018-10-17 10:45:14	
Post Calibration	None	
Calibration Deviation	---	

Overall Settings

RMS Weight	A Weighting	
Peak Weight	Z Weighting	
Detector	Slow	
Preamp	PRMLxT1L	
Microphone Correction	Off	
Integration Method	Linear	
OBA Range	Normal	
OBA Bandwidth	1/1 and 1/3	
OBA Freq. Weighting	Z Weighting	
OBA Max Spectrum	At LMax	
Overload	122.1 dB	
	A	**C**
Under Range Peak	78.3	75.3
Under Range Limit	**27.3**	26.0
Noise Floor	16.9	16.8

Results

LAeq	73.5 dB	
LAE	101.3 dB	
EA	1.484 mPa²h	
LZpeak (max)	2018-10-18 11:07:52	104.3
LASmax	2018-10-18 11:02:58	85.4
LASmin	2018-10-18 11:02:30	57.9
SEA	-99.9 dB	

LAS > 85.0 dB (Exceedance Counts / Duration)	1	1.5
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0
LZ_{peak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0
LZ_{peak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0
LZ_{peak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0

Community Noise	**Ldn**	**LDay 07:00-22:00**
	73.5	73.5

LC_{eq}	79.4 dB
LA_{eq}	73.5 dB
LC_{eq} - LA_{eq}	5.9 dB
LAI_{eq}	75.0 dB
LA_{eq}	73.5 dB
LAI_{eq} - LA_{eq}	1.5 dB

	A	
	dB	**Time Stamp**
L_{eq}	73.5	
$L_{S(max)}$	85.4	2018/10/18 11:02:58
$L_{S(min)}$	57.9	2018/10/18 11:02:30
$L_{Peak(max)}$		

# Overloads	0
Overload Duration	0.0 s
# OBA Overloads	0
OBA Overload Duration	0.0 s

Statistics

LAS5.00	78.1 dB
LAS10.00	76.5 dB
LAS33.30	73.9 dB
LAS50.00	71.9 dB
LAS66.60	69.1 dB
LAS90.00	61.9 dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**
PRMLxT1L	2018-10-17 10:45:14	-28.3
PRMLxT1L	2018-10-11 08:06:09	-28.2
PRMLxT1L	2018-10-05 08:10:06	-28.3
PRMLxT1L	2018-10-04 08:01:40	-28.2
PRMLxT1L	2018-09-27 16:19:28	-28.2
PRMLxT1L	2018-09-25 11:38:46	-28.2
PRMLxT1L	2018-09-19 15:56:09	-28.2
PRMLxT1L	2018-09-19 08:15:07	-28.3
PRMLxT1L	2018-09-14 08:35:45	-28.2
PRMLxT1L	2018-09-12 16:50:02	-28.3

Noise Measurement Field Data

Project:	Bridge Upland	**Job Number:**	195087002
Site No.:	3	**Date:**	10/18/2018
Analyst:	Josh Cortez	**Time:**	11:18 AM
Location:			
Noise Sources:	Traffic		
Comments:			

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
66.4	48.5	82.8	108.8

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	82
Wind (mph):	< 5
Sky:	Clear
Bar. Pressure:	30.01
Humidity:	41%

Photo:

Kimley»Horn

Summary

File Name on Meter	RC4.009	
File Name on PC	SLM_0005586_RC4_009.00.ldbin	
Serial Number	0005586	
Model	SoundExpert® LxT	
Firmware Version	2.302	
User	Josh Cortez	
Location	Upland	
Job Description		
Note		

Measurement

Description		
Start	2018-10-18 11:18:38	
Stop	2018-10-18 11:28:38	
Duration	00:10:00.0	
Run Time	00:10:00.0	
Pause	00:00:00.0	
Pre Calibration	2018-10-17 10:45:14	
Post Calibration	None	
Calibration Deviation	---	

Overall Settings

RMS Weight	A Weighting	
Peak Weight	Z Weighting	
Detector	Slow	
Preamp	PRMLxT1L	
Microphone Correction	Off	
Integration Method	Linear	
OBA Range	Normal	
OBA Bandwidth	1/1 and 1/3	
OBA Freq. Weighting	Z Weighting	
OBA Max Spectrum	At LMax	
Overload	122.1 dB	
	A	**C**
Under Range Peak	78.3	75.3
Under Range Limit	**27.3**	26.0
Noise Floor	16.9	16.8

Results

L_{Aeq}	66.4 dB	
LAE	94.1 dB	
EA	287.683 µPa²h	
$L_{Zpeak\ (max)}$	2018-10-18 11:26:22	108.8
L_{ASmax}	2018-10-18 11:26:22	82.8
L_{ASmin}	2018-10-18 11:23:29	48.5
SEA	-99.9 dB	

LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0
LZpeak > 135.0 dB (Exceedance Counts / Duration)	0	0.0
LZpeak > 137.0 dB (Exceedance Counts / Duration)	0	0.0
LZpeak > 140.0 dB (Exceedance Counts / Duration)	0	0.0

Community Noise	**Ldn**	**LDay 07:00-22:00**
	66.4	66.4

LCeq	76.3	dB
LAeq	66.4	dB
LCeq - LAeq	10.0	dB
LAIeq	68.6	dB
LAeq	66.4	dB
LAIeq - LAeq	2.2	dB

	A	
	dB	**Time Stamp**
Leq	66.4	
LS(max)	82.8	2018/10/18 11:26:22
LS(min)	48.5	2018/10/18 11:23:29
LPeak(max)		

# Overloads	0	
Overload Duration	0.0	s
# OBA Overloads	0	
OBA Overload Duration	0.0	s

Statistics

LAS5.00	70.8	dB
LAS10.00	69.7	dB
LAS33.30	65.4	dB
LAS50.00	63.0	dB
LAS66.60	61.0	dB
LAS90.00	57.8	dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**
PRMLxT1L	2018-10-17 10:45:14	-28.3
PRMLxT1L	2018-10-11 08:06:09	-28.2
PRMLxT1L	2018-10-05 08:10:06	-28.3
PRMLxT1L	2018-10-04 08:01:40	-28.2
PRMLxT1L	2018-09-27 16:19:28	-28.2
PRMLxT1L	2018-09-25 11:38:46	-28.2
PRMLxT1L	2018-09-19 15:56:09	-28.2
PRMLxT1L	2018-09-19 08:15:07	-28.3
PRMLxT1L	2018-09-14 08:35:45	-28.2
PRMLxT1L	2018-09-12 16:50:02	-28.3

Noise Measurement Field Data

Project:	Bridge Upland	**Job Number:**	195087002
Site No.:	4	**Date:**	10/18/2018
Analyst:	Josh Cortez	**Time:**	11:40 AM
Location:			
Noise Sources:	Traffic		
Comments:			

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
58.4	45.3	76.8	108.8

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	82
Wind (mph):	< 5
Sky:	Clear
Bar. Pressure:	30.01
Humidity:	41%

Photo:

Kimley»Horn

Summary

File Name on Meter	RC4.010
File Name on PC	SLM_0005586_RC4_010.00.ldbin
Serial Number	0005586
Model	SoundExpert® LxT
Firmware Version	2.302
User	Josh Cortez
Location	Upland
Job Description	
Note	

Measurement

Description	
Start	2018-10-18 11:40:20
Stop	2018-10-18 11:50:20
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre Calibration	2018-10-17 10:45:14
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting		
Peak Weight	Z Weighting		
Detector	Slow		
Preamp	PRMLxT1L		
Microphone Correction	Off		
Integration Method	Linear		
OBA Range	Normal		
OBA Bandwidth	1/1 and 1/3		
OBA Freq. Weighting	Z Weighting		
OBA Max Spectrum	At LMax		
Overload	122.1	dB	
	A		**C**
Under Range Peak	78.3		75.3
Under Range Limit	**27.3**		26.0
Noise Floor	16.9		16.8

Results

LAeq	58.4	dB	
LAE	86.2	dB	
EA	46.098	µPa²h	
LZpeak (max)	2018-10-18 11:42:34		108.8
LASmax	2018-10-18 11:42:34		76.8
LASmin	2018-10-18 11:40:37		45.3
SEA	-99.9	dB	

LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0
LZpeak > 135.0 dB (Exceedance Counts / Duration)	0	0.0
LZpeak > 137.0 dB (Exceedance Counts / Duration)	0	0.0
LZpeak > 140.0 dB (Exceedance Counts / Duration)	0	0.0

Community Noise	**Ldn**	**LDay 07:00-22:00**
	58.4	58.4

LCeq	71.2 dB
LAeq	58.4 dB
LCeq - LAeq	12.8 dB
LAIeq	65.2 dB
LAeq	58.4 dB
LAIeq - LAeq	6.8 dB

	A	
	dB	**Time Stamp**
Leq	58.4	
LS(max)	76.8	2018/10/18 11:42:34
LS(min)	45.3	2018/10/18 11:40:37
LPeak(max)		

# Overloads	0
Overload Duration	0.0 s
# OBA Overloads	0
OBA Overload Duration	0.0 s

Statistics

LAS5.00	62.8 dB
LAS10.00	60.4 dB
LAS33.30	55.7 dB
LAS50.00	52.8 dB
LAS66.60	49.9 dB
LAS90.00	47.6 dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**
PRMLxT1L	2018-10-17 10:45:14	-28.3
PRMLxT1L	2018-10-11 08:06:09	-28.2
PRMLxT1L	2018-10-05 08:10:06	-28.3
PRMLxT1L	2018-10-04 08:01:40	-28.2
PRMLxT1L	2018-09-27 16:19:28	-28.2
PRMLxT1L	2018-09-25 11:38:46	-28.2
PRMLxT1L	2018-09-19 15:56:09	-28.2
PRMLxT1L	2018-09-19 08:15:07	-28.3
PRMLxT1L	2018-09-14 08:35:45	-28.2
PRMLxT1L	2018-09-12 16:50:02	-28.3

Appendix B

Noise Model Output Files

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Bridge Upland
Project Number: 195087002
Scenario: Existing
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

								Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Baseline Road	Monte Vista Avenue to SR-210 Ramps	4	12	23,525	45	0	1.7%	5.0%	69.2	83	263	833	2,633
2	Baseline Road	SR-210 Rapms to Benson Avenue	4	12	26,990	45	0	1.7%	5.0%	69.8	96	302	955	3,021
3	Foothill Boulevard	Monte Vista Avenue to Central Avenue	4	16	18,855	45	0	1.7%	5.0%	68.3	67	212	671	2,122
4	Foothill Boulevard	Central Avenue to Project Driveway	4	16	10,515	45	0	1.7%	5.0%	65.7	-	118	374	1,182
5	Foothill Boulevard	Project Driveway To Benson Avenue	4	16	9,885	45	0	1.7%	5.0%	65.4	-	111	351	1,111
6	Monte Vista Avenue	Baseline Road to Foothill Boulevard	4	12	16,665	45	0	1.7%	5.0%	67.6	59	186	589	1,862
7	Central Avenue	Foothill Boulevard to 11th Street	4	12	10,350	40	0	1.7%	5.0%	64.6	-	95	301	953
8	Central Avenue	11th Street to Arrow Route	4	12	11,790	40	0	1.7%	5.0%	65.1	-	108	343	1,084
9	Central Avenue	Arrow Route to Arrow Highway	4	12	15,970	40	0	1.7%	5.0%	66.4	-	147	464	1,468
10	Central Avenue	Arrow Highway to Moreno Street	4	12	21,670	40	0	1.7%	5.0%	67.7	63	199	630	1,991
11	Central Avenue	Moreno Street to I-10 Ramps	4	12	32,665	40	0	1.7%	5.0%	69.4	95	300	949	3,000
12	Benson Avenue	Baseline Road to 15th Street	4	12	16,930	45	0	1.7%	5.0%	67.4	60	189	596	1,886
13	Benson Avenue	15th Street to 13th Street	4	12	16,420	45	0	1.7%	5.0%	67.2	58	183	578	1,828
14	Benson Avenue	13th Street to Foothill Boulevard	4	12	17,380	45	0	1.7%	5.0%	67.4	61	193	612	1,934

[1] Distance is from the centerline of the roadway segment to the receptor location.

"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Bridge Upland
Project Number: 195087002
Scenario: Opening Year
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

								Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Baseline Road	Monte Vista Avenue to SR-210 Ramps	4	12	28,815	45	0	1.7%	5.0%	70.1	102	323	1,020	3,225
2	Baseline Road	SR-210 Rapms to Benson Avenue	4	12	32,430	45	0	1.7%	5.0%	70.6	115	363	1,148	3,630
3	Foothill Boulevard	Monte Vista Avenue to Central Avenue	4	16	22,730	45	0	1.7%	5.0%	69.1	81	256	809	2,558
4	Foothill Boulevard	Central Avenue to Project Driveway	4	16	12,930	45	0	1.7%	5.0%	66.6	-	145	460	1,454
5	Foothill Boulevard	Project Driveway To Benson Avenue	4	16	12,270	45	0	1.7%	5.0%	66.3	-	138	436	1,379
6	Monte Vista Avenue	Baseline Road to Foothill Boulevard	4	12	21,015	45	0	1.7%	5.0%	68.6	74	235	743	2,348
7	Central Avenue	Foothill Boulevard to 11th Street	4	12	14,155	40	0	1.7%	5.0%	66.0	-	130	412	1,303
8	Central Avenue	11th Street to Arrow Route	4	12	16,630	40	0	1.7%	5.0%	66.6	-	153	484	1,530
9	Central Avenue	Arrow Route to Arrow Highway	4	12	21,655	40	0	1.7%	5.0%	67.7	63	199	630	1,991
10	Central Avenue	Arrow Highway to Moreno Street	4	12	29,340	40	0	1.7%	5.0%	69.0	85	270	853	2,696
11	Central Avenue	Moreno Street to I-10 Ramps	4	12	40,890	40	0	1.7%	5.0%	70.4	119	376	1,188	3,755
12	Benson Avenue	Baseline Road to 15th Street	4	12	21,380	45	0	1.7%	5.0%	68.4	75	238	753	2,382
13	Benson Avenue	15th Street to 13th Street	4	12	20,685	45	0	1.7%	5.0%	68.2	73	230	728	2,303
14	Benson Avenue	13th Street to Foothill Boulevard	4	12	21,650	45	0	1.7%	5.0%	68.4	76	241	762	2,410

[1] Distance is from the centerline of the roadway segment to the receptor location.

"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Bridge Upland
Project Number: 195087002
Scenario: Opening Year Plus Project
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

								Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Baseline Road	Monte Vista Avenue to SR-210 Ramps	4	12	28,815	45	0	1.8%	5.1%	70.2	104	328	1,036	3,277
2	Baseline Road	SR-210 Rapms to Benson Avenue	4	12	32,620	45	0	1.8%	5.2%	70.7	118	373	1,180	3,732
3	Foothill Boulevard	Monte Vista Avenue to Central Avenue	4	16	22,940	45	0	1.8%	5.1%	69.2	83	263	833	2,634
4	Foothill Boulevard	Central Avenue to Project Driveway	4	16	13,130	45	0	1.8%	5.1%	66.7	-	149	472	1,494
5	Foothill Boulevard	Project Driveway To Benson Avenue	4	16	12,755	45	0	1.7%	5.1%	66.5	-	145	457	1,446
6	Monte Vista Avenue	Baseline Road to Foothill Boulevard	4	12	21,090	45	0	2.0%	5.4%	68.8	79	249	787	2,488
7	Central Avenue	Foothill Boulevard to 11th Street	4	12	14,525	40	0	2.4%	6.0%	66.7	-	155	489	1,546
8	Central Avenue	11th Street to Arrow Route	4	12	17,275	40	0	2.3%	5.8%	67.3	57	180	569	1,798
9	Central Avenue	Arrow Route to Arrow Highway	4	12	22,265	40	0	2.1%	5.7%	68.3	71	226	714	2,257
10	Central Avenue	Arrow Highway to Moreno Street	4	12	29,910	40	0	2.0%	5.5%	69.4	94	296	935	2,958
11	Central Avenue	Moreno Street to I-10 Ramps	4	12	41,390	40	0	1.8%	5.2%	70.6	124	392	1,238	3,916
12	Benson Avenue	Baseline Road to 15th Street	4	12	21,690	45	0	2.0%	5.5%	68.8	82	260	822	2,601
13	Benson Avenue	15th Street to 13th Street	4	12	20,975	45	0	2.1%	5.5%	68.6	80	252	797	2,520
14	Benson Avenue	13th Street to Foothill Boulevard	4	12	21,650	45	0	2.0%	5.5%	68.7	82	259	820	2,593

[1] Distance is from the centerline of the roadway segment to the receptor location.

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FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Bridge Upland
Project Number: 195087002
Scenario: Horizon Year
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

								Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Baseline Road	Monte Vista Avenue to SR-210 Ramps	4	12	33,710	45	0	1.7%	5.0%	70.8	119	377	1,193	3,773
2	Baseline Road	SR-210 Rapms to Benson Avenue	4	12	35,920	45	0	1.7%	5.0%	71.0	127	402	1,271	4,021
3	Foothill Boulevard	Monte Vista Avenue to Central Avenue	4	16	24,825	45	0	1.7%	5.0%	69.5	88	279	883	2,794
4	Foothill Boulevard	Central Avenue to Project Driveway	4	16	13,615	45	0	1.7%	5.0%	66.8	-	153	484	1,531
5	Foothill Boulevard	Project Driveway To Benson Avenue	4	16	13,340	45	0	1.7%	5.0%	66.7	-	150	474	1,499
6	Monte Vista Avenue	Baseline Road to Foothill Boulevard	4	12	22,450	45	0	1.7%	5.0%	68.9	79	251	793	2,509
7	Central Avenue	Foothill Boulevard to 11th Street	4	12	16,020	40	0	1.7%	5.0%	66.5	-	147	466	1,474
8	Central Avenue	11th Street to Arrow Route	4	12	18,430	40	0	1.7%	5.0%	67.1	54	170	536	1,695
9	Central Avenue	Arrow Route to Arrow Highway	4	12	19,020	40	0	1.7%	5.0%	67.2	55	175	553	1,749
10	Central Avenue	Arrow Highway to Moreno Street	4	12	26,460	40	0	1.7%	5.0%	68.6	77	243	769	2,431
11	Central Avenue	Moreno Street to I-10 Ramps	4	12	38,775	40	0	1.7%	5.0%	70.2	113	356	1,126	3,561
12	Benson Avenue	Baseline Road to 15th Street	4	12	23,335	45	0	1.7%	5.0%	68.8	82	260	822	2,599
13	Benson Avenue	15th Street to 13th Street	4	12	19,925	45	0	1.7%	5.0%	68.0	70	222	702	2,219
14	Benson Avenue	13th Street to Foothill Boulevard	4	12	20,820	45	0	1.7%	5.0%	68.2	73	232	733	2,317

[1] Distance is from the centerline of the roadway segment to the receptor location.

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FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Bridge Upland
Project Number: 195087002
Scenario: Horizon Year Plus Project
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

								Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Baseline Road	Monte Vista Avenue to SR-210 Ramps	4	12	33,710	45	0	1.8%	5.1%	70.8	121	383	1,210	3,827
2	Baseline Road	SR-210 Rapms to Benson Avenue	4	12	36,110	45	0	1.8%	5.1%	71.1	130	412	1,303	4,121
3	Foothill Boulevard	Monte Vista Avenue to Central Avenue	4	16	25,035	45	0	1.8%	5.1%	69.6	91	287	908	2,870
4	Foothill Boulevard	Central Avenue to Project Driveway	4	16	13,815	45	0	1.7%	5.1%	66.9	-	157	496	1,567
5	Foothill Boulevard	Project Driveway To Benson Avenue	4	16	13,825	45	0	1.7%	5.1%	66.9	-	157	496	1,567
6	Monte Vista Avenue	Baseline Road to Foothill Boulevard	4	12	22,525	45	0	1.9%	5.4%	69.1	84	265	837	2,647
7	Central Avenue	Foothill Boulevard to 11th Street	4	12	16,390	40	0	2.3%	5.9%	67.2	54	172	543	1,717
8	Central Avenue	11th Street to Arrow Route	4	12	19,075	40	0	2.2%	5.8%	67.7	62	196	621	1,964
9	Central Avenue	Arrow Route to Arrow Highway	4	12	19,630	40	0	2.1%	5.6%	67.7	62	197	623	1,971
10	Central Avenue	Arrow Highway to Moreno Street	4	12	27,030	40	0	2.0%	5.5%	69.0	84	266	841	2,659
11	Central Avenue	Moreno Street to I-10 Ramps	4	12	39,275	40	0	1.8%	5.2%	70.4	117	371	1,173	3,709
12	Benson Avenue	Baseline Road to 15th Street	4	12	23,645	45	0	2.0%	5.5%	69.1	89	282	891	2,819
13	Benson Avenue	15th Street to 13th Street	4	12	20,215	45	0	2.1%	5.6%	68.5	77	243	770	2,435
14	Benson Avenue	13th Street to Foothill Boulevard	4	12	20,820	45	0	2.1%	5.5%	68.5	79	250	791	2,500

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