Appendix K

Acoustical Assessment

Acoustical Assessment
Qume and Commerce Project
City of San José, California

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LIST OF ABBREVIATED TERMS

APN	Assessor's Parcel Number
ADT	average daily traffic
ASTM	American Society for Testing and Materials
dBA	A-weighted sound level
CEQA	California Environmental Quality Act
CSMA	California Subdivision Map Act
CNEL	community equivalent noise level
L_{dn}	day-night noise level
dB	decibel
du/ac	dwelling units per acre
L_{eq}	equivalent noise level
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HVAC	heating ventilation and air conditioning
Hz	hertz
in/sec	inches per second
LUD	Land Use Designation
L_{max}	maximum noise level
µPa	micropascals
L_{min}	minimum noise level
PPV	peak particle velocity
RMS	root mean square
STC	Sound Transmission Class
sf	square feet
TNM	Traffic Noise Model
VdB	vibration velocity level

1 INTRODUCTION

This report documents the results of an Acoustical Assessment completed for the Qume and Commerce project. The purpose of this Acoustical Assessment is to evaluate the project's potential construction and operational noise and vibration levels associated with the project and determine the level of impact the project would have on the environment.

1.1 PROJECT LOCATION

The proposed project is located at 2222 and 2350 Qume Drive and 2150 Commerce Drive in the City of San José. **Figure 1: Regional Vicinity** and **Figure 2: Project Location** depict the project site in a regional and local context. The project site is located in an urban area with a mix of surrounding uses including commercial, office, and industrial uses. The proposed project's existing land use designation is Industrial Park (IP) and existing zoning designation is Industrial Park (IP).

Currently, the project site is developed with an office park complex containing three buildings comprising 425,433 square-feet (sf). Multiple driveways are provided along Qume Drive and Commerce Drive, and surface parking is available throughout the site. Truck access and loading docks are located on the northwestern extent of 2350 Qume Drive and the southwestern extent of 2150 Commerce Drive. There is existing landscaping and trees along all project site boundaries and within parking aisles. The project site also has existing surface lighting.

1.2 PROJECT DESCRIPTION

The proposed project includes approval of a Vesting Tentative Map (VTM) to divide APN 244-15-026, -020, and -003 into four individual parcels. Table 1: Proposed Parcel Summary provides an overview of project parcels.

Table 1: Proposed Parcel Summary

Proposed Project Parcel	Existing APN	Proposed APN	Proposed Acreage
1	244-15-026	244-15-026	15.18
2		244-15-028	9.43
3	244-15-020	244-15-020	4.48
4	244-15-003	244-15-003	3.77

The proposed project would demolish all on-site improvements and construct four new industrial warehouse buildings with dock doors and associated site improvements. The proposed buildings would comprise a total of 714,491 sf with a floor area ratio (FAR) of 0.50 and maximum height of 48-feet, see **Figure 3: Overall Site Plan**. Table 2: Proposed Building Summary provides an overview of proposed buildings and key components. The project site would be accessed from six driveways along Qume Drive, two driveways along Commerce Drive, and three driveways along McKay Drive. An internal roadway would provide vehicular access between Building 1 and Building 2. Internal access would not be provided to/from Building 3 or Building 4.

Table 2: Proposed Building Summary

Building	Building Area (sf)	Dock Doors	Trailer Parking	Automobile Parking[1]	Loading Spaces
1	358,180	39	61	156	39
2	202,735	21	27	150	25
3	83,751	10	4	53	10
4	69,825	10	4	53	7
Total	**714,491**	**80**	**96**	**412**	**81**

Notes
[1] Total parking includes ADA accessible, clean air vehicle, EV stalls

The project site has mature landscape vegetation including trees and shrubs along the site boundary. Project implementation would remove existing vegetation on site, including trees. The removed trees would be replaced according to tree replacement ratios required by the City.

Demolition is anticipated to begin in April 2024, followed by site grading in July 2024 and construction in August 2024. Construction is expected to last approximately 18 months, concluding in September 2025. Operations are anticipated to commence in October 2025. It is anticipated that construction would typically occur five days a week (Monday through Friday) from 7:00 a.m. to 7:00 p.m., however the Site Development Permit includes a request for extended off-hour construction activities. These off-hour activities would include, but is not limited to, extending typical construction to Saturdays from 8:00 AM to 5:00 PM, and perform concrete pours during nighttime hours. The nighttime concrete pours would occur on up to 30 nights for Building 1, 25 nights for Building 2, 15 nights for Building 3, and 15 nights for Building 4. The nighttime concrete pours would utilize the following construction equipment: concrete mixer, concrete pump, concrete vibrator, generator, and air compressor.

Project design features (PDF) below include PDF NOI-1 construction noise measure, PDF NOI-2 extended construction hours, and PDF NOI-3 temporary wall barrier. PDF NOI-1 through PDF NOI-3 would minimize construction noise effects and would be conditions of approval for the project.

Project Design Features

PDF NOI-1 Construction Noise Measure

Prior to Grading Permit issuance, the Applicant shall demonstrate, to the satisfaction of the City of San Jose Director of Public Works or City Engineer that the Project complies with the following:

- Prohibit pile driving.
- Prohibit unnecessary idling of internal combustion engines. Post signs at gates and other places where vehicles may congregate reminding operators of the State's Airborne Toxic Control Measure (ATCM) limiting idling to no more than 5 minutes.
- Utilize "quiet" air compressors and other stationary noise sources where technology exists.
- Control noise from construction workers' radios to a point where they are not audible at existing residences bordering the Project site.
- 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 activities, regarding the construction schedule of the proposed Project. A sign, legible at 50 feet shall also be posted at the Project construction site. All notices and signs shall be reviewed and approved by the Director of Planning, Building and Code Enforcement or Director's designee, 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 for the Noise Disturbance Coordinator where residents can inquire about the construction process and register complaints.
- Prior to issuance of any Grading or Building Permit, the Contractor shall provide evidence that at all times during construction activities and on-site construction staff member will be designated as a Noise Disturbance Coordinator. The Noise Disturbance Coordinator is responsible for responding to complaints about construction noise. When a complaint is received, the Noise Disturbance Coordinator shall determine the cause (e.g., starting too early, bad muffler, etc.), implement reasonable measures to resolve the complaint, and document actions taken. All notices sent to residential units within 300 feet of the construction site and all signs posted at the construction site, shall include the contact name and the telephone number for the Noise Disturbance Coordinator.
- Construction haul routes shall be designed and clearly designated to avoid noise sensitive uses (e.g., residences, convalescent homes, etc.) to the extent feasible.

PDF NOI-2 Extended Construction Hours

San José requires approval of construction occurring outside of the hours of 7:00 AM to 7:00 PM, Monday through Friday and anytime on weekends, within 500 feet of existing residential land uses. The following measures would reduce noise impacts at nearby noise-sensitive receptors:

- Limit the active equipment during nighttime (10:00 PM to 7:00 AM) construction to the following construction equipment: concrete mixer, concrete pump, concrete vibrator, generator, and air compressor. Limit nighttime activity along the eastern boundary near sensitive receptors, as feasible.
- To the extent consistent with applicable regulations and safety considerations, operation of back-up beepers shall be avoided near sensitive receptors between 7:00 PM and 7:00 AM, and/or the work sites shall be arranged in a way that avoids the need for any reverse motions of trucks or the sounding of any reverse motion alarms during off hour work. If these measures are not feasible, equipment and trucks operating during off hours with reverse motion alarms must be outfitted with SAE J994 Class D alarms (ambient-adjusting, or "smart alarms" that automatically adjust the alarm to 5 dBA above the ambient near the operating equipment).
- Residences or other noise-sensitive land uses within 500 feet of construction sites shall be notified of the anticipated construction schedule occurring between 7:00 PM and 7:00 AM and on weekends ("off hours construction"), in writing, at least 15 days prior to the beginning of off

hours construction. This notification shall specify the anticipated dates for all off hour construction and provide the contact information for the Noise Disturbance Coordinator.

- Designate a Noise Disturbance Coordinator that would be responsible for responding to any local complaints including about off hour construction noise within 48 hours. Any nuisance complaint reported during nighttime operations (7:00 PM and 7:00 AM) shall be deemed an urgent issue and shall be responded to immediately. The Coordinator would determine the cause of the noise complaints (e.g., starting too early, bad muffler, etc.) and institute reasonable measures to correct the problem. Conspicuously post a telephone number for the Coordinator at the construction site.

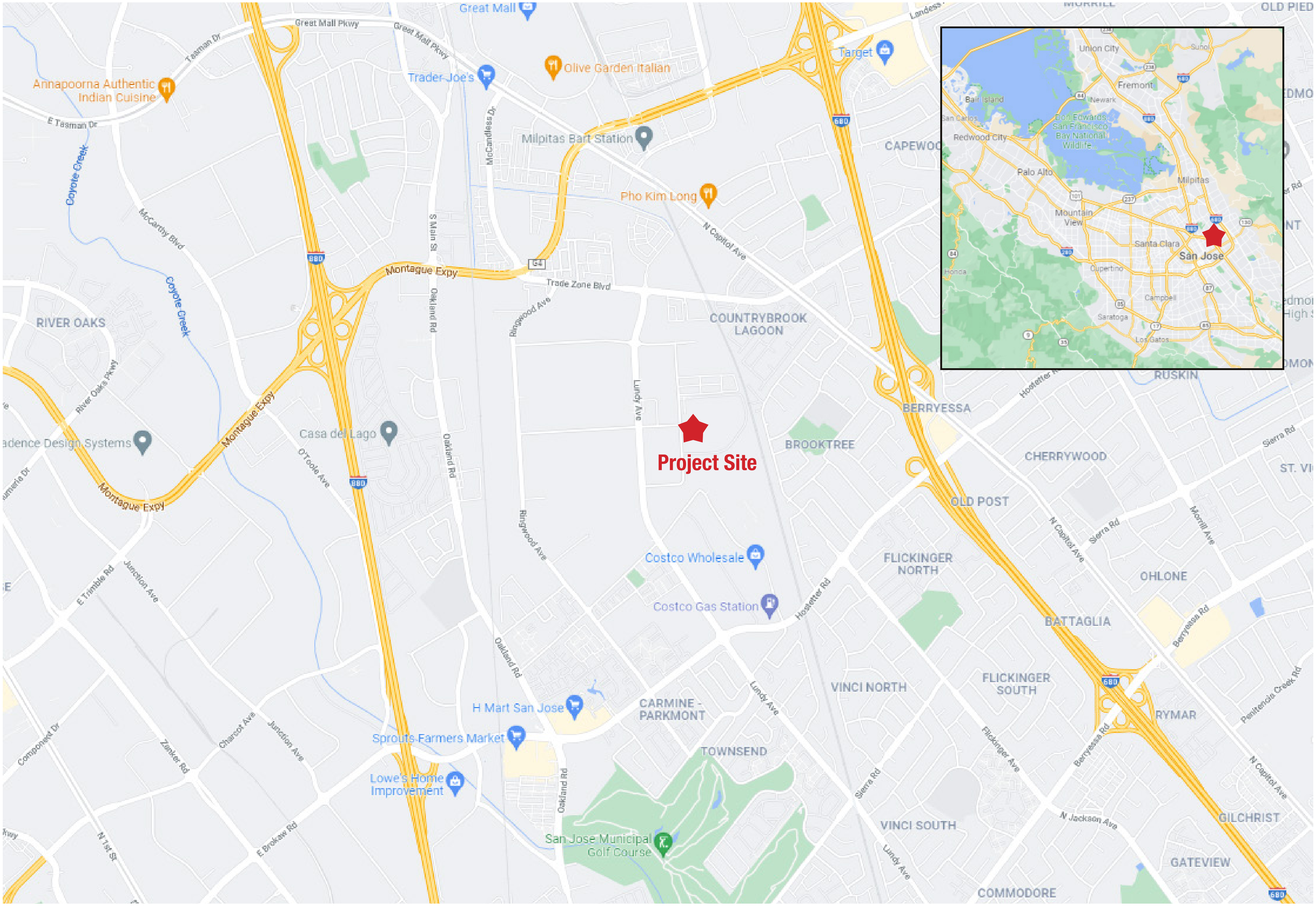
PDF NOI-3 Temporary Noise Barrier

Prior to the issuance of any demolition or grading permit that covers work within 500 feet of residences, the Applicant shall demonstrate to the Director of Planning Building and Code Enforcement or Director's Designee that the temporary construction noise barriers will be installed meeting the following requirements:

Prior to any construction activities within 500 feet of residences, a temporary noise barrier shall be erected along a portion of the Project boundary within 500 feet of residences (**see Figure 4: Temporary Noise Barrier Location**). The temporary noise barrier shall be 350 linear feet along the northern property boundary where it intersects with the eastern boundary; along the entire length (400 linear feet) of the eastern boundary; and 400 linear feet of the southeastern boundary. The temporary noise barrier shall be a minimum of 10 feet high. The temporary noise barrier shall remain in place from the demolition through vertical shell construction, not including paving, landscaping, glazing installations, roofing, and architectural coating (exterior and interior) and finishes.

The temporary noise barrier shall have a sound transmission class (STC) of 25 or greater in accordance with the American Society for Testing and Materials (ASTM) Test Method E90. As an example, one method to achieve this would be a barrier consisting of steel tubular framing, welded joints, a layer of 18-ounce tarp, a two-inch thick fiberglass blanket, a half-inch thick weatherwood asphalt sheathing, and 7/16-inch sturdy board siding. Additionally, to avoid objectionable noise reflections, the source side of the noise barrier shall be lined with an acoustic absorption material meeting a noise reduction coefficient rating of 0.70 or greater in accordance with ASTM Test Method C423.

The project site is designated as Industrial Park (IP) by the General Plan, which allows for warehousing uses. The project site is zoned as Industrial Park (IP). The LI Zoning District also allows for warehouse and distribution facilities.



Source: Google Maps, 2022

Figure 1: Regional Map

Qume & Commerce

Not to scale

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Source: Google Maps, 2022

Figure 2: Site Vicinity

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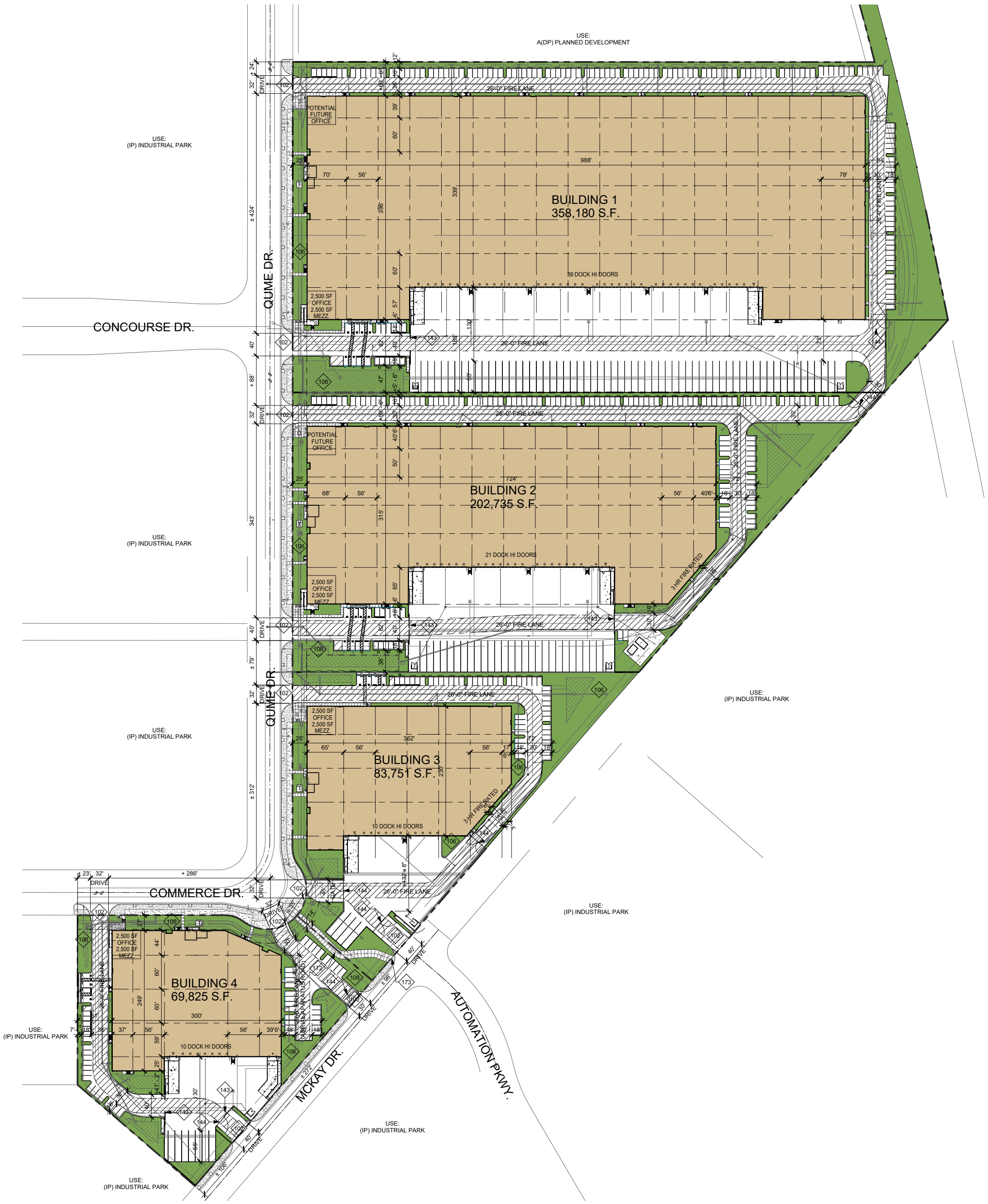

Source: Herdman, 2022

Figure 3: Overall Site Plan

Qume & Commerce

Not to scale

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Source: Google Earth, 2022

Figure 4: Temporary Noise Barrier Location

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Not to scale

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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. The fundamental acoustics model consists of a noise source, 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 ambient noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this ambient 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 3: Typical Noise Levels provides typical noise levels.

Table 3: 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 miles per hour		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}) represents the continuous sound pressure level 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 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 Table 4: Definitions of Acoustical Terms.

Table 4: 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_1, 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 Leq 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 Leq would result in a measurement of 66.4 dBA L_{dn}.
Community Noise Equivalent Level (CNEL)	A 24-hour average Leq 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 Leq 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.

Term	Definitions
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 used. 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 document 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 approximately 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 way 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 1-dBA change cannot be perceived by humans.
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference.
- A minimum 5-dBA change is required before any noticeable change in community response would be expected. A 5-dBA increase 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, including Vibration Decibels (VdB), peak particle velocity (PPV), and the root mean square (RMS) velocity. VdB is the vibration velocity level in the decibel scale. 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 5: 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 5: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations

Maximum PPV (in/sec)	Vibration Annoyance Potential Criteria	Vibration Damage Potential Threshold Criteria	FTA Vibration Damage Criteria
0.008	-	Extremely fragile historic buildings, ruins, ancient monuments	-
0.01	Barely Perceptible	-	-
0.04	Distinctly Perceptible	-	-
0.1	Strongly Perceptible	Fragile buildings	-
0.12	-	-	Buildings extremely susceptible to vibration damage
0.2	-	-	Non-engineered timber and masonry buildings
0.25	-	Historic and some old buildings	-
0.3	-	Older residential structures	Engineered concrete and masonry (no plaster)
0.4	Severe	-	-
0.5	-	New residential structures, Modern industrial/commercial buildings	Reinforced-concrete, steel, or timber (no plaster)
PPV = peak particle velocity; in/sec = inches per second; FTA = Federal Transit Administration			
Source: California Department of Transportation, Transportation and Construction Vibration Guidance Manual, 2020 and Federal Transit administration; Transit Noise and vibration Assessment Manual, 2018.			

[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 San José General Plan

The San José General Plan identifies goals, policies, and implementations in the Noise Element. The Noise Element provides a basis for comprehensive local programs to regulate environmental noise and protect citizens from excessive exposure. Table 6: Land-Use Compatibility Guidelines for Community Noise in San José highlights five land-use categories and the outdoor noise compatibility guidelines.

Table 6: Land-Use Compatibility Guidelines for Community Noise in San José

Land-Use Category	Exterior Noise Exposure (DNL), in dBA		
	Normally Acceptable[1]	**Conditionally Acceptable[2]**	**Normally Unacceptable[3]**
Residential, Hotels and Motels, Hospitals, and Residential Care	Up to 60	>60 to 75	>75
Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds	Up to 65	>65 to 80	>80
Schools, Libraries, Museums, Meeting Halls, Churches	Up to 60	>60 to 75	>75
Office Buildings, Business Commercial, and Professional Offices	Up to 70	>70 to 80	>75
Sports Area, Outdoor Spectator Sports	Up to 70	>70 to 80	>65
Public and Quasi-Public Auditoriums, Concert Halls, Amphitheaters		>55 to 70	>70

1. Normally Acceptable – Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction. There are no special noise insulation requirements.
2. Conditionally Acceptable – New construction should be undertaken only after a detailed analysis of the noise reduction requirement is conducted and needed noise insulation features included in the design.
3. Normally Unacceptable – New construction should be discouraged and may be denied as inconsistent with the General Plan and City Code. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
4. Outdoor open space noise standards do not apply to private balconies/patios.

Source: City of San José General Plan, 2014.

The San José General Plan includes the following policies for noise:

Policy EC – 1.1: Locate new development in areas where noise levels are appropriate for the proposed uses. Consider federal, state and City noise standards and guidelines as a part of new development review

Policy EC – 1.2: Minimize the noise impacts of new development on land uses sensitive to increased noise levels (Categories 1, 2, 3 and 6) by limiting noise generation and by requiring use of noise attenuation measures such as acoustical enclosures and sound barriers, where feasible. The City considers significant noise impacts to occur if a project would:

- Cause the DNL at noise sensitive receptors to increase by five dBA DNL or more where the noise levels would remain "Normally Acceptable"; or
- Cause the DNL at noise sensitive receptors to increase by three dBA DNL or more where noise levels would equal or exceed the "Normally Acceptable" level

Policy EC – 1.3: Mitigate noise generation of new nonresidential land uses to 55 dBA DNL at the property line when located adjacent to existing or planned noise sensitive residential and public/quasi-public land uses.

Policy EC – 1.6: Regulate the effects of operational noise from existing and new industrial and commercial development on adjacent uses through noise standards in the City's Municipal Code.

Policy EC – 1.7: Require construction operations within San José to use best available noise suppression devices and techniques and limit construction hours near residential uses per the City's Municipal Code. The City considers significant construction noise impacts to occur if a project located within 500 feet of residential uses or 200 feet of commercial or office uses would:

- Involve substantial noise generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months.

For such large or complex projects, a construction noise logistics plan that specifies hours of construction, noise and vibration minimization measures, posting or notification of construction schedules, and designation of a noise disturbance coordinator who would respond to neighborhood complaints will be required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses.

Policy EC – 1.13: Update noise limits and acoustical descriptors in the Zoning Code to clarify noise standards that apply to land uses throughout the City.

Policy EC – 2.3: Require new development to minimize continuous vibration impacts to adjacent uses during demolition and construction. For sensitive historic structures, including ruins and ancient monuments or building that are documented to be structurally weakened, a continuous vibration limit of 0.08 in/sec PPV (peak particle velocity) will be used to minimize the potential for cosmetic damage to a building. A continuous vibration limit of 0.20 in/sec PPV will be used to minimize the potential for cosmetic damage at buildings of normal conventional construction. Equipment or activities typical of generating continuous vibration include but are not limited to: excavation equipment; static compaction equipment; vibratory pile drivers; pile-extraction equipment; and vibratory compaction equipment. Avoid use of impact pile drivers within 125 feet of any buildings, and within 300 feet of historical buildings, or buildings in poor condition. On a project-specific basis, this distance of 300 feet may be reduced where warranted by a technical study by a qualified professional that verifies that there will be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction. Transient vibration impacts may exceed a vibration limit of 0.08 in/sec PPV only when and where warranted by a technical study by a qualified professional that verifies that there will be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction.

City of San José Municipal Code

According to San José Municipal Code, Section 20.100.450, construction hours within 500 feet of a residential unit are limited to the hours of 7:00 a.m. to 7:00 p.m. on Monday through Friday, unless otherwise allowed in a Development Permit or other planning approval. The Municipal Code does not establish quantitative noise limits for construction activities in the City. Table 7: City of San José Zoning Ordinance Noise Standards shows the San José standards for maximum noise level at the property line.

Table 7: City of San José Zoning Ordinance Noise Standards

Land Use Types	Maximum Noise Level in Decibels at Property Line
Industrial use adjacent to a property used or zoned for residential purposes	55
Industrial use adjacent to a property used or zoned for commercial purposes	60
Industrial use adjacent to a property used or zoned for industrial or use other than commercial or residential purposes	70
Source: City of San José Municipal Code section 20.50.300.	

4 EXISTING CONDITIONS

4.1 EXISTING NOISE SOURCES

The City of San José 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.

Noise Measurements

To determine ambient noise levels in the project area, four short-term (10-minute) noise measurements and one long-term (24-hour) noise measurements were taken using a Larson Davis SoundExpert LxT Type I integrating sound level meter on November 10 and November 11, 2021; refer to Appendix A for existing noise measurement data.

The noise measurements are shown in **Figure 5: Noise Measurement Locations** short-term measurement 1 (ST-1) was taken to represent the ambient noise level at the residential uses east of the project site on Flickinger Avenue, ST-2 and ST-3 were taken to represent existing noise levels at the industrial uses to the west of the project site, and ST-4 was taken to represent the existing noise level at the industrial uses to the east on Automation Parkway. Long-term measurement 1 (LT-1) was taken to represent existing ambient noise levels along Flickinger Avenue. The primary noise sources during the noise measurements were traffic along Qume Road, McKay Drive, Flickinger Avenue, and stationary noise at residential and industrial operations nearby. Table 8: Noise Measurements provides the ambient noise levels measured at these locations.

Table 8: Noise Measurements

Site No.	Location	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	L_{peak} (dBA)	Time	Date
ST-1	1890 Flickinger Avenue	57.0	40.4	70.5	96.7	1:19 p.m. to 1:29 p.m.	11/20/2021
ST-2	2360 Qume Drive	61.9	46.9	80.0	96.3	1:01 p.m. to 1:11 p.m.	11/20/2021
ST-3	1980 Lundy Avenue	58.3	46.6	75.7	98.9	12:48 p.m. to 12:58 p.m.	11/10/2021
ST-4	1750 Automation Parkway	65.1	43.9	79.6	102.6	12:29 p.m. to 12:39 p.m.	11/10/2021
LT-1	1890 Flickinger Avenue	52.5	36.7	81.0	104.4	1:43 p.m. to 3:37 p.m.	11/10/2021 & 11/11/2021
Source: Noise Measurements taken by Kimley-Horn on November 10th and 11th in 2021.							

Source: Google Maps, 2022

Figure 5: Noise Measurement Locations

Qume & Commerce

Not to scale

Kimley»Horn
Expect More. Experience Better.

Existing Mobile Noise

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 Transportation Analysis (Kimley-Horn, 2022). 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 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. The average daily noise levels along roadway segments in proximity to the project site are included in Table 9: Existing Traffic Noise.

Table 9: Existing Traffic Noise

Roadway Segment	ADT	dBA DNL[1]
Qume Drive		
Commerce to Fortune	2,200	57.7
Commerce Drive		
Lundy to Qume	980	54.2
Concourse Drive		
Lundy to Qume	2,340	58.0
Fortune Drive		
Lundy to Qume	3,280	59.4
Lundy Avenue		
Trade Zone to Murphy	18,380	68.0
ADT = average daily trips; dBA = A-weighted decibels; DNL = day-night noise level		
1. Traffic noise levels are at 100 feet from the roadway centerline. The actual sound level at any receptor location is dependent upon such factors as the source-to-receptor distance and the presence of intervening structures, barriers, and topography.		
Source: Based on data from the Transportation Analysis (Kimley-Horn, 2022). Refer to Appendix A for traffic noise modeling assumptions and results.		

The existing mobile noise in the project area are generated along Qume Drive, which is west of the project site, and McKay Drive which is southeast of the project site.

Existing Stationary Noise

The primary sources of stationary noise in the project vicinity are those associated with the operations of nearby residential uses to the east of the site and existing mixed-used commercial and industrial surrounding of the project site. The noise associated with these sources may represent a single-event noise occurrence, short-term noise, 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. As shown in Table 10: Sensitive Receptors, sensitive receptors near the project site include educational facilities, recreational facilities, and single- and multi-family residences to the east and southeast. Surrounding the project site to the north, south, and west, are large commercial and industrial areas. These distances are from the project site to the sensitive receptor property line. **Figure 6: Sensitive Receptor Locations** shows the locations of the nearest sensitive receptors.

Table 10: Sensitive Receptors

Receptor Description	Distance and Direction from the Project Site
Multi-family residential	125 feet east
Single-family residential	190 feet east
DeVry University	415 feet west
Brooktree Park	1000 feet southeast
Brooktree Elementary School	1000 feet southeast

Source: Google Maps, 2022

Figure 6: Sensitive Receptor Locations

Qume & Commerce

Not to scale

Kimley»Horn
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5 SIGNIFICANCE CRITERIA AND METHODOLOGY

5.1 CEQA THRESHOLDS

Appendix G of the California Environmental Quality Act (CEQA) Guidelines contains analysis guidelines related to noise impacts. These guidelines have been used by the City to develop thresholds of significance for this analysis. A project would create a significant environmental impact if it would:

NOI-1 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;

NOI-2 Generate excessive groundborne vibration or groundborne noise levels; and

NOI-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, expose people residing or working in the project area to excessive noise levels.

5.2 METHODOLOGY

Construction

Construction noise estimates are based upon noise levels on typical noise levels generated by construction equipment published by the Federal Transit Administration (FTA) and FHWA. Construction noise is assessed in dBA L_{eq}. This unit is appropriate because L_{eq} can be used to describe noise level from operation of each piece of equipment separately, and levels can be combined to represent the noise level from all equipment operating during a given period. The Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment Manual* (2018) (FTA Noise and Vibration Manual) identifies a maximum 1-hour noise level standard of 90 dBA L_{eq} at residential uses and 100 dBA L_{eq} at commercial and industrial uses for short-term construction activities. Maximum 8-hour noise level standard of 80 dBA L_{eq} at residential uses, 85 dBA L_{eq} at commercial uses, and 90 dBA L_{eq} at industrial uses for short-term construction activities.

Reference noise levels are used to estimate noise levels at nearby sensitive receptors based on a standard noise attenuation rate of 6 dB per doubling of distance (line-of-sight method of sound attenuation for point sources of noise). Construction noise level estimates do not account for the presence of intervening structures or topography, which may reduce noise levels at receptor locations. Therefore, the noise levels presented herein represent a conservative, reasonable worst-case estimate of actual temporary construction noise.

Operations

The analysis of the existing and future noise environments is based on noise prediction modeling and empirical observations. Reference noise level data are used to estimate the project operational noise impacts from stationary sources. Noise levels are collected from field noise measurements and other published sources from similar types of activities are used to estimate noise levels expected with the project's stationary sources. The reference noise levels are used to represent a worst-case noise environment as noise level from stationary sources can vary throughout the day.

Stationary source operational noise is evaluated based on the standards within the City's Municipal Code. The traffic noise levels in the project vicinity were calculated using the FHWA Highway Noise Prediction Model (FHWA-RD-77-108).

Vibration

Groundborne vibration levels associated with construction-related activities for the project were evaluated utilizing typical groundborne vibration levels associated with construction equipment, obtained from FTA 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

Project construction is expected to last for a period of 18 months. While the total Project construction timeline is 18 months, the proposed Project would not result in more than 12 months of substantial noise generating construction activities such as demolition, grading, and building framing. These more intensive construction activities would last approximately 8 months while the less noise intensive construction phases such as site preparation, building construction, paving, and architectural coating would last approximately 10 months. Excavation, cut, and fill would be required as part of construction and soil hauling would be required for approximately 5,000 cubic yards (cy) of imported soil. The project does not propose pile driving during construction.

The project site is located within 500 feet of residential uses to the east and 200 feet from industrial uses north, south, and west of the site. As noted in the project description, the project includes a request for extended construction hours, beyond 7:00 AM to 7:00 PM, Monday through Friday which would include conducting normal construction activities on Saturdays from 8:00 A.M to 5:00 P.M., and perform concrete pours during nighttime hours. The nighttime concrete pours would occur on up to 30 nights for Building 1, 25 nights for Building 2, 15 nights for Building 3, and 15 nights for Building 4. The nighttime concrete pours would utilize the following construction equipment: concrete mixer, concrete pump, concrete vibrator, generator, and air compressor. .

Construction activities associated with development of the project would include some demolition, site preparation, grading, paving, building construction, and architectural coating. Such activities would require graders, scrapers, and tractors during demolition and 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. Grading and excavation phases of project construction tend to be the shortest in duration and create the highest construction noise levels due to the operation of heavy equipment required to complete these activities. Only a limited amount of equipment can operate near a given location at a particular time. Equipment typically used during this stage includes heavy-duty trucks, backhoes, bulldozers, excavators, front-end loaders, and scrapers. Operating cycles for these types of construction equipment may involve one or two minutes of full-power operation followed by three to four minutes at lower power settings. Other primary sources of noise would be shorter-duration incidents, such as dropping large pieces of equipment or the hydraulic movement of machinery lifts, which would last less than one minute. Noise impacts for mobile construction equipment are typically assessed as emanating from the center of the equipment activity or construction site. [2] For the proposed Project, this

2 For the purposes of this analysis, the construction area is defined as the center of the project site per the methodology in the FTA Transit Noise and Vibration Impact Assessment Manual (September 2018). Although some construction activities may occur

center point would be approximately 480 feet from the nearest sensitive receptor property line. As shown in Table 11: Typical Construction Noise Levels, noise levels would be below 68 dBA at a distance of 480 feet from the center of the Project site. The highest anticipated construction noise level of 68 dBA at 480 feet is expected to occur during the demolition phase (jack hammer).

Table 11: Typical Construction Noise Levels

Equipment	Typical Noise Level (dBA) from Source[1]	
	50 feet (reference level)	480 feet[3]
Air Compressor	80	60
Backhoe	80	60
Compactor	82	62
Concrete Mixer	85	65
Concrete Pump	82	62
Concrete Vibrator	76	56
Crane, Mobile	83	56
Dozer	85	63
Generator[2]	56	37
Grader	85	65
Impact Wrench	85	65
Jack Hammer	88	68
Loader	80	60
Paver	85	65
Pneumatic Tool	85	65
Pump	77	57
Roller	85	65
Saw	76	56
Scarifier	83	63
Scraper	85	65
Shovel	82	62
Truck	84	64

1. Calculated using the inverse square law formula for sound attenuation: $dBA_2 = dBA_1 + 20Log(d_1/d_2)$
Where: $QWdBA_2$ = estimated noise level at receptor; dBA_1 = reference noise level; d_1 = reference distance; d_2 = receptor location distance.
2. Generator would include CAT XQ60 Rental Generator Set.
3. For the purposes of this analysis, the construction area is defined as the center of the project site per the methodology in the FTA Transit Noise and Vibration Impact Assessment Manual (September 2018). Although some construction activities may occur at distances closer than 480 feet from the nearest properties, construction equipment would be dispersed throughout the project site during various construction activities. Therefore, the center of the project site represents the most appropriate distance based on the sporadic nature of construction activities.

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

The noise levels calculated in Table 12: Project Construction Noise Levels, show estimated exterior construction noise at the closest receptors. The modeled exterior noise levels include PDF NOI-1 through PDF NOI-3. Based on calculations using the RCNM model, construction noise levels would range from approximately 60.1 dBA L_{eq} and 65.8 dBA L_{eq} at the nearest sensitive receptors; see Table 12.

at distances closer than 480 feet from the nearest properties, construction equipment would be dispersed throughout the project site during various construction activities. Therefore, the center of the project site represents the most appropriate distance based on the sporadic nature of construction activities.

Table 12: Project Construction Noise Levels

Construction Phase	Receptor Location			Modeled Exterior Noise Level (dBA L_{eq}) [2,3]	Noise Threshold (dBA L_{eq}) [4]	Exceeded?
	Land Use	Direction	Distance (feet) [1]			
Demolition	Residential (1st & 2nd Floors)	East	480	49.9	80	No
	Residential (3rd Floor)	East	480	64.9	80	No
	Industrial	West	275	69.8	90	No
Site Preparation	Residential (1st & 2nd Floors)	East	480	48.0	80	No
	Residential (3rd Floor)	East	480	63.0	80	No
	Industrial	West	275	69.8	90	No
Grading	Residential (1st & 2nd Floors)	East	480	50.8	80	No
	Residential (3rd Floor)	East	480	65.8	80	No
	Industrial	West	275	70.6	90	No
Building Construction	Residential (1st & 2nd Floors)	East	480	49.4	80	No
	Residential (3rd Floor)	East	480	64.4	80	No
	Industrial	West	275	69.3	90	No
Paving	Residential (1st & 2nd Floors)	East	480	60.1	80	No
	Residential (3rd Floor)	East	480	60.1	80	No
	Industrial	West	275	64.9	90	No
Architectural Coating	Residential (1st & 2nd Floors)	East	480	60.1	80	No
	Residential (3rd Floor)	East	480	60.1	80	No
	Industrial	West	275	64.9	90	No

Notes:
1. Distance is from the nearest receptor to the main construction activity area on the Project site. Not all equipment would operate at the closest distance to the receptor.
2. Modeled noise levels conservatively assume the simultaneous operation of all pieces of equipment.
3. Modeled exterior noise level includes PDF NOI-3 (use of a temporary noise barrier) which would only affect the residences on the first and second floors of the multi-family units across the BART tracks. The temporary noise barrier would have a sound transmission class of 25 or greater and would attenuate noise levels by 25 dB. This analysis conservatively takes credit for 15 dB.
4. The FTA Noise and Vibration Manual establishes construction noise standards of 80 dBA $L_{eq(8\text{-}hour)}$ for residential uses and 90 dBA $L_{eq(8\text{-}hour)}$ for commercial and industrial uses.

Source: Federal Highway Administration, *Roadway Construction Noise Model,* 2006. Refer to **Appendix A** for noise modeling results.

As shown in Table 12, the loudest noise levels would be 65.8 dBA L_{eq} at the nearest residential uses and 70.6 dBA L_{eq} at the nearest industrial uses, which would not exceed the FTA's construction noise standards of 80 dBA L_{eq} and/or 90 dBA L_{eq}.

The City considers a significant construction noise impact to occur if the project is located within 500 feet of a residential use or 200 feet of a commercial or office use and would involve substantial noise-generation activities continuing for over 12 months. As stated above the project's substantial noise-generating construction phases would not exceed 12 months, therefore the project would not have a significant construction noise impact per General Plan Policy EC-1.7.

Section 20.100.450 of the Municipal Code limits construction hours within 500 feet of a residential unit are limited to the hours of 7:00 AM to 7:00 PM on Monday through Friday, unless otherwise allowed in a Development Permit or other planning approval. As discussed in the project description above, the project includes PDFs NOI-1 through NOI-3 which would minimize construction noise, including between 7:00 PM and 7:00 AM and on weekends ("off hours construction"). All construction equipment would be equipped with properly operating and maintained mufflers and other state required noise attenuation devices, helping to reduce noise at the source per PDF NOI-1. PDF NOI-2 would ensure work during extended construction hours would be limited, and that the Applicant must implement measures to reduce noise impacts at nearby sensitive receptors. PDF NOI-3 would require the Project to erect a temporary noise barrier, prior to construction, in areas where residences are located within 500 feet of construction. These PDFs would help to minimize construction noise effects to sensitive receptors.

Construction Traffic Noise

Construction is estimated to be approximately 18 months. Construction noise may be generated by large trucks moving materials to and from the project site. Large trucks would be necessary to deliver building materials as well as remove dump materials. Based on the California Emissions Estimator Model (CalEEMod) default assumptions for this project, as analyzed in Qume and Commerce Air Quality Assessment (Kimley-Horn, 2022), the project would generate the highest number of daily trips during the demolition and construction phases. The model estimates that the project would generate up to 15 worker trips and 103 daily hauling trips (5,756 hauling trips over 56 days) for demolition for a total of approximately 118 daily vehicle trips during demolition. During the site preparation phase there would be approximately 18 daily worker trips. Building construction would have 600 daily worker trips and 234 daily vendor trips. Because of the logarithmic nature of noise levels, a doubling of the traffic volume (assuming that the speed and vehicle mix do not also change) would result in a noise level increase of 3 dBA. Lundy Avenue between Trade Zone to Murphy has an average daily trip volume of 18,380 vehicles (Table 9). Therefore, a maximum of 834 daily project construction trips (total of 600 daily worker trips and 234 daily vendor trips) would not double the existing traffic volume per day. Construction related traffic noise would not be noticeable and would not create a significant noise impact.

California establishes noise limits for vehicles licensed to operate on public roads using a pass-by test procedure. Pass-by noise refers to the noise level produced by an individual vehicle as it travels past a fixed location. The pass-by procedure measures the total noise emissions of a moving vehicle with a microphone. When the vehicle reaches the microphone, the vehicle is at full throttle acceleration at an engine speed calculated for its displacement.

For heavy trucks, the State pass-by standard is consistent with the federal limit of 80 dB. The State pass-by standard for light trucks and passenger cars (less than 4.5 tons gross vehicle rating) is also 80 dB at 15 meters from the centerline. According to the FHWA, dump trucks typically generate noise levels of 77 dBA and flatbed trucks typically generate noise levels of 74 dBA, at a distance of 50 feet from the truck (FHWA, Roadway Construction Noise Model, 2006). Therefore, construction related traffic noise would not be noticeable and would not occur for a period exceeding 12 months; therefore, the project would not create a significant noise impact. Construction noise impacts are less than significant.

Operations

Implementation of the Project would create sources of noise in the project vicinity. However, the Project would replace an existing site with similar operational noise levels. The major noise sources associated with the project that would potentially impact existing and future nearby residences include the following:

- Off-site traffic noise;
- Mechanical equipment (i.e., trash compactors, air conditioners, etc.);
- Delivery trucks on the project site, and approaching and leaving the loading areas;
- Activities at the loading areas (i.e., maneuvering and idling trucks, loading/unloading, and equipment noise);
- Parking areas (i.e., car door slamming, car radios, engine start-up, and car pass-by); and
- Landscape maintenance activities.

The closest sensitive receptor property lines are located approximately 140 feet to the east. The City of San José stationary source exterior Zoning Ordinance Noise Standards for industrial areas adjacent to residential uses is 55 dBA L_{eq}. Per General Plan Policy EC-1.1, land use compatibility standard for business commercial areas is up to 70 dBA DNL.

Traffic Noise

Implementation of the Project would generate traffic volumes along study roadway segments. The Project is expected to generate 2,035 average daily trips, however the existing uses on site generate 3,565 average daily trips. This is partially due to the existing and proposed uses of the building. The proposed warehouse use would generate less trips than the existing office use. Therefore, the proposed Project would result in a net of 0 daily trips. In general, a traffic noise increase of less than 3 dBA is barely perceptible to people, while a 5-dBA increase is readily noticeable.[3] Generally, traffic volumes on Project area roadways would have to approximately double for the resulting traffic noise levels to increase by 3 dBA. General Plan Policy EC-1.2 limits noise levels increase by 5 dBA where would remain normally acceptable and 3 dBA where noise levels near sensitive receptors would equal or exceed normally acceptable. Therefore, permanent increases in ambient noise levels of less than 3 dBA are considered to be less than significant.

As shown in Table 13: Existing and Project Traffic Noise, the existing traffic-generated noise level on project area roadways is between 54.2 dBA L_{dn} and 68.0 dBA L_{dn} at 100 feet from the centerline. As previously described, L_{dn} is 24-hour average noise level 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 in the evening and nighttime, respectively.

3 Caltrans, *Technical Noise Supplement to the Traffic Noise Analysis Protocol,* September 2013. Available at: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tens-sep2013-a11y.pdf

Traffic noise levels for roadways primarily affected by the project were calculated using the FHWA's Highway Noise Prediction Model (FHWA-RD-77-108). Traffic noise modeling was conducted for conditions with and without the project, based on traffic volumes (Kimley-Horn, 2022). As noted in Table 13, project noise levels 100 feet from the centerline would range from 55.9 dBA to 68.3 dBA. The project generated trips would have the highest increase of 1.7 dBA on Commerce Drive. However, the 1.7 dBA DNL increase is under the perceptible 3.0 dBA noise level increase per General Plan EC – 1.1. Therefore, the project would not have a significant impact on existing traffic noise levels.

Table 13: Existing and Project Traffic Noise

Roadway Segment	Existing Conditions		With Project		Change from No Project Conditions	Significant Impact?
	ADT	dBA DNL[1]	ADT	dBA DNL[1]		
Qume Drive						
Commerce to Fortune	2,200	57.7	2,860	58.8	1.1	**No**
Commerce Drive						
Lundy to Qume	980	54.2	1,440	55.9	1.7	**No**
Concourse Drive						
Lundy to Qume	2,340	58.0	3,110	59.2	1.2	**No**
Fortune Drive						
Lundy to Qume	3,280	59.4	4,030	60.3	0.9	**No**
Lundy Avenue						
Trade Zone to Murphy	18,380	68.0	19,980	68.3	0.3	**No**
ADT = average daily trips; dBA = A-weighted decibels; DNL= day-night noise levels						
1.Traffic noise levels are at 100 feet from the roadway centerline. The actual sound level at any receptor location is dependent upon such factors as the source-to-receptor distance and the presence of intervening structures, barriers, and topography.						
Source: Based on data from the Transportation Analysis (Kimley-Horn, 2022). Refer to Appendix A for traffic noise modeling assumptions and results.						

Table 14: Background and Background Plus Project Traffic Noise, shows the background conditions traffic. Per the Transportation Analysis, Background conditions would include twelve approved projects that were added to the baseline 2021 volumes. As shown in Table 14, Background roadway noise levels with the project would range from 56.5 dBA to 69.2 dBA. Project traffic would traverse and disperse over project area roadways, where existing ambient noise levels already exist. Future development associated with the project would result in traffic on adjacent roadways, thereby contributing vehicular noise near existing and proposed land uses. However, as discussed above, this analysis did not take reductions for the existing use on site that generates mobile noise. The project would not result in noise level increases above 3.0 dBA. Therefore, impacts are less than significant.

Table 14: Background and Background Plus Project Traffic Noise

Roadway Segment	Background		With Project		Change from No Project Conditions	Significant Impact?
	ADT	dBA DNL[1]	ADT	dBA DNL[1]		
Qume Drive						
Commerce to Fortune	2,210	57.7	2,870	59.5	1.8	**No**

Roadway Segment	Background		With Project		Change from No Project Conditions	Significant Impact?
	ADT	dBA DNL[1]	ADT	dBA DNL[1]		
Commerce Drive						
Lundy to Qume	980	54.2	1,440	56.5	2.3	**No**
Concourse Drive						
Lundy to Qume	2,350	58.0	3,120	59.9	1.9	**No**
Fortune Drive						
Lundy to Qume	3,300	59.4	4,050	61.0	1.6	**No**
Lundy Avenue						
Trade Zone to Murphy	19,580	68.2	21,180	69.2	1.0	**No**
ADT = average daily trips; dBA = A-weighted decibels; DNL= day-night noise levels						
1. Traffic noise levels are at 100 feet from the roadway centerline. The actual sound level at any receptor location is dependent upon such factors as the source-to-receptor distance and the presence of intervening structures, barriers, and topography.						
Source: Based on data from the Transportation Analysis (Kimley-Horn, 2022). Refer to Appendix A for traffic noise modeling assumptions and results.						

Stationary Noise Sources

Implementation of the project would generate sources of noise in the project vicinity from mechanical equipment, truck loading areas, parking lot noise, and landscape maintenance. Table 15: Operational Noise Levels shows the noise levels generated by various stationary noise sources and the resulting noise level at the nearest receiver. Table 15 also show the project's compliance with GP Policy EC-1.1 and EC-1.2 as well as the Municipal Code. Each stationary source is discussed below.

Mechanical Equipment

Regarding mechanical equipment, the project would generate stationary-source noise associated with heating, ventilation, and air conditioning (HVAC) units. HVAC units typically generate noise levels of approximately 52 dBA at a distance of 50 feet.[4] Additionally, the project would include backup generators. Table 15 shows that mechanical equipment would not exceed the City's General Plan standards in Policy EC-1.1 and Policy EC-1.2.

Loading Area Noise

The project is an industrial development that would include deliveries. The primary noise associated with deliveries is the arrival and departure of trucks. Operations of proposed project would potentially require a mixture of deliveries from vans, light trucks, and heavy-duty trucks. Normal deliveries typically occur during daytime hours. During loading and unloading activities, noise would be generated by the trucks' diesel engines, exhaust systems, and brakes during low gear shifting' braking activities; backing up toward the docks/loading areas; dropping down the dock ramps; and maneuvering away from the docks. The project is surrounded by industrial uses. The closest that the proposed loading area could be located to sensitive receptors would be approximately 650 feet away. While there would be temporary noise increases during truck maneuvering and engine idling, these impacts would be of short duration and

[4] Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, July 6, 2010.

infrequent. Typically, heavy truck operations generate a noise level of 64 dBA at a distance of 50 feet. Table 15 shows that truck and loading area noise would not exceed the City's General Plan standards in Policy EC-1.1 and Policy EC-1.2.

Parking Areas

Traffic associated with parking areas is typically not of sufficient volume to exceed community noise standards, which are based on a time-averaged scale such as the CNEL scale. However, the instantaneous maximum sound levels generated by a car door slamming, engine starting up and car pass-bys may be an annoyance to adjacent noise-sensitive receptors. Parking lot noise can also be considered a "stationary" noise source. The instantaneous maximum sound levels generated by a car door slamming, engine starting up, and car pass-bys range from 53 to 61 dBA at 50 feet and may be an annoyance to noise-sensitive receptors. Conversations in parking areas may also be an annoyance to sensitive receptors. Sound levels of speech typically range from 33 dBA at 48 feet for normal speech to 50 dBA at 50 feet for very loud speech. It should be noted that parking lot noise are instantaneous noise levels compared to noise standards in the DNL scale, which are averaged over time. As a result, actual noise levels over time resulting from parking lot activities would be far lower. Table 15 shows that parking area noise would not exceed the City's General Plan standards in Policy EC-1.1 and Policy EC-1.2

Landscape Maintenance Activities

Development and operation of the project includes new landscaping that would require periodic maintenance. Noise generated by a gasoline-powered lawnmower is estimated to be approximately 70 dBA at a distance of five feet. Landscape Maintenance activities would be 50 dBA at 50 feet away and 40.5 dBA at the closest sensitive receptor approximately 150 feet away. Maintenance activities would operate during daytime hours for brief periods of time as allowed by the City Municipal Code and would not permanently increase ambient noise levels in the project vicinity and would be consistent with activities that currently occur at the surrounding uses. Table 15 shows that landscape maintenance noise would not exceed the City's General Plan standards in Policy EC-1.1 and Policy EC-1.2.

Table 15: Operational Noise Levels

Nearest Land Use	Distance (feet)[1]	Reference Level at 50 ft (dBA)	Policy EC-1.1			Policy EC-1.2			
			Noise Level at Receiver	Exterior Noise Standard	Exceed Threshold	Ambient Noise Level (L_{eq})	Combined Noise at Receiver	Incremental Increase (dBA)[10]	Exceed Threshold
Mechanical Equipment									
Industrial	100	52 dBA[2]	46.0 dBA	70 dBA[5]	NO	65.1 dBA[7]	65.2 dBA	0.1	NO
Residences	775		28.2 dBA	60 dBA[6]	NO	57 dBA[9]	57.0 dBA	0.0	NO
Loading Area									
Industrial	300	64 dBA[2]	48.4 dBA	70 dBA[5]	NO	65.1 dBA[7]	65.2 dBA	0.1	NO
Residences	650		41.7 dBA	60 dBA[6]	NO	57 dBA[9]	57.1 dBA	0.1	NO
Parking Area									
Industrial	650	61 dBA[3]	38.7 dBA	70 dBA[5]	NO	65.1 dBA[7]	65.1 dBA	0.0	NO
Residences	675		38.4 dBA	60 dBA[6]	NO	57 dBA[9]	57.1 dBA	0.1	NO
Landscape Maintenance									
Industrial	150	61 dBA[4]	40.5 dBA	70 dBA[5]	NO	65.1 dBA[7]	65.1 dBA	0.0	NO
Residences	150		40.5 dBA	60 dBA[6]	NO	57 dBA[9]	57.1 dBA	0.1	NO

1. The distance is from the location of the operational noise source to the sensitive receptor property line.
2. Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, July 6, 2010.
3. Kariel, H. G., *Noise in Rural Recreational Environments*, Canadian Acoustics 19(5), 3-10, 1991.
4. U.S. EPA, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*, 1971.
5. City of San José Municipal Code section 20.50.300 (Table 20-135), which establishes industrial use noise standards of 55 dBA when adjacent to residential zones, 60 dBA when adjacent to commercial zones, and 70 dBA when adjacent to industrial zones.
6. City of San José General Plan Policy EC-1.1 establishes Normally acceptable noise standards of 60 dBA for residential and institutional uses and 70 dBA for commercial office uses.
7. Noise Measurement ST-4, which is representative of ambient noise levels along Automation Parkway.
8. Noise Measurement ST-3, which is representative of ambient noise levels along Qume Drive.
9. Noise Measurement ST-1, which is representative of ambient noise levels at the residential land uses east of the project site.
10. Incremental noise threshold per City of San José General Plan Policy EC-1.2, which establishes incremental noise standards of 5 dBA where noise levels would remain “Normally Acceptable” and 3 dBA where noise levels would equal or exceed the “Normally Acceptable” level for land uses sensitive to increased noise levels. Normally acceptable levels are 60 dBA for residential uses. Although the normally acceptable standard for industrial and commercial office uses is 70 dBA, it is not considered a land use sensitive to increased noise levels per Policy EC-1.2.

As shown in Table 15, stationary sources would not exceed the Land Use Compatibility Standards from GP Policy EC-1.1 or the incremental noise increases per GP Policy EC-1.2 at the adjacent industrial use and nearest residential property. The project would not place mechanical equipment near residential uses, and noise from this equipment would not be perceptible at the closest sensitive receptor. As noise levels associated with trucks would not exceed the City's 70 dBA and 60 dBA, for industrial, commercial or non-residential, and residential uses, respectively per GP Policy EC-1.1. Loading area noise would not result in increased noise levels exceeding 3 dBA per GP Policy EC-1.2. Noise associated with parking lot activities is not anticipated to exceed the 60 or 70 dBA threshold per GP Policy EC-1.1. Therefore, noise impacts from parking lots would be less than significant. With adherence to the City's Municipal Code, impacts associated with landscape maintenance would be less than significant.

According to the GP Policy EC-1.3, if a nonresidential land use is built adjacent to a sensitive residential receptor then noise from the new use must be mitigated to below 55 dBA. Although there are residential land uses to the east of the project site, there is a railroad in between the project site and the residential land uses. Therefore, the threshold of 55 dBA would not apply.

Additionally, noise levels would be further attenuated by intervening terrain and structures such as the existing BART noise wall adjacent to the sensitive receptors. The existing noise wall would further reduce project operational noise levels. Impacts from mechanical equipment, loading area, parking area, and landscape maintenance would be less than significant. Therefore, the project would not result in a significant impact to operational noise.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Threshold 6.2 Would the Project generate excessive groundborne vibration or groundborne noise levels?

Construction

Increases in groundborne vibration levels attributable to the project would be primarily associated with 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. Ground vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. The effect on buildings located in the vicinity of the construction site often varies depending on soil type, ground strata, and construction characteristics of the receiver building(s). The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration at moderate levels, to slight damage at the highest levels. Groundborne vibrations from construction activities rarely reach levels that damage structures.

The types of construction vibration impacts include human annoyance and building damage. 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. Ordinary buildings that are not particularly fragile would not experience cosmetic damage (e.g., plaster cracks) at distances beyond 30 feet. This distance can vary substantially depending on soil composition and underground geological layer between vibration source and receiver.

The FTA has published standard vibration velocities for construction equipment operations. In general, depending on the building category of the nearest buildings adjacent to the potential pile driving area, the potential construction vibration damage criteria vary. For example, for a building constructed with reinforced concrete with no plaster, the FTA guidelines show that a vibration level of up to 0.50 inch per second (in/sec) peak particle velocity (PPV) is considered safe and would not result in any construction vibration damage. The City of San José General Plan Policy EC-2.3 includes a vibration limit of 0.08 in/sec PPV for sensitive historic structures and 0.20 in/sec PPV for normal conventional construction. The surrounding structures are not listed as historical resources. Therefore, the 0.20 in/sec PPV threshold could be utilized.

Table 16: Typical Construction Equipment Vibration Levels, lists vibration levels at 25 feet, 50 feet, and 75 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 16, 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. The nearest structure is approximately 75 feet from the active construction zone. The nearest sensitive receptor is approximately 75 feet from the active construction zone and would not experience perceptible vibration levels.

Table 16: Typical Construction Equipment Vibration Levels

Equipment	Peak Particle Velocity At 25 feet (in/sec)	Peak Particle Velocity At 50 feet (in/sec)	Peak Particle Velocity At 75 feet (in/sec)
Large Bulldozer	0.089	0.032	0.017
Loaded Trucks	0.089	0.032	0.017
Rock Breaker	0.076	0.027	0.015
Jackhammer	0.035	0.012	0.007
Small Bulldozer/Tractors	0.003	0.001	0.001
1. 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, 2018; D = the distance from the equipment to the receiver.			
Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018.			

As shown in Table 16, the highest vibration levels are achieved with the large bulldozer operations. This construction activity is expected to take place during grading. Project construction would not be closer than 75 feet from the closest structure. Therefore, construction equipment vibration velocities would not exceed the FTA's 0.20 PPV threshold. In general, other construction activities would occur throughout the project site and would not be concentrated at the point closest to the nearest structure. Therefore, vibration impacts associated with the project would be less than significant.

Operations

The project would not generate groundborne vibration that could be felt at surrounding uses. Project operations would not involve railroads or substantial heavy truck operations, and therefore would not result in vibration impacts at surrounding uses. As a result, impacts from vibration associated with project operation would be less than significant.

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 nearest airport to the project site is the Norman Y. Mineta San José International Airport located approximately 2.7 miles southwest of the project site. The project site lies outside of the 65 dBA CNEL noise contours shown in the Norman Y. Mineta San José International Airport Master Plan Update Project report published in October 2019.[5] Although aircraft-related noise would occasionally be audible at the project site, noise from aircraft would not substantially increase ambient noise levels. Exterior noise levels resulting from aircraft would be compatible with the proposed project. Therefore, the project would not expose people residing or working in the project area to excessive airport- or airstrip-related noise levels and no mitigation is required.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

6.2 CUMULATIVE NOISE IMPACTS

Noise by definition is a localized phenomenon, and drastically reduces as distance from the source increases. Cumulative noise impacts involve development of the project in combination with ambient growth and other related development projects. As noise levels decrease as distance from the source increases, only projects in the nearby area could combine with the project to potentially result in cumulative noise impacts.

Cumulative Construction Noise

The project would contribute to other proximate construction noise impacts if construction activities were conducted concurrently. However, based on the noise analysis, the project's construction-related noise impacts would be less than significant. Additionally, the project would include PDFs that would further minimize construction noise. As such, the project would not result in a cumulatively considerable construction noise impact.

Cumulative Operational Noise

Cumulative noise impacts describe how much noise levels are projected to increase over existing conditions with the development of the project and other foreseeable projects. Cumulative noise impacts would occur primarily as a result of increased traffic on local roadways due to buildout of the project and other projects in the vicinity. However, noise from generators and other stationary sources could also generate cumulative noise levels.

Stationary Noise

As discussed above, impacts from the project's operations would be less than significant. Due to site distance, intervening land uses, and the fact that noise dissipates as it travels away from its source, noise impacts from on-site activities and other stationary sources would be limited to the project site and

5 City of San José Norman Y. Mineta San Jose International Airport Master Plan Update, *Noise Assessment for the Master Plan Environmental Impact Report,* October 2019.

vicinity. No known past, present, or reasonably foreseeable projects would compound or increase the operational noise levels generated by the project. Thus, cumulative operational noise impacts from related projects, in conjunction with project-specific noise impacts, would not be cumulatively significant.

Traffic Noise

A project's contribution to a cumulative traffic noise increase would be considered significant when the combined effect exceeds perception level (i.e., auditory level increase) threshold. Cumulative increases in traffic noise levels were estimated by comparing the Existing Plus Project and Background scenarios to existing conditions.

The following criteria is used to evaluate the combined effect of the cumulative noise increase.

- Combined Effect. The cumulative with project noise level ("Background With Project") would cause a significant cumulative impact if a 3.0 dB increase over "Existing" conditions occurs and the resulting noise level exceeds the applicable exterior standard at a sensitive use. Although there may be a significant noise increase due to the project in combination with other related projects (combined effects), it must also be demonstrated that the project has an incremental effect. In other words, a significant portion of the noise increase must be due to the project.

The following criteria have been used to evaluate the incremental effect of the cumulative noise increase.

- Incremental Effects. The "Background With Project" causes a 1.0 dBA increase in noise over the "Background Without Project" noise level.

A significant impact would result only if both the combined and incremental effects criteria have been exceeded. Noise by definition is a localized phenomenon and reduces as distance from the source increases. Consequently, only the project and growth due to occur in the general area would contribute to cumulative noise impacts. Table 17: Cumulative Plus Project Conditions Predicted Traffic Noise Levels, identifies the traffic noise effects along roadway segments in the vicinity of the project site for "Existing," "Background Without Project," and "Background With Project," conditions, including incremental and net cumulative impacts.

First, it must be determined whether the "Background With Project" increase above existing conditions (Combined Effects) is exceeded. As indicated in the table, the project has no street segments that exceed the combined effects criterion. As shown in Table 17 below, under the combined effects criteria, the existing conditions would have the same dBA as compared to Background conditions, except for Lundy Avenue where the existing conditions have lower dBA. Therefore, it would not result in an overall increase in noise levels for all roadway segments. Under the Incremental Effects criteria, cumulative noise impacts are defined by determining if the forecast ambient ("Background Without Project") noise level is increased by 1 dB or more. As indicated below, the project does not exceed the Incremental Effects criteria for any roadway segment analyzed.

Therefore, the project's cumulative noise contribution would be less than significant. Based on the significance criteria set forth in this Report, no roadway segments would result in significant impacts because they would not exceed the City's threshold for noise at nearby sensitive receptors. The project would not result in long-term mobile noise impacts based on project-generated traffic as well as cumulative and incremental noise levels. Therefore, the project, in combination with cumulative background traffic noise levels, would result in a less than significant cumulative impact. The project's contribution to noise levels would not be cumulatively considerable.

Table 17: Cumulative Plus Project Conditions Predicted Traffic Noise Levels

Roadway Segment	Existing[1]	Background Without Project[1]	Background With Project[1]	Combined Effects: dBA Difference: Existing and Background With Project	Incremental Effects: dBA Difference: Background Without and With Project	Cumulatively Significant Impact?
Qume Drive						
Commerce to Fortune	57.7	57.7	59.5	1.8	1.8	No
Commerce Drive						
Lundy to Qume	54.2	54.2	56.5	2.3	2.3	No
Concourse Drive						
Lundy to Qume	58.0	58.0	59.9	1.9	1.9	No
Fortune Drive						
Lundy to Qume	59.4	59.4	61.0	1.6	1.6	No
Lundy Avenue						
Trade Zone to Murphy	68.0	68.2	69.2	1.2	1.0	No
ADT = average daily trips; dBA = A-weighted decibels; DNL= day-night noise levels						
1. Traffic noise levels are at 100 feet from the roadway centerline. The actual sound level at any receptor location is dependent upon such factors as the source-to-receptor distance and the presence of intervening structures, barriers, and topography.						
Source: Based on data from the Transportation Analysis (Kimley-Horn, 2022). Refer to Appendix A for traffic noise modeling assumptions and results.						

7 REFERENCES

1. California Department of Transportation, *California Vehicle Noise Emission Levels*, 1987.
2. California Department of Transportation, *Traffic Noise Analysis Protocol*, 2011.
3. California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, 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 San José, *Envision San José 2040 General Plan FEIR*, 2011.
7. City of San José, *Municipal Code*, 2019.
8. City of San José Norman Y. Mineta San Jose International Airport Master Plan Update, *Noise Assessment for the Master Plan Environmental Impact Report,* October 2019.
9. Cyril M. Harris, *Handbook of Noise Control*, Second Edition, 1979.
10. Cyril M. Harris, *Noise Control in Buildings – A Practical Guide for Architects and Engineers*, 1994.
11. Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden. *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, July 6, 2010.
12. Kariel, H. G., *Noise in Rural Recreational Environments*, Canadian Acoustics 19(5), 3-10, 1991.
13. Federal Highway Administration, *Roadway Construction Noise Model*, 2006.
14. Federal Highway Administration, Roadway *Construction Noise Model User's Guide Final Report*, 2006.
15. Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, 1992.
16. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.
17. Kimley-Horn & Associates, *Qume and Commerce Development Transportation Analysis*, February 2022.
18. United States Environmental Protection Agency, *Protective Noise Levels (EPA 550/9-79-100)*, 1979.

Appendix A

Noise Data

Noise Measurement Field Data

Project:	Qume & Commerce	**Job Number:**	
Site No.:	Short Term Site 1	**Date:**	11/10/2021
Analyst:	Sophie LaHerran	**Time:**	1:19 PM
Location:	Flickinger Ave between Flickinger Ct and Flickinger Way		
Noise Sources:	Traffic, Cars, Railroad		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	57.0	40.4	70.5	96.7

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

Weather	
Temp. (degrees F):	68
Wind (mph):	7
Sky:	Clear
Bar. Pressure:	30.24"
Humidity:	55%

Photo:

Kimley»Horn

Measurement Report

Report Summary

Meter's File Name	LxT_Data.086.s	Computer's File Name	LxTse_0006073-20211110 131950-LxT_Data.086.ldbin
Meter	LxT SE 0006073		
Firmware	2.404		
User		Location	
Job Description			
Note			

Start Time	2021-11-10 13:19:50	Duration	0:10:00.0		
End Time	2021-11-10 13:29:50	Run Time	0:10:00.0	Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	57.0 dB		
LAE	84.8 dB	SEA	--- dB
EA	33.4 µPa²h		
LA_{peak}	96.7 dB	2021-11-10 13:28:30	
LAS_{max}	70.5 dB	2021-11-10 13:27:39	
LAS_{min}	40.4 dB	2021-11-10 13:23:56	
LA_{eq}	57.0 dB		
LC_{eq}	65.3 dB	LC_{eq} - LA_{eq}	8.3 dB
LAI_{eq}	62.4 dB	LAI_{eq} - LA_{eq}	5.4 dB

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight	
	57.0 dB	57.0 dB	0.0 dB	
	LDEN	**LDay**	**LEve**	**LNight**
	57.0 dB	57.0 dB	--- dB	--- dB

Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	57.0 dB		65.3 dB		--- dB	
$Ls_{(max)}$	70.5 dB	2021-11-10 13:27:39	--- dB		--- dB	
$LS_{(min)}$	40.4 dB	2021-11-10 13:23:56	--- dB		--- dB	
$L_{Peak(max)}$	96.7 dB	2021-11-10 13:28:30	--- dB		--- dB	

Overloads	Count	Duration	OBA Count	OBA Duration
	0	0:00:00.0	0	0:00:00.0

Statistics

LAS 5.0	64.1 dB
LAS 10.0	60.3 dB
LAS 33.3	54.2 dB
LAS 50.0	51.6 dB
LAS 66.6	49.3 dB
LAS 90.0	45.9 dB

Noise Measurement Field Data

Project:	Qume & Commerce	**Job Number:**	
Site No.:	Short Term Site 2	**Date:**	11/10/2021
Analyst:	Sophie LaHerran	**Time:**	1:01 PM
Location:	2380 Qume Drive		
Noise Sources:	Traffic, Noise		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	61.9	46.9	80.0	96.3

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

Weather	
Temp. (degrees F):	68
Wind (mph):	7
Sky:	Clear
Bar. Pressure:	30.24"
Humidity:	55%

Photo:

Kimley»Horn

Measurement Report

Report Summary

Meter's File Name	LxT_Data.085.s	Computer's File Name	LxTse_0006073-20211110 130149-LxT_Data.085.ldbin
Meter	LxT SE 0006073		
Firmware	2.404		
User		Location	
Job Description			
Note			

Start Time	2021-11-10 13:01:49	Duration	0:10:00.0		
End Time	2021-11-10 13:11:49	Run Time	0:10:00.0	Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	61.9 dB		
LAE	89.6 dB	SEA	--- dB
EA	102.1 µPa²h		
LA_{peak}	96.3 dB	2021-11-10 13:04:44	
LAS_{max}	80.0 dB	2021-11-10 13:04:44	
LAS_{min}	46.9 dB	2021-11-10 13:03:30	
LA_{eq}	61.9 dB		
LC_{eq}	68.7 dB	LC_{eq} - LA_{eq}	6.8 dB
LAI_{eq}	65.8 dB	LAI_{eq} - LA_{eq}	3.9 dB

Exceedances

	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
61.9 dB	61.9 dB	0.0 dB	
LDEN	**LDay**	**LEve**	**LNight**
61.9 dB	61.9 dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	61.9 dB		68.7 dB		--- dB	
$Ls_{(max)}$	80.0 dB	2021-11-10 13:04:44	--- dB		--- dB	
$LS_{(min)}$	46.9 dB	2021-11-10 13:03:30	--- dB		--- dB	
$L_{Peak(max)}$	96.3 dB	2021-11-10 13:04:44	--- dB		--- dB	

Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

Statistics

LAS 5.0	66.7 dB
LAS 10.0	64.4 dB
LAS 33.3	59.7 dB
LAS 50.0	57.1 dB
LAS 66.6	54.1 dB
LAS 90.0	50.5 dB

Noise Measurement Field Data

Project:	Qume & Commerce	**Job Number:**	
Site No.:	Short Term Site 3	**Date:**	11/10/2021
Analyst:	Sophie LaHerran	**Time:**	12:48 PM
Location:	2155-2149 Commerce Dr		
Noise Sources:	Traffic, Cars		
Comments:			

Results (dBA):

	Leq:	**Lmin:**	**Lmax:**	**Peak:**
Measurement 1:	58.3	46.6	75.7	98.9

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

Weather	
Temp. (degrees F):	68
Wind (mph):	7
Sky:	Clear
Bar. Pressure:	30.24"
Humidity:	55%

Photo:

Kimley»Horn

Measurement Report

Report Summary

Meter's File Name	LxT_Data.084.s	Computer's File Name	LxTse_0006073-20211110 124822-LxT_Data.084.ldbin
Meter	LxT SE 0006073		
Firmware	2.404		
User		Location	
Job Description			
Note			

Start Time	2021-11-10 12:48:22	Duration	0:10:00.0		
End Time	2021-11-10 12:58:22	Run Time	0:10:00.0	Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	58.3 dB		
LAE	86.1 dB	SEA	--- dB
EA	45.3 µPa²h		
LA_{peak}	98.9 dB	2021-11-10 12:48:23	
LAS_{max}	75.7 dB	2021-11-10 12:48:22	
LAS_{min}	46.6 dB	2021-11-10 12:49:19	
LA_{eq}	58.3 dB		
LC_{eq}	68.4 dB	LC_{eq} - LA_{eq}	10.1 dB
LAI_{eq}	63.6 dB	LAI_{eq} - LA_{eq}	5.3 dB

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight	
	58.3 dB	58.3 dB	0.0 dB	
	LDEN	**LDay**	**LEve**	**LNight**
	58.3 dB	58.3 dB	--- dB	--- dB

Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	58.3 dB		68.4 dB		--- dB	
$Ls_{(max)}$	75.7 dB	2021-11-10 12:48:22	--- dB		--- dB	
$LS_{(min)}$	46.6 dB	2021-11-10 12:49:19	--- dB		--- dB	
$L_{Peak(max)}$	98.9 dB	2021-11-10 12:48:23	--- dB		--- dB	

Overloads	Count	Duration	OBA Count	OBA Duration
	0	0:00:00.0	0	0:00:00.0

Statistics

LAS 5.0	63.8 dB
LAS 10.0	61.7 dB
LAS 33.3	57.4 dB
LAS 50.0	55.3 dB
LAS 66.6	53.5 dB
LAS 90.0	50.7 dB

Noise Measurement Field Data

Project:	Qume & Commerece	**Job Number:**	
Site No.:	Short Term Site 4	**Date:**	11/10/2021
Analyst:	Sophie LaHerran	**Time:**	12:29 PM
Location:	Corner of McKay Dr and Automation Pkwy		
Noise Sources:	Traffic, Cars Noise		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	65.1	43.9	79.6	102.6

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

Weather	
Temp. (degrees F):	68
Wind (mph):	7
Sky:	Clear
Bar. Pressure:	30.24"
Humidity:	55%

Photo:

Kimley»Horn

Measurement Report

Report Summary

Meter's File Name	LxT_Data.083.s	Computer's File Name	LxTse_0006073-20211110 122939-LxT_Data.083.ldbin
Meter	LxT SE 0006073		
Firmware	2.404		
User		Location	
Job Description			
Note			

Start Time	2021-11-10 12:29:39	Duration	0:10:00.0		
End Time	2021-11-10 12:39:39	Run Time	0:10:00.0	Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	61.5 dB		
LAE	89.3 dB	SEA	--- dB
EA	94.6 µPa²h		
LA_{peak}	102.6 dB	2021-11-10 12:31:52	
LAS_{max}	79.6 dB	2021-11-10 12:31:37	
LAS_{min}	43.9 dB	2021-11-10 12:38:31	
LA_{eq}	61.5 dB		
LC_{eq}	72.3 dB	LC_{eq} - LA_{eq}	10.8 dB
LAI_{eq}	67.4 dB	LAI_{eq} - LA_{eq}	5.9 dB

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight	
	61.5 dB	61.5 dB	0.0 dB	
	LDEN	LDay	LEve	LNight
	61.5 dB	61.5 dB	--- dB	--- dB

Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	61.5 dB		72.3 dB		--- dB	
$Ls_{(max)}$	79.6 dB	2021-11-10 12:31:37	--- dB		--- dB	
$LS_{(min)}$	43.9 dB	2021-11-10 12:38:31	--- dB		--- dB	
$L_{Peak(max)}$	102.6 dB	2021-11-10 12:31:52	--- dB		--- dB	

Overloads	Count	Duration	OBA Count	OBA Duration
	0	0:00:00.0	0	0:00:00.0

Statistics

LAS 5.0	66.4 dB
LAS 10.0	62.6 dB
LAS 33.3	56.7 dB
LAS 50.0	55.0 dB
LAS 66.6	53.7 dB
LAS 90.0	49.7 dB

Noise Measurement Field Data

Project:	Qume & Commerce	**Job Number:**	
Site No.:	Long Term Site 1	**Date:**	11/10/2021
Analyst:	Sophie LaHerran	**Time:**	1:43 PM
Location:	Intersection of Flickinger Ave and Flickinger Way		
Noise Sources:	Cras, Traffic, Railroad		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	52.5	36.7	81.0	104.4

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

Weather	
Temp. (degrees F):	68
Wind (mph):	7
Sky:	Clear
Bar. Pressure:	30.24"
Humidity:	55%

Photo:

Kimley»Horn

Measurement Report

Report Summary

Meter's File Name	LxT_Data.087.s	Computer's File Name	LxTse_0006073-20211110 134326-LxT_Data.087.ldbin
Meter	LxT SE 0006073		
Firmware	2.404		
User		Location	
Job Description			
Note			

Start Time	2021-11-10 13:43:26	Duration	25:54:07.1		
End Time	2021-11-11 15:37:33	Run Time	25:54:07.1	Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	52.5 dB		
LAE	102.2 dB	SEA	--- dB
EA	1.9 mPa²h		
LA_{peak}	104.4 dB	2021-11-10 13:43:33	
LAS_{max}	81.0 dB	2021-11-11 12:42:52	
LAS_{min}	36.7 dB	2021-11-11 12:12:48	
LA_{eq}	52.5 dB		
LC_{eq}	62.5 dB	LC_{eq} - LA_{eq}	10.0 dB
LAI_{eq}	55.5 dB	LAI_{eq} - LA_{eq}	2.9 dB

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight	
	55.9 dB	53.8 dB	0.0 dB	
	LDEN	LDay	LEve	LNight
	56.3 dB	54.2 dB	50.8 dB	48.1 dB

Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	52.5 dB		62.5 dB		--- dB	
$Ls_{(max)}$	81.0 dB	2021-11-11 12:42:52	--- dB		--- dB	
$LS_{(min)}$	36.7 dB	2021-11-11 12:12:48	--- dB		--- dB	
$L_{Peak(max)}$	104.4 dB	2021-11-10 13:43:33	--- dB		--- dB	

Overloads	Count	Duration	OBA Count	OBA Duration
	0	0:00:00.0	0	0:00:00.0

Statistics

LAS 5.0	57.3 dB
LAS 10.0	54.8 dB
LAS 33.3	49.0 dB
LAS 50.0	45.8 dB
LAS 66.6	44.0 dB
LAS 90.0	41.9 dB

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

Project Name: Qume and Commerce
Project Number:
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	Qume Drive	Commerce to Fortune	2	12	2,200	35	0	5.7%	4.4%	57.7	-	-	59	187
2	Commerce Drive	Lundy to Qume	2	12	980	35	0	5.7%	4.4%	54.2	-	-	-	83
3	Concourse Drive	Lundy to Qume	2	23	2,340	35	0	5.7%	4.4%	58.0	-	-	63	200
4	Fortune Drive	Lundy to Qume	2	12	3,280	35	0	5.7%	4.4%	59.4	-	-	88	278
5	Lundy Avenue	Trade Zone to Murphy	4	6	18,380	40	0	5.7%	4.4%	68.0	63	198	626	1,979

[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: Qume and Commerce
Project Number:
Scenario: Existing 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	Qume Drive	Commerce to Fortune	2	12	2,860	35	0	5.7%	4.4%	58.8	-	-	77	243
2	Commerce Drive	Lundy to Qume	2	12	1,440	35	0	5.7%	4.4%	55.9	-	-	39	122
3	Concourse Drive	Lundy to Qume	2	23	3,110	35	0	5.7%	4.4%	59.2	-	-	84	266
4	Fortune Drive	Lundy to Qume	2	12	4,030	35	0	5.7%	4.4%	60.3	-	-	108	342
6	Lundy Avenue	Trade Zone to Murphy	4	6	19,980	40	0	5.7%	4.4%	68.3	68	215	680	2,151

[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: Qume and Commerce
Project Number:
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	Qume Drive	Commerce to Fortune	2	12	2,210	35	0	5.7%	4.4%	57.7	-	-	59	186
2	Commerce Drive	Lundy to Qume	2	12	980	35	0	5.7%	4.4%	54.2	-	-	-	83
3	Concourse Drive	Lundy to Qume	2	23	2,350	35	0	5.7%	4.4%	58.0	-	-	63	200
4	Fortune Drive	Lundy to Qume	2	12	3,300	35	0	5.7%	4.4%	59.4	-	-	88	278
5	Lundy Avenue	Trade Zone to Murphy	4	6	19,580	40	0	5.7%	4.4%	68.2	66	210	663	2,095

[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: Qume and Commerce
Project Number:
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	Qume Drive	Commerce to Fortune	2	12	2,870	35	0	6.1%	5.7%	59.5	-	-	89	282
2	Commerce Drive	Lundy to Qume	2	12	1,440	35	0	6.1%	5.7%	56.5	-	-	45	141
3	Concourse Drive	Lundy to Qume	2	23	3,120	35	0	6.1%	5.7%	59.9	-	-	98	309
4	Fortune Drive	Lundy to Qume	2	12	4,050	35	0	6.1%	5.7%	61.0	-	40	126	398
5	Lundy Avenue	Trade Zone to Murphy	4	6	21,180	40	0	6.1%	5.7%	69.2	82	261	825	2,608

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 12/7/2021
Case Description: Building Construction

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
MU Residential E	Residential	57	57	57

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	480	0
Crane	No	16		80.6	480	0
Generator	No	50		80.6	480	0
Welder / Torch	No	40		74	480	0
Tractor	No	40	84		480	0
Backhoe	No	40		77.6	480	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator		61.1	57.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane		60.9	52.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator		61	58	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch		54.4	50.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		64.4	60.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe		57.9	53.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	64.4	64.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial W	Industrial	61.9	61.9	61.9

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	275	0
Crane	No	16		80.6	275	0
Generator	No	50		80.6	275	0
Welder / Torch	No	40		74	275	0
Tractor	No	40	84		275	0
Backhoe	No	40		77.6	275	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator		65.9	61.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane		65.7	57.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator		65.8	62.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch		59.2	55.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		69.2	65.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe		62.8	58.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	69.2	69.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 12/7/2021
Case Description: Demolition

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
MU Residential E	Residential	57	57	57

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	480	0
Excavator	No	40		80.7	480	0
Dozer	No	40		81.7	480	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw		69.9	62.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator		61.1	57.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		62	58	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	69.9	64.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial W	Industrial	61.9	61.9	61.9

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	275	0
Excavator	No	40		80.7	275	0
Dozer	No	40		81.7	275	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw		74.8	67.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator		65.9	61.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		66.9	62.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	74.8	69.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 12/8/2021
Case Description: Grading

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
MU Residential E	Residential	57	57	57

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	480	0
Grader	No	40	85		480	0
Dozer	No	40		81.7	480	0
Scraper	No	40		83.6	480	0
Backhoe	No	40		77.6	480	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator		61.1	57.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		65.4	61.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		62	58	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper		63.9	60	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe		57.9	53.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	65.4	65.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial W	Industrial	61.9	61.9	61.9

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	275	0
Grader	No	40	85		275	0
Dozer	No	40		81.7	275	0
Scraper	No	40		83.6	275	0
Backhoe	No	40		77.6	275	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator		65.9	61.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		70.2	66.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		66.9	62.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper		68.8	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe		62.8	58.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	70.2	70.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 12/7/2021
Case Description: Paving

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
MU Residential E	Residential	57	57	57

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	480	0
Paver	No	50		77.2	480	0
Roller	No	20		80	480	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator		61.1	57.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		57.6	54.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller		60.4	53.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	61.1	60.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial W	Industrial	61.9	61.9	61.9

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	275	0
Paver	No	50		77.2	275	0
Roller	No	20		80	275	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator		65.9	61.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		62.4	59.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller		65.2	58.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	65.9	64.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 12/7/2021
Case Description: Site Preparation

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
MU Residential E	Residential	57	57	57

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	480	0
Tractor	No	40	84		480	0
Backhoe	No	40		77.6	480	0

				Results											
		Calculated (dBA)				Noise Limits (dBA)						Noise Limit Exceedance (dBA)			
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		62	58	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		64.4	60.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe		57.9	53.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	64.4	63	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Industrial W	Industrial	61.9	61.9	61.9

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	275	0
Tractor	No	40	84		275	0
Backhoe	No	40		77.6	275	0

				Results											
		Calculated (dBA)				Noise Limits (dBA)						Noise Limit Exceedance (dBA)			
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		74.8	67.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		65.9	61.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe		66.9	62.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	74.8	69.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.