Appendix D: Noise Technical Report

Acoustical Assessment

Mountain Winery Annexation Project
City of Saratoga

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Appendix A: Noise Data

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 Mountain Winery Annexation 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 Mountain Winery is located at 14831 Pierce Road in the City of Saratoga and unincorporated Santa Clara County in California. *Figure 1: Regional Vicinity* and *Figure 2: Project Location*, depict the Project site in a regional and local context. The Mountain Winery is located on three contiguous parcels: APN 503-46-005 (-005), 503-46-006 (-006) and 503-46-007 (-007). The three parcels total approximately 430 acres. The Santa Cruz Mountains are located to the west of the City and unincorporated areas of Santa Clara County border the City to the west.

Land uses surrounding the west, north, and south of the Project site include predominantly undeveloped hillside parcels. Low density single-family residential neighborhoods are located to the east of the project site. South, north, and west of the Project site are scattered residential uses and wineries or other event centers.

1.2 PROJECT DESCRIPTION

The site plan for the Project is depicted on *Figure 2*. The new General Plan land use designation (RC) and the new zoning district (RC) and Precise Plan would allow uses permitted under the Mountain Winery's existing County Use Permit (approved in 2000, modified in 2018) to continue, while also allowing for new uses (subject to a maximum permissible density and intensity of use established by the Precise Plan). Uses currently permitted under the County Use Permit include the existing Mountain Winery operations, a future wine tasting building, a future concession building, a future event building, a future storage building, a future ticket office, and a future outdoor terrace garden area. As proposed, the Project would include lodging (up to 300 hotel rooms), a second water tank, and future connections to the Cupertino Sanitary District infrastructure.

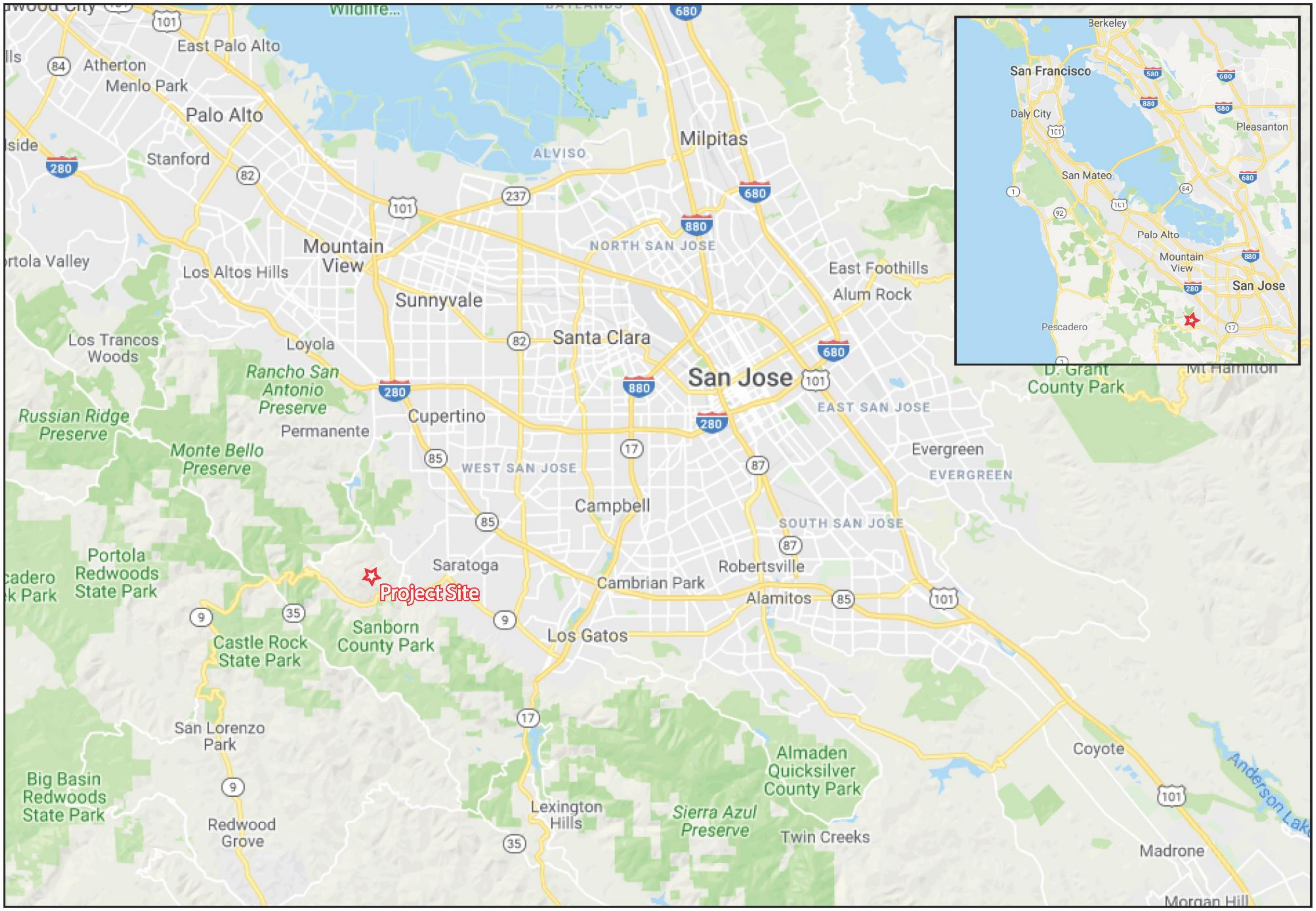
The Project site is located in unincorporated Santa Clara County and is designated in the Santa Clara County General Plan as Hillside (HS). This designation is considered to be a resource conservation area and allows for agriculture and grazing; mineral extraction; parks and low-density recreational uses and facilities; land in its natural state; wildlife refuges; very low-density residential development; and commercial industrial or institutional uses, which by their nature require remote, rural settings, or which support the recreational, or productive use, study or appreciation of the natural environment. The various parcels in the Project site are zoned Hillside-d1 District, Hillside-d1-Scenic Roads; or Hillside Residential (HR). As part of Project, a General Plan amendment would be required to establish a new land use designation that would apply to the Project site: Regional Commercial (RC). This land use designation would allow a broad range of visitor serving commercial uses with a regional orientation. The RC designation would allow indoor and outdoor recreation, dining, entertainment, meetings and special events, retreats, lodging, wineries, spas, agriculture, and other similar commercial activities and compatible uses.

As shown in the *Figure 2*, the majority of the Mountain Winery is located within the (-006) parcel limits. The potential future connection of the Mountain Winery to the Cupertino Sanitary District system would be placed within the (-005) parcel. The existing water tank that provides water to the Mountain Winery is located within the (-007) parcel.

Primary access to the Project site would be provided via Pierce Road which intersects Saratoga-Sunnyvale Road to the north and Big Basin Way (SR-9) to the south. Access from Pierce Road is provided via the main access road terminating at the parking lot at the top of the Mountain Winery. Access to the Project site would continue to be provided via the main access road and Pierce Road. The existing parking lots would remain unaltered, and on-site circulation would not be changed. Should the maximum uses allowed under the project be implemented, internal circulation roads may be constructed to provide access to the new buildings.

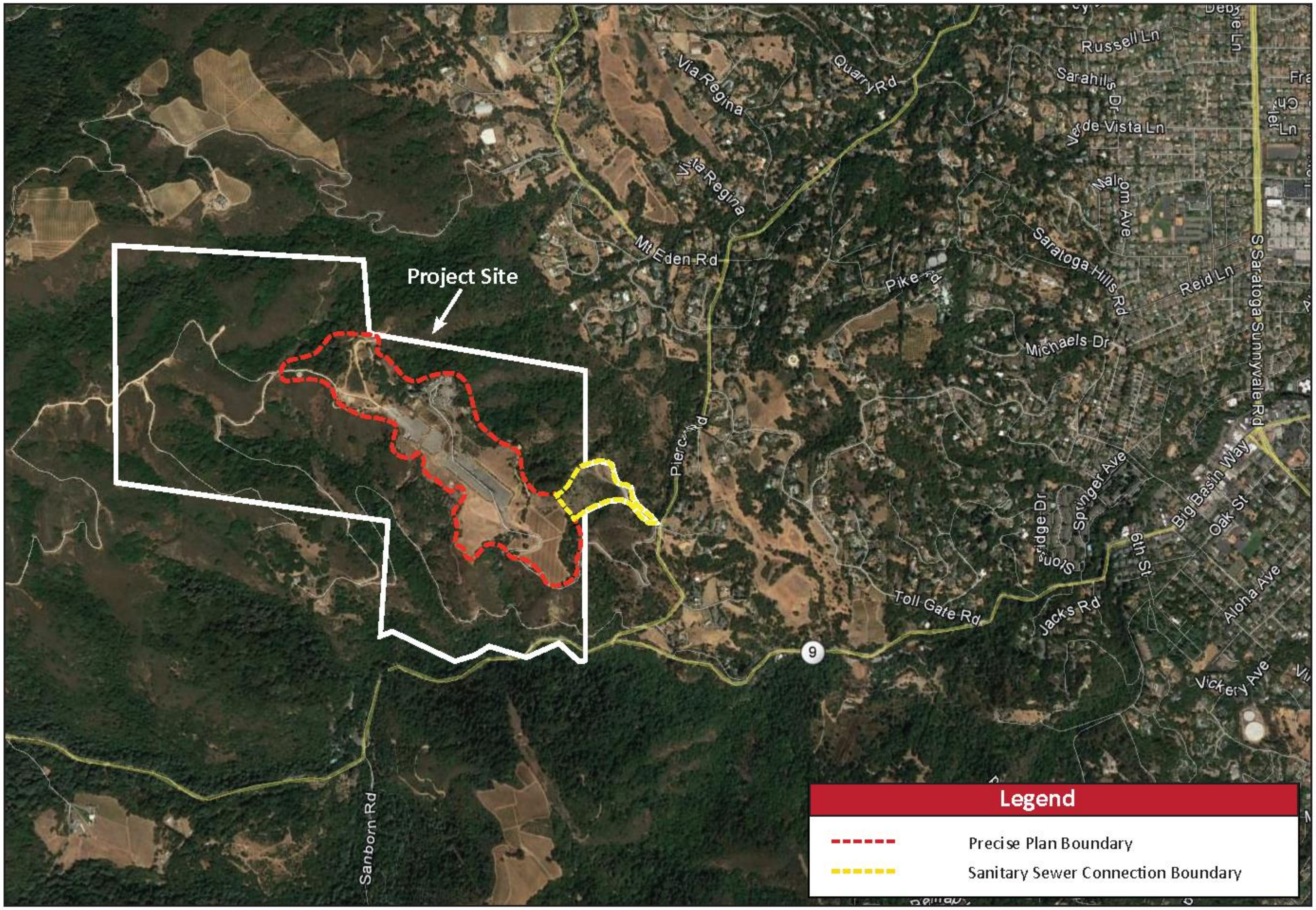
Construction is anticipated to begin in summer 2020 and last approximately 18 months. The Mountain Winery would remain open during construction; however, there may be temporary closures in the parking area. Construction methods would include excavator trenching, pipe, valve and fitting installation, backfill and compaction of native fill. Construction of the Project would be required to be consistent with the City's Best Management Practices and California Building Code.

Figure 1: Regional Vicinity



Source: Google Earth, 2018.

Figure 2: Project Location



Source: Google Maps, 2019.

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 1: Typical Noise Levels* provides typical noise levels.

Table 1: Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	– 110 –	Rock Band
Jet fly-over at 1,000 feet		
	– 100 –	
Gas lawnmower at 3 feet		
	– 90 –	
Diesel truck at 50 feet at 50 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}) is the average noise level averaged over the measurement period, while the day-night noise level (L_{dn}) and Community Equivalent Noise Level (CNEL) are measures of energy average during a 24-hour period, with dB weighted sound levels from 7:00 p.m. to 7:00 a.m. Most commonly, environmental sounds are described in terms of L_{eq} that has the same acoustical energy as the summation of all the time-varying events. Each is applicable to this analysis and defined in *Table 2: Definitions of Acoustical Terms*.

Table 2: Definitions of Acoustical Terms

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

The A-weighted decibel (dBA) sound level scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be 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 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

<u>Hearing Loss</u>. 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.

<u>Annoyance</u>. 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].

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

2.2 GROUNDBORNE VIBRATION

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

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

Table 3: Human Reaction and Damage to Buildings from Vibration

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

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

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.

3.1 REGIONAL

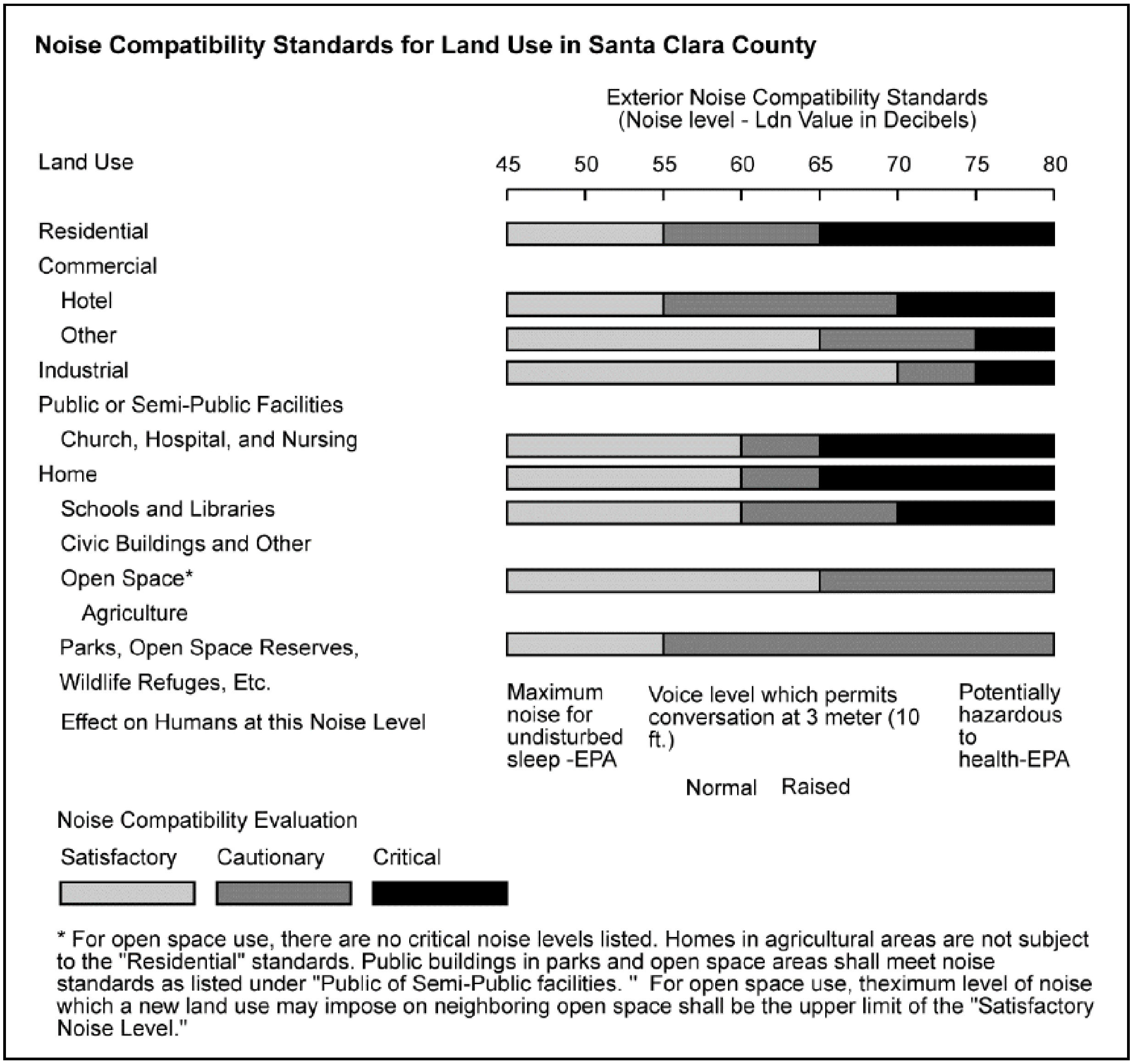
Santa Clara County General Plan

The Santa Clara County General Plan Safety Element (HS) discusses topics related to countywide public health and safety within the natural and built environments. This element includes six sections: (1) Hazardous Materials, (2) Emergency Preparedness, (3) Noise, (4) Natural Hazards, (5) Aviation Safety, and (6) Wastewater Disposal. Policies and implementation recommendations are included within each chapter to ensure the intensity of land use is aligned with estimated levels of risk, availability of services, and facilities to ensure safety. Policies and implementation recommendations most directly related to Noise are included below.

- Policy C-HS 24: Environments for all residents of Santa Clara County free from noises that jeopardize their health and well-being should be provided through measures which promote noise and land use compatibility.
- Policy C-HS 25: Noise impacts from public and private projects should be mitigated.

- Policy C-HS 26: New development in areas of noise impact (areas subject to sound levels of 55 DNL or greater) should be approved, denied, or conditioned so as to achieve a satisfactory noise level for those who will use or occupy the facility (as defined in "Figure 1: Noise Compatibility Standards for Land Use" and "Table 4: Maximum Interior Noise Levels For Intermittent Noise").

Figure 1: Noise Compatibility Standards for Land Use in Santa Clara County



Source: Santa Clara County General Plan, 1994.

Table 4: Recommended Maximum Interior Noise Levels for Intermittent Noise

Use		dBA
Residential		45
Commercial	Hotel-Motel Executive Offices, Conference Rooms Staff Offices Restaurant, Markets, Retail Stores Sales, Secretarial Sports Arena, Bowling Alley, etc.	45 55 60 60 65 75
Industrial	Offices (same as above) Laboratory Machine shop, Assembly and others Mineral Extraction	
Public or Semi-Public Facility	Concert Hall & Legitimate Theater Auditorium, Movie Theater & Church Hospital, Nursing Home & Firehouse (sleeping quarters) School Classroom Library Other Public Buildings	30 45 45 50 50 55

Source: Santa Clara County General Plan, 1994.

3.3 LOCAL

City of Saratoga General Plan

The Saratoga 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 4: Land-Use Compatibility Guidelines* highlights five land-use categories and the outdoor noise compatibility guidelines.

Table 4: Land-Use Compatibility Guidelines

Land-Use Category	Outdoor Day-Night Average Sound Level (DNL), in dB		
	Normally Acceptable[1]	Conditionally Acceptable[2]	Normally Unacceptable[3]
Residential Single-Family	Up to 60	>60 to 70	>70
Residential Multi-Family	Up to 65	>65 to 70	>70
Open Space/Parks	Up to 60	>60 to 70	>70
Commercial/Office	Up to 65	>65 to 75	>75
Public and quasi-Public Facilities	Up to 60	>60 to 65	>65

Source: City of Saratoga General Plan, 2014.

Table Notes:

Sound levels above are as measured at the exterior of the proposed location of the new development (e.g., residential unit, commercial building, etc.) rather than at the property boundary of the source or the property to be developed. Refer to Table LU-1 (Land-Use Element) for detailed descriptions of land-use categories and land-uses for which these guidelines apply. These guidelines are derived from the California Department of Health Services, Guidelines for the Preparation and Content of the Noise Element of the General Plan, 2003. The State Guidelines have been modified to reflect standards for the City of Saratoga.

[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.

Project relevant general plan goals and policies for noise are listed here:

Goal LU 5: Relate development proposals to existing and planned street capacities to avoid excessive noise, traffic, and other public safety hazards so as to protect neighborhoods. If it is determined that existing streets need to be improved to accommodate a project, such improvements shall be in place or bonded for prior to issuance of building permits.

- Policy LU 5.2: Development proposals shall be evaluated against City standards and guidelines to assure that the related traffic, noise, light, appearance, and intensity of the proposed use have limited adverse impact on the area and can be fully mitigated.
- Policy LU 5.4: Through the development review process, ensure that adjoining neighborhoods are protected from noise, light, glare and other impacts resulting from new or expanded non-residential developments.

Goal NOI 1: Maintain or reduce noise levels in the City to avoid exposure to unacceptable or harmful noise.

- Policy NOI 1.1 The City shall maintain an up-to-date Noise Element in accordance with State regulations.
- Policy NOI 1.2: The City shall use the planning and code enforcement processes to discourage activities, practices, or land uses that create or result in excessive noise exposure.
- Policy NOI 1.3: The City shall require that all City-owned and operated equipment and equipment operated under contract with the City meet City noise standards.
- Policy NOI 1.4: The City shall encourage public awareness and education of noise issues and acoustical standards as key ingredients in controlling unwanted noise and its effects on the quality of life in Saratoga.

Goal NOI 2: Promote land-use compatibility by addressing noise exposure from existing noise sources.

- Policy NOI 2.4: New office/commercial development shall be designed and constructed to reduce daytime interior noise levels in accordance with State CALGreen standards prescribing an interior noise level standard of Leq(h) 50 dB as the maximum allowable hourly average noise level during any hour of operation.

Goal NOI 3: Promote land-use compatibility by addressing noise exposure form new noise sources.

- Policy NOI 3.1: Changes in use and development shall be reviewed for noise impacts to neighboring land uses
- Policy NOI 3.2: New development shall be required to utilize appropriate measures to reduce noise impacts to the adopted noise standards; and acoustical analysis may be required by the approving authority.

City of Saratoga Municipal Code

Standards established under the Saratoga Municipal Code (SMC) are used to analyze noise impacts originating from the Project. The City's Noise Control Ordinance (Article 7-30) purpose it to maintain or reduce noise levels in the City to avoid exposure to unacceptable or harmful noise generated by equipment and/or amplified sound that is subject to regulation and control by the City; maintain and preserve the quiet residential atmosphere of the City; implement the goals and policies contained in the Noise Element of the City's General Plan by addressing noise transfer between properties; promote land use compatibility by addressing noise exposure from existing and new noise sources; and prohibit noise which disturbs the peace and quiet of a neighborhood or causes discomfort or annoyance to persons of normal sensitivities.

Table 5: Maximum Permissible Outdoor Noise Levels Generated (dBA)

Land Use	Daytime (7:00 a.m. to 7:00 p.m.)		Evening (7:00 p.m. to 10:00 p.m.)		Nighttime (10:00 p.m. to 7:00 a.m.)	
	Average L_{eq}	Maximum L_{max}	Average L_{eq}	Maximum L_{max}	Average L_{eq}	Maximum L_{max}
Residential (Single and Multi-Family)	55	65	45	55	40	50
Open Space/Parks	60	70	50	55	45	50
Commercial/Office	65	75	60	70	55	60
Public and Quasi-Public Facilities	60	70	55	60	45	50

Source: City of Saratoga Municipal Code Noise Standards (7-30.040)

Section 7-30.060 (a) limits construction to between the hours of 7:30 a.m. and 6:00 p.m. Monday through Friday and between 9:00 a.m. and 5:00 p.m. on Saturdays. Construction is not allowed on Sundays or weekday holidays unless it is a residential construction that does not require a City permit or which does not exceed 50 percent of the existing main or accessory structure. This construction is able to occur between 9:00 a.m. and 5:00 p.m. on Sundays and weekday holidays.

Gasoline powered garden tools (leaf blowers and chainsaws) may be utilized between 8:00 a.m. and 5:00 p.m. Monday through Friday and between 10:00 a.m. and 5:00 p.m. on Saturdays (7-30.060(c)). Per 7-30.070 all exhaust fans and mechanical equipment must be enclosed for the purpose of soundproofing.

4 EXISTING CONDITIONS

4.1 EXISTING NOISE SOURCES

The City of Saratoga 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 10-minute noise measurements were taken using a 3M SoundPro DL-1 Type I integrating sound level meter between 11:13 a.m. and 12:32 p.m. on July 25, 2019; refer to Appendix A for existing noise measurement data and *Figure 3: Noise Measurement Locations*. Noise Measurement 1 was taken to represent the ambient noise level on Highway 9 southwest of the Project site near existing wineries; Noise Measurement 2 was taken to represent the ambient noise level south of the Project site near the entrance of the Mountain Winery adjacent to existing single-family homes; Noise Measurement 3 and 4 were taken to represent the ambient noise level east of the site in the existing single-family neighborhoods. The primary noise sources during all four measurements was traffic on Highway 9 or other roadways and landscape equipment in the residential neighborhoods. *Table 6: Noise Measurements*, provides the ambient noise levels measured at these locations.

Table 6: Noise Measurements

Site No.	Location	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	Time
1	Highway 9 turnout	62.2	42.3	73.4	11:13 a.m.
2	Vintage Lane and Pierce Road	55.3	33.2	70.2	11:34 a.m.
3	Heber Way and Teerlink Way	52.0	38.8	63.7	12:14 p.m.
4	Albar Court and Damon Lane	39.4	29.9	52.8	12:32 p.m.
Source: Noise Measurements taken by Kimley-Horn on July 25, 2019.					

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 Traffic Impact Analysis (Kimley-Horn 2019). The noise prediction model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, and site environmental conditions. The average vehicle noise rates (also referred to as energy rates) used in the FHWA model have been modified to reflect average vehicle noise rates identified for California by 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 7: Existing Traffic Noise*.

Table 7: Existing Traffic Noise

Roadway Segment	ADT	dBA Ldn[1]
Sunnyvale-Saratoga Road		
North of Pierce Road	23,050	65.1

Pierce Road		
Project Driveway to Sunnyvale-Saratoga Road	800	47.0
Project Driveway to Highway 9	670	46.2
Highway 9		
West of Toll Gate Road	2,790	53.8
East of Toll Gate Road	3,540	53.4
South of Los-Gatos Saratoga Road	13,750	59.5
Los Gatos-Saratoga Road		
South of Highway 9	8,670	60.7
ADT = average daily trips; dBA = A-weighted decibels; Ldn = day-night noise level		
[1] Traffic noise levels are at 100 feet from the roadway centerline.		
Source: Based on traffic data provided by Kimley-Horn, 2019. Refer to Appendix A for traffic noise modeling assumptions and results.		

The Project site is primarily surrounded by rural landscape. Residential uses exist west and to the south of the Project site. The existing mobile noise in the Project area are generated along Highway 9 and Pierce Road which are south and east 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 south and east of the site. The noise associated with these sources may represent a single-event noise occurrence, short-term noise, or long-term/continuous noise.

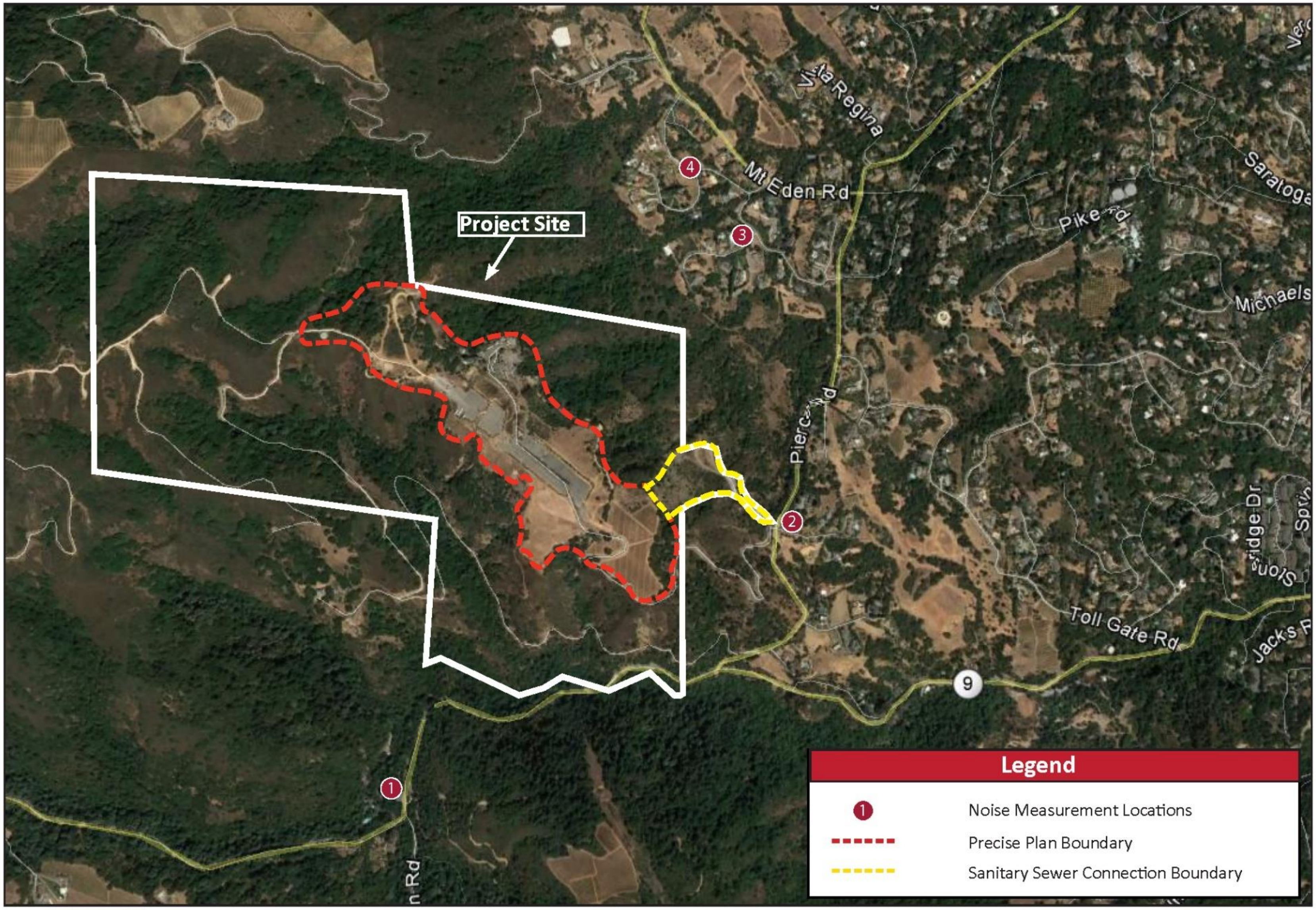
4.2 SENSITIVE RECEPTORS

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 8: Sensitive Receptors**Error! Reference source not found.***, sensitive receptors near the Project site include single-family residences adjacent to the eastern boundary, approximately 200 feet from the Sanitary Sewer Connection construction area and approximately 1,000 feet from the Precise Plan area. The distances shown in *Table 8*, include distances from the Precise Plan area and Sanitary Sewer Connection area to the nearest sensitive receptor. It should be noted that the Sanitary Sewer Connection improvement would occur outside of the Precise Plan area. The noise generated is further discussed below in Section 16.5.3, *Impacts of the Project*. Single-family residential communities are located surrounding the project site. Majority of the single-family residences are located more than 1,500 feet from the Precise Plan area.

Table 8: Sensitive Receptors

Receptor Description	Distance and Direction from the Precise Plan Area	From Sanitary Sewer Connection Area
Single-family residential	1,000 feet east	200 feet east
Single-family residential	1,100 feet southeast	1,150 feet southeast
Single-family residential	1,500 feet east	1,450 feet east
Single-family residential	1,600 feet west	2,760 feet west
Single-family residential	2,000 feet north	4,800 feet northwest
Winery and Event Center	2,400 feet southwest	3,500 feet southwest
St. Nicholas Orthodox Church	1.2 miles east	1.1 miles east
Saratoga Elementary School	1.4 miles east	1.3 miles east
The Home of Christ Church in Saratoga	1.4 miles southeast	1.3 miles southeast
Saratoga Quarry Park	0.6 miles southeast	0.6 miles southeast
Wildwood Park	1.25 miles east	1.1 miles east

Figure 3: Noise Measurement Locations



Source: Google Earth, 2018.

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:

- Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Generate excessive groundborne vibration or groundborne noise levels; and
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels.

5.2 METHODOLOGY

Construction noise estimates are based upon noise levels from the Federal Highway Administration (FHWA) Roadway Construction Noise Model (FHWA-HEP-05-054) as well as the distance to nearby receptors. Reference noise levels from FHWA 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.

This analysis of the existing and future noise environments is based on noise prediction modeling and empirical observations. Predicted construction noise levels were based on typical noise levels generated by construction equipment. The traffic noise levels in the Project vicinity were calculated using the FHWA Highway Noise Prediction Model (FHWA-RD-77-108).

Groundborne vibration levels associated with construction-related activities for the Project were evaluated utilizing typical groundborne vibration levels associated with construction equipment, obtained from Federal Transit Administration (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

Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g. land clearing, grading, excavation, paving). Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. During construction, exterior noise levels could affect the residential neighborhoods surrounding the construction site. The nearest construction would be for the Sanitary Sewer Connection. Project construction would occur approximately 200 feet from existing single-family residences to the east across Pierce Road. However, construction activities would occur throughout the Project site and would not be concentrated at a single point near sensitive receptors. The construction of the lodging and ancillary uses would occur at least 1,000 feet from the nearest sensitive receptors. Noise levels typically attenuate (or drop off) at a rate of 6 dB per doubling of distance from point sources, such as industrial machinery. During construction, exterior noise levels could affect the residential neighborhoods near the construction site.

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. It should be noted that 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. According to the applicant, no pile-driving would be required during construction.

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

Table 9: Typical Construction Noise Levels

Table 9: Typical Construction Noise Levels

Equipment	Typical Noise Level (dBA) at 50 feet from Source[1]	Typical Noise Level (dBA) at 100 feet from Source[1]	Typical Noise Level (dBA) at 200 feet from Source[1]	Typical Noise Level (dBA) at 500 feet from Source[1]
Air Compressor	80.0	74.0	68.0	60.0
Backhoe	80.0	74.0	68.0	60.0
Compactor	82.0	76.0	70.0	62.0
Concrete Mixer	85.0	79.0	73.0	65.0
Concrete Pump	82.0	76.0	70.0	62.0
Concrete Vibrator	76.0	70.0	64.0	56.0
Crane, Derrick	88.0	82.0	76.0	68.0
Crane, Mobile	83.0	77.0	71.0	63.0
Dozer	85.0	79.0	73.0	65.0
Generator	82.0	76.0	70.0	62.0
Grader	85.0	79.0	73.0	65.0
Impact Wrench	85.0	79.0	73.0	65.0
Jack Hammer	88.0	82.0	76.0	68.0
Loader	80.0	74.0	68.0	60.0
Paver	85.0	79.0	73.0	65.0
Pneumatic Tool	85.0	79.0	73.0	65.0
Pump	77.0	71.0	65.0	57.0
Roller	85.0	79.0	73.0	65.0
Saw	83.0	77.0	64.0	56.0
Scraper	85.0	79.0	73.0	65.0
Shovel	82.0	76.0	70.0	62.0
Truck	84.0	78.0	72.0	64.0

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

The City of Saratoga does not have construction noise standards. As shown in *Table 9* noise levels at the sensitive receptor are below 100 dBA at 50 feet. The nearest sensitive receptor to the Project site is located approximately 200 feet southeast of the Sanitary Sewer Connection area and approximately 1,000 feet east of the Precise Plan area. The highest anticipated construction noise level of 76.0 dBA is expected to occur during the grading phase. Additionally, the majority of construction would occur throughout the Project site and would not be concentrated at a single point near sensitive receptors. The Project construction would comply with Section 7-30.060 which limits construction hours to between the hours of 7:30 a.m. and 6:00 p.m. Monday through Friday and between the hours of 9:00 a.m. and 5:00 p.m. on Saturdays. Construction is prohibited on Sundays and weekday holidays.

Sensitive receptors near the Project site include: residences approximately 200 feet southeast of the Sanitary Sewer Connection area and approximately 1,000 feet east of the Precise Plan area. These distances are from the Project site to the sensitive receptor property line. These sensitive uses may be exposed to elevated noise levels during project construction. Construction activities would be limited to daytime hours when people would be out of their houses and would conform to the time-of-day restrictions of the City's Municipal Code. Mitigation Measure NOI-1 would ensure that all construction equipment is equipped with properly operating and maintained mufflers and other state required noise attenuation devices, helping to reduce noise at the source. NOI-1 is required to ensure that construction noise levels do not exceed the City's standards and that time-of-day restrictions are adhered to. With Implementation of NOI-1, construction noise impacts to nearby receptors would be less than significant.

Construction Traffic Noise

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. Excavation and cut and fill would be required. Soil hauling would not be required as the earthwork would balance on-site. Based on the California Emissions Estimator Model (CalEEMod) default assumptions for this project, as analyzed in Mountain Winery Annexation Air Quality Assessment, the Project would generate the highest number of daily trips during the building construction phase. The model estimates that the project would generate up to 290 worker trips and 113 vendor trips per day. 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. Pierce Road between Project Driveway to Highway 9 has an average daily trip volume of 670 vehicles (*Table 7*). Therefore, 403 project construction trips (290 worker trips plus 113 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).

Operations

The current Mountain Winery operations include noise generating activities such as concerts/events with crowd noise and picnicking and tailgating as well as existing parking lot activity. Implementation of the Project would create new sources of noise in the project vicinity. The major noise sources associated with the Project that would potentially impact existing and future nearby residences include the following. These noise sources are discussed in further detail below.

- 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);
- Additional parking area activity (i.e., car door slamming, car radios, engine start-up, and car pass-by); and
- Landscape maintenance activities; and
- Off-site traffic noise.

As discussed above, the closest sensitive receptors are single-family residences located 200 from the Sanitary Sewer Connection area, southeast across Pierce Road. The nearest sensitive receptors to the Precise Plan area are located approximately 1,000 feet east. The City of Saratoga stationary source exterior noise standard for residential areas is 55 dBA L_{eq} and 65 dBA L_{max} during the daytime (*Table 5: Maximum Permissible Outdoor Noise Levels Generated (dBA)*). The land use compatibility standard for residential areas is also 60 dBA DNL (L_{dn}) for normally acceptable conditions.

Current Mountain Winery Activities

<u>Crowd Noise</u>
The Project area may include some crowd noise due to events or hotel amenities at the proposed hotel area or tail gate activities in the parking area. Crowd noise is dependent on several factors including vocal effort, impulsiveness, and the random orientation of the crowd members. Crowd noise is estimated at 60 dBA at one meter (3.28 feet) away for raised normal speaking. This noise level would have a +5 dBA adjustment for the impulsiveness of the noise source, and a -3 dBA adjustment for the random orientation of the crowd members. Therefore, crowd noise would be 62 dBA at one meter from the source. Noise has a decay rate due to distance attenuation, which is calculated based on the Inverse Square Law. Based upon the Inverse Square Law, sound levels decrease by 6 dBA for each doubling of distance from the source. As a result, crowd noise would be 56.0 dBA at 6.56 feet and 52.3 dBA at 10 feet. Therefore, crowd noise at the closest existing sensitive receptors (located 1,584 feet away) would not exceed the City's 60 dBA standard. A less than significant impact would occur in this regard.

<u>Concert</u>
The concert series began at Mountain Winery in 1958. The concert bowl accommodates approximately 2,500 people. The previously approved Mountain Winery CUP and Architectural and Site Approval DEIR (1999) evaluated the noise from concert events and found the existing events periodically exceed the Santa Clara County and City of Saratoga noise standards and that impacts were potentially significant. However, the Mountain Winery CUP and Architectural and Site Approval DEIR required mitigation 9a and 3-9b. These mitigation measures require noise monitoring during annual concerts and provide concert "hotline" for noise complaints. Mitigation Measure 3-9b requires acoustical studies to be completed for any modification or expansion of the concert bowl. As the Project would not expand or reconfigure the concert bowl, this measure is irrelevant. The project would not impact or increase the existing noise levels from concert events. Mountain Winery is required to comply with the existing mitigation measures in the CUP and Architectural and Site Approval DEIR. However, no new mitigation measures are required. The Project would result in no new impacts to concert noise.

Stationary Noise Sources

Implementation of the Project would create new or intensified sources of noise in the project vicinity from residential sources, mechanical equipment, truck loading areas, parking lot noise, and landscape maintenance.

<u>Residential Areas</u>
Noise that is typical of lodging areas includes group conversations, pet noise, vehicle noise (see discussion below) and general maintenance activities. Noise from residential stationary sources would primarily occur during the "daytime" activity hours of 7:00 a.m. to 10:00 p.m. Furthermore, the residences would be required to comply with the noise standards set forth in the City's General Plan and Municipal Code.

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 50 to 60 dBA at 50 feet. The nearest existing sensitive receptor's property lines are located approximately 0.2 miles (1,000 feet) from the closest point of the Precise Plan area. Conservatively, at 1,000 feet, mechanical equipment noise levels would be reduced to 34 dBA based on distance attenuation alone. This noise level is below the City's 60 dBA exterior standard and would not be perceptible considering the existing ambient levels are between 39 dBA and 52 dBA in this area (*Table 6*). Additionally, per section 7-30.070 of the City's Municipal Code all exhaust fans and mechanical equipment must be enclosed for the purpose of soundproofing. Operation of mechanical equipment would not increase ambient noise levels beyond the acceptable compatible land use noise levels. Therefore, the Project would result in a less than significant impact related to stationary noise levels.

Loading Area Noise

The project is a hotel that would necessitate occasional deliveries. The primary noise associated with deliveries is the arrival and departure of trucks. Operations of proposed 300-room hotel would potentially require deliveries of vans and light trucks and not 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 not anticipated to require a significant number of truck deliveries. The majority of deliveries for the commercial uses would consist of vendor deliveries in vans and would be somewhat infrequent and irregular. The closest that the proposed hotel could be located to sensitive receptors would be approximately 0.2 miles (1,000 feet) away. While there would be temporary noise increases during truck maneuvering and engine idling, these impacts would of short duration and infrequent. Typically, heavy truck operations generate a noise level of 68 dBA at a distance of 30 feet. At 1,000 feet, noise levels would attenuate to 37.5 dBA, which is below the City's 60 dBA standard. Noise levels would be further attenuated by intervening terrain and structures. As noise levels associated with trucks and loading/unloading activities would be below City standards and ambient levels, impacts would be less than significant.

Parking Areas

As discussed in the crowd noise section above, some tail gate activities may occur before concert events in the parking area. Crowd noise would be 56.0 dBA at 6.56 feet and 52.3 dBA at 10 feet. Therefore, crowd noise at the closest existing sensitive receptors (located 1,000 feet away) would not exceed the City's 60 dBA standard. A less than significant impact would occur in this regard.

Traffic associated with parking lots is typically not of sufficient volume to exceed community noise standards, which are based on a time-averaged scale such as the CNEL scale. Also, noise would primarily remain on the Project site and would be intermittent (during peak-events). 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 60 to 63 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. The nearest sensitive receptors would be approximately 0.2 miles (1,000 feet) east of the surface parking area. Additionally, the Project is not proposing adding new parking. The project would use the existing parking areas. Therefore, parking lot noise would not result in substantially greater noise levels than currently exist in the vicinity and would not exceed the City's 65 dBA standard. Noise impacts would less than significant.

<u>Landscape Maintenance Activities</u>

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 5 feet. Landscape Maintenance activities would be 24 dBA at the closest sensitive receptor approximately 1,000 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. Therefore, with adherence to the City's Municipal Code, impacts associated with landscape maintenance would be less than significant.

Traffic Noise

Implementation of the Project would generate increased traffic volumes along study roadway segments. The project is expected to generate 1,431 average daily trips, which would result in noise increases on project area roadways. In general, a traffic noise increase of less than 3 dBA is barely perceptible to people, while a 5-dBA increase is readily noticeable (Caltrans, 2013). Generally, traffic volumes on project area roadways would have to approximately double for the resulting traffic noise levels to increase by 3 dBA. Therefore, permanent increases in ambient noise levels of less than 3 dBA are considered to be less than significant.

As shown in *Table 10: Existing and Project Traffic Noise*, the existing traffic-generated noise level on Project area roadways is between 53.4 dBA Ldn and 65.1 dBA Ldn at 100 feet from the centerline. As previously described, Ldn 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.

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, 2019). As noted in *Table 10*, the project would have an increase of 3.4 dBA on Pierce Road between the Project Driveway and Highway 9. However, the resulting 49.6 dBA noise level is under the City's normally acceptable 60 dBA threshold for residential uses. Therefore, the Project would not have a significant impact on existing traffic noise levels.

Table 10: Existing and Project Traffic Noise

Roadway Segment	Existing Conditions (Existing Development)		With Project		Project Change from Existing Conditions	Significant Impact?
	ADT	dBA Ldn[1]	ADT	dBA Ldn[1]		
Sunnyvale-Saratoga Road						

Table 10: Existing and Project Traffic Noise

Roadway Segment	Existing Conditions (Existing Development)		With Project		Project Change from Existing Conditions	Significant Impact?
	ADT	dBA Ldn[1]	ADT	dBA Ldn[1]		
North of Pierce Road	23,050	65.1	23,270	65.1	0.0	No
Pierce Road						
Project Driveway to Sunnyvale-Saratoga Road	800	47.0	1,020	48.0	1.1	No
Project Driveway to Highway 9	670	46.2	1,460	49.6	3.4	No[2]
Highway 9						
West of Toll Gate Road	2,790	53.8	3,580	54.9	1.1	No
East of Toll Gate Road	3,540	53.4	4,330	54.3	0.9	No
South of Los-Gatos Saratoga Road	13,750	59.5	9,180	59.8	0.2	No
Los Gatos-Saratoga Road						
South of Highway 9	8,670	60.7	14,030	60.8	0.1	No

ADT = average daily trips; dBA = A-weighted decibels; Ldn = day-night noise level

[1] Traffic noise levels are at 100 feet from the roadway centerline.
[2] This level is above the perceptible noise level change of 3.0 dBA. However, at 50.0 dBA the noise level is under the City's noise threshold for residential uses.

Source: Based on traffic data provided by Kimley-Horn, 2019. Refer to Appendix A for traffic noise modeling results.

Table 11: Opening Year and Opening Year Plus Project Traffic Noise, shows the background conditions or Opening Year traffic. Per the TIA, Opening Year includes two approved/pending projects that were added to the existing 2019 volumes. The two background developments are located near Highway 9 in Saratoga Village.

As shown in the table, opening year roadway noise levels with the Project would range from 48.4 to 65.7 dBA. The highest increase in noise levels would occur along Pierce Road between the Project driveway and Highway 9. Noise levels along Pierce Road would increase by 3.4 dBA with the Project. This level is above the perceptible noise level change of 3.0 dBA. However, at 50.0 dBA the noise level is under the City's noise threshold for residential uses. Therefore, impacts are less than significant.

Table 11: Opening Year and Opening Year Plus Project Traffic Noise

Roadway Segment	Opening Year		With Project		Project Change from Existing Conditions	Significant Impact?
	ADT	dBA Ldn[1]	ADT	dBA Ldn[1]		
Sunnyvale-Saratoga Road						
North of Pierce Road	23,160	65.12	23,380	65.2	0.0	No
Pierce Road						
Project Driveway to Sunnyvale-Saratoga Road	800	46.98	1,020	48.0	1.1	No
Project Driveway to Highway 9	670	46.21	1,460	49.6	3.38	No
Highway 9						
West of Toll Gate Road	2,790	53.80	3,580	54.9	1.1	No

Table 11: Opening Year and Opening Year Plus Project Traffic Noise

Roadway Segment	Opening Year		With Project		Project Change from Existing Conditions	Significant Impact?
	ADT	dBA Ldn[1]	ADT	dBA Ldn[1]		
East of Toll Gate Road	3,540	53.44	4,330	54.3	0.9	No
South of Los-Gatos Saratoga Road	8,910	59.63	9,420	59.9	0.2	No
Los Gatos-Saratoga Road						
South of Highway 9	13,890	60.77	14,170	60.9	0.1	No
ADT = average daily trips; dBA = A-weighted decibels; Ldn= day-night noise levels						
1. Traffic noise levels are at 100 feet from the roadway centerline.						
Source: Based on traffic data provided by Kimley-Horn, 2019. Refer to Appendix A for traffic noise modeling results.						

Additional 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 additional traffic on adjacent roadways, thereby increasing vehicular noise near existing and proposed land uses. This level is above the perceptible noise level change of 3.0 dBA. However, the noise resulting from the increase in traffic would not exceed the City's normally acceptable 60 dBA threshold for the nearest sensitive receptors. Therefore, impacts would be less than significant.

Summary

Overall, implementation of MM NOI-1 and adherence to Municipal Code requirements, noise impacts associated with traffic, mechanical equipment, deliveries, loading/unloading activities, and parking lot noise would be reduced to a less than significant level.

Mitigation Measures:

NOI-1 Prior to Grading Permit issuance, the applicant shall demonstrate, to the satisfaction of the City of Saratoga Director of Public Works or City Engineer that all applicable construction plans and specification include the following measures:

- Construction activities shall be restricted to day time hours of between 7:00 a.m. and 7:00 p.m. on weekdays.
- Prior to the start of construction activities, the construction contractor shall:
  - Maintain and tune all proposed equipment in accordance with the manufacturer's recommendations to minimize noise emission.
  - Inspect all proposed equipment and should fit all equipment with properly operating mufflers, air intake silencers, and engine shrouds that are no less effective than as originally equipped by the manufacturer.
  - Post a sign, clearly visible at the site, with a contact name and telephone number of the City of Saratoga's authorized representative to respond in the event of a noise complaint.
  - Place stationary construction equipment and material delivery in loading and unloading areas as far as practicable from the residences.

- Limit unnecessary engine idling to the extent feasible.
- Use smart back-up alarms, which automatically adjust the alarm level based on the background noise level, or switch off back-up alarms and replace with human spotters.
- Use low-noise emission equipment.
- Limit use of public address systems.
- Minimize grade surface irregularities on construction sites.

Level of Significance: Less than significant impact with mitigation.

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 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. In general, the FTA architectural damage criterion for continuous vibrations (i.e. 0.2 in/sec) appears to be conservative. 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.

Table 12: Typical Construction Equipment Vibration Levels, lists vibration levels at 25 feet for typical construction equipment. Groundborne vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. As indicated in *Table 12*, based on FTA data, vibration velocities from typical heavy construction equipment operations that would be used during Project construction range from 0.003 to 0.089 in/sec PPV at 25 feet from the source of activity. The nearest sensitive receptors are the single-family residences across Pierce Road approximately 200 feet from the active construction zone for the Sanitary Sewer Connection. However, construction for the lodging and ancillary uses would be at least 1,000 feet from the nearest sensitive receptors.

Table 12: Typical Construction Equipment Vibration Levels

Equipment	Peak Particle Velocity at 25 Feet (in/sec)	Peak Particle Velocity at 200 Feet (in/sec) [1]
Large Bulldozer	0.089	0.004
Loaded Trucks	0.076	0.003
Rock Breaker	0.059	0.003
Jackhammer	0.035	0.002
Small Bulldozer/Tractors	0.003	0.000

Notes:
1. Calculated using the following formula: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$, where: PPV_{equip} = the peak particle velocity in in/sec of the equipment adjusted for the distance; PPV_{ref} = 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 12*, the highest vibration levels are achieved with the large bulldozer operations. This construction activity is expected to take place during grading. Project construction would be more than 200 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 residential 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. 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 airports to the Project site are the Norman Y. Mineta San Jose International Airport located approximately 10 miles northeast of the Project and Palo Alto Airport located approximately 13 miles north of the site. The Project is not within 2.0 miles of a public airport or within an airport influence zone. Additionally, there are no private airstrips located within the Project vicinity. 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's construction activities, when properly mitigated, would not result in a substantial temporary increase in ambient noise levels. The City permits construction activities between the hours of 7:30 a.m. and 6:00 p.m. during the week, and between 9:00 a.m. and 5:00 p.m. on Saturdays. Construction is not allowed on Sundays or weekday holidays. There would be periodic, temporary, noise impacts that would cease upon completion of construction activities. The Project would contribute to other proximate construction noise impacts if construction activities were conducted concurrently. However, based on the noise analysis above, the Project's construction-related noise impacts would be less than significant following compliance with local regulations and mitigation measures outlined in this study.

Construction activities at other planned and approved projects would be required to take place during daytime hours, and the City and project applicants would be required to evaluate construction noise impacts and implement mitigation, if necessary, to minimize noise impacts. Each project would be required to comply with the applicable City of Saratoga Municipal Code limitations on allowable hours of construction. Therefore, Project construction would not contribute to cumulative impacts and impacts in this regard are not cumulatively considerable.

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 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 Cumulative scenarios to existing conditions. The traffic analysis considers cumulative traffic from future growth assumed in the traffic mode, as well as cumulative projects identified by the City of Saratoga.

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

- Combined Effect. The cumulative with Project noise level ("Cumulative 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 "Cumulative With Project" causes a 1.0 dBA increase in noise over the "Cumulative 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 13: 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," "Cumulative Without Project," and "Cumulative With Project," conditions, including incremental and net cumulative impacts.

Table 13: Cumulative Plus Project Conditions Predicted Traffic Noise Levels

Roadway Segment	Existing[1]	Cumulative Without Project[1]	Cumulative With Project[1]	Combined Effects	Incremental Effects	Cumulatively Significant Impact?
				dBA Difference: Existing and Cumulative With Project	dBA Difference: Cumulative Without and With Project	
Sunnyvale-Saratoga Road						
North of Pierce Road	65.1	65.8	65.9	0.8	0.0	No
Pierce Road						
Project Driveway to Sunnyvale-Saratoga Road	47.0	47.7	48.6	1.6	0.9	No
Project Driveway to Highway 9	46.2	47.2	50.1	3.9	2.9	No
Highway 9						
West of Toll Gate Road	53.8	56.0	56.7	2.9	0.7	No
East of Toll Gate Road	53.4	55.5	56.1	2.6	0.6	No
South of Los-Gatos Saratoga Road	59.5	61.6	61.7	2.2	0.2	No
Los Gatos-Saratoga Road						
South of Highway 9	60.7	61.7	61.7	1.0	0.1	No

ADT = average daily trips; dBA = A-weighted decibels; Ldn= day-night noise levels

1. Traffic noise levels are at 100 feet from the roadway centerline.

Source: Based on traffic data provided by Kimley-Horn, 2019. Refer to Appendix A for traffic noise modeling assumptions and results.

First, it must be determined whether the "Future With Project" increase above existing conditions (Combined Effects) is exceeded. As indicated in the table, the Project has one street segment (Pierce Road between Project Driveway to Highway 9) that exceeds the combined effects criterion. Next, under the Incremental Effects criteria, cumulative noise impacts are defined by determining if the forecast ambient ("Future Without Project") noise level is increased by 1 dB or more.

The Project's contribution to traffic noise is evaluated in *Table 13*. As shown in the table, one segment of Pierce Road exceeds the combined effects and incremental effects criterion. As discussed above, the Project would increase local noise levels by a maximum of 3.9 dBA Ldn. The increase is greater than 3 dBA; however the resulting noise level would be 50.5 dBA which is less than the City's noise threshold for residential uses. Therefore, the Project's cumulative noise contribution would be less than significant. Based on the significance criteria set forth in this EIR, 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.

7 REFERENCES

1. California Department of Transportation, *California Vehicle Noise Emission Levels*, 1987.
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3. California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, 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 Saratoga, *General Plan Noise Element,* March 5, 2014.
7. City of Saratoga, *Municipal Code*, 2019.
8. Cyril M. Harris, *Handbook of Noise Control, Second Edition*, 1979.
9. Cyril M. Harris, *Noise Control in Buildings – A Practical Guide for Architects and Engineers*, 1994.
10. Federal Highway Administration, *Roadway Construction Noise Model*, 2006.
11. Federal Highway Administration, *Roadway Construction Noise Model User's Guide Final Report*, 2006.
12. Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, 1992.
13. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.
14. Kimley-Horn & Associates, *Traffic Impact Study for the Mountain Winery Annexation Project,* August 2019.
15. United States Environmental Protection Agency, *Protective Noise Levels (EPA 550/9-79-100)*, 1979.

Appendix A

Noise Data

Noise Measurement Field Data

Project:	Mountain Winery	**Job Number:**	
Site No.:	#1	**Date:**	7/25/2019
Analyst:	Noemi Wyss	**Time:**	11:13 AM
Location:	Highway 9 turnout		
Noise Sources:	Cars on highway 9, stream, birds		
Comments:			

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
62.2	42.3	73.4	88.5

Equipment	
Sound Level Meter:	SoundPro DL
Calibrator:	QC-10
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	82
Wind (mph):	5
Sky:	Clear
Bar. Pressure:	29.93
Humidity:	63%

Photo:

Kimley»Horn

Noise Measurement Field Data

Project:	Mountain Winery	**Job Number:**	
Site No.:	#2	**Date:**	7/25/2019
Analyst:	Noemi Wyss	**Time:**	11:34 AM
Location:	Vintage Lane and Pierce Road		
Noise Sources:	Bugs, cars on Pierce Road, airplane		
Comments:			

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
55.3	33.2	70.2	87.1

Equipment	
Sound Level Meter:	SoundPro DL
Calibrator:	QC-10
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	82
Wind (mph):	5
Sky:	Clear
Bar. Pressure:	29.93
Humidity:	63%

Photo:

Kimley»Horn

Noise Measurement Field Data

Project:	MountainWinery	**Job Number:**	
Site No.:	#3	**Date:**	10/17/2018
Analyst:	Noemi Wyss	**Time:**	12:14 PM
Location:	Heber Way and Teerlink Way		
Noise Sources:	gardener, airplanes, truck beeping (work being done)		
Comments:			

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
52.0	38.8	63.7	86.9

Equipment	
Sound Level Meter:	SoundPro DL
Calibrator:	QC-10
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	84
Wind (mph):	5
Sky:	Clear
Bar. Pressure:	29.98
Humidity:	98%

Photo:

Kimley»Horn

Noise Measurement Field Data

Project:	Mountain Winery	**Job Number:**	
Site No.:	#4	**Date:**	7/25/2019
Analyst:	Noemi Wyss	**Time:**	12:32 PM
Location:	Albar Court and Damon Lane		
Noise Sources:	Birds, blower (gardener)		
Comments:			

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
39.4	29.9	52.8	79.3

Equipment	
Sound Level Meter:	SoundPro DL
Calibrator:	QC-10
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	84
Wind (mph):	5
Sky:	Clear
Bar. Pressure:	29.98
Humidity:	98%

Photo:

Kimley»Horn

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

Project Name: Mountain Winery
Project Number:
Scenario: Existing
Ldn/CNEL: Ldn

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%

#	Roadway	Segment	Lanes	Median Width	ADT Volume	Speed (mph)	Alpha Factor	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	Distance from Centerline of Roadway: Ldn at 100 Feet	Distance to Contour: 70 Ldn	65 Ldn	60 Ldn	55 Ldn
1	Sunnyvale-Saratoga Road	North of Pierce Road	4	8	23,050	40	0	2.0%	1.0%	65.1	-	102	323	1,022
2	Pierce Road	Project Driveway to Sunnyvale-Saratoga Road	2	0	800	25	0	2.0%	1.0%	47.0	-	-	-	-
3	Pierce Road	Project Driveway to Highway 9	2	0	670	25	0	2.0%	1.0%	46.2	-	-	-	-
4	Highway 9	West of Toll Gate Road	2	0	2,790	30	0	2.0%	1.0%	53.8	-	-	-	76
5	Highway 9	East of Toll Gate Road	2	0	3,540	25	0	2.0%	1.0%	53.4	-	-	-	70
6	Los Gatos- Saratoga Road	South of Highway 9	2	0	13,750	30	0	2.0%	1.0%	60.7	-	37	118	374
7	Highway 9/ Saratoga Avenue	South of Los-Gatos Saratoga Road	2	0	8,670	35	0	2.0%	1.0%	59.5	-	-	89	282

[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: Mountain Winery
Project Number:
Scenario: Existing Plus Project
Ldn/CNEL: Ldn

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	Ldn at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 Ldn	65 Ldn	60 Ldn	55 Ldn
1	Sunnyvale-Saratoga Road	North of Pierce Road	4	8	23,270	40	0	2.0%	1.0%	65.1	-	103	326	1,032
2	Pierce Road	Project Driveway to Sunnyvale-Saratoga Roac	2	0	1,020	25	0	2.0%	1.0%	48.0	-	-	-	-
3	Pierce Road	Project Driveway to Highway 9	2	0	1,460	25	0	2.0%	1.0%	49.6	-	-	-	-
4	Highway 9	West of Toll Gate Road	2	0	3,580	30	0	2.0%	1.0%	54.9	-	-	-	97
5	Highway 9	East of Toll Gate Road	2	0	4,330	25	0	2.0%	1.0%	54.3	-	-	-	85
6	Los Gatos- Saratoga Road	South of Highway 9	2	0	14,030	30	0	2.0%	1.0%	60.8	-	38	121	382
7	Highway 9/ Saratoga Aveni	South of Los-Gatos Saratoga Road	2	0	9,180	35	0	2.0%	1.0%	59.8	-	-	95	299

[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: Mountain Winery
Project Number:
Scenario: Opening Year Background Conditions
Ldn/CNEL: Ldn

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	Ldn at	Distance to Contour			
#	**Roadway**	**Segment**	**Lanes**	**Width**	**Volume**	**(mph)**	**Factor**	**Trucks**	**Trucks**	**100 Feet**	**70 Ldn**	**65 Ldn**	**60 Ldn**	**55 Ldn**
1	Sunnyvale-Saratoga Road	North of Pierce Road	4	8	23,160	40	0	2.0%	1.0%	65.1	-	103	325	1,027
2	Pierce Road	Project Driveway to Sunnyvale-Saratoga Roac	2	0	800	25	0	2.0%	1.0%	47.0	-	-	-	-
3	Pierce Road	Project Driveway to Highway 9	2	0	670	25	0	2.0%	1.0%	46.2	-	-	-	-
4	Highway 9	West of Toll Gate Road	2	0	2,790	30	0	2.0%	1.0%	53.8	-	-	-	76
5	Highway 9	East of Toll Gate Road	2	0	3,540	25	0	2.0%	1.0%	53.4	-	-	-	70
6	Los Gatos- Saratoga Road	South of Highway 9	2	0	13,890	30	0	2.0%	1.0%	60.8	-	38	119	378
7	Highway 9/ Saratoga Aveni	South of Los-Gatos Saratoga Road	2	0	8,910	35	0	2.0%	1.0%	59.6	-	-	92	290

[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: Mountain Winery
Project Number:
Scenario: Opening Year Plus Project
Ldn/CNEL: Ldn

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	Ldn at		Distance to Contour		
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 Ldn	65 Ldn	60 Ldn	55 Ldn
1	Sunnyvale-Saratoga Road	North of Pierce Road	4	8	23,380	40	0	2.0%	1.0%	65.2	-	104	328	1,037
2	Pierce Road	Project Driveway to Sunnyvale-Saratoga Roac	2	0	1,020	25	0	2.0%	1.0%	48.0	-	-	-	-
3	Pierce Road	Project Driveway to Highway 9	2	0	1,460	25	0	2.0%	1.0%	49.6	-	-	-	-
4	Highway 9	West of Toll Gate Road	2	0	3,580	30	0	2.0%	1.0%	54.9	-	-	-	97
5	Highway 9	East of Toll Gate Road	2	0	4,330	25	0	2.0%	1.0%	54.3	-	-	-	85
6	Los Gatos- Saratoga Road	South of Highway 9	2	0	14,170	30	0	2.0%	1.0%	60.9	-	39	122	385
7	Highway 9/ Saratoga Aveni	South of Los-Gatos Saratoga Road	2	0	9,420	35	0	2.0%	1.0%	59.9	-	-	97	307

[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: Mountain Winery
Project Number:
Scenario: Horizon Year
Ldn/CNEL: Ldn

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	Ldn at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 Ldn	65 Ldn	60 Ldn	55 Ldn
1	Sunnyvale-Saratoga Road	North of Pierce Road	4	8	27,350	40	0	2.0%	1.0%	65.8	-	121	384	1,213
2	Pierce Road	Project Driveway to Sunnyvale-Saratoga Roac	2	0	940	25	0	2.0%	1.0%	47.7	-	-	-	-
3	Pierce Road	Project Driveway to Highway 9	2	0	840	25	0	2.0%	1.0%	47.2	-	-	-	-
4	Highway 9	West of Toll Gate Road	2	0	4,620	30	0	2.0%	1.0%	56.0	-	-	40	126
5	Highway 9	East of Toll Gate Road	2	0	5,720	25	0	2.0%	1.0%	55.5	-	-	36	113
6	Los Gatos- Saratoga Road	South of Highway 9	2	0	17,060	30	0	2.0%	1.0%	61.7	-	46	147	464
7	Highway 9/ Saratoga Aveni	South of Los-Gatos Saratoga Road	2	0	13,950	35	0	2.0%	1.0%	61.6	-	45	144	454

[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: Mountain Winery
Project Number:
Scenario: Horizon Year Plus Project
Ldn/CNEL: Ldn

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	Ldn at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 Ldn	65 Ldn	60 Ldn	55 Ldn
1	Sunnyvale-Saratoga Road	North of Pierce Road	4	8	27,570	40	0	2.0%	1.0%	65.9	-	122	387	1,223
2	Pierce Road	Project Driveway to Sunnyvale-Saratoga Roa(	2	0	1,160	25	0	2.0%	1.0%	48.6	-	-	-	-
3	Pierce Road	Project Driveway to Highway 9	2	0	1,630	25	0	2.0%	1.0%	50.1	-	-	-	32
4	Highway 9	West of Toll Gate Road	2	0	5,410	30	0	2.0%	1.0%	56.7	-	-	47	147
5	Highway 9	East of Toll Gate Road	2	0	6,510	25	0	2.0%	1.0%	56.1	-	-	41	128
6	Los Gatos- Saratoga Road	South of Highway 9	2	0	17,340	30	0	2.0%	1.0%	61.7	-	47	149	472
7	Highway 9/ Saratoga Aven	South of Los-Gatos Saratoga Road	2	0	14,460	35	0	2.0%	1.0%	61.7	-	47	149	471

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