Appendix I

Noise Technical Report

Noise Technical Report
for the
Sand Canyon Resort Project
City of Santa Clarita, California

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INTRODUCTION

The purpose of this report is to evaluate the potential for noise and groundborne vibration impacts resulting from implementation of the proposed Sand Canyon Resort Project (the "Project"). This report includes an evaluation of potential impacts associated with substantial temporary and permanent increases in ambient noise levels in the vicinity of the Project Site; exposure of people in the vicinity of the Project Site to excessive noise or groundborne vibration levels; and whether exposure is in excess of standards established in the City of Santa Clarita's General Plan or Noise Ordinance. Mitigation measures intended to reduce noise and vibration impacts are proposed, where appropriate, to avoid or reduce potentially significant impacts of the Project.

PROJECT OVERVIEW

Project Location

The 75-acre Project Site is located at 27734 Sand Canyon Road in the Sand Canyon area in the City of Santa Clarita (City). See Figure 1, Aerial Photograph of the Project Site. The Project Site is within the existing nine-hole golf course (Mountain Course) at Sand Canyon Country Club. Due to drought the Mountain Course was closed in April of 2017.

The Project Site is zoned Open Space (OS) and is located within the Planned Development (PD) overlay zone. The Project includes a Zone Change and General Plan Amendment to Community Commercial (CC) and a subdivision from one lot into four lots. See Figure 2, Tentative Tract Map. Surrounding properties are zoned UR1, NU4, NU5, and OS.

Project Characteristics

The Project is a 389-room resort and will include the following amenities: one 3-story main hotel building (241 keys), two 3-story spa garden inn hotel buildings (81 keys), fourteen 2-story view villas (56 keys), 9 oak villas (9 keys), a function wing level that would include: space for a grand ballroom, junior ballroom, meeting room space , three restaurants, kitchen/bakery space , kids club and arcade. In addition, the Project includes spa and sauna uses, a beauty salon, gym, two swimming pools, one tennis and six pickleball courts, 9-hole miniature golf, kid's playground, and 2 miles of multi-purpose trails. See Figure 3, Project Site Plan. This analysis assumes the Project would be operational by 2023 and no soil import or export would be required.

Figure 1, Aerial Photograph of the Project Site

Figure 2, Tentative Tract Map

Figure 3, Project Site Plan

FUNDAMENTALS OF SOUND AND ENVIRONMENTAL NOISE

Sound is technically described in terms of amplitude (i.e., loudness) and frequency (i.e., pitch). The standard unit of sound amplitude measurement is the decibel (dB). The dB scale is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound. The pitch of the sound is related to the frequency of the pressure vibration. Since the human ear is not equally sensitive to a given sound level at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted dB scale (dBA) provides this compensation by emphasizing frequencies in a manner approximating the sensitivity of the human ear.

Noise, on the other hand, is typically defined as unwanted sound audible at such a level that the sound becomes an undesirable by-product of society's normal day-to-day activities. Sound becomes unwanted when it interferes with normal activities, causes actual physical harm, or results in adverse health effects. The definition of noise as unwanted sound implies that it has an adverse effect, or causes a substantial annoyance, to people and their environment. However, not every unwanted audible sound interferes with normal activities, causes harm, or has adverse health effects. For unwanted audible sound, i.e. noise, to be considered adverse it must occur with sufficient frequency and at such a level that these adverse impacts are reasonably likely to occur. Thresholds of significance, set forth below, are established to differentiate between benign, unwanted audible sound and potentially significant and adverse unwanted audible sound.

A typical noise environment consists of a base of steady ambient noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources. These can vary from an occasional aircraft or train passing by to virtually continuous noise, such as traffic on a major highway. Table 1, Representative Environmental Noise Levels, illustrates representative noise levels in the environment.

Several rating scales have been developed to analyze the adverse effects of community noise on people. Since environmental noise fluctuates over time, these scales consider that the effects of noise on people is largely dependent upon the total acoustical energy content of the noise, as well as the time of day when the noise occurs. Those that are applicable to this analysis are as follows:

- L_{eq}: An L_{eq}, or equivalent energy noise level, is 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.

- L_{max}: The maximum instantaneous noise level experienced during a given period of time.

- L_{min}: The minimum instantaneous noise level experienced during a given period of time.

- CNEL: The Community Noise Equivalent Level (CNEL) is a 24-hour average L_{eq} with a 5 dBA "weighting" during the hours of 7:00 P.M. to 10:00 P.M. and a 10 dBA "weighting" added to noise during the hours of 10:00 P.M. to 7:00 A.M. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a constant 60 dBA 24 hour L_{eq} would result in a CNEL of 66.7 dBA.

Table 1
Representative Environmental Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	—110—	Rock Band
Jet Fly-over at 100 feet		
	—100—	
Gas Lawnmower at 3 feet		
	—90—	
		Food Blender at 3 feet
Diesel Truck going 50 mph at 50 feet	—80—	Garbage Disposal at 3 feet
Noisy Urban Area during Daytime		
Gas Lawnmower at 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 Area during Daytime	—50—	Dishwasher in Next Room
Quiet Urban Area during Nighttime	—40—	Theater, Large Conference Room (background)
Quiet Suburban Area during Nighttime		
	—30—	Library
Quiet Rural Area during Nighttime		Bedroom at Night, Concert Hall (background)
	—20—	
		Broadcast/Recording Studio
	—10—	
Lowest Threshold of Human Hearing	—0—	Lowest Threshold of Human Hearing

Note: Colors are for illustrative purposes only.
Source: California Department of Transportation, Technical Noise Supplement, Page 2-20, September 2013.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day, night, or over a 24-hour period. For residential uses, environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60–70 dBA range, and high above 70 dBA. Frequent exposure to noise levels greater than 85 dBA over time can cause temporary or permanent hearing loss. 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 55–60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with more noisy urban residential or residential-commercial areas (60–75 dBA) or dense urban or industrial areas (65–80 dBA).

It is widely accepted that in the community noise environment the average healthy ear can barely perceive CNEL noise level changes of 3 dBA. CNEL changes from 3 to 5 dBA may be noticed by some individuals who are extremely sensitive to changes in noise. A 5 dBA CNEL increase is readily noticeable to most people, while the human ear perceives a 10 dBA CNEL increase as a doubling of sound. However, there is no direct correlation between increasing or even doubling noise-generating uses and what is detectable by the human ear as an increase in noise level. The human ear perceives a 10 dB(A) increase in sound level to be a doubling of sound volume, but doubling the sound energy, i.e., the noise-generating activity, only results in a 3 dB(A) increase in sound. This means that a doubling of sound wave energy (e.g., doubling the volume of traffic on a roadway) would result in a barely perceptible change in sound level to the human ear. Thus, relatively sizeable increases in baseline noise generation are not necessarily perceived as significant noise increases by the human ear.

Noise levels from a particular source generally decline as distance to the receptor increases. Other factors, such as the weather and reflective barriers, also help intensify or reduce the noise level at any given location. A commonly used rule of thumb for roadway noise is that for every doubling of distance from the source (assume a starting point of 50 feet), the noise level is reduced by about 3 dBA at acoustically "hard" locations (i.e., the area between the noise source and the receptor is nearly complete asphalt, concrete, hard-packed soil, or other solid materials) and 4.5 dBA at acoustically "soft" locations (i.e., the area between the source and receptor is normal earth or has vegetation, including grass). Noise from stationary or point sources is reduced by about 6 to 7.5 dBA for every doubling of distance at acoustically hard and soft locations, respectively. Noise levels are also generally reduced by about 1 dBA for each 1,000 feet of distance due to air absorption. 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 can reduce noise levels by 5 to 10 dBA. The normal noise attenuation within residential structures with open windows is about 17 dBA, while the noise attenuation with closed windows is about 25 dBA.[1] And, the exterior-to-interior reduction of newer homes and office buildings can be more than 30 dBA, depending on construction materials and methods used.

[1] *National Cooperative Highway Research Program Report 117, Highway Noise: A Design Guide for Highway Engineers, 1971.*

FUNDAMENTALS OF ENVIRONMENTAL GROUNDBORNE VIBRATION

Vibration is sound radiated through the ground. Vibration can result from a source (e.g., train operations, motor vehicles, machinery equipment, etc.) causing the adjacent ground to move and creating vibration waves that propagate through the soil to the foundations of nearby buildings. This effect is referred to as groundborne vibration. The peak particle velocity (PPV) or the root mean square (RMS) velocity is usually used to describe vibration levels. PPV is defined as the maximum instantaneous peak of the vibration level, while RMS is defined as the square root of the average of the squared amplitude of the level. PPV is typically used for evaluating potential building damage, while RMS velocity in decibels (VdB) is typically more suitable for evaluating human response.

The background vibration velocity level in residential areas is usually around 50 VdB. The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels for many people. Most perceptible indoor vibration is caused by sources within buildings, such as the operation of mechanical equipment, movement of people, or slamming of doors. Typical outdoor sources of perceptible groundborne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the groundborne vibration from traffic is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings, such as historic buildings. The general human response to different levels of groundborne vibration velocity levels is described in Table 2, Human Response to Different Levels of Groundborne Vibration.

Table 2
Human Response to Different Levels of Groundborne Vibration

Vibration Velocity Level	Human Perception
65 VdB	Approximate threshold of perception for many people.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find that transportation-related vibration at this level is unacceptable.
85 VdB	Vibration acceptable only if there are an infrequent number of events per day.

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2006.

REGULATORY FRAMEWORK

Federal Standards

Noise

There are no federal noise standards that directly regulate environmental noise related to the construction or operation of the Project. However, the Office of Safety and Health Administration (OSHA) regulations safeguard the hearing of workers exposed to occupational noise.

Vibration

The Federal Transit Administration (FTA) has adopted vibration standards that are used to evaluate potential building damage impacts related to construction activities. The vibration damage criteria adopted by the FTA are shown in Table 3, Construction Vibration Damage Criteria.

Table 3
Construction Vibration Damage Criteria

Building Category	PPV (in/sec)
I. Reinforced-concrete, steel or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12
Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2006.	

The FTA has also adopted standards associated with human annoyance for groundborne vibration impacts for the following three land-use categories: (1) Vibration Category 1 – High Sensitivity, (2) Vibration Category 2 – Residential, and (3) Vibration Category 3 – Institutional. The FTA defines Category 1 as buildings where vibration would interfere with operations within the building, including vibration-sensitive research and manufacturing facilities, hospitals with vibration-sensitive equipment, and university research operations. Vibration-sensitive equipment includes, but is not limited to, electron microscopes, high-resolution lithographic equipment, and normal optical microscopes. Category 2 refers to all residential land uses and any buildings where people sleep, such as hotels and hospitals. Category 3 refers to institutional land uses such as schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment, but still have the potential for activity interference.

Under conditions where there are an infrequent number of events per day, the FTA has established thresholds of 65 VdB for Category 1 buildings, 80 VdB for Category 2 buildings, and 83 VdB for Category 3

buildings.[2] Under conditions where there are an occasional number of events per day, the FTA has established thresholds of 65 VdB for Category 1 buildings, 75 VdB for Category 2 buildings, and 78 VdB for Category 3 buildings.[3] Under conditions where there are a frequent number of events per day, the FTA has established thresholds of 65 VdB for Category 1 buildings, 72 VdB for Category 2 buildings, and 75 VdB for Category 3 buildings.[4] No thresholds have been adopted or recommended for commercial or office uses.

State Standards

Noise

The California Department of Health Services has established guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. These guidelines for land use and noise exposure compatibility are shown in Table 4, Community Noise Exposure. In addition, Section 65302(f) of the California Government Code requires each county and city in the state to prepare and adopt a comprehensive long-range general plan for its physical development, with Section 65302(g) requiring a noise element to be included in the general plan. The noise element must: (1) identify and appraise noise problems in the community; (2) recognize Office of Noise Control guidelines; and (3) analyze and quantify current and projected noise levels.

Vibration

No state vibration standards apply to the proposed Project. Moreover, according to the Caltrans *Transportation- and Construction-Induced Vibration Guidance Manual* (2013), there are no official Caltrans standards for vibration. However, this manual provides guidelines for assessing vibration damage potential to various types of buildings, ranging from 0.08 to 0.12 inches per second for extremely fragile historic buildings, ruins, and ancient monuments, to 0.50 to 2.0 inches per second for modern industrial and commercial buildings.

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[2] *"Infrequent events" are defined by the FTA as being fewer than 30 vibration events of the same kind per day. FTA, Transit Noise and Vibration Impact Assessment, May 2006.*

[3] *"Occasional events" are defined by the FTA as between 30 and 70 vibration events of the same source per day. FTA, Transit Noise and Vibration Impact Assessment, May 2006.*

[4] *"Frequent events" are defined by the FTA as more than 70 vibration events of the same source per day. FTA, Transit Noise and Vibration Impact Assessment, May 2006.*

Table 4
Community Noise Exposure (State General Plan Guidelines)

Land Use	Normally Acceptable[a]	Conditionally Acceptable[b]	Normally Unacceptable[c]	Clearly Unacceptable[d]
Single-Family, Duplex, Mobile Homes	50 - 60	55 - 70	70 - 75	above 75
Multi-Family Homes	50 - 65	60 - 70	70 - 75	above 75
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 - 70	60 - 70	70 - 80	above 80
Transient Lodging – Motels, Hotels	50 - 65	60 - 70	70 - 80	above 75
Auditoriums, Concert Halls, Amphitheaters	---	50 - 70	---	above 70
Sports Arena, Outdoor Spectator Sports	---	50 - 75	---	above 75
Playgrounds, Neighborhood Parks	50 - 70	---	67 - 75	above 75
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 - 75	---	70 - 80	above 80
Office Buildings, Business and Professional Commercial	50 - 70	67 - 77	above 75	---
Industrial, Manufacturing, Utilities, Agriculture	50 - 75	70 - 80	above 75	---

[a] Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.
[b] Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
[c] Normally Unacceptable: New construction or development should generally be discouraged. 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.
[d] Clearly Unacceptable: New construction or development should generally not be undertaken.
Source: Office of Planning and Research, State of California General Plan Guidelines, October 2003 (in coordination with the California Department of Health Services (DHS)).

Local Standards

City of Santa Clarita General Plan Noise Element

The Noise Element of the General Plan is a comprehensive program for including noise management in the planning process, providing a tool for planners to use in achieving and maintaining land uses that are compatible with existing and future environmental noise levels. The Noise Element identifies current noise conditions within the planning area, and projects future noise impacts resulting from continued growth allowed by the Land Use Element. The element identifies noise-sensitive land uses and noise sources, and defines areas of noise impact for the purpose of developing programs to ensure that residents in the Santa Clarita Valley will be protected from excessive noise intrusion. As development proposals are reviewed in the future, the City and County will evaluate each proposal with respect to the Noise Element to ensure that noise impacts are reduced through planning and project design. Through implementation of the policies and programs of the Noise Element, current and future adverse noise

impacts will be reduced or avoided in order to protect the general health, safety, and welfare of the community.

The most basic planning strategy to minimize adverse impacts on new land uses due to noise is to avoid designating sensitive land uses in areas that are subject to high levels of noise. Uses such as schools, hospitals, child care, senior care, congregate care, churches, and all types of residential use should be located outside of any area anticipated to exceed acceptable noise levels as defined by the Noise and Land Use Compatibility Guidelines, or should be protected from noise through sound attenuation measures such as site and architectural design and sound walls. As stated previously, the State of California has adopted guidelines for acceptable noise levels in various land use categories (California Office of Planning and Research, General Plan Guidelines 2003, Appendix C). The City of Santa Clarita and the County of Los Angeles have adopted these guidelines in a modified form as a basis for planning decisions based on noise considerations. Modifications were made to eliminate overlap between categories in the table, in order to make the guidelines easier for applicants and decision makers to interpret and apply to planning decisions. These guidelines are shown in Table 5, Noise and Land Use Compatibility Guidelines (City Noise Element). Additional considerations in the determination of noise compatible land uses include the following:

A. Noise Exposure Information Desired. Where sufficient data exists, evaluate land use suitability with respect to a worst-case value of CNEL. Usually, a future projection of noise levels represents the worst case. Existing and future noise contours for freeway, roadway, airport and railroads are provided in the Noise Element.

B. Noise Source Characteristics. The land use-noise compatibility recommendations should be viewed in relation to the specific source of the noise. For example, aircraft and railroad noise is normally made up of higher single noise events than auto traffic but occurs less frequently. Therefore, different sources yielding the same composite noise exposure do not necessarily create the same noise environment. The State Aeronautics Act uses 65 dB CNEL as the criterion which airports must eventually meet to protect existing residential communities from unacceptable exposure to aircraft noise. In order to facilitate the purposes of the Act, one of which is to encourage land uses compatible with the 65 dB CNEL criterion wherever possible, and in order to facilitate the ability of airports to comply with the Act, residential uses located in areas with an aircraft noise level greater than 65 CNEL should be discouraged and considered located within normally unacceptable areas.

C. Suitable Interior Environments. One objective of locating residential units relative to a known noise source is to maintain a suitable interior noise environment at no greater than 45 dB CNEL. This requirement, coupled with the measured or calculated noise reduction performance of the type of structure under consideration, should govern the minimum acceptable distance to a noise source.

D. Acceptable Outdoor Environments. Another consideration, which in some communities is an overriding factor, is the desire for an acceptable outdoor noise environment. The acceptable outdoor noise level is 65 CNEL for rear yard areas, neighborhood parks, and pool recreation areas at multi-family developments.

Table 5
Noise and Land Use Compatibility Guidelines (City Noise Element)

Land Use	Normally Acceptable[a]	Conditionally Acceptable[b]	Normally Unacceptable[c]	Clearly Unacceptable[d]
Residential – Low Density Single-Family, Duplex, Mobile Homes	50 - 60	60 - 70	70 - 75	above 75
Residential - Multi-Family Homes	50 - 60	60 - 70	70 - 75	above 75
Transient Lodging – Motels, Hotels	50 - 60	60 - 70	70 - 80	above 80
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 - 60	60 - 70	70 - 80	above 80
Auditoriums, Concert Halls, Amphitheaters	---	50 - 65	---	above 65
Sports Arena, Outdoor Spectator Sports	---	50 - 75	---	above 75
Playgrounds, Neighborhood Parks	50 - 65	---	65 - 75	above 75
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 - 75	---	70 - 80	above 80
Office Buildings, Business and Professional Commercial	50 - 70	70-75	above 75	---
Industrial, Manufacturing, Utilities, Agriculture	50 - 75	75 - 80	above 80	---

[a] Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.
[b] Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
[c] Normally Unacceptable: New construction or development should generally be discouraged. 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. Sound walls, window upgrades, and site design modifications may be needed in order to achieve City standards.
[d] Clearly Unacceptable: New construction or development should generally not be undertaken.
Source: City of Santa Clarita General Plan Noise Element, Exhibit N-8: Noise and Land Use Compatibility Guidelines, June 2010.

The following relevant and applicable goals, objectives, and policies from the City's Noise Element have been identified for the Project.

Goal N 1: A healthy and safe noise environment for Santa Clarita Valley residents, employees, and visitors.

Objective N 1.1: Protect the health and safety of the residents of the Santa Clarita Valley by the elimination, mitigation, and prevention of significant existing and future noise levels.

Policy N 1.1.1: Use the Noise and Land Use Compatibility Guidelines contained on Exhibit N-8, which are consistent with State guidelines, as a policy basis for decisions on land use and development proposals related to noise.

Policy N 1.1.2: Continue to implement the adopted Noise Ordinance and other applicable code provisions, consistent with state and federal standards, which establish noise impact thresholds for noise abatement and attenuation, in order to reduce potential health hazards associated with high noise levels.

Policy N 1.1.3: Include consideration of potential noise impacts in land use planning and development review decisions.

Policy N 1.1.4: Control noise sources adjacent to residential, recreational, and community facilities, and those land uses classified as noise sensitive.

Goal N 2: Protect residents and sensitive receptors from traffic-generated noise.

Objective N 2.1: Prevent and mitigate adverse effects of noise generated from traffic on arterial streets and highways through implementing noise reduction standards and programs.

Policy N 2.1.1: Encourage owners of existing noise-sensitive uses, and require owners of proposed noise sensitive land uses, to construct sound barriers to protect users from significant noise levels, where feasible and appropriate.

Policy N 2.1.2: Encourage the use of noise absorbing barriers, where appropriate.

Goal N 3: Protect residential neighborhoods from excessive noise.

Objective N 3.1: Prevent and mitigate significant noise levels in residential neighborhoods.

Policy N 3.1.1: Require that developers of new single-family and multi-family residential neighborhoods in areas where the ambient noise levels exceed 60 CNEL provide mitigation measures for the new residences to reduce interior noise levels to 45 CNEL, based on future traffic and railroad noise levels.

Policy N 3.1.2: Require that developers of new single-family and multi-family residential neighborhoods in areas where the projected noise levels exceed 65 CNEL provide mitigation measures (which may include noise barriers, setbacks, and site design) for new residences to reduce outdoor noise levels to 65 CNEL, based on future traffic conditions.

This requirement would apply to rear yard areas for single-family developments, and to private open space and common recreational and open space areas for multi-family developments.

Policy N 3.1.3: Through enforcement of the applicable Noise Ordinance, protect residential neighborhoods from noise generated by machinery or activities that produce significant discernable noise exceeding recommended levels for residential uses.

Policy N 3.1.4: Require that those responsible for construction activities develop techniques to mitigate or minimize the noise impacts on residences, and adopt standards that regulate noise from construction activities that occur in or near residential neighborhoods.

Policy N 3.1.5: Require that developers of private schools, childcare centers, senior housing, and other noise sensitive uses in areas where the ambient noise level exceeds 65 dBA (day), provide mitigation measures for these uses to reduce interior noise to acceptable levels.

Policy N 3.1.7: Ensure that design of parks, recreational facilities, and schools minimize noise impacts to residential neighborhoods.

Policy N 3.1.9: Implement a buyer and renter notification program for new residential developments where appropriate, to educate and inform potential buyers and renters of the sources of noise in the area and/or new sources of noise that may occur in the future. As determined by the reviewing authority, notification may be appropriate in the following areas:

> c. Within 200 feet of commercial uses in mixed-use developments, potential buyers and renters should receive notice that the commercial uses within the mixed-use developments may generate noise in excess of levels typically found in residential areas, that the commercial uses may change over time, and the associated noise levels and frequency of noise events may change along with the use.

City of Santa Clarita Noise Ordinance (Ord. 89-29, 1/23/90)

The City Noise Ordinance provides exterior noise standards within the City and the following references are those portions of the Noise Ordinance that may be applicable to the Project.

Section 11.44.040 (Noise Limits) of the City of Santa Clarita Municipal Code (SCMC)

A. It shall be unlawful for any person within the City to produce or cause or allow to be produced noise which is received on property occupied by another person within the designated region, in excess of the following levels, except as expressly provided otherwise herein:

Region	Time	Sound Level dB
Residential zone	Day	65
Residential zone	Night	55
Commercial and manufacturing	Day	80
Commercial and manufacturing	Night	70

At the boundary line between a residential property and a commercial and manufacturing property, the noise level of the quieter zone shall be used.

B. Corrections to Noise Limits. The numerical limits given in subsection (A) of this section shall be adjusted by the following corrections, where the following noise conditions exist:

Noise Condition	Correction (in dB)
(1) Repetitive impulsive noise	-5
(2) Steady whine, screech or hum	-5
The following corrections apply to day only:	
(3) Noise occurring more than 5 but less than 15 minutes per hour	+5
(4) Noise occurring more than 1 but less than 5 minutes per hour	+10
(5) Noise occurring less than 1 minute per hour	+20

Section 11.44.060 of the SCMC (Special Noise Sources—Radios, Television Sets and Similar Devices)

A. Use Restricted. It shall be unlawful for any person within the City to use or operate any radio receiving set, musical instrument, phonograph, television set, or other machine or device for the producing or reproducing of sound at anytime in such a manner as to produce noise levels on residential land which would disturb the peace, quiet and comfort of neighboring residents or any reasonable person of normal sensitivity residing in the area.

B. Prima Facie Violation. Any noise exceeding the ambient noise limits as set forth in Section 11.44.040 at the property line of any residential land (or if a condominium or apartment house, within any adjoining apartment) by more than five (5) decibels shall be deemed to be prima facie evidence of a violation of the provisions of this section.

Section 11.44.070 of the SCMC (Special Noise Sources—Machinery, Fans and Other Mechanical Devices)

Any noise level from the use or operation of any machinery, equipment, pump, fan, air conditioning apparatus, refrigerating equipment, motor vehicle, or other mechanical or electrical device, or in repairing or rebuilding any motor vehicle, which exceeds the noise limits as set forth in Section 11.44.040 at any property line, or, if a condominium or rental units, within any condominium unit or rental unit within the complex, shall be a violation of this chapter.

Section 11.44.080 of the SCMC (Special Noise Sources—Construction and Building)

No person shall engage in any construction work which requires a building permit from the City on sites within three hundred (300) feet of a residentially zoned property except between the hours of seven a.m. to seven p.m., Monday through Friday, and eight a.m. to six p.m. on Saturday. Further, no work shall be performed on the following public holidays: New Year's Day, Independence Day, Thanksgiving, Christmas, Memorial Day and Labor Day.

Emergency work as defined in Section 11.44.020(D) is permitted at all times. The Department of Community Development may issue a permit for work to be done "after hours"; provided, that containment of construction noises is provided.

EXISTING CONDITIONS

Noise Sensitive Receptors

The City's Noise Element of the General Plan states noise sensitive land uses are those in which persons occupying the use are particularly sensitive to the effects of noise, including housing, schools, medical facilities, libraries, social care facilities, and similar facilities. For purposes of this analysis, noise sensitive receptors within close proximity of the Project Site and having a line-of-sight to the Project construction areas have been graphically identified in Figure 4, Noise Monitoring and Sensitive Receptor Location Map. As shown therein, the nearest sensitive receptors to the Project Site include adjacent residences to the north, adjacent residences to the west, and residences to the south (approximately 300 feet). Additionally, a water quality/detention basin would be developed prior to the Project and would be located near the existing water feature south of Robinson Ranch Road. As shown in Figure 5, Detention Basin Sensitive Receptor Location Map, there are residences located to the south of the proposed detention basin (approximately 380 feet).

Measured Ambient Noise Levels

To establish baseline noise conditions, existing noise levels were monitored at five locations in the vicinity of the Project Site. The locations of where the noise measurements were taken are depicted in Figure 4, Noise Monitoring and Sensitive Receptor Location Map. The noise survey was conducted in September

2018 using the 3M SoundPro SP DL-1 sound level meter, which conforms to industry standards set forth in ANSI S1.4-1983 (R2006) – Specification for Sound Level Meters/Type 1, and is consistent with the sound level meter definition established in the SCMC. This instrument was calibrated and operated according to the manufacturer's written specifications. At the measurement sites, the microphone was placed at a height of approximately five feet above grade. The results of the measurements are summarized in Table 6, Existing Daytime Noise Levels in the Vicinity of the Project Site. As shown in Table 6, the daytime ambient noise levels ranged from 39.8 dBA Leq to 63.3 dBA Leq in the vicinity the Project Site. Based on this data, the calculated CNEL for locations 1 and 4 are 66.9 dBA and 53.6 dBA respectively.

Table 6
Existing Noise Levels in the Vicinity of the Project Site

No.	Noise Measurement Location	Primary Noise Sources	Noise Levels (dBA)		
			L_{eq}	L_{min}	L_{max}
Daytime Measurement (between 7:00 a.m. and 7:00 p.m.)					
1	Western area of the Project Site along Sand Canyon Road, near residential receptors.	Traffic activity along Sand Canyon Road.	63.3	44.8	75.3
2	Northern area of the Project Site along closed Mountain Course.	Open space with distant traffic activity from nearby roads.	39.8	32.6	53.3
3	Eastern area of the Project Site along closed Mountain Course, near residential receptors.	Open space with distant traffic activity from nearby roads.	41.4	36.3	51.0
4	North of the Project Site along Oak Springs Canyon Road, near residential receptors.	Light traffic and residential activity along Oak Springs Canyon Road.	53.3	36.3	75.6
5	South of the Project Site along Robinson Ranch Road, near residential receptors.	Traffic activity along Robinson Ranch Road.	44.4	38.3	58.8
Evening Measurement (between 7:00 p.m. and 10:00 p.m.)					
1	Western area of the Project Site along Sand Canyon Road, near residential receptors.	Traffic activity along Sand Canyon Road.	60.7	51.9	69.9
4	North of the Project Site along Oak Springs Canyon Road, near residential receptors.	Light traffic and residential activity along Oak Springs Canyon Road.	47.8	37.5	61.3
Nighttime Measurement (between 10:00 p.m. and 7:00 a.m.)					
1	Western area of the Project Site along Sand Canyon Road, near residential receptors.	Traffic activity along Sand Canyon Road.	59.6	49.6	74.1
4	North of the Project Site along Oak Springs Canyon Road, near residential receptors.	Light traffic and residential activity along Oak Springs Canyon Road.	44.1	39.7	58.4
Noise measurements were conducted in September of 2018. Noise monitoring data files are provided in Appendix A to this report.					

Figure 4, Noise Monitoring and Sensitive Receptor Location Map

Figure 5, Detention Basin Sensitive Receptor Location Map

Existing Modeled Roadway Noise Levels

Existing roadway noise levels were calculated for primary roadway segments located in proximity to the Project Site. The roadway segments selected for analysis are considered to be those that are expected to be most directly impacted by project-related traffic, which, for the purpose of this analysis, include the roadways that are nearest to the Project Site and had the most project-generated trips. These roadways, when compared to roadways located further away from the Project site, would experience the greatest percentage increase in traffic generated by the Project.

Calculation of the existing roadway noise levels was accomplished using the Federal Highway Administration Highway Noise Prediction Model (FHWA-RD-77-108) and traffic volumes from the project traffic analysis. The 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 (energy rates) utilized in the FHWA Model have been modified to reflect average vehicle noise rates identified for California by Caltrans. The Caltrans data show 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 study area roadway segments are presented in Table 7, Existing (2018) Roadway Noise Levels.

Table 7
Existing (2018) Roadway Noise Levels

Roadway	Roadway Segment	Predominant Existing Land Use Along Segment	dBA CNEL
Sand Canyon Road	North of Lost Canyon Drive	Residential	68.2
	Between Lost Canyon Drive and Robinson Ranch Rd.	Residential	66.9
	South of Robinson Ranch Rd.	Residential	65.4
Traffic data: Sand Canyon Resort Traffic Impact Analysis, Stantec Consulting Services, Inc., November 20, 2018. Noise levels calculated from the nearest receptor location to the roadway centerline. *Calculations provided in Appendix B to this report.*			

Existing Groundborne Vibration Levels

The main sources of groundborne vibration near the Project Site are heavy-duty vehicular travel (e.g., refuse trucks, delivery trucks, and transit buses) on local roadways. Trucks and buses typically generate groundborne vibration velocity levels of around 63 VdB at 50 feet, and these levels could reach 72 VdB where trucks and buses pass over bumps in the road.[5] In terms of PPV levels, a heavy-duty vehicle traveling at a distance of 50 feet can result in a vibration level of approximately 0.001 inch per second.

[5] *FTA, Transit Noise and Vibration Impact Assessment, May 2006.*

ENVIRONMENTAL IMPACTS

Thresholds of Significance

In accordance with Appendix G to the state *CEQA Guidelines*, the Project would have a significant impact on noise if it would cause any of the following conditions to occur:

(a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

(b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;

(c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;

(d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;

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

(f) For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

The Project Site is not located within an airport land use plan, is not located within 2 miles of a public or public-use airport, and is not located within the vicinity of a private airstrip. Therefore, no impacts with respect to criterion (e) and (f) would occur and no further analysis is required.

The state CEQA Guidelines do not define the levels at which groundborne vibration or groundborne noises are considered "excessive." Thus, in terms of construction-related vibration impacts on buildings, the adopted guidelines and recommendations by the FTA to limit groundborne vibration based on the age and/or condition of the structures that are located in close proximity to construction activity are used in this analysis to evaluate potential groundborne vibration impacts. Based on the FTA criteria, construction impacts relative to groundborne vibration would be considered significant if the following were to occur:

- Project construction activities would cause a PPV groundborne vibration level to exceed 0.5 inches per second at any building that is constructed with reinforced-concrete, steel, or timber;

- Project construction activities would cause a PPV groundborne vibration level to exceed 0.3 inches per second at any engineered concrete and masonry buildings;

- Project construction activities would cause a PPV groundborne vibration level to exceed 0.2 inches per second at any non-engineered timber and masonry buildings; or

- Project construction activities would cause a PPV ground-borne vibration level to exceed 0.12 inches per second at any historical building or building that is extremely susceptible to vibration damage.

In terms of groundborne vibration impacts associated with human annoyance, this analysis uses the FTA's vibration impact thresholds for sensitive buildings, residences, and institutional land uses under conditions where there are a frequent number of events per day, which would provide for the most conservative vibration analysis. These thresholds are 65 VdB at buildings where vibration would interfere with interior operations, 72 VdB at residences and buildings where people normally sleep, and 75 VdB at other institutional buildings.[6] The 65 VdB threshold applies to typical land uses where vibration would interfere with interior operations, including vibration-sensitive research and manufacturing facilities, hospitals with vibration-sensitive equipment, and university research operations. Vibration-sensitive equipments include, but are not limited to, electron microscopes, high-resolution lithographic equipment, and normal optical microscopes. The 72 VdB threshold applies to all residential land uses and any buildings where people sleep, such as hotels and hospitals. The 75 VdB threshold applies to institutional land uses such as schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment, but still have the potential for activity interference.

The state CEQA Guidelines do not define the levels at which noise would be considered substantial increases. Thus, for purposes of this analysis, the Project would normally have a significant impact on noise levels from project operations if the project causes the ambient noise level measured at the property line of affected uses to increase by 3 dBA if the total ambient noise levels without the Project exceed the City's General Plan exterior noise standards, or any 5 dBA or greater noise increase when total ambient noise levels without the Project are within the City's General Plan exterior noise standards (see "conditionally acceptable" column in Table 5 earlier in this report).

Project Impacts

Detention Basin

As stated previously, a water quality/detention basin would be developed prior to the Project and would be located near the existing water feature south of Robinson Ranch Road. This phase would be short term

[6] *FTA, Transit Noise and Vibration Impact Assessment, May 2006.*

and intermittent, and the detention basin would not generate substantial operational noise levels. However, the noise and groundborne vibration impacts associated with the development of the detention basin have been included in the analysis below.

Construction Noise

Construction of the Project would require the use of heavy equipment for grading/excavation, installation of utilities, building fabrication, and finishing. Construction activities would also involve the use of smaller power tools, generators, and other sources of noise. During each stage of construction, several types of equipment potentially could be operating concurrently and noise levels would vary based on the amount of equipment in operation and the location of the activity. The Federal Highway Administration's (FHWA) Roadway Construction Noise Model has compiled data regarding the noise-generating characteristics of specific types of construction equipment and typical construction activities. The data pertaining to the types of construction equipment and activities that would occur at the Project Site are presented in Table 8, Noise Range of Project Construction Equipment.

Table 8
Noise Range of Project Construction Equipment

Equipment	Estimated Usage Factor %[a]	Typical Noise Level at 50 Feet (dBA Lmax)
Air Compressor	40	77.7
Backhoe	40	77.6
Crane	16	80.6
Dozer	40	81.7
Excavator	40	80.7
Forklift	20	75.0
Generator	50	80.6
Grader	40	85.0
Dump Truck	40	76.5
Paver	50	77.2
Paving Scarifier	20	89.5
Roller	20	80.0
Scraper	40	83.6
Tractor	40	84.0
Trencher	50	80.4
Welders	40	74.0

[a] Usage factor represents the percentage of time the equipment would be operating at full speed.
Source: FHWA Roadway Construction Noise Model User's Guide, 2006

Noise levels would diminish notably with distance from the construction site at a rate of 6 dBA per doubling of distance (noise from stationary or point sources is reduced by about 6 dBA for every doubling of distance at acoustically hard locations). For example, a noise level of 86 dBA L_{eq} measured at 50 feet from the noise source to the receptor would decline to 80 dBA L_{eq} at 100 feet from the source to the receptor, and fall by another 6 dBA L_{eq} to 74 dBA L_{eq} at 200 feet from the source to the receptor. These

noise attenuation rates assume a flat and unobstructed distance between the noise generator and the receptor. Intervening structures and vegetation would further attenuate (reduce) the noise.

As shown in Table 9, Estimated Exterior Construction Noise at Sensitive Receptors, the construction noise levels forecasted for the proposed construction work would result in noise increases at all of the sensitive receptors. Increases in noise levels at sensitive receptors during construction would be temporary and would not generate continuously high noise levels. In addition, the construction noise experienced at sensitive receptors during the initial periods of construction (i.e., grading and excavation work) typically would be reduced in the later construction periods (i.e., interior building construction). As the structure is built, the noise from interior construction work would be reduced at off-site locations because the proposed structure would break the line-of-sight noise transmission from the interior construction area to the exterior areas of sensitive receptors.

Table 9
Estimated Exterior Construction Noise at Sensitive Receptors

Sensitive Land Uses[a]	Distance to Project Site (feet)	Existing Monitored Daytime Ambient Noise Levels (dBA L_{eq})	Estimated Peak Construction Noise Levels (dBA)	Noise Level Increase
Detention Basin Prior to Project Construction				
1. Residential uses to south	380	44.4	68.5	24.1
Project Construction Noise				
1. Residential uses to north	Adjacent[b]	53.3	99.5	46.2
2. Residential uses to west	Adjacent[b]	63.3	99.5	36.2
3. Residential uses to south	300	44.4	73.5	29.1

[a] See Figure 4 (Noise Monitoring and Sensitive Receptor Location Map).
[b] While the Project includes construction activity up to the property lines of adjacent buildings, this analysis assumes that not all equipment would operate closer than 15 feet from the residential uses during peak activities.
See Appendix C for data sheets. Modeling based on Federal Highway Administration, Roadway Construction Noise Model, January 2006.
Source: Pomeroy Environmental Services, 2018.

The detention basin and Project's construction-related noise levels at the above mentioned sensitive receptors would have the potential to exceed the City's exterior daytime noise standards identified previously. However, it should be noted that the Project would be consistent with Section 11.44.080 of the SCMC (Special Noise Sources—Construction and Building), which states no person shall engage in any construction work which requires a building permit from the City on sites within three hundred (300) feet of a residentially zoned property except between the hours of seven a.m. to seven p.m., Monday through Friday, and eight a.m. to six p.m. on Saturday. Nevertheless, as temporary construction noise levels would exceed exterior daytime noise standards, construction noise impacts would be considered potentially significant.

Construction-Related Groundborne Vibration

Construction activities that would occur within the Project Site would have the potential to generate low levels of groundborne vibration. Table 10, Vibration Source Levels for Construction Equipment, identifies various PPV and RMS velocity (in VdB) levels for the types of construction equipment that would operate during the construction of the Project. Based on the information presented in Table 10, vibration velocities could reach as high as approximately 0.089 inches per second PPV at 25 feet from the source activity, depending on the type of construction equipment in use. This corresponds to a RMS velocity level (in VdB) of 87 VdB at 25 feet from the source activity.

Table 10
Vibration Source Levels for Construction Equipment

Equipment	Approximate PPV (in/sec)				Approximate RMS (VdB)			
	25 Feet	50 Feet	75 Feet	100 Feet	25 Feet	50 Feet	75 Feet	100 Feet
Large Bulldozer	0.089	0.031	0.017	0.011	87	78	73	69
Caisson Drilling	0.089	0.031	0.017	0.011	87	78	73	69
Loaded Trucks	0.076	0.027	0.015	0.010	86	77	72	68
Jackhammer	0.035	0.012	0.007	0.004	79	70	65	61
Small Bulldozer	0.003	0.001	0.0006	0.0004	58	49	44	40

Note: in/sec = inches per second.
Source: FTA, Transit Noise and Vibration Impact Assessment, Final Report, 2006.

With respect to human annoyance, residential sensitive receptors located within 75 feet of the Project Site boundaries could experience construction related vibration levels of up to approximately 73-87 VdB. These levels would exceed the FTA's vibration impact threshold of 72 VdB for residences and buildings where people normally sleep. With regard to the proposed detention basin, the nearest sensitive receptors are located approximately 380 feet from the detention basin boundaries. As such, temporary construction vibration levels during development of the detention basin would not have the potential to exceed residential annoyance thresholds. Similar to construction noise sources, it should be noted that the Project would be consistent with Section 11.44.080 of the SCMC (Special Noise Sources—Construction and Building), which states no person shall engage in any construction work which requires a building permit from the City on sites within three hundred (300) feet of a residentially zoned property except between the hours of seven a.m. to seven p.m., Monday through Friday, and eight a.m. to six p.m. on Saturday. Nevertheless, as temporary construction vibration levels would exceed residential annoyance thresholds, impacts would be considered potentially significant.

With respect to building damage, heavy project construction activities would not occur within close proximity to any known off-site historical building or building that is extremely susceptible to vibration damage. As discussed previously, vibration thresholds relative to historic and potentially historic buildings

are more restrictive than the threshold for non-engineered timber and masonry buildings. Specifically, Project construction activities could result in significant impacts if a PPV ground-borne vibration level was to exceed 0.12 inches per second at any historical building or building that is extremely susceptible to vibration damage. As there are no known off-site historical buildings or buildings that are extremely susceptible to vibration damage within 25 feet of heavy project construction activities (resulting in a peak PPV of 0.089 in/sec), there is no potential for the Project to generate ground-borne vibration levels that exceed the threshold of 0.12 inches per second at a historical building, or any building that is extremely susceptible to vibration damage. With regard to the proposed detention basin, there are no known off-site historical buildings or buildings that are extremely susceptible to vibration damage within 25 feet of the detention basin boundaries. As such, there is no potential for the development of the detention basin to generate ground-borne vibration levels that exceed the threshold of 0.12 inches per second. Thus, impacts with respect to building damage would be less than significant.

Operational Noise Impacts

Traffic Noise Generation

The increase in traffic resulting from implementation of the Project would increase ambient noise levels at off-site locations in the Project vicinity. These concerns were addressed using the FHWA TNM model, which calculates the CNEL noise level for a particular reference set of input conditions, based on site-specific traffic volumes, distances, speeds and/or noise barriers. Based on the traffic analysis prepared for the Project in combination with an analysis of the surrounding land uses, roadway noise levels were forecasted to determine if the Project's vehicular traffic would result in a significant impact at off-site locations.

Off-site locations in the Project vicinity would experience an increase in noise resulting from the additional traffic generated by the Project. The Project-related increases in noise levels at the primary roadway segments located in proximity to the Project Site are identified in Table 11, Project Roadway Noise Levels. As shown in Table 11, the Project would increase local noise levels by a maximum of 1.1 dBA CNEL during the 2023 With Project scenario for the roadway segment of Sand Canyon Road between Lost Canyon Drive and Robinson Ranch Road. All other roadway segments would not experience noise level increases by more than 0.9 dBA CNEL and these increases would be less than the 3 dBA and 5 dBA CNEL thresholds identified previously. As such, the Project's traffic-related noise level increases would not exceed thresholds of significance, and off-site traffic noise levels associated with the Project would be less than significant.

Table 11
Project Roadway Noise Levels

Roadway	Roadway Segment	dBA CNEL					
		2023 Without Project [1]	**2023 With Project [2]**	***Project Net Increase [2] – [1]***	**2028 Without Project [3]**	**2028 With Project [4]**	***Project Net Increase [4] – [3]***
Sand Canyon Road	North of Lost Canyon Dr.	68.7	69.6	***0.9***	71.1	71.7	***0.6***
	Between Lost Canyon and Robinson Ranch	67.9	69.0	***1.1***	69.0	69.9	***0.9***
	South of Robinson Ranch	65.8	65.9	***0.1***	67.5	67.6	***0.1***
Traffic data: Sand Canyon Resort Traffic Impact Analysis, Stantec Consulting Services, Inc., November 20, 2018. Noise levels calculated from the nearest receptor location to the roadway centerline. *Calculations provided in Appendix B to this report.*							

Parking Noise

Parking will be provided as required by the Code with surface parking. Various noise events would occur periodically from the parking uses. Such periodic events would include activation of car alarms, sounding of car horns, slamming of car doors, engine revs, and tire squeals. Automobile movements would comprise the most continuous noise source and would generate a noise level of approximately 65 dBA at a distance of 25 feet. Car alarm and horn noise events generate sound levels as high as 75 dBA at a reference distance of 25 feet, however these noise sources would be sporadic. Thus, these parking related noise sources would not have the potential to exceed the City's exterior noise standards. It should also be noted that the existing Sand Canyon Country Club currently generates noise levels associated with parking and vehicular noise sources identified above. Although the Project would increase the number of vehicles parking in the area, the types of noise would be similar to those currently occurring at the Sand Canyon Country Club. While periodic noise levels from car alarms, horns, slamming of doors, etc., would increase as a result of the Project, these events would not occur consistently over a 24-hour period and thus would not have the potential to increase ambient noise levels at off-site locations by 5 dBA CNEL or more, nor exceed the City's exterior noise standards at off-site locations. As such, noise impacts from the parking areas would be considered less than significant.

Stationary Noise Sources

As part of the Project, new mechanical equipment, HVAC units, and exhaust fans could be installed on the roof or near the proposed new structures. Although the operation of this equipment would generate noise, the design of these on-site HVAC units and exhaust fans would be required to comply with the regulations of the SCMC. Specifically, Section 11.44.070 of the SCMC states any noise level from the use or operation of any machinery, equipment, pump, fan, air conditioning apparatus, refrigerating equipment, motor vehicle, or other mechanical or electrical device, or in repairing or rebuilding any motor vehicle, which exceeds the noise limits as set forth in Section 11.44.040 at any property line, or, if a

condominium or rental units, within any condominium unit or rental unit within the complex, shall be a violation of this chapter. Similarly, Section 11.44.060 of the SCMC states any noise level from the use or operation any radio receiving set, musical instrument, phonograph, television set, or other machine or device for the producing or reproducing of sound at anytime in such a manner as to produce noise levels on residential land which would disturb the peace, quiet and comfort of neighboring residents or any reasonable person of normal sensitivity residing in the area shall be unlawful. In addition to these requirements, the Project will screen mechanical equipment as feasible and necessary to meet City noise standards. The method of screening would be architecturally compatible with project features and would blend with the building designs. As such, compliance with Section 11.44.070 of the SCMC would ensure noise from stationary sources would be less than significant.

Outdoor Spaces

The Project includes outdoor open spaces that would have the potential to generate outdoor noise that could impact nearby receptors. The north area of the Project Site (See Noise Monitoring Location 2) would feature several outdoor amenities such as a pool courtyard, a family pool area, and a wedding garden. The pool courtyard would be located between the Functions Building and Spa Building and the family pool area would be located east of the Functions Building and Spa Building. The wedding garden would be located between the two proposed buildings for the Wedding Garden Resort. Additionally, one tennis court, six pickle-ball courts, a playground, and a 9-hole miniature golf course are proposed for the east area of the Project Site, adjacent to the existing Sand Canyon Country Club parking lot. The Project also includes 3 miles of multi-purpose trails and private balconies for the villas and hotel.

Noise associated with outdoor amenities would consist primarily of people talking, which typically results in noise levels of approximately 60-65 dBA at three feet.[7] However, some outdoor areas could produce higher noise levels in various areas of the Project Site. Specifically, the wedding garden could be used to host events which may include amplified music or live performances. However, it should be noted the nearest receptor to this area is approximately 300 feet away, and it would be located between the two the Wedding Garden Resort buildings blocking line-of-site with receptors. Moreover, the Project would be subject to Section 11.44.060 of the SCMC which states the use or operation any radio receiving set, musical instrument, phonograph, television set, or other machine or device for the producing or reproducing of sound at anytime in such a manner as to produce noise levels on residential land which would disturb the peace, quiet and comfort of neighboring residents or any reasonable person of normal sensitivity residing in the area shall be unlawful.

The Project would also include two swimming pools. With respect to potential swimming pool noise, typical noise levels for recreational swimming, including children playing, range from approximately 64.8

[7] *California Department of Transportation, Technical Noise Supplement, Page 2-20, September 2013. See Table 1 provided previously in this document.*

Leq dBA at a distance of 50 feet from the source.[8] The nearest receptor to the pool courtyard is approximately 600 feet away, and the pool courtyard would be located between the Functions Building and Spa Building, blocking line-of-site with receptors. The nearest receptor to the family pool area is approximately 300 feet away. Though no structures would block line-of-sight with receptors, noise would be reduced due to distance. As stated previously, noise from stationary or point sources is reduced by about 7.5 dBA for every doubling of distance at acoustically soft locations (i.e., the area between the source and receptor is normal earth or has vegetation, including grass). Therefore, pool related noise would be approximately 46.1 dBA at the nearest receptors. This would be substantially similar, and potentially less than, existing noise levels at nearby receptors. Moreover this would not exceed the residential noise limits as set forth in Section 11.44.040 of the SCMC.

The east area of the Project Site would include one tennis court and six pickle-ball courts which could generate elevated noise levels at nearby sensitive receptors. The nearest sensitive receptor to these uses is located approximately 200 feet from this area. A previous noise study shows that typical noise levels for pickle-ball courts range from approximately 57.0 Leq dBA to 66.9 Leq dBA at a distance of 10 feet from the court.[9] As stated previously, noise from stationary or point sources is reduced by about 7.5 dBA for every doubling of distance at acoustically soft locations (i.e., the area between the source and receptor is normal earth or has vegetation, including grass). Therefore, noise would be reduced to approximately 35.0 dBA at the nearest receptors. This would be substantially similar, and usually less than, existing noise levels at nearby receptors. Moreover this would not exceed the residential noise limits as set forth in Section 11.44.040 of the SCMC. It should also be noted the site was previously utilized as a full 9-hole course that historically generated outdoor recreational noise for years, so the utilization of a less-intense outdoor activity, would not be considered a new type of noise source to the vicinity. Based of the discussion above, the Project would not result in a significant impact related to outdoor noise.

Exposure to Elevated Noise Levels

As shown in Table 12 later in this report, future cumulative exterior noise levels could reach up to 72.0 dBA CNEL along Sand Canyon Road. While the Project would contribute to these future cumulative traffic noise levels (less than 0.9 dBA CNEL increase at worst-case location as shown in Table 12), these noise levels are primarily a result of traffic from existing conditions, ambient growth, cumulative development, and general plan buildout to the future year 2040. As such, it is possible for on-site uses with a direct line-of-sight to these roadways may experience exterior noise levels above the City's exterior noise standard of 65 dBA CNEL. However, it should be noted that these calculations are based on the worst-case locations immediately adjacent to the property lines along the roadways. Uses with greater setbacks and without

[8] *Reference noise data for pool sources is provided in Appendix A to this report. Reference data collected by PES at Sierra Hills Swim and Racquet Club.*

[9] *Acoustic Group, Inc., Noise Study for the Cimarron Pickleball Courts in Surprise, AZ, September 9, 2012. Reference noise data provided in Appendix A to this report.*

a direct line-of-sight to these roadways are expected to experience exterior noise levels below the City's exterior noise standard of 65 dBA CNEL (i.e., locations where project building facades, topography or vegetation along the site's boundary will shield internal on-site uses from the roadway noise). Based on data published by the Federal Highway Administration, such conditions can reduce line-of-sight noise levels by approximately 10 dBA for some locations.[10] Assuming a 10 dBA reduction described above, uses with greater setbacks and without a direct line-of-sight to the roadways would experience exterior noise levels of approximately 62.0 dBA CNEL. These noise levels would be within the City's exterior noise standard of 65 dBA CNEL. As such, these impacts would be considered less than significant.

Operational Vibration Impacts

The Project would not include any stationary equipment that would result in excessive vibration levels. Groundborne vibration at the Project Site and immediate vicinity currently result from heavy-duty vehicular travel (e.g., refuse trucks and transit buses) on the nearby local roadways, and the proposed land uses at the Project Site would not result in substantial increased use of these heavy-duty vehicles. While refuse trucks would be used for the disposal of solid waste at the Project Site, these trips are already occurring at the Sand Canyon Country Club and within the neighborhood and only occur once a week. The number of transit buses that travel along adjacent roadways would also not substantially increase due to the Project. Thus, vibration impacts associated with operation of the Project would be less than significant.

CUMULATIVE IMPACTS

This cumulative impact analysis considers development of the Project in combination with ambient growth and other development projects within the vicinity. As noise is a localized phenomenon and decreases in magnitude as distance from the source increases, only projects and ambient growth in the nearby area could combine with the Project to result in cumulatively considerable noise impacts.

Construction Noise

Construction of the Project in combination with related projects could result in an increase in construction-related noise and vibration levels in this urbanized area of the City. However, all of the related projects would be subject to the SCMC, which limits the hours of allowable construction activities. In addition, each of the related projects could be subject to additional project-specific mitigation measures aimed at the reduction of construction noise and vibration levels. Furthermore, as noise is a localized phenomenon and decreases in magnitude as distance from the source increases, it is unlikely that Project-related construction activities would combine with construction activities associated with the related

[10] *Based on a review of Table 4 of the FHWA Noise Barrier Design Handbook (July 14, 2011), the design feasibility of a sound barrier that reduces noise by 10 dBA is defined as "attainable."*

projects to generate a cumulatively considerable noise and vibration impact during construction. As such, cumulative impacts with respect to construction noise and vibration would be less than significant.

Operational Noise

Cumulative mobile source noise impacts would occur primarily as a result of increased traffic on local roadways due to the Project, ambient growth, and related projects/cumulative development within the study area. Therefore, cumulative traffic-generated noise impacts have been assessed based on the contribution of the Project to the Future With Project (2040) volumes on the roadway segments in the project vicinity. As shown below in Table 12, Future Roadway Noise Levels, column [3] minus column [1] would yield an increase in cumulative roadway noise levels with the Project for future year 2040 compared to existing conditions (i.e., existing conditions, plus project, plus ambient growth, plus related projects/cumulative development). As shown in Table 12, cumulative traffic noise levels for the year 2040 would increase by a maximum of 3.8 dBA CNEL for the roadway segment of Sand Canyon Road, north of Lost Canyon Drive, and 3.0 dBA CNEL at Sand Canyon Road between Lost Canyon Drive and Robinson Ranch Road.

Table 12
Future Roadway Noise Levels

Roadway	Roadway Segment	dBA CNEL				
		Existing (2018) [1]	2040 Without Project [2]	2040 With Project [3]	*Project Net Increase* [3]-[2]	*Cumulative Net Increase* [3]-[1]
Sand Canyon Road	North of Lost Canyon Dr.	68.2	71.5	72.0	***0.5***	***3.8***
	Between Lost Canyon and Robinson Ranch	66.9	69.0	69.9	***0.9***	***3.0***
	South of Robinson Ranch	65.4	67.6	67.6	***0.0***	***2.2***

Traffic data: Sand Canyon Plaza Traffic Impact Analysis, Stantec Consulting Services, Inc., November 2015. Noise levels calculated from the nearest receptor location to the roadway centerline.
Calculations provided in Appendix B to this report.

As described previously, a significant impact would occur when noise levels increase by more than 3 dBA CNEL where future noise levels exceed acceptable levels (i.e., 70 dBA CNEL for residential areas). Although the Project would only contribute a maximum increase of 0.9 dBA CNEL for future 2040 traffic noise levels, cumulative impacts would be considered significant for the following roadway segments along Sand Canyon because cumulative increases exceed 3 dBA: Sand Canyon Road, north of Lost Canyon Drive; and, Sand Canyon Road between Lost Canyon Drive and Robinson Rand Road.

MITIGATION MEASURES

Regulatory Compliance Measures

1. The Project shall adhere to Section 11.44.080 of the SCMC (Special Noise Sources—Construction and Building). As stated therein, no person shall engage in any construction work which requires a building permit from the City on sites within three hundred (300) feet of a residentially zoned property except between the hours of seven a.m. to seven p.m., Monday through Friday, and

eight a.m. to six p.m. on Saturday. Further, no work shall be performed on the following public holidays: New Year's Day, Independence Day, Thanksgiving, Christmas, Memorial Day and Labor Day.

Construction Noise & Vibration Mitigation Measures

1. Noise and groundborne vibration construction activities whose specific location on the Project Site may be flexible (e.g., operation of compressors and generators, cement mixing, general truck idling) shall be conducted as far as possible from the nearest off-site land uses.
2. When possible, construction activities shall be scheduled so as to avoid operating several pieces of equipment simultaneously, which causes high noise levels.
3. Flexible sound control curtains shall be placed around all drilling apparatuses, drill rigs, and jackhammers when in use.
4. The Project contractor shall use power construction equipment with state-of-the-art noise shielding and muffling devices.
5. Barriers such as flexible sound control curtains shall be erected around heavy equipment to minimize the amount of noise on the surrounding land uses to the maximum extent feasible during construction.
6. All construction truck traffic shall be restricted to truck routes approved by the City, which shall avoid residential areas and other sensitive receptors to the extent feasible.
7. A construction notice shall be prepared and shall include the following information: job site address, permit number, name and phone number of the contractor and owner or owner's agent, hours of construction allowed by code or any discretionary approval for the site, and City telephone numbers where violations can be reported. The notice shall be posted and maintained at the construction site prior to the start of construction and displayed in a location that is readily visible to the public and approved by the City.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Construction Impacts

The Project's temporary construction noise levels would exceed exterior daytime noise standards at the identified sensitive receptors. As noted previously and as required in Regulatory Compliance Measure 1, the Project would be consistent with Section 11.44.080 of the SCMC (Special Noise Sources—Construction and Building), which states no person shall engage in any construction work which requires a building permit from the City on sites within three hundred (300) feet of a residentially zoned property except between the hours of seven a.m. to seven p.m., Monday through Friday, and eight a.m. to six p.m. on Saturday. In addition, Construction Noise & Vibration Mitigation Measures 1 through 7 would serve to reduce construction noise levels to the maximum extent feasible. Nevertheless, the Project's temporary construction noise levels would be considered significant and unavoidable.

The Project's temporary construction vibration levels would exceed human annoyance thresholds at the identified sensitive receptors. As noted previously and as required in Regulatory Compliance Measure 1, the Project would be consistent with Section 11.44.080 of the SCMC (Special Noise Sources—Construction and Building), which states no person shall engage in any construction work which requires a building permit from the City on sites within three hundred (300) feet of a residentially zoned property except between the hours of seven a.m. to seven p.m., Monday through Friday, and eight a.m. to six p.m. on Saturday. In addition, Construction Noise & Vibration Mitigation Measures 1 through 7 would serve to reduce construction vibration levels to the maximum extent feasible. Nevertheless, the Project's temporary construction vibration levels (human annoyance) would be considered significant and unavoidable.

Operational Impacts

The Project's generation of operational traffic, parking and stationary noise levels would be less than significant.

The Project's generation of operational vibration levels would be less than significant.

Exterior noise levels for the proposed rear yard areas, open space areas, and recreational areas would be consistent with the City's exterior noise standards. This impact would be less than significant.

Cumulative mobile source noise impacts would occur primarily as a result of increased traffic on local roadways due to the Project, ambient growth, and related projects/cumulative development within the study area; cumulative traffic noise level increases would be considered significant on Sand Canyon Road, north of Lost Canyon Drive, and Sand Canyon Road between Lost Canyon Drive and Robinson Ranch Road. However, given the Project would result in a maximum increase of 0.9 dBA CNEL for future 2040 traffic noise levels along these segments, the Project would not have a considerable contribution to cumulatively significant traffic noise level increases. Although the Project would only contribute a maximum increase of 0.9 dBA CNEL for future 2040 traffic noise levels, cumulative traffic noise level increases would be considered significant Sand Canyon Road, north of Lost Canyon Drive, and Sand Canyon Road between Lost Canyon Drive and Robinson Ranch Road. As no feasible mitigation is available to reduce this impact, cumulative traffic noise impacts would be considered significant and unavoidable.