APPENDIX G

NOISE

Noise Technical Memorandum

Michael Baker INTERNATIONAL

We Make a Difference

MEMORANDUM

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Date: March 31, 2017

Subject: Brentwood Golf Course Redevelopment Project – Noise Technical Memorandum

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PURPOSE

The purpose of this technical memorandum is to evaluate potential short- and long-term noise and groundborne vibration impacts as a result of the proposed Brentwood Golf Redevelopment Project (project), located in Brentwood, California.

PROJECT LOCATION

The project site located within Deer Ridge Golf Club (Deer Ridge) and Shadow Lakes Golf Club (Shadow Lakes) in the City of Brentwood approximately 0.5 miles west of Highway 4. The Shadow Lakes site borders Balfour Road to the south and the Deer Ridge site is located south of Balfour Road bordering Foothill Drive to the west.

The project sites are within the existing PD-18 and PD-20 zoning uses respectively. This is comprised entirely of single-family residential and golf course uses. The Shadow Lakes Golf Club (PD-18) also encompasses a small portion of neighborhood commercial uses on the western portion of the site. Heritage High School is located directly west of the Deer Ridge Country Club, whereas the John Muir Medical Center as well as the R. Paul Krey Elementary School are located directly east. Residential uses surround the greater proximity of the two sites.

PROJECT DESCRIPTION

The proposed project includes the modification of the Shadow Lakes Golf Club and Deer Ridge Country Club to combine the two existing courses (18-holes each; 36-holes total) into one (1) eighteen (18) hole golf course. The project would then utilize a portion of the available land of each the existing golf courses and redevelop each portion into two new senior living facilities. The frontage of the Shadow Lakes Golf Club shall be developed into an approximately 17 acre senior living facility. The club house and parking area of Deer Ridge Country Club, as well as a portion of the golf course, would be developed into an additional approximately 9 acres of senior living.

The area to the east of the Shadow Lakes Club House is identified as residential village (Village 1). The proposed village may accommodate up to 310 units in multiple buildings. It is anticipated that the buildings could be all used all as active adult residential buildings or could include up to 100 units as an assisted care facility. The area around the existing Deer Ridge Club House would be developed as a residential village (Village 2). The proposed village may accommodate up to 250 units in multiple buildings. It is anticipated that the buildings could be all used all as active adult residential buildings or could include up to 100 units as an assisted care facility.

The project would require a General Plan amendment, rezoning by way of a Planned Development, and subdivision approvals. The project would total approximately 364 acres with 338 acres devoted to open space areas and 17 acres devoted to village one and 9 acres devoted to village two.

FUNDAMENTALS OF SOUND AND ENVIRONMENTAL NOISE

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air, and is characterized by both its amplitude and frequency (or pitch). The human ear does not hear all frequencies equally. In particular, the ear de-emphasizes low and very high frequencies. To better approximate the sensitivity of human hearing, the A-weighted decibel scale (dBA) has been developed. On this scale, the human range of hearing extends from approximately three dBA to around 140 dBA.

Noise is generally defined as unwanted or excessive sound, which can vary in intensity by over one million times within the range of human hearing; therefore, a logarithmic scale, known as the decibel scale (dB), is used to quantify sound intensity. Noise can be generated by a number of line sources, including mobile sources such as automobiles, trucks, and airplanes, and stationary sources such as construction sites, machinery, and industrial operations. 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 propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. 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 (FHWA 2011). 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 (FHWA 2011).

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. Regarding increases in dBA, the following relationships should be noted in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived by humans.

- Outside of the laboratory, a 3 dBA change is considered a just-perceivable difference.

- A change in level of at least 5 dBA is required before any noticeable change in community response would be expected. An increase of 5 dBA is typically considered substantial.

- A 10 dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

FUNDAMENTALS OF ENVIRONMENTAL GROUNDBORNE VIBRATION

Sources of earthborne 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 1, *Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibration Levels*, 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.

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 section (in/sec) is used to evaluate construction-generated vibration for building damage and human complaints.

Table 1
Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibration Levels

Peak Particle Velocity (inches/second)	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: Caltrans 2004

REGULATORY SETTING

State of California

California Noise Control Act of 1973

Sections 46000 through 46080 of the California Health and Safety Code, known as the California Noise Control Act, find that excessive noise is a serious hazard to public health and welfare and that exposure to certain levels of noise can result in physiological, psychological, and economic damage. The act also finds that there is a continuous and increasing bombardment of noise in urban, suburban, and rural areas. The California Noise Control Act declares that the State of California has a responsibility to protect the health and welfare of its citizens by the control, prevention, and abatement of noise. It is the policy of the state to provide an environment for all Californians that is free from noise that jeopardizes their health or welfare.

California Noise Insulation Standards (CCR Title 24, Part 2, Chapter 2-35)

In 1974, the California Commission on Housing and Community Development adopted noise insulation standards for multi-family residential buildings (Title 24, Part 2, California Code of Regulations). Title 24 establishes standards for interior room noise (attributable to outside noise sources). The regulations also specify that acoustical studies must be prepared whenever a multi-family residential building or structure is proposed to be located near an existing or adopted freeway route, expressway, parkway, major street, thoroughfare, rail line, rapid transit line, or industrial noise source, and where such noise source or sources create an exterior CNEL (or L_{dn}) of 60 dBA or greater. Such acoustical analysis must demonstrate that the residence has been designed to limit intruding noise to an interior CNEL (or L_{dn}) of at least 45 dBA.

City of Brentwood

Brentwood Municipal Code

Noise regulations listed in City of Brentwood's Municipal Code are designed or the sole purpose of securing and promoting the public health, comfort, safety and welfare of its residents. The goal is to maintain and preserve the quiet atmosphere of the city, and to implement programs and enact legislation consistent with the objectives and goals set forth in the noise element of the general plan and aimed at retaining noise levels throughout the city acceptable values established in the general plan.

Section 9.32.030 provides exterior and interior standards for the City. Table 2, *City of Brentwood Exterior Noise Standards*, depicts the City's exterior noise standards for residential, commercial, and industrial uses.

Table 2
City of Brentwood Exterior Noise Standards

Zones #'s	Designated Zone	Time Interval	Exterior Noise Levels
Zone I	Residential	7 am-10 pm	60
		10 pm-7 am	45
Zone II	Commercial	7 am - 10 pm	60
		10 pm - 7 am	45
Zone III	Industrial	7 am - 10 pm	65
		10 pm - 7 am	60

Source: City of Brentwood Municipal Code, Section 9.32.030

Table 3, *City of Brentwood Interior Noise Standards*, lists interior noise levels that shall apply within all receiving multi-family residential units within noise zone I and II (residential and commercial).

Table 3
City of Brentwood Interior Noise Standards

	Time Interval	Interior Noise
Multi-family residential	10:00 p.m. to 7:00 a.m.	40
	7:00 a.m. to 10:00 a.m.	45

Source: City of Brentwood Municipal Code, Section 9.32.030

The following construction noise standards are from Section 9.32.050 of the City's Municipal Code:

A. Outside Heavy Construction. Monday through Thursday between the hours of five p.m. of one day and eight a.m. of the next, Friday between the hours of five p.m. of one day and nine a.m. of the next, Saturday after four p.m., and never on Sunday or city holidays, no person adjacent to or within any residential zone in the city shall operate power construction equipment or perform any outside construction work or operate any other

construction device so as to create any noise, which exceeds the noise level limits. These specified construction activities are permitted between the hours of eight a.m. and five p.m. Monday through Friday, nine a.m. and four p.m. Saturday with city engineer approval only, and never on Sunday or city holidays

B. Outside Carpentry Construction. Monday through Thursday between the hours of seven p.m. of one day and seven a.m. of the next, Friday between the hours of seven p.m. of one day and nine a.m. of the next, Saturday after five p.m. and never on Sunday or city holidays, no person in a residential zone shall operate or permit the operation of any mechanically powered saw, sander, drill, grinder or similar tools, so as to create any noise which exceeds the noise level limits of this article unless it is within a completely enclosed structure. These specified domestic activities are permitted between the hours of seven a.m. and seven p.m. Monday through Friday, nine a.m. and five p.m. Saturday and never on Sunday or city holidays.

City of Brentwood General Plan

The Noise Element is a mandatory component of the General Plan. The overall purpose of the Noise Element is to address major noise sources and to promote safe and comfortable noise levels throughout Brentwood. The Noise Element contains goals, policies, and actions that seek to reduce community exposure to excessive noise levels through the establishment of noise level standards for a variety of land uses.

Table 4, *Land Use Compatibility for Community Noise Environment*, shows the land use compatibility for community noise environment as shown in the Brentwood General Plan Noise Element.

Table 4
Land Use Compatibility for Community Noise Environment

Land Use Category	Exterior Noise Exposure (Ldn)					
	55	60	65	70	75	80
Single-Family Residential						
Multi-Family Residential, Hotels, and Motels						
Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds						
Schools, Libraries, Museums, Hospitals, Personal Care, Meeting Halls, Churches						
Office Buildings, Business Commercial, and Professional						
Industrial						

	NORMALLY ACCEPTABLE Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special insulation requirements
	CONDITIONALLY ACCEPTABLE Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features included in the design
	UNACCEPTABLE New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies

Source: City of Brentwood General Plan, Noise Element

Goals from the Noise Element that are relevant to the proposed project are as follows:

Goal N 1 Preserve a pleasant noise environment and enhance the quality of existing and future land uses by minimizing exposure to harmful and excessive noise.

Goal N 2 Protect the city's economic base by preventing incompatible land uses from encroaching upon existing or planned noiseproducing agriculture, industries, farmland, airports, and other sources.

NOISE SENSITIVE RECEPTORS

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as parks, historic sites, cemeteries, and recreation areas are considered sensitive to increases in exterior noise levels. Schools, churches, hotels, libraries, and other places where low interior noise levels are essential are also considered noise-sensitive land uses. The nearest sensitive receptors to the Deer Ridge Parcel project site include the existing residences approximately 25 feet to the southeast and the nearest sensitive receptors to the Shadow Lakes Parcel project site include the existing residences approximately 25 feet to the north.

EXISTING CONDITIONS

Brentwood 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.

Existing Ambient Noise Measurements

In order to quantify existing ambient noise levels in the project area, Michael Baker International conducted two short-term noise measurements on March 14, 2017 (see Appendix A). The noise measurement sites were representative of typical existing noise exposure within and immediately adjacent to the project site. The 10-minute measurements were taken between 9:15 and 10:30 a.m. Short-term (L_{eq}) measurements are considered representative of the noise levels throughout the day. The average noise levels and sources of noise measured at each location are listed in Table 5, *Existing Noise Measurements*.

Table 5
Existing Noise Measurements

Site No.	Location	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	Time
1	Cul-de-sac of Stirling Court adjacent to walking trail	40.9	36.8	49.0	9:22 a.m.
2	Sidewalk adjacent to park's parking lot	50.1	40.6	61.7	9:36 a.m.
3	Pebble Beach Drive adjacent to golf cart path	50.9	38.4	67.5	9:51 a.m.
4	At the bend of Augusta Drive	50.7	37.6	67.8	10:07 a.m.

Source: Michael Baker International. See Appendix A for noise measurement outputs.

As shown in Table 5, the ambient recorded noise levels ranged from 40.9 dBA to 50.9 dBA L_{eq} near the project site. The noise most commonly in the project vicinity is produced by automotive vehicles (cars, trucks, buses, motorcycles). Traffic moving along streets and freeways produces a sound level that remains relatively constant and is part of the city's minimum ambient noise level. Vehicular noise varies with the volume, speed and type of traffic. Slower traffic produces less noise than fast moving traffic. Trucks typically generate more noise than cars. Infrequent or intermittent noise also is associated with vehicles, including sirens, vehicle alarms, slamming of doors, garbage and construction vehicle activity and honking of horns. These noises add to urban noise and are regulated by a variety of agencies.

Existing Roadway Noise Levels

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) (see Appendix B) and traffic volumes from the project traffic impact analysis (Kimley-Horn 2017). 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) used in the FHWA model have been modified to reflect average vehicle noise rates identified for California by the California Department of Transportation (Caltrans). The Caltrans data shows 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 these roadway segments are presented in Table 6, *Existing Traffic Noise Levels*.

As depicted in Table 6, the existing traffic-generated noise level on project-vicinity roadways currently ranges from 49.6 to 63.6 dBA CNEL. CNEL is 24-hour average noise level with a 5 dBA "weighting" during the hours of 7:00 p.m. to 10:00 p.m. and a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively.

Table 6
Existing Traffic Noise Levels

Roadway Segment	Existing Conditions				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Balfour Road between Foothill Drive & John Muir Pkwy.	18,772	63.6	175	81	-
American Ave between Balfour Rd. & Heritage High School	10,119	54.5	-	-	-
Foothill Drive between Balfour Road & Eagle Rock Avenue	5,180	51.5	-	-	-
Eagle Rock between Foothill Drive & John Muir Pkwy.	3,330	49.6	-	-	-
Fairview Avenue between Balfour Road & Arlington Way	7,522	56.8	61	-	-

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

Source: Based on traffic data within the Traffic Impact Analysis, prepared by Kimley-Horn, 2017. Refer to Appendix B for traffic noise modeling assumptions and results.

CEQA THRESHOLDS

The environmental analysis in this memorandum is patterned after the Initial Study Checklist recommended by the *CEQA Guidelines*. The issues presented in the Initial Study Checklist have been utilized as thresholds of significance in this section. Accordingly, a project may have a significant adverse impact related to noise and vibration if it would do any of the following:

- Cause 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.

- Cause exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels.

- Cause a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

- Cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

- For a project located within an airport land-use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, result in exposure of people residing or working in the project area to excessive noise levels.

- For a project within the vicinity of a private airstrip, result in exposure of people residing or working in the project area to excessive noise levels.

IMPACT ANALYSIS

NOI-1 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?

***Less Than Significant Impact with Mitigation Incorporated*.**

Short-term 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. 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 7, *Typical Construction Noise Levels*.

Table 7
Typical Construction Noise Levels

Equipment	Typical Noise Level (dBA) at 50 Feet from Source	
	L_{max}	L_{eq}
Air Compressor	80	76
Backhoe/Front End Loader	80	76
Compactor (Ground)	80	73
Concrete Mixer Truck	85	81
Concrete Mixer (Vibratory)	80	73
Concrete Pump Truck	82	75
Concrete Saw	90	83
Crane	85	77
Dozer/Grader/Excavator/Scraper	85	81
Drill Rig Truck	84	77
Generator	82	79
Gradall	85	81
Hydraulic Break Ram	90	80
Jackhammer	85	78
Impact Hammer/Hoe Ram (Mounted)	90	83
Pavement Scarifier/Roller	85	78
Paver	85	82
Pneumatic Tools	85	82
Pumps	77	74
Truck (Dump/Flat Bed)	84	80

Source: FTA 2006

As shown in Table 7, the loudest piece of equipment would reach maximum noise levels of 90 dBA at 50 feet from the source. The nearest sensitive receptors are 25 feet from the project site. Since construction noise levels drop off at a rate of about 6 dBA per doubling of distance between the noise source and receptor, the loudest piece of equipment would reach maximum noise levels of 96 dBA at 25 feet from the source.

Per Section 9.32.050 of the City's Municipal Code, the City allows heavy construction activities to occur between eight a.m. and five p.m. Monday through Friday, nine a.m. and four p.m. Saturday with city engineer approval only, and never on Sunday or city holidays. Outside carpentry construction is restricted to the hours of seven a.m. and seven p.m. Monday through Friday, nine a.m. and five p.m. Saturday and never on Sunday or city holidays. If construction is to occur during other hours, it cannot exceed the exterior residential noise level standards of 60 dBA from 7 am-10 pm or 45 dBA from 10:00 p.m. to 7:00 a.m. Since the noise levels at the nearest residence during construction activities are expected to reach levels of 96 dBA, Mitigation Measure 1, which limits construction hours, would be required. Therefore, the project impact would be **less than significant with mitigation incorporated.**

Long-Term Operational Impacts

Off-Site Mobile Noise

Future development generated by the proposed project would result in additional traffic on adjacent roadways, thereby increasing vehicular noise in the vicinity of existing and proposed

land uses. The "Future Without Project" and "Future With Project" scenarios are compared in Table 8, *Future Project Traffic Noise Levels*. As depicted in Table 8, under the "Future Without Project" scenario, noise levels would range from approximately 49.7 dBA to 63.9 dBA, with the highest noise levels occurring along Balfour Road between Foothill Drive & John Muir Parkway. The "Future With Project" scenario noise levels would range from approximately 49.8 dBA to 64.3 dBA with the highest noise levels also occurring along the same roadway segment.

Table 8
Future Project Traffic Noise Levels

Roadway Segment	Future Without Project					Future Plus Project					Difference in dBA @ 100 feet from Roadway
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)			ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)			
			60 CNEL Noise Contour	65 CNEL Noise CNEL	70 CNEL Noise Contour			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour	
Balfour Rd between Foothill Dr & John Muir Pkwy	19,820	63.9	181	84	-	22,095	64.3	195	90	-	0.4
American Ave between Balfour Rd & Heritage High School	10,423	54.6	-	-	-	10,423	54.6	-	-	-	0
Foothill Dr between Balfour Rd & Eagle Rock Ave	5,296	51.6	-	-	-	5,470	51.8	-	-	-	0.2
Eagle Rock between Foothill Dr & John Muir Pkwy	3,430	49.7	-	-	-	3,562	49.8	-	-	-	0.1
Fairview Ave between Balfour Rd & Arlington Way	7,748	56.9	62	-	-	7,748	56.9	62	-	-	0

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

Source: Based on traffic data within the Traffic Impact Analysis, prepared by Kimley-Horn, February 2017. Refer to Appendix B for traffic noise modeling assumptions and results.

Per Section 9.32.030 of the City's Municipal Code, daytime (7:00 a.m. to 10:00 p.m.) residential noise standards are 60 dBA and nighttime (10:00 p.m. to 7:00 a.m.) standards are 45 dBA. However, one street segment (Balfour Road between Foothill Drive & John Muir Parkway) exceeds this standard without the project. Therefore, to determine if there is a substantial permanent increase in ambient noise levels, this analysis uses a 3 dBA increase as a threshold, which is considered a just-perceivable difference. As shown in Table 8, the noise levels would result in a maximum increase of 0.4 dBA. This increase in noise would occur along Balfour Road between Foothill Drive & John Muir Parkway. Since the proposed project would not increase noise levels above 3 dBA along the roadway segments analyzed, a **less than significant impact** would occur.

Stationary Noise Impacts

Potential stationary noise sources related to long-term operations of future development in the project site would include mechanical equipment. Mechanical equipment (e.g., heating, ventilation, and air conditioning [HVAC] equipment) typically generates noise levels of approximately 50-60 dBA L_{eq} at 50 feet. Operation of mechanical equipment would not be anticipated to increase ambient noise levels beyond the acceptable compatible land use noise levels. Therefore, the proposed project would result in a **less than significant impact** related to stationary noise levels.

Mitigation Measures:

Mitigation Measure 1: Heavy construction activities shall be restricted to the hours of eight a.m. and five p.m. Monday through Friday, nine a.m. and four p.m. Saturday with city engineer approval only, and never on Sunday or city holidays. Outside carpentry construction shall be restricted to the hours of seven a.m. and seven p.m. Monday through Friday, nine a.m. and five p.m. Saturday and never on Sunday or city holidays.

Timing/ Implementation: During construction activities

Enforcement/ Monitoring: City of Brentwood Planning Division

NOI-2 Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

Less Than Significant Impact.

Short-Term Construction

Project construction would have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and the operations involved. Vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. Since there are no established vibration standards in the City of Brentwood, this evaluation uses Caltrans's (2002) recommended standard of 0.2 inches per second peak particle velocity with respect to the prevention of structural damage for normal buildings. This is also the level at which vibrations may begin to annoy people in buildings. Table 9, *Typical Construction Equipment Vibration Levels, displays vibration levels for typical construction equipment.*

The nearest structures to the Deer Ridge Parcel project site include the existing residences approximately 25 feet to the southeast. The nearest structures to the Shadow Lakes Parcel project site include the existing residences approximately 25 feet to the north. Based on the vibration levels presented in Table 9, ground vibration generated by heavy-duty equipment reach levels of 0.089 inches per second peak particle velocity at 25 feet. Therefore, the use of construction equipment would not result in a groundborne vibration velocity level above 0.2 inches per second at the nearest off-site structure. Vibration impacts would be less than significant.

Table 9
Typical Construction Equipment Vibration Levels

Equipment Type	Peak Particle Velocity at 25 Feet (inches per second)
Large Bulldozer	0.089
Caisson Drilling	0.089
Loaded Trucks	0.076
Rock Breaker	0.059
Jackhammer	0.035
Small Bulldozer/Tractor	0.003

Source: FTA 2006; Caltrans 2004

Long-Term Operational Impacts

The project proposes two new senior living facilities that would not generate ground-borne vibration that could be felt at surrounding uses. The proposed project would not involve railroads or substantial heavy truck operations, and therefore would not result in vibration impacts at surrounding uses. A less than significant impact would occur is this regard.

Mitigation Measures: No mitigation is required.

NOI-3 A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Less Than Significant Impact. Refer to Operational Impact Discussion NOI-1.

Mitigation Measures: No mitigation is required.

NOI-4 A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Less Than Significant Impact with Mitigation Incorporated. Refer to Construction Impact Discussion NOI-1.

Mitigation Measures: Mitigation Measure 1 is required. Refer to Construction Impact Discussion NOI-1.

NOI-5 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 airport, would the project expose people residing or working in the project area to excessive noise levels?

No Impact. The nearest public airport to the project site is the Tracy Municipal Airport, located approximately 22.5 miles southeast of the project site. The proposed project is not located within an airport land use plan nor is it located within two miles of a public airport. Therefore, no impacts would occur in this regard.

Mitigation Measures: No mitigation is required.

NOI-6 For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

No Impact. The nearest private airstrip to the project site is Funny Farm, located approximately 5.4 miles northeast of the project site. Since the nearest private airstrip located further than two miles of the project site, no impacts would occur in this regard.

Mitigation Measures: No mitigation is required.

CONCLUSION

Project implementation would result in less than significant short- and long-term noise impacts with the implementation of Mitigation Measure 1. Therefore, the proposed project would not result in significant effects related to the State CEQA Guidelines.

REFERENCES

Caltrans (California Department of Transportation). 2002. *Transportation Related Earthborne Vibrations.*

———. 2004. *Transportation- and Construction-Induced Vibration Guidance Manual*.

FHWA (Federal Highway Administration). 2011. *Effective Noise Control During Nighttime Construction.* http://ops.fhwa.dot.gov/wz/workshops/accessible/schexnayder_paper.htm.

FTA (Federal Transit Administration). 2006. *Transit Noise and Vibration Impact Assessment.*

Kimley-Horn. 2017. *Traffic Impact Study: Brentwood Golf Redevelopment*

Brentwood, City of. 2002. *Brentwood Municipal Code.*

Brentwood, City of. 2014. *City of Brentwood General Plan.*

Appendix A
Noise Measurement Outputs

Summary

File Name on meter	EF_HS.020
File Name on PC	SLM_0003788_EF_HS_020.00.ldbin
Serial Number	0003788
Model	SoundExpert® LxT
Firmware Version	2.301
User	
Location	
Job Description	
Note	

Measurement

Description	Brentwood Golf Redevelopment Project- Site 1
Start	2017-03-14 09:22:26
Stop	2017-03-14 09:32:26
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre Calibration	2017-03-14 09:19:04
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamp	PRMLxT1L
Microphone Correction	Off
Integration Method	Exponential
OBA Range	High
OBA Bandwidth	1/1 and 1/3
OBA Freq. Weighting	A Weighting
OBA Max Spectrum	At LMax

Overload	120.3 dB		
	A	**C**	**Z**
Under Range Peak	**76.6**	73.6	78.6 dB
Under Range Limit	**25.3**	24.8	31.3 dB
Noise Floor	15.9	15.7	21.4 dB

Results

LA_{Seq}	40.9 dB		
LASE	68.7 dB		
EAS	0.825 µPa²h		
$LA_{Speak\ (max)}$	2017-03-14 09:28:06	68.2 dB	
LAS_{max}	2017-03-14 09:30:22	49.0 dB	
LAS_{min}	2017-03-14 09:29:26	36.8 dB	
SEA	-99.9 dB		

LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{Speak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{Speak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{Speak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s

Community Noise	**Ldn**	**LDay 07:00-23:00**	**LNight 23:00-07:00**	**Lden**
	40.9	40.9	-99.9	40.9

LC_{Seq}	59.3 dB	
LA_{Seq}	40.9 dB	
LC_{Seq} - LA_{Seq}	18.4 dB	
LAI_{eq}	43.1 dB	
LA_{eq}	40.9 dB	
LAI_{eq} - LA_{eq}	2.2 dB	

	A		**C**	
	dB	**Time Stamp**	**dB**	**Time Stamp**
L_{eq}	40.9		-99.9	
$L_{S(max)}$	49.0	2017/03/14 8:30:22	-99.9	1970/01/01 0:00:00

$L_{F(max)}$	-99.9	1970/01/01 0:00:00		-99.9	1970/01/01 0:00:00
$L_{I(max)}$	-99.9	1970/01/01 0:00:00		-99.9	1970/01/01 0:00:00
$L_{S(min)}$	36.8	2017/03/14 8:29:26		-99.9	1970/01/01 0:00:00
$L_{F(min)}$	-99.9	1970/01/01 0:00:00		-99.9	1970/01/01 0:00:00
$L_{I(min)}$	-99.9	1970/01/01 0:00:00		-99.9	1970/01/01 0:00:00
$L_{Peak(max)}$	68.2	2017/03/14 8:28:06		-99.9	1970/01/01 0:00:00

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

Statistics

LAS5.00	43.3	dB
LAS10.00	42.7	dB
LAS33.30	41.1	dB
LAS50.00	40.2	dB
LAS66.60	39.5	dB
LAS90.00	38.4	dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**	**6.3**
Direct	2017-01-03 10:54:35	-27.0	2.5
Direct	2017-01-03 10:30:13	-26.0	
Direct	2014-07-01 09:45:44	-27.0	61.7
PRMLxT1L	2017-03-14 08:18:51	-26.6	42.4
PRMLxT1L	2017-03-10 10:18:04	-26.5	39.5
PRMLxT1L	2017-03-07 09:33:39	-26.7	48.9
PRMLxT1L	2017-03-07 09:33:11	-26.6	55.6
PRMLxT1L	2017-01-05 08:48:43	-26.7	68.6
PRMLxT1L	2017-01-05 08:46:51	-26.7	63.2
PRMLxT1L	2017-01-05 08:46:31	-26.7	68.4
PRMLxT1L	2017-01-04 10:50:48	-26.6	50.2

Summary

File Name on meter	EF_HS.021
File Name on PC	SLM_0003788_EF_HS_021.00.ldbin
Serial Number	0003788
Model	SoundExpert® LxT
Firmware Version	2.301
User	
Location	
Job Description	
Note	

Measurement

Description	Brentwood Golf Redevelopment Project- Site 2
Start	2017-03-14 09:36:11
Stop	2017-03-14 09:46:11
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre Calibration	2017-03-14 09:18:51
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamp	PRMLxT1L
Microphone Correction	Off
Integration Method	Exponential
OBA Range	High
OBA Bandwidth	1/1 and 1/3
OBA Freq. Weighting	A Weighting
OBA Max Spectrum	At LMax

Overload	120.3 dB		
	A	**C**	**Z**
Under Range Peak	**76.6**	73.6	78.6
Under Range Limit	**25.3**	24.8	31.3
Noise Floor	15.9	15.7	21.4

Results

LA_{Seq}	50.0 dB		
LASE	77.8 dB		
EAS	6.736 µPa²h		
$LA_{Speak\ (max)}$	2017-03-14 09:42:23	82.0 dB	
LAS_{max}	2017-03-14 09:42:47	61.7 dB	
LAS_{min}	2017-03-14 09:37:37	40.6 dB	
SEA	-99.9 dB		

LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s	
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s	
LA_{Speak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s	
LA_{Speak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s	
LA_{Speak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s	

Community Noise	**Ldn**	**LDay 07:00-23:00**	**LNight 23:00-07:00**
	50.0	50.0	-99.9

LC_{Seq}	63.5 dB
LA_{Seq}	50.0 dB
LCS_{eq} - LA_{Seq}	13.4 dB
LAI_{eq}	55.6 dB
LA_{eq}	50.1 dB
LAI_{eq} - LA_{eq}	5.5 dB

	A		
	dB	**Time Stamp**	**dB**
L_{eq}	50.1		-99.9
$L_{S(max)}$	61.7	2017/03/14 8:42:47	-99.9

$L_{F(max)}$	-99.9	1970/01/01 0:00:00	-99.9
$L_{I(max)}$	-99.9	1970/01/01 0:00:00	-99.9
$L_{S(min)}$	40.6	2017/03/14 8:37:37	-99.9
$L_{F(min)}$	-99.9	1970/01/01 0:00:00	-99.9
$L_{I(min)}$	-99.9	1970/01/01 0:00:00	-99.9
$L_{Peak(max)}$	82.0	2017/03/14 8:42:23	-99.9

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

Statistics

LAS5.00	54.9	dB
LAS10.00	53.2	dB
LAS33.30	49.6	dB
LAS50.00	47.9	dB
LAS66.60	46.5	dB
LAS90.00	43.6	dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**
Direct	2017-01-03 10:54:35	-27.0
Direct	2017-01-03 10:30:13	-26.0
Direct	2014-07-01 09:45:44	-27.0
PRMLxT1L	2017-03-14 08:18:51	-26.6
PRMLxT1L	2017-03-10 10:18:04	-26.5
PRMLxT1L	2017-03-07 09:33:39	-26.7
PRMLxT1L	2017-03-07 09:33:11	-26.6
PRMLxT1L	2017-01-05 08:48:43	-26.7
PRMLxT1L	2017-01-05 08:46:51	-26.7
PRMLxT1L	2017-01-05 08:46:31	-26.7
PRMLxT1L	2017-01-04 10:50:48	-26.6

Summary

File Name on meter	EF_HS.022
File Name on PC	SLM_0003788_EF_HS_022.00.ldbin
Serial Number	0003788
Model	SoundExpert® LxT
Firmware Version	2.301
User	
Location	
Job Description	
Note	

Measurement

Description	Brentwood Golf Redevelopment Project- Site 3
Start	2017-03-14 09:51:34
Stop	2017-03-14 10:01:34
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre Calibration	2017-03-14 09:18:51
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamp	PRMLxT1L
Microphone Correction	Off
Integration Method	Exponential
OBA Range	High
OBA Bandwidth	1/1 and 1/3
OBA Freq. Weighting	A Weighting
OBA Max Spectrum	At LMax

Overload	120.3 dB		
	A	**C**	**Z**
Under Range Peak	**76.6**	73.6	78.6
Under Range Limit	**25.3**	24.8	31.3
Noise Floor	15.9	15.7	21.4

Results

LASeq	50.9 dB		
LASE	78.7 dB		
EAS	8.188 µPa²h		
LASpeak (max)	2017-03-14 09:58:15	88.1 dB	
LASmax	2017-03-14 09:55:44	67.5 dB	
LASmin	2017-03-14 09:52:07	38.4 dB	
SEA	-99.9 dB		

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

Community Noise	**Ldn**	**LDay 07:00-23:00**	**LNight 23:00-07:00**
	50.9	50.9	-99.9

LCSeq	59.7 dB		
LASeq	50.9 dB		
LCSeq - LASeq	8.8 dB		
LAIeq	55.1 dB		
LAeq	50.9 dB		
LAIeq - LAeq	4.2 dB		

	A		
	dB	**Time Stamp**	**dB**
Leq	50.9		-99.9
LS(max)	67.5	2017/03/14 8:55:44	-99.9

$L_{F(max)}$	-99.9	1970/01/01 0:00:00	-99.9
$L_{I(max)}$	-99.9	1970/01/01 0:00:00	-99.9
$L_{S(min)}$	38.4	2017/03/14 8:52:07	-99.9
$L_{F(min)}$	-99.9	1970/01/01 0:00:00	-99.9
$L_{I(min)}$	-99.9	1970/01/01 0:00:00	-99.9
$L_{Peak(max)}$	88.1	2017/03/14 8:58:15	-99.9

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

Statistics

LAS5.00	54.8	dB
LAS10.00	52.9	dB
LAS33.30	48.6	dB
LAS50.00	47.3	dB
LAS66.60	45.9	dB
LAS90.00	42.0	dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**
Direct	2017-01-03 10:54:35	-27.0
Direct	2017-01-03 10:30:13	-26.0
Direct	2014-07-01 09:45:44	-27.0
PRMLxT1L	2017-03-14 08:18:51	-26.6
PRMLxT1L	2017-03-10 10:18:04	-26.5
PRMLxT1L	2017-03-07 09:33:39	-26.7
PRMLxT1L	2017-03-07 09:33:11	-26.6
PRMLxT1L	2017-01-05 08:48:43	-26.7
PRMLxT1L	2017-01-05 08:46:51	-26.7
PRMLxT1L	2017-01-05 08:46:31	-26.7
PRMLxT1L	2017-01-04 10:50:48	-26.6

Summary

File Name on meter	EF_HS.023
File Name on PC	SLM_0003788_EF_HS_023.00.ldbin
Serial Number	0003788
Model	SoundExpert® LxT
Firmware Version	2.301
User	
Location	
Job Description	
Note	

Measurement

Description	Brentwood Golf Redevelopment Project- Site 4
Start	2017-03-14 10:07:52
Stop	2017-03-14 10:17:52
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre Calibration	2017-03-14 09:18:51
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamp	PRMLxT1L
Microphone Correction	Off
Integration Method	Exponential
OBA Range	High
OBA Bandwidth	1/1 and 1/3
OBA Freq. Weighting	A Weighting
OBA Max Spectrum	At LMax

Overload	120.3 dB		
	A	**C**	**Z**
Under Range Peak	**76.6**	73.6	78.6
Under Range Limit	**25.3**	24.8	31.3
Noise Floor	15.9	15.7	21.4

Results

LA_{Seq}	50.7 dB		
LASE	78.4 dB		
EAS	7.744 µPa²h		
$LA_{Speak\ (max)}$	2017-03-14 10:10:52	90.4 dB	
LAS_{max}	2017-03-14 10:10:49	67.8 dB	
LAS_{min}	2017-03-14 10:08:23	37.6 dB	
SEA	-99.9 dB		

LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s	
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s	
LA_{Speak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s	
LA_{Speak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s	
LA_{Speak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s	

Community Noise	**Ldn**	**LDay 07:00-23:00**	**LNight 23:00-07:00**
	50.7	50.7	-99.9

LC_{Seq}	57.4 dB
LA_{Seq}	50.7 dB
LCS_{eq} - LA_{Seq}	6.8 dB
LAI_{eq}	56.3 dB
LA_{eq}	50.7 dB
LAI_{eq} - LA_{eq}	5.6 dB

	A		
	dB	**Time Stamp**	**dB**
L_{eq}	50.7		-99.9
$L_{S(max)}$	67.8	2017/03/14 9:10:49	-99.9

$L_{F(max)}$	-99.9	1970/01/01 0:00:00	-99.9
$L_{I(max)}$	-99.9	1970/01/01 0:00:00	-99.9
$L_{S(min)}$	37.6	2017/03/14 9:08:23	-99.9
$L_{F(min)}$	-99.9	1970/01/01 0:00:00	-99.9
$L_{I(min)}$	-99.9	1970/01/01 0:00:00	-99.9
$L_{Peak(max)}$	90.4	2017/03/14 9:10:52	-99.9

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

Statistics

LAS5.00	54.3	dB
LAS10.00	50.4	dB
LAS33.30	47.2	dB
LAS50.00	45.5	dB
LAS66.60	43.5	dB
LAS90.00	41.0	dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**
Direct	2017-01-03 10:54:35	-27.0
Direct	2017-01-03 10:30:13	-26.0
Direct	2014-07-01 09:45:44	-27.0
PRMLxT1L	2017-03-14 08:18:51	-26.6
PRMLxT1L	2017-03-10 10:18:04	-26.5
PRMLxT1L	2017-03-07 09:33:39	-26.7
PRMLxT1L	2017-03-07 09:33:11	-26.6
PRMLxT1L	2017-01-05 08:48:43	-26.7
PRMLxT1L	2017-01-05 08:46:51	-26.7
PRMLxT1L	2017-01-05 08:46:31	-26.7
PRMLxT1L	2017-01-04 10:50:48	-26.6

Appendix B
Traffic Noise Modeling Outputs

Existing Conditions

TRAFFIC NOISE LEVELS AND NOISE CONTOURS

Project Number: 1A
Project Name: Brentwood Golf Redevelopment

Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Source of Traffic Volumes: Kimley Horn 2017
Community Noise Descriptor: L_{dn}: CNEL: x

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%

Analysis Condition				Design		Vehicle Mix			Distance from Centerline of Roadway			
Roadway, Segment	Lanes	Median Width	ADT Volume	Speed (mph)	Alpha Factor	Medium Trucks	Heavy Trucks	CNEL at 100 Feet	Distance to Contour 70 CNEL	65 CNEL	60 CNEL	55 CNEL
Balfour Rd between Foothill Dr & John Muir Pkwy	4	15	18,772	45	0.5	1.8%	0.1%	63.6	-	81	175	377
American Ave between Balfour Rd & Heritage High School	4	6	10,119	25	0.5	1.8%	0.1%	54.5	-	-	-	93
Foothill Dr between Balfour Rd & Eagle Rock Ave	2	20	5,180	25	0.5	1.8%	0.1%	51.5	-	-	-	59
Eagle Rock between Foothill Dr & John Muir Pkwy	2	7	3,330	25	0.5	1.8%	0.1%	49.6	-	-	-	43
Fairview Ave between Balfour Rd & Arlington Way	4	7	7,522	35	0.5	1.8%	0.1%	56.8	-	-	61	131

Cumulative No Project Conditions

TRAFFIC NOISE LEVELS AND NOISE CONTOURS

Project Number: 2A
Project Name: Brentwood Golf Redevelopment

Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Source of Traffic Volumes: Kimley Horn 2017
Community Noise Descriptor: L_{dn}: CNEL: x

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%

Analysis Condition				Design		Vehicle Mix			Distance from Centerline of Roadway			
		Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
Roadway, Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
Balfour Rd between Foothill Dr & John Muir Pkwy	4	15	19,820	45	0.5	1.8%	0.1%	63.9	-	84	181	390
American Ave between Balfour Rd & Heritage High School	4	6	10,423	25	0.5	1.8%	0.1%	54.6	-	-	-	94
Foothill Dr between Balfour Rd & Eagle Rock Ave	2	20	5,296	25	0.5	1.8%	0.1%	51.6	-	-	-	60
Eagle Rock between Foothill Dr & John Muir Pkwy	2	7	3,430	25	0.5	1.8%	0.1%	49.7	-	-	-	44
Fairview Ave between Balfour Rd & Arlington Way	4	7	7,748	35	0.5	1.8%	0.1%	56.9	-	-	62	134

Cumulative Plus Project Conditions

TRAFFIC NOISE LEVELS AND NOISE CONTOURS

Project Number: 2B
Project Name: Brentwood Golf Redevelopment

Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Source of Traffic Volumes: Kimley Horn 2017
Community Noise Descriptor: L_{dn}: CNEL: x

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%

Analysis Condition				Design		Vehicle Mix			Distance from Centerline of Roadway			
Roadway, Segment	Lanes	Median Width	ADT Volume	Speed (mph)	Alpha Factor	Medium Trucks	Heavy Trucks	CNEL at 100 Feet	Distance to Contour 70 CNEL	65 CNEL	60 CNEL	55 CNEL
Balfour Rd between Foothill Dr & John Muir Pkwy	4	15	22,095	45	0.5	1.8%	0.1%	64.3	-	90	195	420
American Ave between Balfour Rd & Heritage High School	4	6	10,423	25	0.5	1.8%	0.1%	54.6	-	-	-	94
Foothill Dr between Balfour Rd & Eagle Rock Ave	2	20	5,470	25	0.5	1.8%	0.1%	51.8	-	-	-	61
Eagle Rock between Foothill Dr & John Muir Pkwy	2	7	3,562	25	0.5	1.8%	0.1%	49.8	-	-	-	45
Fairview Ave between Balfour Rd & Arlington Way	4	7	7,748	35	0.5	1.8%	0.1%	56.9	-	-	62	134