

MEMORANDUM

DATE: November 27, 2019

To: John Arnau, Manager, Environmental Services, CEQA/Habitat Support, OC Waste & Recycling

FROM: Zhe Chen, LSA Associates, Inc.

SUBJECT: Noise and Vibration Impact Analysis for the Bee Canyon Greenery Project

This memorandum has been prepared to evaluate potential noise and vibration impacts associated with the proposed Bee Canyon Greenery Project (project) at the Frank R. Bowerman (FRB) Landfill in an unincorporated portion of Orange County, California. This report provides a project-specific noise and vibration impact analysis by examining the impacts of the proposed project on nearby sensitive uses.

PROJECT DESCRIPTION

The project site is at FRB landfill north of Irvine in an unincorporated portion of Orange County, as shown on Figure 1. The proposed composting facility would be on the Phase V-D stockpile area, as shown in Figure 2.

The project would be an open windrow composting facility, which is typically used for green waste and wood waste organic materials only. The green waste and wood waste is placed in long rows called windrows. The windrows are turned using compost windrow turners to improve porosity and oxygen content, mix in or remove moisture, and redistribute cooler and hotter portions of the piles. Open windrow composting is a commonly used composting operation method. Composting process control parameters include the initial ratios of carbon- and nitrogen-rich materials, the amount of bulking agent needed added to assure air porosity, the pile size, the moisture content, and the turning frequency. The temperature of the windrows must be measured and logged constantly to determine the optimum time for turning them for quicker compost production. Finished compost would be placed on top of the active compost piles to reduce odors and volatile organic compound emissions. Once built out, the project would operate from 7:00 a.m. to 5:00 p.m., Monday through Saturday.

Construction would take approximately 2 months. The site is currently vacant, requiring minor site preparation to prepare for grading. Construction activities would include building a berm and retention basin, and installing water and electrical lines.

The project site is surrounded by open space with industrial to the west across State Route 133 (SR-133), and residences to the south across State Route 241 (SR-241).

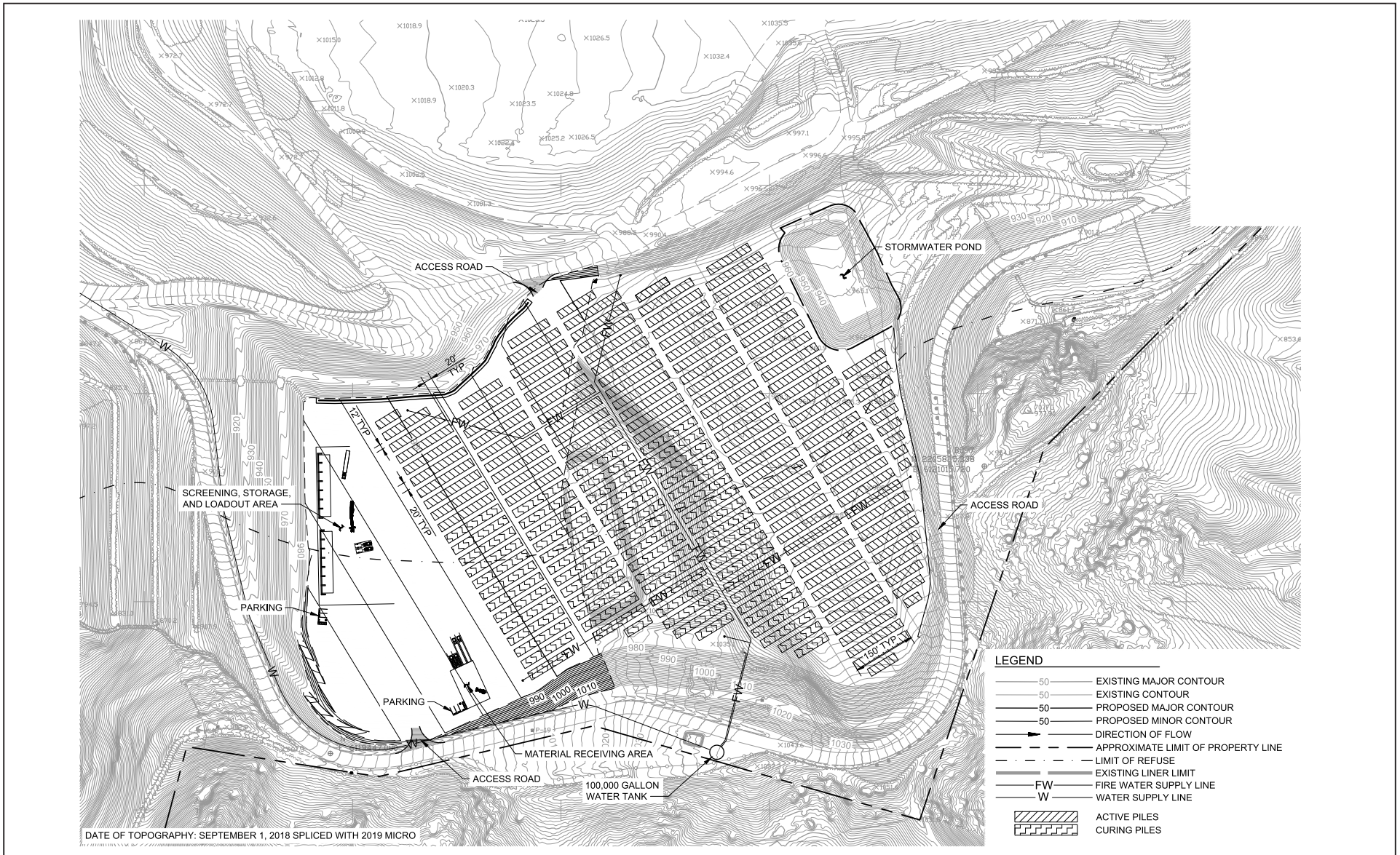
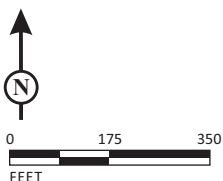


FIGURE 2

LSA



SOURCE: Tetra Tech/BAS (3/2019)

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Bee Canyon Greenery
Site Plan

CHARACTERISTICS OF SOUND

Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep.

To the human ear, sound has two significant characteristics: pitch and loudness. Pitch is generally an annoyance, while loudness can affect the ability to hear. Pitch is the number of complete vibrations, or cycles per second, of a sound wave, which results in the tone's range from high to low. Loudness is the strength of a sound, and it describes a noisy or quiet environment; it is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound wave combined with the reception characteristics of the human ear. Sound intensity refers to the power carried by sound waves per unit area in a direction perpendicular to that area. This characteristic of sound can be precisely measured with instruments. The analysis of a project defines the noise environment of the project area in terms of sound pressure level and its effect on adjacent sensitive land uses.

Measurement of Sound

Sound pressure level is measured with the A-weighted decibel scale to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound, similar to the human ear's de-emphasis of these frequencies. Decibels, unlike linear units (e.g., inches or pounds), are measured on a logarithmic scale representing points on a sharply rising curve.

For example, 10 decibels (dB) is 10 times more intense than 1 dB, 20 dB is 100 times more intense than 1 dB, and 30 dB is 1,000 times more intense than 1 dB. Thirty decibels (30 dB) represents 1,000 times as much acoustic energy as 1 dB. The decibel scale increases as the square of the change, representing the sound pressure energy. A sound as soft as human breathing is about 10 times greater than 0 dB. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. A 10 dB increase in sound level is perceived by the human ear as only a doubling of the sound's loudness. Ambient sounds generally range from 30 dB (very quiet) to 100 dB (very loud).

Sound levels are generated from a source, and their decibel level decreases as the distance from that source increases. Sound levels dissipate exponentially with distance from their noise sources. For a single point source, sound levels decrease approximately 6 dB for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by stationary equipment. If noise is produced by a line source (e.g., highway traffic or railroad operations) the sound decreases 3 dB for each doubling of distance in a hard site environment. Line source sound levels decrease 4.5 dB for each doubling of distance in a relatively flat environment with absorptive vegetation.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. The equivalent continuous sound level (L_{eq}) is the total sound energy of time-varying noise over a sample period. However, the predominant rating scales for human communities in the State of California are the L_{eq} and Community Noise Equivalent Level (CNEL) or the day-night average noise level (L_{dn}) based on A weighted decibels (dBA). CNEL is the time-varying noise over a 24-hour period, with a 5 dBA

weighting factor applied to the hourly L_{eq} for noise occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and a 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale but without the adjustment for events occurring during the relaxation and sleeping hours. CNEL and L_{dn} are within 1 dBA of each other and are normally interchangeable. The City uses the CNEL noise scale for long-term noise impact assessment.

Other noise rating scales of importance when assessing the annoyance factor include the maximum instantaneous noise level (L_{max}), which is the highest exponential time-averaged sound level that occurs during a stated time period. The noise environments discussed in this analysis for short-term noise impacts are specified in terms of maximum levels denoted by L_{max} , which reflects peak operating conditions and addresses the annoying aspects of intermittent noise. It is often used together with another noise scale, or noise standards in terms of percentile noise levels, in noise ordinances for enforcement purposes. For example, the L_{10} noise level represents the noise level exceeded 10 percent of the time during a stated period. The L_{50} noise level represents the median noise level. Half the time the noise level exceeds this level, and half the time it is less than this level. The L_{90} noise level represents the noise level exceeded 90 percent of the time and is considered the background noise level during a monitoring period. For a relatively constant noise source, the L_{eq} and L_{50} are approximately the same.

Noise impacts can be described in three categories. The first category includes audible impacts that refer to increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3 dB or greater because this level has been found to be barely perceptible in exterior environments. The second category, potentially audible, refers to a change in the noise level between 1 dB and 3 dB. This range of noise levels has been found to be noticeable only in laboratory environments. The last category includes changes in noise levels of less than 1 dB, which are inaudible to the human ear. Only audible changes in existing ambient or background noise levels are considered potentially significant.

Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to sound levels higher than 85 dBA. Exposure to high sound levels affects the entire system, with prolonged sound exposure in excess of 75 dBA increasing body tensions, thereby affecting blood pressure and functions of the heart and the nervous system. In comparison, extended periods of sound exposure above 90 dBA would result in permanent cell damage. When the sound level reaches 120 dBA, a tickling sensation occurs in the human ear, even with short-term exposure. This level of sound is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by a feeling of pain in the ear (i.e., the threshold of pain). A sound level of 160–165 dBA will result in dizziness or a loss of equilibrium. The ambient or background noise problem is widespread and generally more concentrated in urban areas than in outlying, less-developed areas.

Table A lists definitions of acoustical terms, and Table B shows common sound levels and their sources.

Table A: Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit of sound level that denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
Frequency, Hz	Of a function periodic in time, the number of times that the quantity repeats itself in 1 second (i.e., the number of cycles per second).
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high-frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. (All sound levels in this report are A-weighted unless reported otherwise.)
L ₀₁ , L ₁₀ , L ₅₀ , L ₉₀	The fast A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 1%, 10%, 50%, and 90% of a stated time period, respectively.
Equivalent Continuous Noise Level, L _{eq}	The level of a steady sound that, in a stated time period and at a stated location, has the same A-weighted sound energy as the time varying sound.
Community Noise Equivalent Level, CNEL	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 5 dBA to sound levels occurring in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 dBA to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Noise Level, L _{dn}	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 dBA to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
L _{max} , L _{min}	The maximum and minimum A-weighted sound levels measured on a sound level meter, during a designated time interval, using fast time averaging.
Ambient Noise Level	The all-encompassing noise associated with a given environment at a specified time. It is usually a composite of sound from many sources from many directions, near and far; no particular sound is dominant.
Intrusive	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content, as well as the prevailing ambient noise level.

Source: *Handbook of Acoustical Measurements and Noise Control* (Harris 1991)

Table B: Common Sound Levels and Their Noise Sources

Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Evaluations
Near Jet Engine	140	Deafening	128 times as loud
Civil Defense Siren	130	Threshold of Pain	64 times as loud
Hard Rock Band	120	Threshold of Feeling	32 times as loud
Accelerating Motorcycle at a Few Feet Away	110	Very Loud	16 times as loud
Pile Driver; Noisy Urban Street/Heavy City Traffic	100	Very Loud	8 times as loud
Ambulance Siren; Food Blender	95	Very Loud	—
Garbage Disposal	90	Very Loud	4 times as loud
Freight Cars; Living Room Music	85	Loud	—
Pneumatic Drill; Vacuum Cleaner	80	Loud	2 times as loud
Busy Restaurant	75	Moderately Loud	—
Near Freeway Auto Traffic	70	Moderately Loud	Reference level
Average Office	60	Quiet	One-half as loud
Suburban Street	55	Quiet	—
Light Traffic; Soft Radio Music in Apartment	50	Quiet	One-quarter as loud
Large Transformer	45	Quiet	—
Average Residence without Stereo Playing	40	Faint	One-eighth as loud
Soft Whisper	30	Faint	—
Rustling Leaves	20	Very Faint	—
Human Breathing	10	Very Faint	Threshold of Hearing
—	0	Very Faint	—

Source: Compiled by LSA (2016).

FUNDAMENTALS OF VIBRATION

Vibration refers to ground-borne noise and perceptible motion. Ground-borne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem outdoors, where the motion may be discernible, but without the effects associated with the shaking of a building there is less adverse reaction. Vibration energy propagates from a source through intervening soil and rock layers to the foundations of nearby buildings. The vibration then propagates from the foundation throughout the remainder of the structure. Building vibration may be perceived by occupants as the motion of building surfaces, the rattling of items sitting on shelves or hanging on walls, or a low-frequency rumbling noise. The rumbling noise is caused by the vibration of walls, floors, and ceilings that radiate sound waves. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by 10 dB or less. This is an order of magnitude below the damage threshold for normal buildings.

Typical sources of ground-borne vibration are construction activities (e.g., blasting, pile-driving, and operating heavy-duty earthmoving equipment), steel-wheeled trains, and occasional traffic on rough roads. Problems with both ground-borne vibration and noise from these sources are usually localized to areas within approximately 100 feet (ft) from the vibration source, although there are examples of ground-borne vibration causing interference out to distances greater than 200 ft (Federal Transit Authority [FTA] 2018). When roadways are smooth, vibration from traffic, even heavy trucks, is rarely perceptible. It is assumed for most projects that the roadway surface will be smooth enough that ground-borne vibration from street traffic will not exceed the impact criteria; however, both construction of the project and the freight train operations could result in ground-borne vibration that may be perceptible and annoying.

Ground-borne noise is not likely to be a problem because noise arriving via the normal airborne path will usually be greater than ground-borne noise.

Ground-borne vibration has the potential to disturb people and damage buildings. Although it is very rare for train-induced ground-borne vibration to cause even cosmetic building damage, it is not uncommon for construction processes such as blasting and pile-driving to cause vibration of sufficient amplitudes to damage nearby buildings (FTA 2018). Ground-borne vibration is usually measured in terms of vibration velocity, either the root-mean-square (RMS) velocity or peak particle velocity (PPV). The RMS is best for characterizing human response to building vibration, and PPV is used to characterize potential for damage. Decibel notation acts to compress the range of numbers required to describe vibration. Vibration velocity level in decibels is defined as:

$$L_v = 20 \log_{10} [V/V_{ref}]$$

where “ L_v ” is the vibration velocity in decibels (VdB), “ V ” is the RMS velocity amplitude, and “ V_{ref} ” is the reference velocity amplitude, or 1×10^{-6} inches/second (in/sec) used in the United States. Table C illustrates human response to various vibration levels, as described in the Transit Noise and Vibration Impact Assessment Manual (FTA 2018).

Table C: Human Response to Different Levels of Ground-Borne Noise and Vibration

Vibration Velocity Level	Noise Level		Human Response
	Low Frequency ¹	Mid Frequency ²	
65 VdB	25 dBA	40 dBA	Approximate threshold of perception for many humans. Low-frequency sound is usually inaudible; mid-frequency sound is excessive for quiet sleeping areas.
75 VdB	35 dBA	50 dBA	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find transit vibration at this level unacceptable. Low-frequency noise is acceptable for sleeping areas; mid-frequency noise is annoying in most quiet occupied areas.
85 VdB	45 dBA	60 dBA	Vibration is acceptable only if there are an infrequent number of events per day. Low-frequency noise is unacceptable for sleeping areas; mid-frequency noise is unacceptable even for infrequent events with institutional land uses, such as schools and churches.

Source: *Transit Noise and Vibration Impact Assessment* (FTA 2018)

¹ Approximate noise level when vibration spectrum peak is near 30 Hz.

² Approximate noise level when vibration spectrum peak is near 60 Hz.

dBA = A-weighted decibels

FTA = Federal Transit Administration

Hz = Hertz VdB = vibration velocity decibels

Factors that influence ground-borne vibration and noise include the following:

- **Vibration Source:** Vehicle suspension, wheel types and condition, railroad track/roadway surface, railroad track support system, speed, transit structure, and depth of vibration source.
- **Vibration Path:** Soil type, rock layers, soil layering, depth to water table, and frost depth.
- **Vibration Receiver:** Foundation type, building construction, and acoustical absorption.

Among the factors listed above, there are significant differences in the vibration characteristics when the source is underground compared to at the ground surface. In addition, soil conditions are known to have a strong influence on the levels of ground-borne vibration. Among the most important factors are the stiffness and internal damping of the soil and the depth to bedrock.

Experience with ground-borne vibration indicates: (1) vibration propagation is more efficient in stiff, clay soils than in loose, sandy soils; and (2) shallow rock seems to concentrate the vibration energy close to the surface and can result in ground-borne vibration problems at large distances from a railroad track. Factors such as layering of the soil and the depth to the water table can have significant effects on the propagation of ground-borne vibration. Soft, loose, sandy soils tend to attenuate more vibration energy than hard, rocky materials. Vibration propagation through groundwater is more efficient than through sandy soils.

REGULATORY SETTING

Federal Regulations

Federal Transit Administration

Vibration standards included in the FTA's Transit Noise and Vibration Impact Assessment Manual (2018) are used in this analysis for ground-borne vibration impacts on human annoyance, as shown in Table D. Table D provides the criteria for assessing the potential for interference or annoyance from vibration levels in a building.

Table D: Interpretation of Vibration Criteria for Detailed Analysis

Land Use	Max L_v (VdB) ¹	Description of Use
Workshop	90	Distinctly feelable vibration. Appropriate to workshops and non-sensitive areas.
Office	84	Feelable vibration. Appropriate to offices and non-sensitive areas.
Residential Day	78	Feelable vibration. Appropriate for computer equipment and low-power optical microscopes (up to 20X).
Residential Night and Operating Rooms	72	Vibration not feelable, but ground-borne noise may be audible inside quiet rooms. Suitable for medium-power microscopes (100X) and other equipment of low sensitivity.

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018)

¹ As measured in 1/3-Octave bands of frequency over the frequency range 8 to 80 Hertz.

FTA = Federal Transit Administration

L_v = velocity in decibels

VdB = vibration velocity decibels

The criteria for environmental impact from ground-borne vibration and noise are based on the maximum levels for a single event. Table E lists the potential vibration building damage criteria associated with construction activities, as suggested in the Transit Noise and Vibration Impact Assessment Manual (FTA 2018). FTA guidelines show that a vibration level of up to 102 VdB (equivalent to 0.5 in/sec in PPV) (FTA 2018) is considered safe for buildings consisting of reinforced concrete, steel, or timber (no plaster) and would not result in any construction vibration damage. For a non-engineered timber and masonry building, the construction building vibration damage criterion is 94 VdB (0.2 in/sec in PPV).

Table E: Construction Vibration Damage Criteria

Building Category	PPV (in/sec)	Approximate L_v (VdB) ¹
Reinforced concrete, steel, or timber (no plaster)	0.50	102
Engineered concrete and masonry (no plaster)	0.30	98
Non-engineered timber and masonry buildings	0.20	94
Buildings extremely susceptible to vibration damage	0.12	90

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018)

¹ RMS vibration velocity in decibels (VdB) re 1 μ in/sec.

μ in/sec = microinches per second

FTA = Federal Transit Administration

in/sec = inch/inches per second

L_v = velocity in decibels

PPV = peak particle velocity

RMS = root-mean-square

VdB = vibration velocity decibels

Local Regulations

The proposed project is located in an unincorporated portion of Orange County. However, sensitive receptors are located in the City of Irvine. Therefore, for purposes of this analysis, City of Irvine noise standards are used.

City of Irvine

Municipal Code. Section 6-8-204 of the City's Municipal Code (City of Irvine 2015) establishes the maximum permissible noise level that may intrude into a neighbor's property. The Noise Ordinance (adopted in 1975 and revised in 2015) establishes noise level standards for various land use categories affected by stationary noise sources. Land use categories in Irvine are defined in four noise zones, as listed below. Table F provides the City of Irvine's (City) maximum noise standard based on the noise zone, the location of the noise (exterior/interior), and the time period.

1. **Noise Zone 1:** All hospitals, libraries, churches, schools, and residential properties
2. **Noise Zone 2:** All professional office and public institutional properties
3. **Noise Zone 3:** All commercial properties, excluding professional office properties
4. **Noise Zone 4:** All industrial properties

Table F: City of Irvine Maximum Noise Level Standards

Noise Zone	Exterior/ Interior	Time Period	L ₅₀ (30 mins)	L ₂₅ (15 mins)	L ₈ (5 mins)	L ₂ (1 min)	L _{max} (Anytime)
1	Exterior	7:00 AM to 10:00 PM	55	60	65 ¹	70	75
		10:00 PM to 7:00 AM	50	55	60	65 ¹	70
	Interior	7:00 AM to 10:00 PM	—	—	55	60	65
		10:00 PM to 7:00 AM	—	—	45	50	55
2	Exterior	Anytime	55	60	65	70	75
	Interior	Anytime	—	—	55	60	65
3	Exterior	Anytime	60	65	70	75	80
	Interior	Anytime	—	—	55	60	65
4	Exterior	Anytime	70	75	80	85	90
	Interior	Anytime	—	—	55	60	65

Source: City of Irvine Municipal Code (City of Irvine 2015)

Note: It shall be unlawful for any person at any location within Irvine to create any noise or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person which causes the noise level, when measured on any property within designated noise zones either within or without Irvine, to exceed the applicable noise standard. Each of the noise standards specified above shall be reduced by 5 dBA for impact, or predominant tone noise or for noises consisting of speech or music. In the event the noise source and the affected property are within different noise zones, the noise standards of the affected property shall apply.

¹ This standard does not apply to multifamily residence private balconies. Multifamily developments with balconies that do not meet the 65 dBA CNEL criterion are required to provide occupancy disclosure notices to all future tenants regarding potential noise impacts.

City = City of Irvine

CNEL = Community Noise Equivalent Level

dBA = A-weighted decibels

L_{max} = maximum instantaneous noise level

min/mins = minute/minutes

The City's Municipal Code Noise Ordinance has not established any upper limits for construction noise because construction noise is temporary and will stop after project construction is complete. Section 6-8-205a of the City's Municipal Code Noise Ordinance regulates the timing of construction

activities and includes special provisions for sensitive land uses. Construction activities shall take place only between the hours of 7:00 a.m. and 7:00 p.m., Monday through Friday, and between 9:00 a.m. and 6:00 p.m. on Saturday. No construction shall be permitted outside of these hours or on Sundays and federal holidays, except for Columbus Day, unless a temporary waiver is granted by the Chief Building Official or his/her authorized representative. Trucks, vehicles, and equipment that are making or are involved with material deliveries, loading or transferring materials, equipment service, or maintenance of any devices or appurtenances for or within any construction project in the city shall not be operated or driven on City streets outside of these hours or on Sundays and federal holidays unless the City grants a temporary waiver. Any waiver granted shall take into consideration the potential impact on the community. No construction activity will be permitted outside of these hours except in emergencies, including maintenance work on the City rights-of-way that might be required.

EXISTING SETTING

Overview of the Existing Noise Environment

The primary existing noise sources in the project area are transportation facilities. Traffic on State Route 214 (SR-241) is a steady source of ambient noise.

Existing Sensitive Land Uses in the Project Vicinity

The project site is surrounded by open space with industrial to the west across SR-133, and residences to the south across SR-241. The closest residence and industrial use are approximately 3,500 ft and 5,500 ft, respectively, from the boundary of the proposed composting facility.

Ambient Noise Measurements

Short-term (20-minute) noise level measurements were conducted on May 28, 2019, using a Larson Davis Model 824 Type 1 sound level meter. Table G shows the results of the short-term measurements along with a description of the measurement location and noise sources that occurred during the measurement. Figure 3 shows the short-term monitoring locations.

Table G: Short-Term Ambient Noise Level Measurements

Monitor No.	Location	Date	Start Time	Duration (minutes)	Noise Level (dBA)								Noise Source(s)
					L _{eq}	L _{max}	L _{min}	L ₅₀	L ₂₅	L ₈	L ₂		
ST-1	113 Tomato Springs, east of the residential backyard on the access road	5/28/19	1:50 p.m.	20	45.8	61.5	34.4	43.2	45.6	49.0	53.4	Traffic on SR-241 and birds chirping.	
ST-2	Between 117 and 123 Soaring Eagle, on the driveway between the two residences.	5/28/19	2:25 p.m.	20	39.4	62.0	32.4	37.5	39.3	42.6	44.9	Faint traffic on SR-241.	

Source: Compiled by LSA Associates, Inc. (2019).

dBA = A-weighted decibels

L_{eq} = equivalent continuous sound level

L_{max} = maximum measured sound level

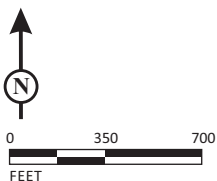
L_{min} = minimum measured sound level

SR-241 = State Route 241



FIGURE 3

LSA



LEGEND

- Project Site
- Short Term Monitoring Locations

SOURCE: Google Earth

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Noise Monitoring Locations

Existing Aircraft Noise

Airport-related noise levels are primarily associated with aircraft engine noise made while aircraft are taking off, landing, or running their engines while still on the ground. The project site is outside the 65 dBA CNEL noise contour, or Noise Impact Zone “1”, and the 60 dBA CNEL noise contour, or Noise Impact Zone “2”, of John Wayne Airport (JWA) based on the JWA Airport Impact Zones map in the Airport Environs Land Use Plan (Orange County Airport Land Use Commission 2008).

Existing Traffic Noise

The Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108) was used to evaluate traffic-related noise conditions along roadway segments in the project vicinity. This model requires various parameters, including traffic volumes, vehicle mix, vehicle speed, and roadway geometry to compute typical equivalent noise levels during daytime, evening, and nighttime hours. The resultant noise levels are weighted and summed over 24-hour periods to determine the CNEL values. Traffic volumes were obtained from the Limited Scope Traffic Impact Analysis (LSA 2019). The standard vehicle mix for Southern California roadways was used for traffic on these roadway segments. Table H provides the existing traffic noise levels in the project vicinity. These traffic noise levels are representative of a worst-case scenario that assumes a flat terrain and no shielding between the traffic and the noise contours. Appendix A provides the specific assumptions used in developing these noise levels and model printouts.

Table H: Existing Traffic Noise Levels Without Project

Roadway Segment	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane
Portola Parkway Between Bee Canyon Access Road and San Canyon Avenue	17,900	76	155	331	70.0
Sand Canyon Avenue Between Portola Parkway and Irvine Boulevard	13,600	57	112	235	67.7
Sand Canyon Avenue Between Irvine Boulevard and Trabuco Road	29,200	108	217	459	71.1
Sand Canyon Avenue Between Trabuco Road and I-5 Northbound Ramps	40,600	135	270	571	72.0

Source: Compiled by LSA (June 2019).

Notes: Traffic noise within 50 feet of the roadway centerline should be evaluated with site-specific information.

ADT = average daily traffic

CNEL = Community Noise Equivalent Level

dBA = A-weighted decibels

ft = feet

I-5 = Interstate 5

IMPACTS

Short-Term Construction Noise Impacts

Two types of short-term noise impacts would occur during construction on the project site. First, construction crew commutes and the transport of construction equipment to the project site would

incrementally increase noise levels on access roads leading to the site. There would be a relatively high single-event noise exposure potential causing intermittent noise from large trucks passing at 50 ft that would generate up to a maximum of 84 dBA. The transport of construction equipment would be moved on-site just one time and would remain on-site for the duration of each construction phase. This one-time trip, when heavy construction equipment is moved on and off-site, would not add to the daily traffic noise in the project vicinity. Construction crew commute and haul truck trips would reach up to a total 22 trips per hour and 73 trips per day based on 18 trips per hour/36 trips per day for construction crew commutes and 4 trips per hour/37 trips per day for haul truck trips. The construction-related traffic would increase traffic noise levels by up to 0.1 dBA when the construction-related vehicle trips are compared to existing hourly/daily traffic volumes of 1,360/13,600 and 1,790/17,900 on Sand Canyon Avenue and Portola Parkway, respectively. A noise level increase of less than 3 dBA would not be perceptible to the human ear in an outdoor environment. Therefore, short-term construction-related impacts associated with worker commutes, equipment transport, and haul truck trips to the project site would be less than significant.

The second type of short-term noise impact is related to noise generated during construction activities on the project site. Construction is completed in discrete steps, each of which has its own mix of equipment, and consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on the project site. Therefore, the noise levels vary as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table I lists the typical construction equipment noise levels (L_{max}) recommended for noise impact assessments, based on a distance of 50 ft between the equipment and a noise receptor.

Table I: Typical Construction Equipment Noise Levels

Equipment Description	Acoustical Usage Factor (%)	Maximum Noise Level (L_{max}) at 50 ft ¹
Dozers	40	85
Dump Trucks	40	84
Excavators	40	85
Flat Bed Trucks	40	84
Forklifts	20	85
Loaders	40	80
Man Lifts	20	85
Pickup Trucks	40	55
Scrapers	40	85
Water Trucks	40	84

Table I: Typical Construction Equipment Noise Levels

Equipment Description	Acoustical Usage Factor (%)	Maximum Noise Level (L_{max}) at 50 ft ¹
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Source: Roadway Construction Noise Model (Federal Highway Administration 2006)

Note: Noise levels reported in this table are rounded to the nearest whole number.

¹ Maximum noise levels were developed based on Spec 721.560 from the Central Artery/Tunnel program to be consistent with the City of Boston's Noise Code for the "Big Dig" project.

ft = feet

L_{max} = maximum instantaneous sound level

Spec = specification

Table J lists the composite noise levels generated by project construction activities for each construction phase and the associated pieces of construction equipment for each phase. These noise levels assume that each piece of construction equipment operates as an individual point source and each doubling of the sound source with equal strength increases the noise level by 3 dBA. The maximum noise levels generated by each piece of construction equipment are shown in Table I. Table J shows the composite L_{eq} noise level based on a usage factor of 40 percent for all pieces of construction equipment except for a usage factor of 20 percent for forklifts and man lifts. As shown in Table J, the asphalt grinding phase would be the noisiest construction phase, which would generate a composite noise level of 91 dBA L_{max} (87 dBA L_{eq}).

Table J: Construction Noise Levels by Phase

Phase	Equipment	Composite Noise Level at 50 ft	
		dBA L_{max}	dBA L_{eq}
Fine Grade Pad	Dozer, Scraper	90	86
Asphalt Grindings	Dozer, Excavator, Dump Truck	91	87
Berm and Retention Basin Building	Dozer, Forklift	90	85
Water Line Installation	Dozer, Excavator, Forklift, Water Truck	91	86
Electrical Line Installation	Flat Bed Truck, Man Lift	88	82
All Work and Miscellaneous	Pickup Truck	58.	54

Source: Compiled by LSA (June 2019)

dBA L_{eq} = average A-weighted hourly noise level

L_{max} = maximum instantaneous noise level

The closest residence to the south and industrial use to the west are approximately 3,500 ft and 5,500 ft from the project construction boundary, respectively. Therefore, the closest residence and industrial use may be subject to short-term noise reaching 54 dBA L_{max} (49 dBA L_{eq}) and 50 dBA L_{max} (45 dBA L_{eq}), respectively. The proposed project would be required to comply with the construction hours and days specified in the City's Municipal Code. The implementation of measures listed below would minimize noise impacts from construction equipment. Therefore, noise generated by project construction activities would be less than significant with the implementation of the minimization measures described below.

The following measures would minimize construction noise:

- The construction contractor shall limit construction activities to between the hours of 7:00 a.m. and 7:00 p.m., Monday through Friday, and between 9:00 a.m. and 6:00 p.m. on Saturday. No construction shall be permitted outside of these hours or on Sundays and federal holidays, except for Columbus Day, unless a temporary waiver is granted by the Chief Building Official or his/her authorized representative.
- During all project site excavation and grading, the project contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and most noise-sensitive receptors nearest the project site during all project construction.
- The construction contractor shall place all stationary construction equipment so that the emitted noise is directed away from the sensitive receptors nearest the project site.

Short-Term Construction Vibration Impacts

This construction vibration impact analysis discusses the level of human annoyance using vibration levels in VdB and will assess the potential for building damage using vibration levels in PPV (in/sec) because vibration levels calculated in RMS are best for characterizing human response to building vibration, whereas vibration levels in PPV are best used to characterize potential for damage. As shown in Table E, the FTA guidelines indicate that a vibration level up to 102 VdB (equivalent to 0.5 PPV [in/sec]) is considered safe for buildings consisting of reinforced concrete, steel, or timber (no plaster), and would not result in any construction vibration damage (FTA 2018). For a non-engineered timber and masonry building, the construction vibration damage criterion is 94 VdB (0.2 PPV [in/sec]). For a fragile building, the construction vibration damage criterion is 90 VdB (0.12 PPV [in/sec]).

Table K shows the PPV and VdB values at a distance of 25 ft from the construction vibration source. As shown in Table K, bulldozers and other heavy-tracked construction equipment (except for pile drivers and vibratory rollers) generate approximately 87 VdB of ground-borne vibration when measured at a distance of 25 ft, based on the Transit Noise and Vibration Impact Assessment Manual (FTA 2018). Project construction is expected to use a large bulldozer and a loaded truck. The greatest levels of vibration are anticipated to occur during the fine grade pad, asphalt grindings, berm and retention basin building, and water line installation. All other phases are expected to result in lower vibration levels. The distance to the nearest buildings for vibration impact analysis is measured between the nearest off-site buildings and the project boundary (assuming the construction equipment would be used at or near the project boundary) because vibration impacts normally occur within the buildings.

The formula for vibration transmission is provided below.

$$L_{\text{vdB}}(D) = L_{\text{vdB}}(25 \text{ feet}) - 30 \log(D/25)$$

$$\text{PPV}_{\text{equip}} = \text{PPV}_{\text{ref}} \times (25/D)^{1.5}$$

Table L lists the projected vibration levels from various construction equipment expected to be used on the project site to the nearest buildings in the project vicinity. For typical construction activity, the equipment with the highest vibration generation potential is the large bulldozer and loaded truck, each of which would generate 87 VdB (0.089 PPV [in/sec]) and 86 VdB (0.076 PPV [in/sec]) at 25 ft, respectively. As shown in Table L, the closest residence and industrial building would experience vibration levels of up to 23 VdB (0.000 PPV [in/sec]) and 22 VdB (0.000 PPV [in/sec]), respectively.

Table K: Vibration Source Amplitudes for Construction Equipment

Equipment	Reference PPV/L _v at 25 feet	
	PPV (in/sec)	L _v (VdB) ¹
Hoe Ram	0.089	87
Large Bulldozer	0.089	87
Caisson Drilling	0.089	87
Loaded Trucks	0.076	86
Jackhammer	0.035	79
Small Bulldozer	0.003	58

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018)

¹ RMS VdB re 1 μin/sec.

μin/sec = microinches per second

FTA = Federal Transit Administration

in/sec = inches per second

L_v = velocity in decibels

PPV = peak particle velocity

RMS = root-mean-square

VdB = vibration velocity in decibels

Table L: Summary of Construction Vibration Levels

Land Use	Direction	Equipment/Activity	Reference Vibration Level (VdB) at 25 ft	Reference Vibration Level (PPV) at 25 ft	Distance ¹ (ft)	Maximum Vibration Level (VdB)	Maximum Vibration Level (PPV)
Residential	South	Large Bulldozer	87	0.089	3,500	23	0.00005
		Loaded Trucks	86	0.076		22	0.00005
Industrial	West	Large Bulldozer	87	0.089	5,500	17	0.00003
		Loaded Trucks	86	0.076		16	0.00002

Source: Compiled by LSA (June 2019)

Note: Reference vibration levels are associated with a large bulldozer.

¹ Distances reflect the nearest structure of each land use category in a given direction to the nearest project construction boundary. All other structures of each land use category in the given direction would experience lower vibration levels.

ft = feet

PPV = peak particle velocity

VdB = vibration velocity decibels

These vibration levels would not have the potential to result in community annoyance because vibration levels would not exceed the FTA's community annoyance threshold of 78 VdB and 84 VdB

for residential and industrial uses, respectively. In addition, these vibration levels would not exceed the FTA vibration damage threshold of 94 VdB (0.2 PPV [in/sec]) because both structures were observed to be constructed of non-engineered timber. Therefore, vibration levels generated by project construction activities would be less than significant. No vibration reduction measures are required.

Long Term Traffic Noise Impacts

Traffic Noise Impacts to Off-Site Receivers

The FHWA Highway Traffic Noise Prediction Model (FHWA-RD-77 108) was used to evaluate highway traffic-related noise conditions along roadway segments in the project vicinity. This model requires various parameters, including traffic volumes, vehicle mix, vehicle speed, and roadway geometry, to compute typical equivalent noise levels during daytime, evening, and nighttime hours. The resultant noise levels are weighted and summed over 24-hour periods to determine the CNEL values.

Tables M, N, and O provide the traffic noise levels for the existing with and without project, interim-year (2023) approved with and without project, and interim-year (2023) pending with and without project scenarios, respectively. These noise levels represent the worst-case scenario, which assumes that no shielding is provided between traffic and the location where the noise contours are drawn. The traffic volumes of all scenarios were obtained from the Limited Scope Traffic Impact Analysis (LSA 2019). The standard vehicle mix for Southern California roadways was used for traffic on these roadway segments. The specific assumptions used in developing these noise levels and the model printouts are provided in the Attachment.

Tables M, N, and O show that the increase in project-related traffic noise would be up to 0.1 dBA. Noise level increases below 3 dBA would not be perceptible to the human ear in an outdoor environment. Therefore, traffic noise impacts from project-related traffic on off-site sensitive receptors would be less than significant, and no noise reduction measures are required.

Table M: Existing Traffic Noise Levels Without and With Project

Roadway Segment	Without Project Traffic Conditions					With Project Traffic Conditions					
	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase from Baseline Conditions
Portola Parkway Between Bee Canyon Access Road and Sand Canyon Avenue	17,900	76	155	331	70.0	17,960	76	156	332	70.0	0.0
Sand Canyon Avenue Between Portola Parkway and Irvine Boulevard	13,600	57	112	235	67.7	13,660	57	112	236	67.8	0.1
Sand Canyon Avenue Between Irvine Boulevard and Trabuco Road	29,200	108	217	459	71.1	29,260	108	217	460	71.1	0.0
Sand Canyon Avenue Between Trabuco Road and Interstate 5 Northbound Ramps	40,600	135	270	571	72.0	40,660	135	270	572	72.0	0.0

Source: Compiled by LSA (2019)

ADT = average daily traffic

CNEL = Community Noise Equivalent Level

dBA = A-weighted decibels

ft = feet

Table N: Interim-Year (2023) Approved Without and With Project

Roadway Segment	Without Project Traffic Conditions					With Project Traffic Conditions					
	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase from Baseline Conditions
Portola Parkway Between Bee Canyon Access Road and Sand Canyon Avenue	20,100	81	168	358	70.5	20,160	81	168	358	70.5	0.0
Sand Canyon Avenue Between Portola Parkway and Irvine Boulevard	16,400	63	126	266	68.5	16,460	63	126	267	68.6	0.1
Sand Canyon Avenue Between Irvine Boulevard and Trabuco Road	33,900	117	238	507	71.8	33,960	117	239	507	71.8	0.0
Sand Canyon Avenue Between Trabuco Road and Interstate 5 Northbound Ramps	53,700	158	323	687	73.2	53,760	158	323	688	73.2	0.0

Source: Compiled by LSA (2019)

ADT = average daily traffic

CNEL = Community Noise Equivalent Level

dBA = A-weighted decibels

ft = feet

Table O: Interim-Year (2023) Pending Without and With Project

Roadway Segment	Without Project Traffic Conditions					With Project Traffic Conditions					
	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase from Baseline Conditions
Portola Parkway Between Bee Canyon Access Road and Sand Canyon Avenue	19,900	81	167	355	70.4	19,960	81	167	356	70.5	0.1
Sand Canyon Avenue Between Portola Parkway and Irvine Boulevard	16,500	63	126	267	68.6	16,560	63	127	268	68.6	0.0
Sand Canyon Avenue Between Irvine Boulevard and Trabuco Road	34,100	118	239	509	71.8	34,160	118	240	509	71.8	0.0
Sand Canyon Avenue Between Trabuco Road and Interstate 5 Northbound Ramps	55,400	161	330	702	73.4	55,460	161	330	702	73.4	0.0

Source: Compiled by LSA (2019)

ADT = average daily traffic

CNEL = Community Noise Equivalent Level

dBA = A-weighted decibels

ft = feet

Long-term Off-Site Stationary Noise Impacts

Off-Road Equipment for Composting

The project would use off-road equipment on site for composting activities during project operation. It was anticipated that a windrow turner, two front-end loaders, one water truck, and one dump truck would be used. It was assumed that the windrow turner would generate similar levels of noise as bulldozers. The composite noise level from all of the equipment described above during project operations would be 90 dBA L_{max} (87 dBA L_{eq}) at 50 ft.

Table P shows the noise levels from off-road equipment for composting at the nearest noise-sensitive locations. As shown in Table P, the closest residence and industrial use are approximately 3,500 ft south of the project and 5,500 ft west of the project, respectively. At a distance of 3,500 ft and 5,500 ft, noise would be attenuated by 37 dBA and 41 dBA compared to the noise level measured at 50 ft from the source. Noise generated from on-site off-road equipment would potentially reach up to 53 dBA L_{max} (50 dBA L_{eq}) and 49 dBA L_{max} (46 dBA L_{eq}), respectively. These noise levels would not exceed the City's daytime L_{50} (30-minute), L_{25} (15-minute), L_8 (5-minute), L_2 (1-minute), and L_{max} (any time) noise standard of 55, 60, 65, 70, and 75 dBA, respectively, for residential land uses. For industrial land uses, these noise levels would not exceed the City's exterior daytime L_{50} (30-minute), L_{25} (15-minute), L_8 (5-minute), L_2 (1-minute), and L_{max} (anytime) noise standard of 70, 75, 80, 85, and 90 dBA, respectively. As the proposed project would not operate during nighttime hours, it would not exceed the City's nighttime noise standards.

Table P: Summary of Off-Road Equipment Noise Levels

Land Use	Direction	Composite Noise Level (dBA L_{max}) at 50 ft	Composite Noise Level (dBA L_{eq}) at 50 ft	Usage Factor	Distance from Composting Site (ft)	Distance Attenuation (dBA)	Average Noise Level (dBA L_{max})	Average Noise Level (dBA L_{eq})
Residence	South	90	87	40	3,500	37	53	50
Industrial	West	90	87	40	5,500	41	49	46

Source: Compiled by LSA (June 2019)

dBA = A-weighted

decibels

ft = feet

L_{max} = maximum instantaneous noise level

L_{eq} = equivalent continuous sound level

Based on the United States Environmental Protection Agency (EPA) Protective Noise Levels, Condensed Version of EPA Levels Document (1978), with a combination of exterior walls, doors, and windows, standard construction for Southern California (warm climate) buildings would provide attenuation of 24 dBA or more with windows closed (the national average is 25 dBA with windows closed). With windows and doors closed, the noise level would be reduced to 29 dBA L_{max} (53 dBA - 24 dBA = 29 dBA) and 26 dBA L_{eq} (50 dBA - 24 dBA = 26 dBA) for the closest residence. These noise levels would not exceed the City's interior daytime L_8 (5-minute), L_2 (1-minute), and L_{max} (anytime) noise standard of 55, 60, and 65 dBA, respectively. For the closest industrial use, noise levels would reduce to 25 dBA L_{max} (49 dBA - 24 dBA = 25 dBA) and 22 dBA L_{eq} (46 dBA - 24 dBA = 22 dBA) for the closest. These noise levels would not exceed the City's interior daytime L_8 (5-minute), L_2 (1-minute), and L_{max} (anytime) noise standard of 55, 60, and 65 dBA, respectively. As discussed above, the City's

nighttime noise standards would not be exceeded because the proposed project would not operate during nighttime hours. Therefore, noise levels generated by off-road equipment associated with project operations would be less than significant. No noise reduction measures are required.

Long-Term Vibration Impacts

The proposed project would generate vibration from on-site off-road equipment. As shown in Table L, a large bulldozer and loaded truck would generate a vibration level of 87 VdB (0.089 PPV [in/sec]) and 86 VdB (0.076 PPV [in/sec]) at 25 ft, respectively. The closest residence and industrial building are approximately 3,500 ft to the south and 5,500 ft to the west, respectively. At a distance of 3,500 ft and 5,500 ft, the operation of off-road equipment would generate ground-borne vibration levels of 23 VdB (0.000 in/sec PPV) at the closest residence and 22 VdB (0.000 in/sec PPV) at the closest industrial use, respectively. These vibration levels would not have the potential to result in community annoyance because vibration levels would not exceed the FTA's community annoyance threshold of 78 VdB and 84 VdB for residential and industrial uses, respectively. Also, these vibration levels would not exceed the FTA vibration damage threshold of 94 VdB (0.2 PPV [in/sec]) because both structures were observed to be constructed of non-engineered timber. In addition, vibration levels generated from project-related traffic on the adjacent roadways are unusual for on-road vehicles because the rubber tires and suspension systems of on-road vehicles provide vibration isolation. Therefore, vibration levels generated from project operations would be less than significant. No vibration reduction measures are required.

CONCLUSION

No short-term and long-term noise and vibration reduction measures are required.

Attachments: References
FHWA Traffic Noise Model Printouts

REFERENCES

- Airport Land Use Commission. 2008. *Airport Environs Land Use Plan for John Wayne Airport*. April 17.
- City of Irvine. 2015. Municipal Code.
- Federal Highway Administration (FHWA). 1977. Highway Traffic Noise Prediction Model, FHWA-RD-77-108.
- _____. 2006. *Highway Construction Noise Handbook*. Roadway Construction Noise Model, FHWA-HEP-06-015. DOT-VNTSC-FHWA-06-02. NTIS No. PB2006-109012. August.
- Federal Transit Administration (FTA). 2018. *Transit Noise and Vibration Impact Assessment Manual*. Office of Planning and Environment. Report No. 0123. September.
- Harris, Cyril M., editor. 1991. *Handbook of Acoustical Measurements and Noise Control*, Third Edition.
- LSA Associates, Inc. (LSA). 2019. *Limited Scope Traffic Impact Analysis*. June.
- United States Environmental Protection Agency (EPA). 1978. *Protective Noise Levels, Condensed Version of EPA Levels Document*. EPA 550/9-79-100. November.

TABLE Existing NP-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Portola Parkway Between Bee Canyon Access Road and San Canyon Avenue

NOTES: Bee Canyon Greenery Project - Existing NP

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 17900 SPEED (MPH): 55 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 26 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.98

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
75.8	155.5	331.2	711.7

TABLE Existing NP-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Sand Canyon Avenue Between Portola Parkway and Irvine Boulevard

NOTES: Bee Canyon Greenery Project - Existing NP

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13600 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 26 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.73

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
56.7	111.7	235.4	504.6

TABLE Existing NP-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Sand Canyon Avenue Between Irvine Boulevard and Trabuco Road

NOTES: Bee Canyon Greenery Project - Existing NP

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 29200 SPEED (MPH): 55 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 44 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.11

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
107.8	216.6	459.0	985.0

TABLE Existing NP-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Sand Canyon Avenue Between Trabuco Road and I-5
Northbound Ramps

NOTES: Bee Canyon Greenery Project - Existing NP

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 40600 SPEED (MPH): 55 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS			
	75.51	12.57	9.34
M-TRUCKS			
	1.56	0.09	0.19
H-TRUCKS			
	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 56 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.01

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
134.7	269.8	571.3	1226.0

TABLE Existing P-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Portola Parkway Between Bee Canyon Access Road and San Canyon Avenue

NOTES: Bee Canyon Greenery Project - Existing P

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 17960 SPEED (MPH): 55 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 26 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.99

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
75.9	155.8	331.9	713.3

TABLE Existing P-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Sand Canyon Avenue Between Portola Parkway and Irvine Boulevard

NOTES: Bee Canyon Greenery Project - Existing P

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13660 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 26 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.75

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
56.9	112.0	236.1	506.1

TABLE Existing P-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Sand Canyon Avenue Between Irvine Boulevard and Trabuco Road

NOTES: Bee Canyon Greenery Project - Existing P

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 29260 SPEED (MPH): 55 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 44 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.12

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
108.0	216.9	459.6	986.4

TABLE Existing P-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Sand Canyon Avenue Between Trabuco Road and I-5
Northbound Ramps

NOTES: Bee Canyon Greenery Project - Existing P

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 40660 SPEED (MPH): 55 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 56 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.02

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
134.8	270.1	571.9	1227.2

TABLE 2023 Approved NP-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Portola Parkway Between Bee Canyon Access Road and San Canyon Avenue

NOTES: Bee Canyon Greenery Project - 2023 Approved NP

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 20100 SPEED (MPH): 55 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 26 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.48

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
81.2	167.6	357.7	768.8

TABLE 2023 Approved NP-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Sand Canyon Avenue Between Portola Parkway and Irvine Boulevard

NOTES: Bee Canyon Greenery Project - 2023 Approved NP

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 16400 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 26 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.55

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
62.8	125.8	266.3	571.6

TABLE 2023 Approved NP-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Sand Canyon Avenue Between Irvine Boulevard and Trabuco Road

NOTES: Bee Canyon Greenery Project - 2023 Approved NP

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 33900 SPEED (MPH): 55 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 44 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.76

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
117.3	238.4	506.6	1087.9

TABLE 2023 Approved NP-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Sand Canyon Avenue Between Trabuco Road and I-5
Northbound Ramps

NOTES: Bee Canyon Greenery Project - 2023 Approved NP

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 53700 SPEED (MPH): 55 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 56 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.23

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
157.9	323.0	687.4	1476.8

TABLE 2023 Approved P-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Portola Parkway Between Bee Canyon Access Road and San Canyon Avenue

NOTES: Bee Canyon Greenery Project - 2023 Approved P

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 20160 SPEED (MPH): 55 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 26 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.50

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
81.3	168.0	358.4	770.3

TABLE 2023 Approved P-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Sand Canyon Avenue Between Portola Parkway and Irvine Boulevard

NOTES: Bee Canyon Greenery Project - 2023 Approved P

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 16460 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 26 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.56

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
62.9	126.1	267.0	572.9

TABLE 2023 Approved P-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Sand Canyon Avenue Between Irvine Boulevard and Trabuco Road

NOTES: Bee Canyon Greenery Project - 2023 Approved P

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 33960 SPEED (MPH): 55 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 44 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.77

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
117.4	238.6	507.1	1089.2

TABLE 2023 Approved P-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Sand Canyon Avenue Between Trabuco Road and I-5
Northbound Ramps

NOTES: Bee Canyon Greenery Project - 2023 Approved P

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 53760 SPEED (MPH): 55 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 56 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.23

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
158.0	323.2	687.9	1477.9

TABLE 2023 Pending NP-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Portola Parkway Between Bee Canyon Access Road and San Canyon Avenue

NOTES: Bee Canyon Greenery Project - 2023 Pending NP

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 19900 SPEED (MPH): 55 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 26 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.44

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
80.7	166.5	355.3	763.7

TABLE 2023 Pending NP-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Sand Canyon Avenue Between Portola Parkway and Irvine Boulevard

NOTES: Bee Canyon Greenery Project - 2023 Pending NP

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 16500 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 26 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.57

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
63.0	126.3	267.4	573.9

TABLE 2023 Pending NP-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Sand Canyon Avenue Between Irvine Boulevard and Trabuco Road

NOTES: Bee Canyon Greenery Project - 2023 Pending NP

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 34100 SPEED (MPH): 55 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 44 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.78

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
117.7	239.3	508.5	1092.2

TABLE 2023 Pending NP-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Sand Canyon Avenue Between Trabuco Road and I-5
Northbound Ramps

NOTES: Bee Canyon Greenery Project - 2023 Pending NP

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 55400 SPEED (MPH): 55 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 56 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.36

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
160.8	329.5	701.7	1507.8

TABLE 2023 Pending P-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Portola Parkway Between Bee Canyon Access Road and San Canyon Avenue

NOTES: Bee Canyon Greenery Project - 2023 Pending P

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 19960 SPEED (MPH): 55 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 26 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.45

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
80.8	166.9	356.0	765.2

TABLE 2023 Pending P-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Sand Canyon Avenue Between Portola Parkway and Irvine Boulevard

NOTES: Bee Canyon Greenery Project - 2023 Pending P

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 16560 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 26 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.59

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
63.1	126.6	268.1	575.3

TABLE 2023 Pending P-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Sand Canyon Avenue Between Irvine Boulevard and Trabuco Road

NOTES: Bee Canyon Greenery Project - 2023 Pending P

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 34160 SPEED (MPH): 55 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 44 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.79

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
117.8	239.6	509.1	1093.4

TABLE 2023 Pending P-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/10/2019

ROADWAY SEGMENT: Sand Canyon Avenue Between Trabuco Road and I-5
Northbound Ramps

NOTES: Bee Canyon Greenery Project - 2023 Pending P

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 55460 SPEED (MPH): 55 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 56 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.37

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
160.9	329.8	702.2	1508.9
