

NOISE AND VIBRATION IMPACT ANALYSIS

**TENTATIVE TRACT MAP NO. 37731—COLE DEVELOPMENT PROJECT
RIVERSIDE, CALIFORNIA**

LSA

August 2020

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LIST OF ABBREVIATIONS AND ACRONYMS

ADT	average daily traffic
ALUC	Riverside County Airport Land Use Commission
APN	Assessor's Parcel Number
CalEEMod	California Emissions Estimator Model
City	City of Riverside
CNEL	Community Noise Equivalent Level
dB	decibel
dBA	A-weighted decibel
FHWA	United States Federal Highway Administration
ft	foot/feet
FTA	United States Federal Transit Administration
HVAC	heating, ventilation, and air conditioning
Hz	hertz
in/sec	inches per second
L_{dn}	day-night average noise level
LDR	Low Density Residential
L_{eq}	equivalent continuous sound level
L_{max}	maximum instantaneous noise level
LSA	LSA Associates, Inc.
L_v	velocity in decibels
OSP	Orangecrest Specific Plan
PPV	peak particle velocity
project	Tentative Tract Map No. 37731 Cole Development Project
RMS	root-mean-square (velocity)
sf	square foot/feet
TTM	Tentative Tract Map
V	velocity amplitude
VdB	vibration velocity decibels
V_{ref}	reference velocity amplitude

NOISE AND VIBRATION IMPACT ANALYSIS

INTRODUCTION

This noise and vibration impact analysis has been prepared to evaluate the potential noise and vibration impacts and identify reduction measures associated with the Tentative Tract Map (TTM) No. 37731 Cole Development Project (project) in Riverside, Riverside County, California. This report is intended to satisfy City of Riverside (City) requirements for a project-specific noise and vibration impact analysis by examining the short-term and long-term noise and vibration impacts on sensitive uses adjacent to the project site and evaluating reduction measures required by the proposed project.

PROJECT LOCATION AND DESCRIPTION

The project site is located at the northwest corner of Cole Avenue and Mariposa Avenue, on the south side of Lurin Avenue, as shown on Figure 1, Regional and Project Location. The project would be developed on six vacant parcels (Assessor's Parcel Numbers [APNs]: 266-140-021, 022, 029, 030, 049, and 050).

The proposed project consists of the following entitlements to facilitate the establishment of a 138-unit Planned Residential Development: (1) Tentative Tract Map (TM 37731) to subdivide 35.8 net acres into 138 single-family residential lots and lettered lots for private streets and common open space; (2) Planned Residential Development for the establishment of detached single-family dwellings, private streets, and common open space; (3) Variance to allow a reduced perimeter setback; and (4) Design Review of project plans.

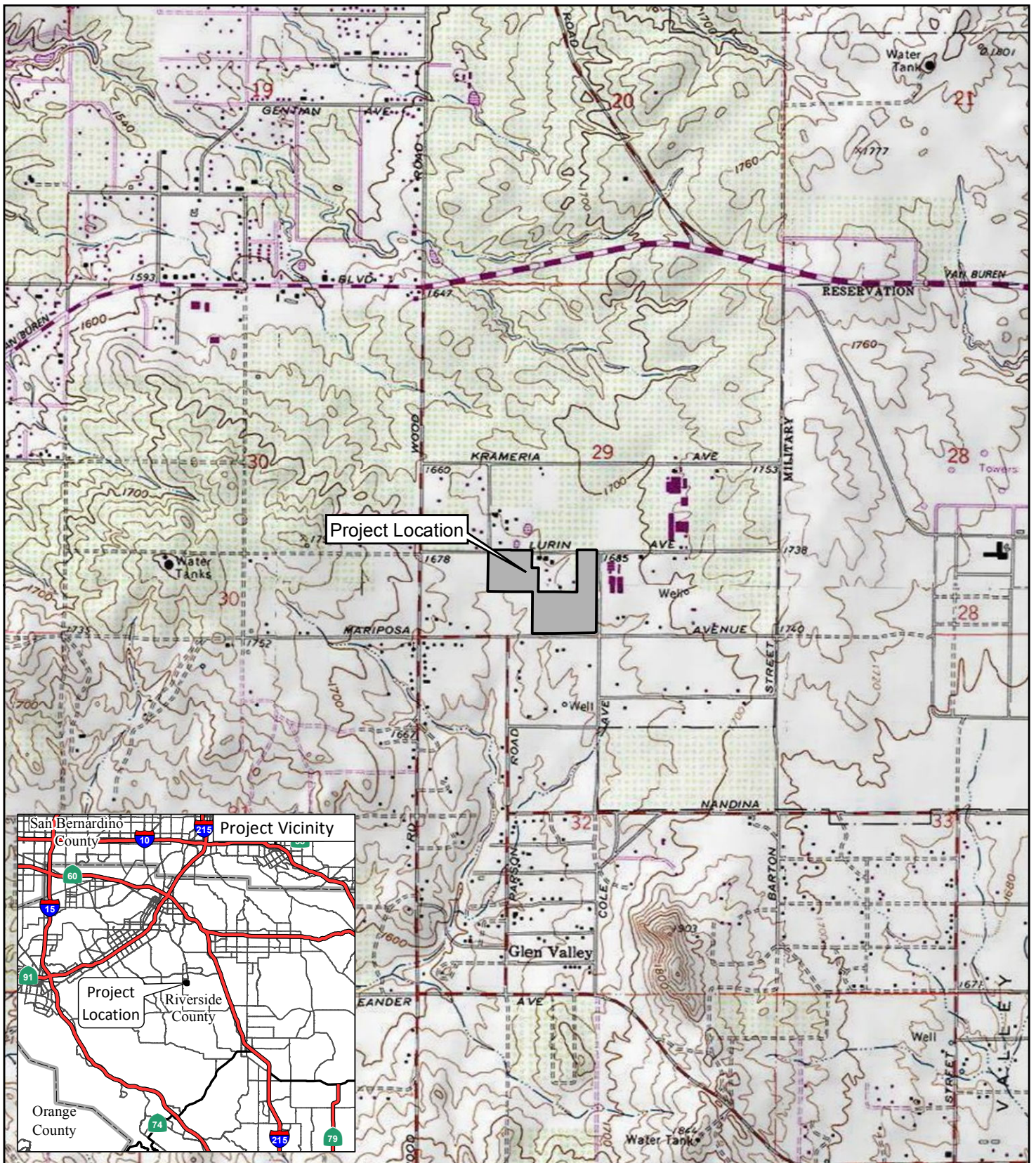
The upper (northern) portion of the site has a General Plan Land Use Designation of LDR (Low Density Residential) and is zoned R-1-1300-SP—Single-Family Residential and Specific Plan (Orangecrest) Overlay Zones. The lower (southern) portion of the site has a General Plan Land Use Designation of VLDR (Very Low Density Residential) and is zoned R-1-1/2 Acre-SP—Single-Family Residential and Specific Plan (Orangecrest) Overlay Zones and R-E-SP—Residential Estate and Specific Plan (Orangecrest) Overlay Zones.

Also, the project would construction 6-foot (ft) high perimeter walls. Figure 2 depicts the project's conceptual site plan.

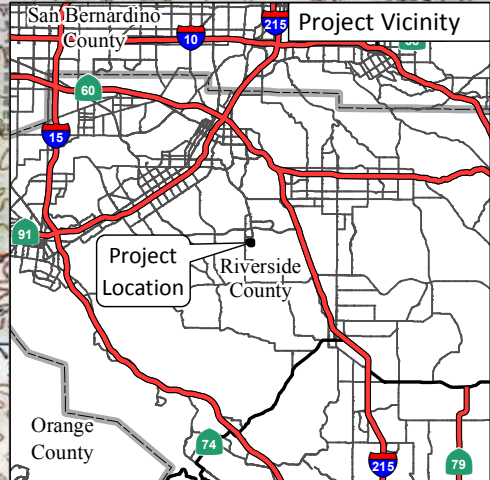
CHARACTERISTICS OF SOUND

Sound is increasing in the environment and can affect quality of life. 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 wave, resulting in the tone's range from high to low. Loudness is the strength of a sound and describes a noisy or quiet environment; it is measured by the amplitude of



Project Location



LEGEND
 Project Location

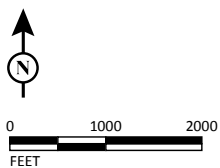


FIGURE 1

TTM37731 Cole Development
 Regional and Project Location

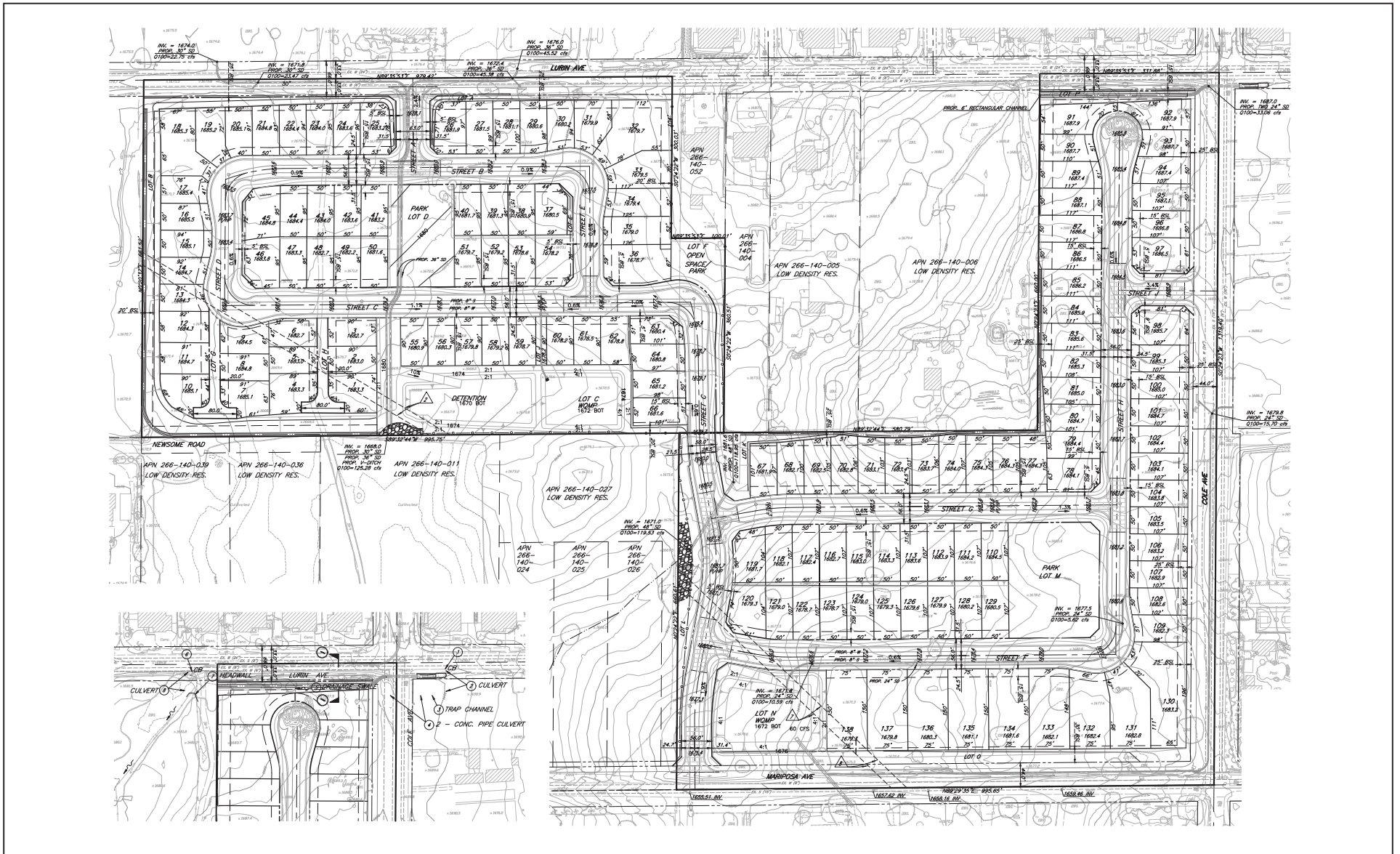


FIGURE 2

LSA



0 130 160
FEET

SOURCE: KWC Engineers

I:\DFD1906\G\Cole\Site Plan-Cole.cdr (5/4/2020)

TTM37731 Cole Development

Conceptual Site Plan

the sound wave. Loudness is determined by the intensity of the sound waves combined with the reception characteristics of the human ear. Sound intensity is the average rate of sound energy transmitted through a unit area perpendicular to the direction in which the sound waves are traveling. 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 intensity and its effect on adjacent sensitive land uses.

Measurement of Sound

Sound intensity is measured through the A-weighted 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 (dB), unlike the linear scale (e.g., inches or pounds), is a scale based on powers of 10.

For example, 10 dB is 10 times more intense than 0 dB, 20 dB is 100 times more intense than 0 dB, and 30 dB is 1,000 times more intense than 0 dB. Thirty decibels (30 dB) represents 1,000 times as much acoustic energy as 0 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 loudness of the sound. Ambient sounds generally range from 30 A-weighted decibels (dBA) (very quiet) to 100 dBA (very loud).

Sound levels are generated from a source, and their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. 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, such as highway traffic or railroad operations, the sound decreases 3 dB for each doubling of distance in a hard site environment. Line source noise in a relatively flat environment with absorptive vegetation decreases 4.5 dB for each doubling of distance.

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-weighted average noise over a sample period. However, the predominant rating scales for human communities in California are L_{eq} and the Community Noise Equivalent Level (CNEL) or the day-night average noise level (L_{dn}) based on 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 noises 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 hours. CNEL and L_{dn} are within 1 dBA of each other and are normally interchangeable. The noise adjustments are added to the noise events occurring during the more sensitive hours.

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 are specified in terms of L_{max} for short-term noise impacts. L_{max} reflects peak operating conditions and

addresses the annoying aspects of intermittent noise. Another noise scale often used together with L_{max} in noise ordinances for enforcement purposes is noise standards in terms of percentile noise levels. 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 of the time the noise level exceeds this level, and half of 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, L_{eq} and L_{50} are approximately the same.

Noise impacts can be described in three categories. The first is audible impacts, which refer to increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3 dB or greater since 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 and 3 dB. This range of noise levels has been found to be noticeable only in laboratory environments. The last category is changes in noise level 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 noise levels higher than 85 dBA. Exposure to high noise levels affects the entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions and thereby affecting blood pressure and functions of the heart and the nervous system. In comparison, extended periods of noise exposure above 90 dBA would result in permanent cell damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear, even with short-term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by the feeling of pain in the ear. This is called the threshold of pain. A sound level of 160 to 165 dBA will potentially result in dizziness or 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 noise sources.

Table A: Definitions of Acoustical Terms

Term	Definition
Decibel, dB	A unit of noise 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., 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-frequency 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_2 , L_8 , L_{50} , L_{90}	The fast A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 2 percent, 8 percent, 50 percent, and 90 percent of a stated time period.

Table A: Definitions of Acoustical Terms

Term	Definition
Equivalent Continuous Sound 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 dB to sound levels occurring in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 dB to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Average Noise Level, L_{dn}	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 dB 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; 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 on its amplitude, duration, frequency, time of occurrence, and tonal or informational content, as well as the prevailing ambient noise level.

Source: *Handbook of Acoustical Measurement 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 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	½ as loud
Suburban Street	55	Quiet	—
Light Traffic; Soft Radio Music in Apartment	50	Quiet	¼ as loud
Large Transformer	45	Quiet	—
Average Residence without Stereo Playing	40	Faint	⅛ 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 Associates, Inc. (2004).

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. Outdoors, 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 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 ft from the vibration source, although there are examples of ground-borne vibration causing interference out to distances greater than 200 ft (*Transit Noise and Vibration Impact Assessment Manual* [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 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 (e.g., 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 velocity 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. The vibration velocity level in decibels is defined as the following:

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

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 annoying. 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 acceptable only if there are an infrequent number of events per day. Low-frequency noise is annoying for sleeping areas; mid-frequency noise is annoying even for infrequent events with institutional land uses such as schools and churches.

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

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

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

dBA = A-weighted decibel

Hz = Hertz

FTA = United States Federal Transit Administration

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 the following: (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 including 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 *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018) are used in this analysis for ground-borne vibration impacts on human annoyance.

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 nonsensitive areas.
Office	84	Feelable vibration. Appropriate to offices and nonsensitive 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 Hz.

FTA = United States Federal Transit Administration

Hz = hertz

L_v = velocity in decibels

Max = maximum

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). United States Federal Traffic Administration (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 nonengineered-timber and masonry buildings, 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
Nonengineered-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) is 1 μ in/sec.

μ in/sec = micro-inches 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 decibels

State Regulations

Title 24

The State's Noise Insulation Standards (California Building Code/California Code of Regulations Title 24, Part 2) establishes standards for interior noise attributable to outside noise sources and

requires the preparation of acoustical studies wherever a residential building is proposed within the 60 dBA CNEL noise contour created by a freeway, expressway, parkway, major street, thoroughfare, rail line, rail transit line, or industrial noise source. The acoustical study must show that the building has been designed to limit the intrusion of exterior noise such that interior noise levels do not exceed 45 dBA CNEL.

Local Regulations

City of Riverside

Noise Element of the General Plan. The City addresses noise in the Noise Element of the General Plan and lists policies required to meet the City's noise-related objectives. The applicable objectives and policies for the proposed project are listed below.

- **Objective N-1:** Minimize noise levels from point sources throughout the community and, wherever possible, mitigate the effects of noise to provide a safe and healthful environment.
 - **Policy N-1.1:** Continue to enforce noise abatement and control measures particularly within residential neighborhoods.
 - **Policy N-1.2:** Require the inclusion of noise-reducing design features in development consistent with standards in Table F (City of Riverside Noise/Land Use Compatibility Criteria), Title 24 of the California Code of Regulations, and Title 7 of the Municipal Code.
 - **Policy N-1.3:** Enforce the City Noise Control Code to ensure that stationary noise and noise emanating from construction activities, private developments/residences, and special events are minimized.
 - **Policy N-1-5:** Avoid locating noise-sensitive land uses in existing and anticipated noise-impacted areas.
- **Objective N-2:** Minimize the adverse effects of airport-related noise through proper land use planning.
 - **Policy N-2.1:** Ensure that new development can be made compatible with the noise environment by using noise/land use compatibility standards (Table F) and the airport noise contour maps (found in the Riverside County Airport Land Use Compatibility Plan) as guides to future planning and development decisions.
 - **Policy N-2.2:** Avoid placing noise-sensitive land uses (e.g., residential uses, hospitals, assisted-living facilities, group homes, schools, and day care centers) within the high noise impact areas (over 60 dB CNEL) for Riverside Municipal Airport and Flabob Airport in accordance with the Riverside County Airport Land Use Compatibility Plan.

Table F: City of Riverside Noise/Land Use Noise Compatibility Criteria

Land Use Category	Community Noise Equivalent Level (CNEL) or Day-Night Level (Ldn), dB						
	55	60	65	70	75	80	85
Single Family Residential*							
Infill Single Family Residential*							
Commercial- Motels, Hotels, Transient Lodging							
Schools, Libraries, Churches, Hospitals, Nursing Homes							
Amphitheaters, Concert Hall, Auditorium, Meeting Hall							
Sports Arenas, Outdoor Spectator Sports							
Playgrounds, Neighborhood Parks							
Golf Courses, Riding Stables, Water Rec., Cemeteries							
Office Buildings, Business, Commercial, Professional							
Industrial, Manufacturing Utilities, Agriculture							
Freeway Adjacent Commercial, Office, and Industrial Uses.							

Nature of the noise environment where the CNEL or Ldn level is:

Below 55 dB
Relatively quiet suburban or urban areas, no arterial streets within 1 block, no freeways within 1/4 mile.

55-65 dB
Most somewhat noisy urban areas, near but not directly adjacent to high volumes of traffic.

65-75 dB
Very noisy urban areas near arterials, freeways or airports.

75+ dB
Extremely noisy urban areas adjacent to freeways or under airport traffic patterns. Hearing damage with constant exposure outdoors.

<p> Normally Acceptable</p> <p>Specific land use is satisfactory, based on the assumption that any building is of normal conventional construction, without any special noise insulation requirements.</p>	<p> Conditionally Acceptable</p> <p>New construction or development should be undertaken only after a detailed analysis of noise reduction requirements is made and needed noise insulation features included in design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.</p>	<p> Normally Unacceptable</p> <p>New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in design.</p>	<p> Conditionally Unacceptable</p> <p>New construction or development should generally not be undertaken, unless it can be demonstrated that noise reduction requirements can be employed to reduce noise impacts to an acceptable level. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in the design.</p>
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The Community Noise Equivalent Level (CNEL) and Day-Night Noise Level (Ldn) are measures of the 24-hour noise environment. They represent the constant A-weighted noise level that would be measured if all the sound energy received over the day were averaged. In order to account for the greater sensitivity of people to noise at night, the CNEL weighting includes a 5-decibel penalty on noise between 7:00 p.m. and 10:00 p.m. and a 10-decibel penalty on noise between 10:00 p.m. and 7:00 a.m. of the next day. The Ldn includes only the 10-decibel weighting for late-night noise events. For practical purposes, the two measures are equivalent for typical urban noise environments.

* For properties located within airport influence areas, acceptable noise limits for single family residential uses are established by the Riverside County Airport Land Use Compatibility Plan.

SOURCE: STATE DEPARTMENT OF HEALTH,
AS MODIFIED BY THE CITY OF RIVERSIDE

Source: General Plan 2025, Noise Element, Figure N-10 (City of Riverside 2007).

- **Objective N-3:** Ensure the viability of March Air Reserve Base/March Inland Port.
 - **Policy N-3.1:** Avoid placing noise-sensitive land uses (e.g., residential uses, hospitals, assisted-living facilities, group homes, schools, and day care centers) within the high noise impact areas (over 65 dB CNEL) for March Air Reserve Base/March Inland Port in accordance with the Riverside County Airport Land Use Compatibility Plan.
- **Objective N-4:** Minimize ground transportation–related noise impacts.
 - **Policy N-4.1:** Ensure that noise impacts generated by vehicular sources are minimized through the use of noise reduction features (e.g., earthen berms, landscaped walls, lowered streets, and improved technology).

To achieve Objective N-1, the proposed residential project was assessed using the Noise/Land Use Noise Compatibility Criteria shown in Table F. As shown in Table F, a noise level of up to 60 dBA CNEL is the upper limit of what is considered a “normally acceptable” noise environment for single-family residential uses, while noise levels between 60 and 65 dBA CNEL are considered “conditionally acceptable.” New development should generally be discouraged within the “unacceptable” category. However, if new development does proceed, a detailed analysis of the noise reduction requirements must be made, and the necessary noise insulation features must be included in the design.

Municipal Code. Sections 7.25.010 and 7.30.015 of the City’s Municipal Code establishes the maximum permissible noise level that may intrude into a neighbor’s property. Table G provides the City’s maximum noise standards based on the type of land use, the location of the noise (exterior/interior), and the time period. The noise metric used for stationary sources is defined as noise levels that cannot be exceeded for certain percentages of time, or L_n .

Section 7.35.020(G) of the City’s Municipal Code exempts noise sources associated with construction, repair, remodeling, or grading of any real property from the noise limits specified in Sections 7.25.010 and 7.30.015 of the City’s Municipal Code, provided the following requirements are met:

- a. A permit has been obtained from the City as required.
- b. Activities do not take place between the hours of 7:00 p.m. and 7:00 a.m. on weekdays, between the hours of 5:00 p.m. and 8:00 a.m. on Saturdays, or at any time on Sunday or a federal holiday.

Table G: City of Riverside Maximum Noise Level Standards

Type of Land Use	Exterior/ Interior	Time Period	L ₅₀ (30 minutes)	L ₂₅ (15 minutes)	L ₈ (5 minutes)	L ₂ (1 minute)	L _{max} (Anytime)
Residential	Exterior	7:00 AM to 10:00 PM	55–60	60	65	70	75
		10:00 PM to 7:00 AM	45–50	50	55	60	65
	Interior	7:00 AM to 10:00 PM	—	—	45–50	50	55
		10:00 PM to 7:00 AM	—	—	35–40	40	45
School	Interior	7:00 AM to 10:00 PM (while school is in session)	—	—	45–50	50	55
Hospital	Interior	Anytime	—	—	45–50	50	55
Office/ Commercial	Exterior	Anytime	65–70	70	75	80	85
Industrial	Exterior	Anytime	70–75	75	80	85	90
Community Support	Exterior	Anytime	60–65	65	70	75	80
Public Recreation Facility	Exterior	Anytime	65–70	70	75	80	85
Nonurban	Exterior	Anytime	70–75	75	80	85	90

Source: City of Riverside Municipal Code (2020).

dBA = A-weighted decibel

L_{max} = maximum instantaneous noise level

L₅₀ (exterior) = The exterior noise standard plus up to 5 dBA for a cumulative period of more than 30 minutes in any hour.

L₂₅ (exterior) = The exterior noise standard plus 5 dBA for a cumulative period of more than 15 minutes in any hour.

L₈ (exterior) = The exterior noise standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour.

L₂ (exterior) = The exterior noise standard plus 15 dBA for a cumulative period of more than 1 minute in any hour.

L_{max} (exterior) = The exterior noise standard plus 20 dBA or the maximum measured ambient noise level for any period of time.

L₈ (interior) = The interior noise standard plus up to 5 dBA for a cumulative period of more than 5 minutes in any hour.

L₂ (interior) = The interior noise standard plus 5 dBA for a cumulative period of more than 1 minute in any hour.

L_{max} (interior) = The interior noise standard plus 10 dBA or the maximum measured ambient noise level for any period of time.

EXISTING SETTING

Overview of the Existing Noise Environment

The primary existing noise sources in the project area is traffic on surrounding public streets. Traffic on Cole Avenue, Lurin Avenue, Mariposa Avenue, and other local streets contributes to the ambient noise levels in the project vicinity. Noise from motor vehicles is generated by engines, the interaction between the tires and the road, and the vehicles' exhaust systems.

Sensitive Land Uses in the Project Vicinity

Land uses in the vicinity of the project area include residences, vacant land, and a commercial use. Single-family residences are located south of Lurin Avenue between Cole Avenue and Dant Street and north, east, south, and southwest of the project. The closest single-family residential building is located south of Lurin Avenue between Cole Avenue and Dant Street at 19331 Lurin Avenue, which is approximately 10 ft from the project construction boundary. Vacant land is located to the northwest, west, and southwest of the project. A commercial use is located north of the project.

Ambient Noise Measurements

Short-Term Noise Measurements

Short-term (20-minute) noise level measurements were conducted on November 6, 2019, using a Larson Davis Model 831 Type 1 sound level meter. Table H shows the results of the short-term noise level measurements along with a description of the measurement location and noise sources that occurred during the measurement. As shown in Table H, the measured average noise levels in the project vicinity range from 42.2 to 55.0 dBA L_{eq} , and the calculated CNEL noise levels range from 48.9 to 59.6 dBA based on the noise level profile from the long-term noise level measurement. Figure 3 shows the short-term monitoring locations.

Table H: Short-Term Ambient Noise Level Measurements

Monitor No.	Location	Date	Start Time	Noise Level				Noise Source(s)
				dBA L_{eq}	dBA L_{max}	dBA L_{min}	dBA CNEL ¹	
ST-1	West edge of the project site, between the end of Newsome Road and Lurin Avenue, 10 ft south of the concrete pillar	11/6/19	10:28 AM	55.0	75.7	30.7	59.6	Light traffic on Mariposa Avenue and a dog barking across the street and a few houses away
ST-2	Southeast of the project site, on the northwest corner of Jurupa Valley High School	11/6/19	11:02 AM	42.2	59.6	34.8	48.9	Light traffic on Wood Road and Lurin Avenue and construction work (faint) in the distance

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

¹ The CNEL noise levels for ST-1 and ST-2 were calculated based on the noise level profile of LT-1 and LT-2, respectively.

CNEL = Community Equivalent Noise Level

L_{max} = maximum measured sound level

dBA = A-weighted decibel

L_{min} = minimum measured sound level

L_{eq} = equivalent continuous sound level

Long-Term Noise Measurements

The long-term (24-hour) noise level measurements were conducted from November 6 to 7, 2019, using two Spark 706RC Dosimeters. Tables I and J show the hourly L_{eq} results from the long-term noise level measurements, and Table K shows the calculated CNEL from the long-term noise level measurements. As shown in Table K, the measured CNEL is 68.1 dBA at LT-1 and 59.4 dBA at LT-2. Figure 3 shows the long-term monitoring locations.

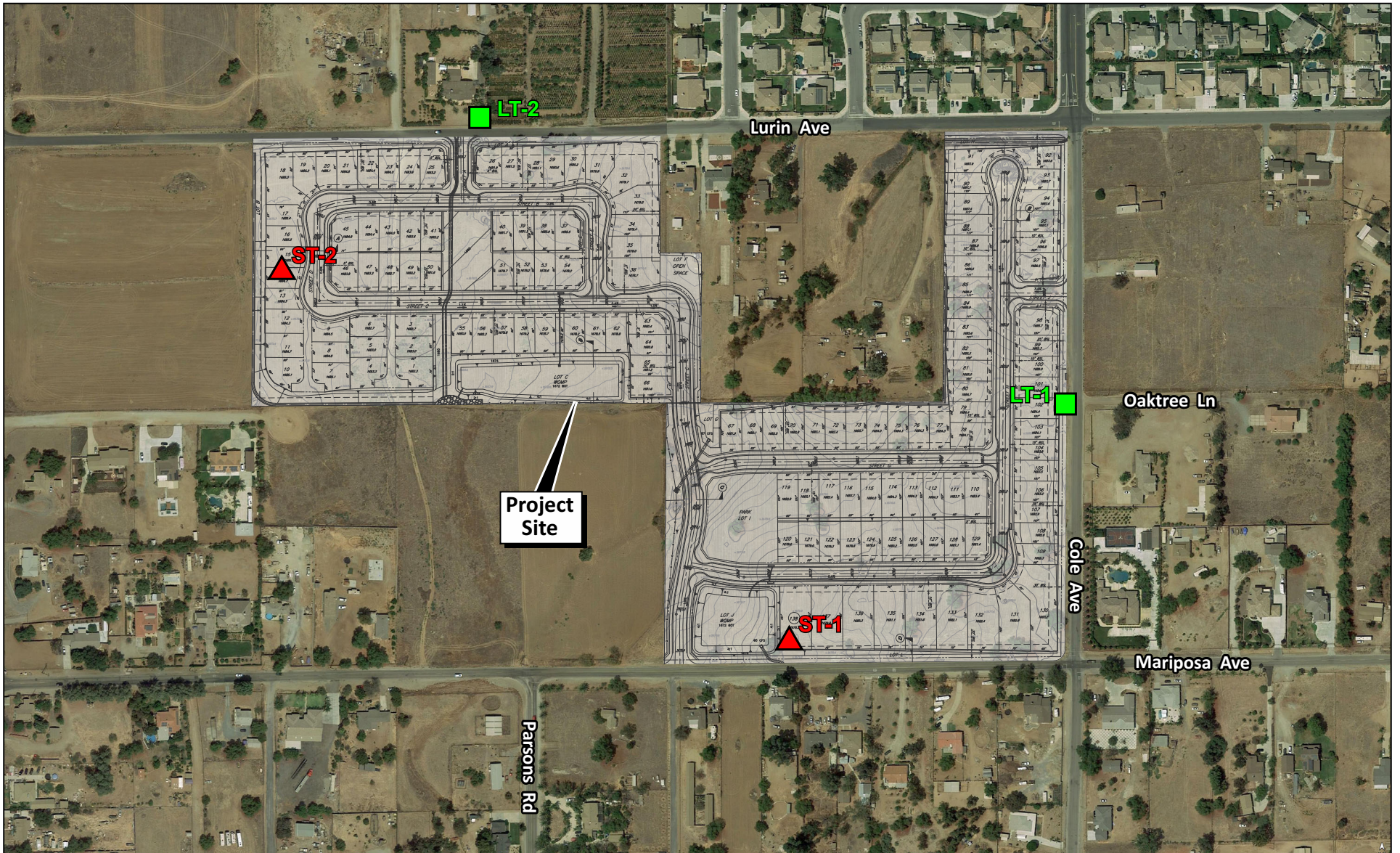


FIGURE 3

LSA



0 175 350
FEET

SOURCE: Google Earth

LEGEND

- - Long Term Monitoring Locations
- ▲ - Short Term Monitoring Locations

TTM37731 Cole Development
Noise Monitoring Locations

Table I: Long-Term (24-Hour) Noise Level Measurement Results at LT-1

	Start Time	Date	Noise Level (dBA L _{eq})
1	10:00 AM	11/6/19	63.5
2	11:00 AM	11/6/19	63.3
3	12:00 PM	11/6/19	64.4
4	1:00 PM	11/6/19	65.6
5	2:00 PM	11/6/19	66.3
6	3:00 PM	11/6/19	67.6
7	4:00 PM	11/6/19	67.3
8	5:00 PM	11/6/19	67.4
9	6:00 PM	11/6/19	66.3
10	7:00 PM	11/6/19	64.3
11	8:00 PM	11/6/19	64.0
12	9:00 PM	11/6/19	62.4
13	10:00 PM	11/6/19	59.9
14	11:00 PM	11/6/19	55.6
15	12:00 AM	11/7/19	55.3
16	1:00 AM	11/7/19	52.8
17	2:00 AM	11/7/19	52.8
18	3:00 AM	11/7/19	54.4
19	4:00 AM	11/7/19	57.5
20	5:00 AM	11/7/19	60.9
21	6:00 AM	11/7/19	66.4
22	7:00 AM	11/7/19	67.4
23	8:00 AM	11/7/19	64.0
24	9:00 AM	11/7/19	63.3

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

dBA L_{eq} = equivalent continuous sound level measured in A-weighted decibels

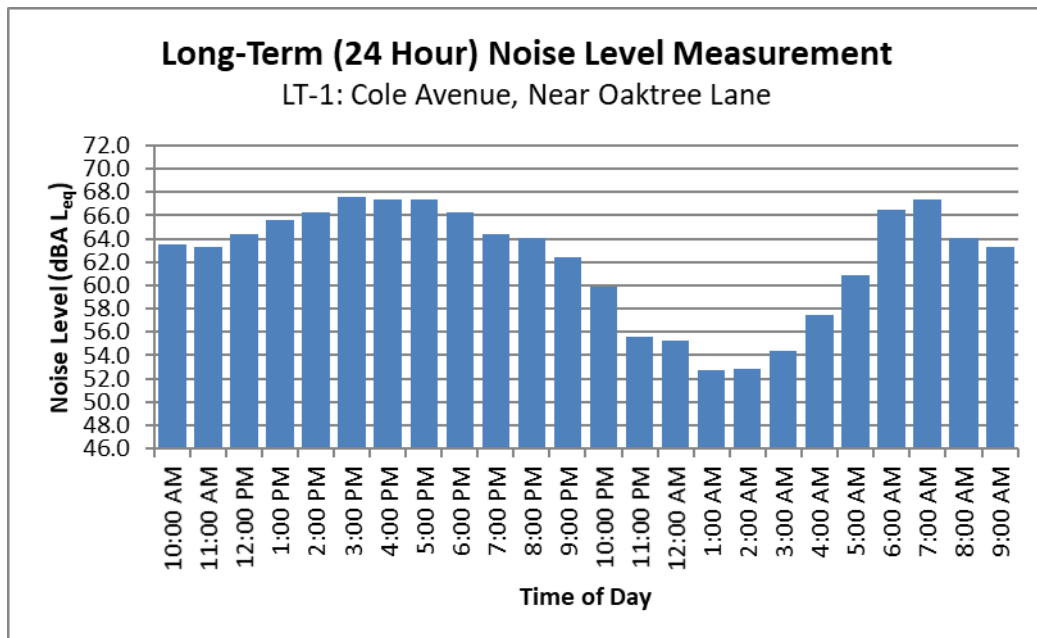


Table J: Long-Term (24-Hour) Noise Level Measurement Results at LT-2

	Start Time	Date	Noise Level (dBA L _{eq})
1	11:00 AM	11/6/19	52.7
2	12:00 PM	11/6/19	60.0
3	1:00 PM	11/6/19	60.5
4	2:00 PM	11/6/19	59.0
5	3:00 PM	11/6/19	55.5
6	4:00 PM	11/6/19	57.6
7	5:00 PM	11/6/19	61.7
8	6:00 PM	11/6/19	55.5
9	7:00 PM	11/6/19	53.4
10	8:00 PM	11/6/19	51.0
11	9:00 PM	11/6/19	50.1
12	10:00 PM	11/6/19	47.1
13	11:00 PM	11/6/19	45.0
14	12:00 AM	11/7/19	48.9
15	1:00 AM	11/7/19	42.9
16	2:00 AM	11/7/19	49.5
17	3:00 AM	11/7/19	46.3
18	4:00 AM	11/7/19	51.1
19	5:00 AM	11/7/19	51.2
20	6:00 AM	11/7/19	57.2
21	7:00 AM	11/7/19	62.2
22	8:00 AM	11/7/19	58.4
23	9:00 AM	11/7/19	55.4
24	10:00 AM	11/7/19	53.7

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

dBA L_{eq} = equivalent continuous sound level measured in A-weighted decibels

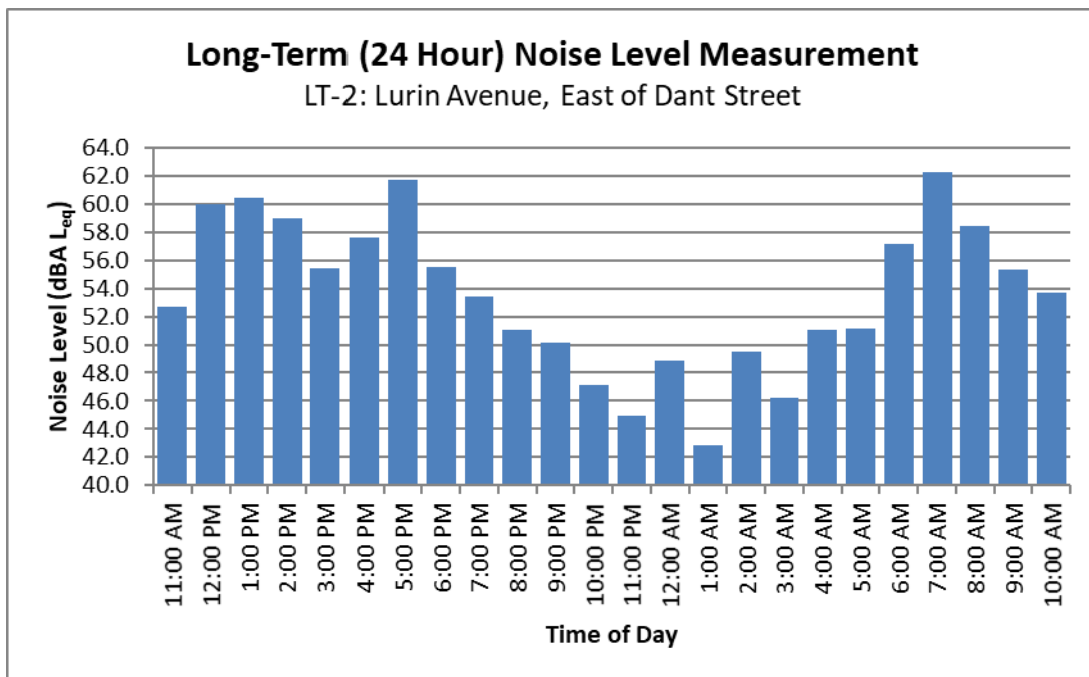


Table K: Long-Term Ambient Noise Monitoring Results

Monitoring No.	Location	Start Date	Start Time	Duration (hours)	Noise Level (dBA CNEL)	Noise Source
LT-1	Cole Avenue, across from Oaktree Lane. Approximately 20 ft from the centerline of Cole Avenue	11/6/19	10:00 AM	24	68.1	Traffic on Cole Avenue
LT-2	Lurin Avenue, east of Dant Street. Approximately 25 ft from the centerline of Lurin Avenue.	11/6/19	11:00 AM	24	59.4	Traffic on Lurin Avenue

Source: Compiled by LSA Associates, Inc. (2019).
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel

Existing Aircraft Noise

The nearest airports to the project site are the Riverside Municipal Airport and March Air Reserve Base, located 7.9 miles northwest and 3.2 miles east of the project site, respectively. Based on the Riverside County Airport Land Use Compatibility Plan (ALUC 2004), the project site is outside the 55 and 60 dBA CNEL noise contours of Riverside Municipal and March Air Reserve Base, respectively. There are no private airstrips located within the vicinity of the project site.

Existing Traffic Noise

The United States 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 resulting noise levels are weighted and summed over 24-hour periods to determine the CNEL values. The existing average daily traffic (ADT) volumes were obtained from the Traffic Impact Analysis (LSA 2020). The standard vehicle mix for Southern California roadways was used for roadways in the project vicinity. Table L lists the existing traffic noise levels on roadways in the project vicinity. 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. Table L indicates that the existing traffic noise levels in the project vicinity are moderately low. The specific assumptions used in developing these noise levels and the model printouts are provided in Appendix A.

Table L: Existing Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (ft)	Centerline to 65 CNEL (ft)	Centerline to 60 CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane
Lurin Avenue West of Project Driveway 1	690	<50	<50	<50	51.0
Lurin Avenue between Project Driveway 1 and Cole Avenue	720	<50	<50	<50	51.2
Lurin Avenue East of Cole Avenue	1,230	<50	<50	<50	53.5
Mariposa Avenue West of Project Driveway 2	3,510	<50	<50	80	62.3
Mariposa Avenue between Project Driveway 2 and Cole Avenue	3,505	<50	<50	80	62.3
Mariposa Avenue East of Cole Avenue	2,450	<50	<50	63	60.8
Cole Avenue North of Lurin Avenue	3,560	<50	<50	56	58.8
Cole Avenue between Lurin Avenue and Project Driveway 3	3,015	<50	<50	<50	57.4
Cole Avenue between Project Driveway 3 and Mariposa Avenue	2,945	<50	<50	<50	57.3
Cole Avenue South of Mariposa Avenue	1,680	<50	<50	<50	57.9

Source: Compiled by LSA Associates, Inc. (2020).

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

ADT = average daily traffic

dBA = A-weighted decibel

CNEL = Community Noise Equivalent Level

ft = foot/feet

IMPACTS

Short-Term Construction Noise Impacts

Two types of short-term noise impacts could occur during construction on the project site. First, construction crew commutes and the transport of construction equipment and materials to the site for the proposed project would incrementally increase noise levels on roads leading to the site. The pieces of heavy equipment for construction activities will be moved on site, will remain for the duration of each construction phase, and will not add to the daily traffic volume in the project vicinity. Although there would be a relatively high single-event noise exposure potential causing intermittent noise nuisance (passing trucks at 50 ft would generate up to a maximum of 84 dBA), the effect on longer-term (hourly or daily) ambient noise levels would be small because the hourly/daily construction-related vehicle trips are small when compared to existing hourly/daily traffic volume on Cole Avenue, Lurin Avenue, and Mariposa Avenue. The building construction phase would generate the most trips out of all of the construction phases, at 83 trips per hour and 118 trips per day based on the California Emissions Estimator Model (CalEEMod, Version 2016.3.2). Roadways that would be used to access the project site are Cole Avenue, Lurin Avenue, and Mariposa Avenue. Also, it is assumed that approximately half of the construction-related traffic would access the project site from Lurin Avenue and that the other half would access the project from Mariposa Avenue. Based on Table L, Cole Avenue, Lurin Avenue, and Mariposa Avenue have estimated existing hourly/daily traffic volumes of 295/2,945, 72/720, and 245/2,450, respectively, near the project site. Based on the information above, construction-related traffic would increase noise by up to 1.1 dBA on Cole Avenue, 2 dBA on Lurin Avenue, and 0.7 dBA on Mariposa Avenue. A noise level increase of less than 3 dBA would not be perceptible to the human ear in an outdoor environment.

Therefore, no short-term construction-related noise impacts associated with worker commute and equipment transport to the project site would occur. No noise reduction measures are required.

The second type of short-term noise impact is related to noise generated during site preparation, grading, building construction, paving, and architectural coating on the project site. Construction is undertaken in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases change the character of the noise generated on a 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 M lists the maximum noise levels (L_{max}) recommended for noise impact assessments for typical construction equipment included in the *FHWA Highway Construction Noise Handbook* (FHWA 2006), based on a distance of 50 ft between the equipment and a noise receptor.

Table M: Typical Construction Equipment Noise Levels

Equipment Description	Acoustical Usage Factor ¹	Maximum Noise Level (L_{max}) at 50 ft ²
Backhoe	40	80
Compactor (ground)	20	80
Compressor	40	80
Crane	16	85
Dozer	40	85
Dump Truck	40	84
Excavator	40	85
Flatbed Truck	40	84
Forklift	20	85
Front-End Loader	40	80
Grader	40	85
Impact Pile Driver	20	95
Jackhammer	20	85
Pickup Truck	40	55
Pneumatic Tools	50	85
Pump	50	77
Rock Drill	20	85
Roller	20	85
Scraper	40	85
Tractor	40	84
Welder	40	73

Source: *FHWA Highway Construction Noise Handbook*, Table 9.1 (FHWA 2006).

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

¹ Usage factor is the percentage of time during a construction noise operation that a piece of construction equipment is operating at full power.

² Maximum noise levels were developed based on Spec 721.560 from the CA/T program to be consistent with the City of Boston, Massachusetts, Noise Code for the “Big Dig” project.

CA/T = Central Artery/Tunnel

ft = foot/feet

FHWA = United States Federal Highway Administration

L_{max} = maximum instantaneous noise level

Typical noise levels range up to 88 dBA L_{max} at 50 ft during the noisiest construction phases. The site preparation phase, which includes excavation and grading of the site, tends to generate the highest noise levels because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery such as backfillers, bulldozers, draglines, and front-end loaders. Earthmoving and compacting equipment includes compactors, scrapers, and graders.

Project construction is expected to require the use of graders, bulldozers, and water trucks/pickup trucks. Noise associated with the use of each type of construction equipment for the site preparation phase is estimated to be between 55 dBA L_{max} and 85 dBA L_{max} at a distance of 50 ft from the active construction area. As shown in Table M, the maximum noise level generated by each grader is assumed to be approximately 85 dBA L_{max} at 50 ft. Each bulldozer would generate approximately 85 dBA L_{max} at 50 ft. The maximum noise level generated by water trucks/pickup trucks is approximately 55 dBA L_{max} at 50 ft from these vehicles. It should be noted that the use of pile driving and blasting is not expected for the proposed project. Each doubling of the sound sources with equal strength increases the noise level by 3 dBA. Assuming that each piece of construction equipment operates at some distance from the other equipment, the worst-case combined noise level during this phase of construction would be 88 dBA L_{max} at a distance of 50 ft from the active construction area. Based on a usage factor of 40 percent, the worst-case combined noise level during this phase of construction would be 84 dBA L_{eq} at a distance of 50 ft from the active construction area.

The closest residential property line at 19331 Lurin Avenue (south of Lurin Avenue between Cole Avenue and Dant Street) is located approximately 30 ft from the project construction boundary and may be subject to short-term construction noise reaching 92 dBA L_{max} (88 dBA L_{eq}) or higher generated by construction activities in the project area. Ambient noise levels at the project site range between 42.2 to 67.6 dBA L_{eq} based on short-term noise level measurements at ST-1 and ST-2, shown in Table H, and long-term noise level measurements at LT-1 and LT-2, shown in Tables I and J. Noise levels generated by project construction would be higher than ambient noise levels. The proposed project would be required to comply with the construction hours allowed under the City's Municipal Code Noise Ordinance and standard construction measures listed below. Therefore, no noise impacts from construction activities would occur. No noise reduction measures are required.

- 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. Sensitive receptors nearest to the project site include residences south of Lurin Avenue between Cole Avenue and Dant Street and north, east, south, and southwest of 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 assesses the potential for building damage using vibration levels in PPV (in/sec). Vibration levels calculated in RMS velocity are best for characterizing human response to building vibration, whereas vibration levels in PPV are best for characterizing damage potential. 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 nonengineered-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 N shows the reference vibration levels at a distance of 25 ft for each type of standard construction equipment from the *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018). Outdoor site preparation for the proposed project is expected to require the use of a large bulldozer and loaded trucks, which would generate ground-borne vibration of up to 87 VdB (0.089 PPV [in/sec]) and 86 VdB (0.076 PPV [in/sec]) when measured at 25 ft, respectively. As previously discussed, the use of pile driving and blasting is not expected for the proposed project.

Table N: Vibration Source Amplitudes for Construction Equipment

Equipment	Reference PPV/L _v at 25 ft	
	PPV (in/sec)	L _v (VdB) ¹
Pile Driver (Impact), Typical	0.644	104
Pile Driver (Sonic), Typical	0.170	93
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large Bulldozer²	0.089	87
Caisson Drilling	0.089	87
Loaded Trucks²	0.076	86
Jackhammer	0.035	79
Small Bulldozer	0.003	58

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

¹ RMS vibration velocity in decibels (VdB) is 1 μin/sec.

² Equipment shown in bold is expected to be used on site.

μin/sec = micro-inches per second

L_v = velocity in decibels

ft = foot/feet

PPV = peak particle velocity

FTA = United States Federal Transit Administration

RMS = root-mean-square

in/sec = inches per second

VdB = vibration velocity decibels

The greatest vibration levels are anticipated to occur during the site preparation phase. 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:

$$L_{v\text{dB}}(D) = L_{v\text{dB}}(25\text{ ft}) - 30 \text{ Log}(D/25)$$

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

Table O lists the projected vibration levels from various construction equipment expected to be used on the project site to the closest buildings in the project vicinity. As shown in Table O, the closest structure to the project construction boundary is the residence 10 ft away located at 19331 Lurin Avenue, which would experience vibration levels of up to 99 VdB (0.352 PPV [in/sec]). This vibration level would result in community annoyance because vibration levels would exceed the FTA community annoyance threshold of 78 VdB for residential uses during daytime hours. In addition, this vibration level has the potential to result in building damage because the building was observed to be constructed of nonengineered timber and masonry and because the vibration level would exceed the FTA vibration damage threshold of 94 VdB (0.2 PPV [in/sec]).

Table O: 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 (ft)	Maximum Vibration Level (VdB)	Maximum Vibration Level (PPV)
Residential (19331 Lurin Avenue)	North	Large bulldozers	87	0.089	10	99	0.352
		Loaded trucks	86	0.076	10	98	0.300
Residential (19504 Mariposa Avenue)	East	Large bulldozers	87	0.089	70	74	0.019
		Loaded trucks	86	0.076	70	73	0.016
Residential (19345 Mariposa Avenue)	South	Large bulldozers	87	0.089	75	73	0.017
		Loaded trucks	86	0.076	75	72	0.015

Source: Compiled by LSA Associates, Inc. (2020).

Note: The FTA-recommended building damage threshold is 94 VdB (0.2 PPV [in/sec]) for building structures constructed of nonengineered timber.

ft = foot/feet

PPV = peak particle velocity

FTA = United States Federal Transit Administration

VdB = vibration velocity decibels

in/sec = inches per second

Other building structures surrounding the project site would experience vibration levels of up to 74 VdB (0.019 PPV [in/sec]) or lower. This vibration level would not result in community annoyance because vibration levels would not exceed the FTA community annoyance threshold of 78 VdB for residential uses during daytime hours. In addition, this vibration level would not have the potential to result in building damage because other buildings were observed to be constructed of nonengineered timber and masonry and because the vibration level would not exceed the FTA vibration damage threshold of 94 VdB (0.2 PPV [in/sec]).

The implementation of vibration reduction measures to prohibit the use of large bulldozers and loaded trucks within 15 ft of existing building structures or require the use of light construction equipment (e.g., small rubber-tire bulldozers or pickup trucks) within 15 ft of the residential building at 19331 Lurin Avenue would reduce construction vibration levels to 94 VdB (0.2 PPV [in/sec]) or lower. Light construction equipment such as a small rubber-tire bulldozer would generate a vibration level of 58 VdB (0.003 PPV [in/sec]) at 25 ft and would reduce vibration levels to 94 VdB (0.2 PPV [in/sec]) or below at the closest structure. This vibration level would not exceed the FTA vibration damage threshold of 94 VdB (0.2 in/sec PPV) for buildings constructed of nonengineered

timber and masonry. Therefore, no construction vibration impacts would occur during project construction with the implementation of the vibration reduction measure described above.

Long-Term Aircraft Noise Impacts

Based on the Riverside County Airport Land Use Compatibility Plan (ALUC 2004), the project site is outside the 55 and 60 dBA CNEL noise contours of Riverside Municipal and March Air Reserve Base, respectively. There are no private airstrips located within the vicinity of the project site. Therefore, the proposed project would not expose people residing or working in the project area to excessive noise levels.

Long-Term Traffic Noise Impacts

The FHWA Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used to evaluate traffic-related noise conditions along street 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 resulting noise levels are weighted and summed over 24-hour periods to determine the CNEL values. The Existing (2019), Project Completion (2021), and Cumulative (2021) ADT volumes were obtained from the Traffic Impact Analysis (LSA 2020) for the proposed project. The standard vehicle mix for Southern California roadways was used for roadways in the project vicinity. Tables P, Q, and R list the traffic noise levels for the Existing (2019), Project Completion (2021), and Cumulative (2021) Without and With Project scenarios, respectively. These noise levels represent the worst-case scenario, which assumes that no shielding is provided between the traffic and the location where the noise contours are drawn. The specific assumptions used in developing these noise levels and the model printouts are provided in Appendix A.

Tables P, Q, and R show that the proposed project would result in a project-related traffic noise increase of up to 2.0 dBA in the project vicinity. This noise level increase is below 3 dBA and would not be perceptible to the human ear in an outdoor environment. Therefore, no off-site traffic noise impacts would occur, and no noise reduction measures are required.

Land Use Compatibility Assessment

The proposed 138 single-family residences was evaluated to determine the land use compatibility of the project site based on the City's Noise/Land Use Compatibility Criteria shown in Table F. As discussed above and shown in Table F, a noise level of up to 60 dBA CNEL is the upper limit of what is considered a "normally acceptable" noise environment for single-family residential uses, while noise levels between 60 dBA CNEL and 65 dBA CNEL are considered "conditionally acceptable."

The FHWA Highway Traffic Noise Prediction Model (FHWA-RD-77-108) was used to evaluate the proposed on-site uses because traffic noise on roadways adjacent to the project is the only major noise source. Proposed on-site residences were evaluated using the Cumulative (2021) With Project traffic noise levels shown in Table R.

Table P: Existing (2019) 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
Lurin Avenue West of Project Driveway 1	690	<50	<50	<50	51.0	1,100	<50	<50	<50	53.0	2.0
Lurin Avenue between Project Driveway 1 and Cole Avenue	720	<50	<50	<50	51.2	790	<50	<50	<50	51.6	0.4
Lurin Avenue East of Cole Avenue	1,230	<50	<50	<50	53.5	1,640	<50	<50	<50	54.7	1.2
Mariposa Avenue West of Project Driveway 2	3,510	<50	<50	80	62.3	3,580	<50	<50	81	62.4	0.1
Mariposa Avenue between Project Driveway 2 and Cole Avenue	3,505	<50	<50	80	62.3	3,775	<50	<50	84	62.7	0.4
Mariposa Avenue East of Cole Avenue	2,450	<50	<50	63	60.8	2,450	<50	<50	63	60.8	0.0
Cole Avenue North of Lurin Avenue	3,560	<50	<50	56	58.8	4,040	<50	<50	60	59.3	0.5
Cole Avenue between Lurin Avenue and Project Driveway 3	3,015	<50	<50	<50	57.4	3,830	<50	<50	<50	58.4	1.0
Cole Avenue between Project Driveway 3 and Mariposa Avenue	2,945	<50	<50	<50	57.3	3,215	<50	<50	<50	57.7	0.4
Cole Avenue South of Mariposa Avenue	1,680	<50	<50	<50	57.9	1,680	<50	<50	<50	57.9	0.0

Source: Compiled by LSA Associates, Inc. (2020).

ADT = average daily traffic

CNEL = Community Noise Equivalent Level

dB A = A-weighted decibel

ft = foot/feet

Table Q: Project Completion (2021) 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
Lurin Avenue West of Project Driveway 1	710	<50	<50	<50	51.1	1,120	<50	<50	<50	53.1	2.0
Lurin Avenue between Project Driveway 1 and Cole Avenue	740	<50	<50	<50	51.3	810	<50	<50	<50	51.7	0.4
Lurin Avenue East of Cole Avenue	1,270	<50	<50	<50	53.6	1,680	<50	<50	<50	54.8	1.2
Mariposa Avenue West of Project Driveway 2	3,650	<50	<50	82	62.5	3,720	<50	<50	83	62.6	0.1
Mariposa Avenue between Project Driveway 2 and Cole Avenue	3,650	<50	<50	82	62.5	3,920	<50	<50	86	62.8	0.3
Mariposa Avenue East of Cole Avenue	2,550	<50	<50	65	60.9	2,550	<50	<50	65	60.9	0.0
Cole Avenue North of Lurin Avenue	3,690	<50	<50	57	58.9	4,170	<50	<50	61	59.5	0.6
Cole Avenue between Lurin Avenue and Project Driveway 3	3,130	<50	<50	<50	57.5	3,945	<50	<50	<50	58.5	1.0
Cole Avenue between Project Driveway 3 and Mariposa Avenue	3,065	<50	<50	<50	57.4	3,335	<50	<50	<50	57.8	0.4
Cole Avenue South of Mariposa Avenue	1,750	<50	<50	<50	58.0	1,750	<50	<50	<50	58.0	0.0

Source: Compiled by LSA Associates, Inc. (2020).

ADT = average daily traffic

CNEL = Community Noise Equivalent Level

dBA = A-weighted decibel

ft = foot/feet

Table R: Cumulative (2021) 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
Lurin Avenue West of Project Driveway 1	790	<50	<50	<50	51.6	1,200	<50	<50	<50	53.4	1.8
Lurin Avenue between Project Driveway 1 and Cole Avenue	820	<50	<50	<50	51.7	890	<50	<50	<50	52.1	0.4
Lurin Avenue East of Cole Avenue	1,800	<50	<50	<50	55.1	2,210	<50	<50	<50	56.0	0.9
Mariposa Avenue West of Project Driveway 2	3,670	<50	<50	82	62.5	3,740	<50	<50	83	62.6	0.1
Mariposa Avenue between Project Driveway 2 and Cole Avenue	3,670	<50	<50	82	62.5	3,940	<50	<50	86	62.8	0.3
Mariposa Avenue East of Cole Avenue	2,550	<50	<50	65	60.9	2,550	<50	<50	65	60.9	0.0
Cole Avenue North of Lurin Avenue	4,660	<50	<50	66	60.0	5,140	<50	<50	70	60.4	0.4
Cole Avenue between Lurin Avenue and Project Driveway 3	3,650	<50	<50	<50	58.2	4,465	<50	<50	<50	59.1	0.9
Cole Avenue between Project Driveway 3 and Mariposa Avenue	3,585	<50	<50	<50	58.1	3,855	<50	<50	<50	58.4	0.3
Cole Avenue South of Mariposa Avenue	2,250	<50	<50	<50	59.1	2,250	<50	<50	<50	59.1	0.0

Source: Compiled by LSA Associates, Inc. (2020).

ADT = average daily traffic

CNEL = Community Noise Equivalent Level

dBA = A-weighted decibel

ft = foot/feet

Exterior Noise Assessment

Proposed on-site residences were evaluated only based on their adjacent roadway because other roadways within the project vicinity are low in traffic noise and would not contribute to incremental traffic noise increases. In addition, the project would construct a 6 ft high perimeter wall, which would provide a minimum noise reduction of 5 dBA. Table S shows the Cumulative (2021) With Project exterior traffic noise levels at the nearest residential property line from the adjacent roadway. As shown in Table S, traffic noise levels at the property line of all first-row residences range between 49.3 dBA CNEL to 56.8 dBA CNEL. These noise levels are normally acceptable based on Table F, and no noise reduction measures are required.

Table S: Exterior Traffic Noise Levels at the Closest Residences

First-Row Residences	Reference Noise Level (dBA CNEL)	Reference Distance (ft)	Distance from Roadway Centerline to Property Line (ft)	Distance Attenuation (dBA)	Shielding (dBA) ¹	Exterior Noise Level at the Property Line (dBA CNEL)
Cole Avenue between Lurin Avenue and Project Driveway 3	59.1	56	60	0.4	5	53.7
Cole Avenue between Project Driveway 3 and Mariposa Avenue	58.4	56	60	0.4	5	53.0
Lurin Avenue between Project Driveway 1 and Cole Avenue	52.1	56	40	-2.2 ²	5	49.3
Mariposa Avenue between Project Driveway 2 and Cole Avenue	60	86	65	-1.8	5	56.8

Source: Compiled by LSA Associates, Inc. (2020).

¹ The proposed 6 ft high perimeter wall would provide a minimum noise reduction of 5 dBA.

² A negative number represents a noise level increase.

CNEL = Community Noise Equivalent Level

dBA = A-weighted decibel

ft = foot/feet

Interior Noise Assessment

Table T shows the exterior noise level at the building setback line and the interior noise levels with windows and doors open and closed under the Cumulative (2021) With Project scenario. The interior noise levels were calculated from the exterior noise level and based on standard construction for Southern California (warm climate) residential buildings from the United States Environmental Protection Agency’s (EPA) Protective Noise Levels (EPA 1978), which would provide 12 dBA or more with windows and doors open (the national average is 15 dBA) and 24 dBA or more with windows and doors closed (the national average is 25 dBA). With windows and doors open, first-row residences along Mariposa Avenue and Cole Avenue between Lurin Avenue and Project Driveway 3 would exceed the interior noise standard of 45 dBA CNEL, while first-row residences along Cole Avenue between Project Driveway 3 and Mariposa Avenue and Lurin Avenue would not exceed the interior noise standard of 45 dBA CNEL. With windows and doors closed, all first-row

Table T: Interior Traffic Noise Levels at the Closest Residences

First-Row Residences	Distance from Roadway Centerline to Building Setback Line	Exterior Noise Level at the Building Setback Line ¹ (dBA CNEL)	Interior Noise Level with Windows/ Doors Open ² (dBA CNEL)	Interior Noise Level with Windows/ Doors Closed ³ (dBA CNEL)
Cole Avenue between Lurin Avenue and Project Driveway 3	75	57.2	45.2 ⁴	33.2
Cole Avenue between Project Driveway 3 and Mariposa Avenue	80	56.1	44.1	32.1
Lurin Avenue between Project Driveway 1 and Cole Avenue	50	52.8	40.8	28.8
Mariposa Avenue between Project Driveway 2 and Cole Avenue	75	60.9	48.9	36.9

Source: Compiled by LSA Associates, Inc. (2020).

- ¹ The exterior noise level was calculated using the same reference noise level and reference distance shown in Table S, and the proposed 6 ft high perimeter wall would provide a minimum noise reduction of 5 dBA.
- ² The interior noise level with windows and doors open was calculated based on an exterior-to-interior noise reduction of 12 dBA based on the EPA Protective Noise Levels (EPA 1978).
- ³ The interior noise level with windows and doors closed was calculated based on an exterior-to-interior noise reduction of 24 dBA based on the EPA Protective Noise Levels (EPA 1978).
- ⁴ The number in bold represents a noise level that exceeds the City of Riverside’s interior noise standard of 45 dBA CNEL.

CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel

EPA = United States Environmental Protection Agency
ft = foot/feet

residences would not exceed the noise standard of 45 dBA CNEL. Mechanical ventilation such as air conditioning would be required for first-row residences along Mariposa Avenue and Cole Avenue between Lurin Avenue and Project Driveway 3 so that windows and doors can remain closed for a prolonged period of time. As the project would provide air conditioning as a standard feature, windows and doors can remain closed for a prolonged period of time. Therefore, no on-site traffic noise impacts would occur and no noise reduction measures are required.

Long-Term Stationary Source Noise Impacts

HVAC Equipment

The proposed project includes on-site ground-floor heating, ventilation, and air conditioning (HVAC) units for each residence that could potentially operate 24 hours per day. The HVAC equipment would generate noise levels of 66.5 dBA L_{eq} at 5 ft based on previous measurements conducted by LSA for similar project types. Table U shows the noise levels generated by HVAC equipment at the property line of the closest off-site land use along with distance attenuation and shielding from the proposed 6 ft high perimeter wall. As shown in Table U, noise levels generated from on-site HVAC units would not exceed the City’s exterior daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) 30-minute (L_{50}) noise standards of 55 dBA and 45 dBA, respectively, for residential uses. Also, noise levels generated from on-site HVAC units would not exceed the City’s exterior 30-minute (L_{50}) noise standard of 65 dBA at any time for commercial uses. In addition, Table T shows that , with shielding from the 6 ft high perimeter wall, interior noise levels generated from on-site HVAC units would not exceed the City’s interior daytime and nighttime 5-minute (L_5) noise standards of 45 dBA and 35 dBA, respectively, for residential uses. Therefore, no off-site noise impacts from on-site HVAC equipment would occur. No noise reduction measures are required.

Table U: HVAC Noise Levels

Land Use	Direction	Reference Noise Level at 5 ft (dBA L _{eq})	Distance from Source to Off-Site Property Line (ft)	Distance Attenuation (dBA)	Shielding ¹ (dBA)	Exterior Noise Level (dBA L _{eq})	Interior Noise Level ² (dBA L _{eq})
Residential/Commercial	North	66.5	60	21.6	5	39.9	15.9
Residential	East	66.5	125	28.0	5	33.5	9.5
Residential	South	66.5	100	26.0	5	35.5	11.5

Source: Compiled by LSA Associates, Inc. (2020).

¹ Noise level reduction from the proposed 6 ft high perimeter wall.

² Average distance to the property line of off-site land uses.

dBA = A-weighted decibel

ft = foot/feet

HVAC = heating, ventilation, and air conditioning

L_{eq} = equivalent continuous sound level

Long-Term Ground-Borne Noise and Vibration from Vehicular Traffic

Once operational, the proposed project would not generate vibration. In addition, vibration levels generated from project-related traffic on the adjacent roadways (Cole Avenue, Lurin Avenue, and Mariposa Avenue) would be unusual for on-road vehicles because the rubber tires and suspension systems of on-road vehicles provide vibration isolation. Vibration generated from project-related traffic on the adjacent roadways would be less than significant, and no noise reduction measures are required.

STANDARD CONDITIONS

The following measures would further minimize construction noise:

- The construction contractor shall limit construction activities to between the hours of 7:00 a.m. and 7:00 p.m. on weekdays and between the hours of 8:00 a.m. and 5:00 p.m. on Saturdays. Construction is prohibit outside of these hours or at any time on Sundays and federal holidays.
- 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.

REDUCTION MEASURES

Short-Term Construction Noise Impacts

No noise reduction measures are required.

Short-Term Construction Vibration Impacts

The following measure would be required to reduce construction vibration impacts:

- The construction contractor shall prohibit heavy construction (e.g., large bulldozers and loaded trucks) or require the use of light construction equipment (e.g., small rubber-tire bulldozers or pickup trucks) within 15 ft of the residential building at 19331 Lurin Avenue.

Long-Term Aircraft Noise Impacts

No noise reduction measures are required.

Long-Term Traffic Noise Impacts

No noise reduction measures are required.

Long-Term Stationary Noise Impacts

No noise reduction measures are required.

Long-Term Vibration Impacts

No vibration reduction measures are required.

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APPENDIX A

FHWA HIGHWAY TRAFFIC NOISE MODEL PRINTOUTS

TABLE Existing (2019)-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019

ROADWAY SEGMENT: Lurin Avenue West of Project Driveway 1

NOTES: TTM37731 Cole Development - Existing (2019)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 690 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 50.97

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

TABLE Existing (2019)-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019

ROADWAY SEGMENT: Lurin Avenue between Project Driveway 1 and Cole Avenue

NOTES: TTM37731 Cole Development - Existing (2019)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 720 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 51.16

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

TABLE Existing (2019)-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Lurin Avenue East of Cole Avenue
NOTES: TTM37731 Cole Development - Existing (2019)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1230 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 53.48

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

TABLE Existing (2019)-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Mariposa Avenue West of Project Driveway 2
NOTES: TTM37731 Cole Development - Existing (2019)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3510 SPEED (MPH): 45 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.34

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	79.9	171.8

TABLE Existing (2019)-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Mariposa Avenue between Project Driveway 2 and Cole Avenue
NOTES: TTM37731 Cole Development - Existing (2019)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3505 SPEED (MPH): 45 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.33

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	79.8	171.6

TABLE Existing (2019)-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Mariposa Avenue East of Cole Avenue
NOTES: TTM37731 Cole Development - Existing (2019)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2450 SPEED (MPH): 45 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.78

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	63.0	135.2

TABLE Existing (2019)-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Cole Avenue North of Lurin Avenue
NOTES: TTM37731 Cole Development - Existing (2019)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3560 SPEED (MPH): 35 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): 16 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 58.79

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	55.5	115.6

TABLE Existing (2019)-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019

ROADWAY SEGMENT: Cole Avenue between Lurin Avenue and Project Driveway 3

NOTES: TTM37731 Cole Development - Existing (2019)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3015 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.38

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	80.4

TABLE Existing (2019)-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Cole Avenue between Project Driveway 3 and Mariposa Avenue
NOTES: TTM37731 Cole Development - Existing (2019)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2945 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.27

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	79.2

TABLE Existing (2019)-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Cole Avenue South of Mariposa Avenue
NOTES: TTM37731 Cole Development - Existing (2019)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1680 SPEED (MPH): 40 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.87

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	86.6

TABLE Existing (2019) With Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019

ROADWAY SEGMENT: Lurin Avenue West of Project Driveway 1

NOTES: TTM37731 Cole Development - Existing (2019) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1100 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 53.00

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

TABLE Existing (2019) With Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019

ROADWAY SEGMENT: Lurin Avenue between Project Driveway 1 and Cole Avenue

NOTES: TTM37731 Cole Development - Existing (2019) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 790 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 51.56

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

TABLE Existing (2019) With Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Lurin Avenue East of Cole Avenue
NOTES: TTM37731 Cole Development - Existing (2019) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1640 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 54.73

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	53.8

TABLE Existing (2019) With Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Mariposa Avenue West of Project Driveway 2
NOTES: TTM37731 Cole Development - Existing (2019) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3580 SPEED (MPH): 45 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.42

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	81.0	174.0

TABLE Existing (2019) With Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Mariposa Avenue between Project Driveway 2 and Cole Avenue
NOTES: TTM37731 Cole Development - Existing (2019) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3775 SPEED (MPH): 45 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.65

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	83.9	180.3

TABLE Existing (2019) With Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Mariposa Avenue East of Cole Avenue
NOTES: TTM37731 Cole Development - Existing (2019) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2450 SPEED (MPH): 45 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.78

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	63.0	135.2

TABLE Existing (2019) With Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Cole Avenue North of Lurin Avenue
NOTES: TTM37731 Cole Development - Existing (2019) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 4040 SPEED (MPH): 35 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): 16 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.34

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	60.0	125.6

TABLE Existing (2019) With Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019

ROADWAY SEGMENT: Cole Avenue between Lurin Avenue and Project Driveway 3

NOTES: TTM37731 Cole Development - Existing (2019) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3830 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 58.42

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	94.2

TABLE Existing (2019) With Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Cole Avenue between Project Driveway 3 and Mariposa Avenue
NOTES: TTM37731 Cole Development - Existing (2019) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3215 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.66

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	83.9

TABLE Existing (2019) With Project-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Cole Avenue South of Mariposa Avenue
NOTES: TTM37731 Cole Development - Existing (2019) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1680 SPEED (MPH): 40 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.87

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	86.6

TABLE Project Completion (2021)-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Lurin Avenue West of Project Driveway 1
NOTES: TTM37731 Cole Development - Project Completion (2021)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 710 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 51.10

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

TABLE Project Completion (2021)-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019

ROADWAY SEGMENT: Lurin Avenue between Project Driveway 1 and Cole Avenue

NOTES: TTM37731 Cole Development - Project Completion (2021)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 740 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 51.28

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

TABLE Project Completion (2021)-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Lurin Avenue East of Cole Avenue
NOTES: TTM37731 Cole Development - Project Completion (2021)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1270 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 53.62

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

TABLE Project Completion (2021)-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Mariposa Avenue West of Project Driveway 2
NOTES: TTM37731 Cole Development - Project Completion (2021)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3650 SPEED (MPH): 45 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.51

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	82.0	176.3

TABLE Project Completion (2021)-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Mariposa Avenue between Project Driveway 2 and Cole Avenue
NOTES: TTM37731 Cole Development - Project Completion (2021)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3650 SPEED (MPH): 45 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.51

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	82.0	176.3

TABLE Project Completion (2021)-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Mariposa Avenue East of Cole Avenue
NOTES: TTM37731 Cole Development - Project Completion (2021)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2550 SPEED (MPH): 45 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.95

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	64.7	138.8

TABLE Project Completion (2021)-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Cole Avenue North of Lurin Avenue
NOTES: TTM37731 Cole Development - Project Completion (2021)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3690 SPEED (MPH): 35 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): 16 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 58.95

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	56.8	118.4

TABLE Project Completion (2021)-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019

ROADWAY SEGMENT: Cole Avenue between Lurin Avenue and Project Driveway 3

NOTES: TTM37731 Cole Development - Project Completion (2021)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3130 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.54

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	82.4

TABLE Project Completion (2021)-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019

ROADWAY SEGMENT: Cole Avenue between Project Driveway 3 and Mariposa Avenue

NOTES: TTM37731 Cole Development - Project Completion (2021)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3065 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.45

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	81.3

TABLE Project Completion (2021)-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Cole Avenue South of Mariposa Avenue
NOTES: TTM37731 Cole Development - Project Completion (2021)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1750 SPEED (MPH): 40 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 58.04

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	89.0

Project-01

TABLE Project Completion (2021) With
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Lurin Avenue West of Project Driveway 1
NOTES: TTM37731 Cole Development - Project Completion (2021) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1120 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 53.08

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

Project-02

TABLE Project Completion (2021) With
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Lurin Avenue between Project Driveway 1 and Cole Avenue
NOTES: TTM37731 Cole Development - Project Completion (2021) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 810 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 51.67

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

Project-03

TABLE Project Completion (2021) With
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Lurin Avenue East of Cole Avenue
NOTES: TTM37731 Cole Development - Project Completion (2021) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1680 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 54.84

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	54.6

Project-04

TABLE Project Completion (2021) With
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Mariposa Avenue West of Project Driveway 2
NOTES: TTM37731 Cole Development - Project Completion (2021) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3720 SPEED (MPH): 45 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.59

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	83.1	178.5

Project-05
TABLE Project Completion (2021) With

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019

ROADWAY SEGMENT: Mariposa Avenue between Project Driveway 2 and Cole Avenue

NOTES: TTM37731 Cole Development - Project Completion (2021) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3920 SPEED (MPH): 45 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.82

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	86.0	184.9

Project-06

TABLE Project Completion (2021) With
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Mariposa Avenue East of Cole Avenue
NOTES: TTM37731 Cole Development - Project Completion (2021) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2550 SPEED (MPH): 45 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.95

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	64.7	138.8

Project-07

TABLE Project Completion (2021) With
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
 ROADWAY SEGMENT: Cole Avenue North of Lurin Avenue
 NOTES: TTM37731 Cole Development - Project Completion (2021) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 4170 SPEED (MPH): 35 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): 16 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.48

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	61.2	128.2

Project-08

TABLE Project Completion (2021) With
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Cole Avenue between Lurin Avenue and Project Driveway 3
NOTES: TTM37731 Cole Development - Project Completion (2021) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3945 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 58.54

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	96.1

Project-09

TABLE Project Completion (2021) With
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Cole Avenue between Project Driveway 3 and Mariposa Avenue
NOTES: TTM37731 Cole Development - Project Completion (2021) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3335 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.81

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	86.0

Project-10

TABLE Project Completion (2021) With
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Cole Avenue South of Mariposa Avenue
NOTES: TTM37731 Cole Development - Project Completion (2021) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1750 SPEED (MPH): 40 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 58.04

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	89.0

TABLE Cumulative (2021)-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Lurin Avenue West of Project Driveway 1
NOTES: TTM37731 Cole Development - Cumulative (2021)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 790 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 51.56

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

TABLE Cumulative (2021)-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019

ROADWAY SEGMENT: Lurin Avenue between Project Driveway 1 and Cole Avenue

NOTES: TTM37731 Cole Development - Cumulative (2021)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 820 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 51.72

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

TABLE Cumulative (2021)-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Lurin Avenue East of Cole Avenue
NOTES: TTM37731 Cole Development - Cumulative (2021)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1800 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 55.14

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	57.2

TABLE Cumulative (2021)-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Mariposa Avenue West of Project Driveway 2
NOTES: TTM37731 Cole Development - Cumulative (2021)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3670 SPEED (MPH): 45 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.53

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	82.3	176.9

TABLE Cumulative (2021)-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Mariposa Avenue between Project Driveway 2 and Cole Avenue
NOTES: TTM37731 Cole Development - Cumulative (2021)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3670 SPEED (MPH): 45 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.53

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	82.3	176.9

TABLE Cumulative (2021)-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Mariposa Avenue East of Cole Avenue
NOTES: TTM37731 Cole Development - Cumulative (2021)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2550 SPEED (MPH): 45 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.95

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	64.7	138.8

TABLE Cumulative (2021)-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Cole Avenue North of Lurin Avenue
NOTES: TTM37731 Cole Development - Cumulative (2021)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 4660 SPEED (MPH): 35 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): 16 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.96

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	65.6	138.0

TABLE Cumulative (2021)-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019

ROADWAY SEGMENT: Cole Avenue between Lurin Avenue and Project Driveway 3

NOTES: TTM37731 Cole Development - Cumulative (2021)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3650 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 58.21

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	91.3

TABLE Cumulative (2021)-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Cole Avenue between Project Driveway 3 and Mariposa Avenue
NOTES: TTM37731 Cole Development - Cumulative (2021)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3585 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 58.13

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	90.2

TABLE Cumulative (2021)-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Cole Avenue South of Mariposa Avenue
NOTES: TTM37731 Cole Development - Cumulative (2021)

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2250 SPEED (MPH): 40 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.14

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	105.2

TABLE Cumulative (2021) With Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019

ROADWAY SEGMENT: Lurin Avenue West of Project Driveway 1

NOTES: TTM37731 Cole Development - Cumulative (2021) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1200 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 53.38

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

TABLE Cumulative (2021) With Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019

ROADWAY SEGMENT: Lurin Avenue between Project Driveway 1 and Cole Avenue

NOTES: TTM37731 Cole Development - Cumulative (2021) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 890 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 52.08

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

TABLE Cumulative (2021) With Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019

ROADWAY SEGMENT: Lurin Avenue East of Cole Avenue

NOTES: TTM37731 Cole Development - Cumulative (2021) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2210 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 56.03

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	65.5

TABLE Cumulative (2021) With Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Mariposa Avenue West of Project Driveway 2
NOTES: TTM37731 Cole Development - Cumulative (2021) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3740 SPEED (MPH): 45 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.61

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	83.3	179.2

TABLE Cumulative (2021) With Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Mariposa Avenue between Project Driveway 2 and Cole Avenue
NOTES: TTM37731 Cole Development - Cumulative (2021) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3940 SPEED (MPH): 45 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.84

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	86.3	185.5

TABLE Cumulative (2021) With Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019

ROADWAY SEGMENT: Mariposa Avenue East of Cole Avenue

NOTES: TTM37731 Cole Development - Cumulative (2021) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2550 SPEED (MPH): 45 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.95

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	64.7	138.8

TABLE Cumulative (2021) With Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Cole Avenue North of Lurin Avenue
NOTES: TTM37731 Cole Development - Cumulative (2021) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5140 SPEED (MPH): 35 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): 16 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.39

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	69.8	147.2

TABLE Cumulative (2021) With Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019

ROADWAY SEGMENT: Cole Avenue between Lurin Avenue and Project Driveway 3

NOTES: TTM37731 Cole Development - Cumulative (2021) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 4465 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.08

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	104.3

TABLE Cumulative (2021) With Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019
ROADWAY SEGMENT: Cole Avenue between Project Driveway 3 and Mariposa Avenue
NOTES: TTM37731 Cole Development - Cumulative (2021) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3855 SPEED (MPH): 30 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 58.44

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	94.6

TABLE Cumulative (2021) With Project-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2019

ROADWAY SEGMENT: Cole Avenue South of Mariposa Avenue

NOTES: TTM37731 Cole Development - Cumulative (2021) With Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2250 SPEED (MPH): 40 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): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.14

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
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0.0	0.0	0.0	105.2