Appendix F

Acoustical Assessment

Kimley»Horn

Acoustical Assessment

Kanan Road/Agoura Road Ultimate Intersection Improvements Project

City of Agoura Hills, California

Kimley»Horn

Expect More. Experience Better.

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LIST OF ABBREVIATED TERMS

ADT	average daily traffic
dBA	A-weighted sound level
CEQA	California Environmental Quality Act
CNEL	community equivalent noise level
L_{dn}	day-night noise level
dB	decibel
L_{eq}	equivalent noise level
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HVAC	heating ventilation and air conditioning
Hz	hertz
in/sec	inches per second
L_{max}	maximum noise level
µPa	micropascals
L_{min}	minimum noise level
PPV	peak particle velocity
RMS	root mean square
VdB	vibration velocity level

1 INTRODUCTION

This report documents the results of an Acoustical Assessment completed for the Kanan Road/Agoura Road Ultimate Intersection Improvements Project (Proposed Project). The purpose of this Acoustical Assessment is to evaluate the potential Project-related construction and operational noise and vibration levels and determine the level of impact the Proposed Project would have on the environment.

1.1 Project Location

The Project site is in the City of Agoura Hills (City), which is located along the U.S. Route 101 (US 101 or Ventura Freeway). Exhibit 1: Regional Vicinity Map, depicts the Project site in a regional context.

Exhibit 2: Local Vicinity Map, depicts the Project site in a local context and indicates the Project site is generally comprised of three discontiguous areas:

- Kanan Road/Agoura Road intersection - this comprises most of the Project site, with the south leg extending to Cornell Way;
- Agoura Road/Whizin Market Square access driveway intersection (approximately 605 feet east of Cornell Road) – this is the proposed east pilasters location; and
- Agoura Road/Roadside Drive intersection (approximately 1,585 feet west of Kanan Road) – this is the proposed west pilasters location.

The Kanan Road/Agoura Road intersection is in the City's southern portion, approximately 600 feet south of the Kanan Road/U.S. Highway 101 interchange. The Project site is within the Agoura Village Specific Plan (AVSP) area, except the proposed west pilasters location, which is at the Agoura Road/Roadside Drive intersection, adjacent and west of the AVSP area.

1.2 Project Description

The Agoura Hills City Council adopted the Agoura Village Specific Plan (AVSP) and certified the accompanying updated Final Revised and Recirculated Program EIR (Certified PEIR) (State Clearinghouse [SCH] No. 2003111051) in accordance with CEQA on November 19, 2008 (Resolution 19-1915). One of the AVSP proposed components was a roundabout at Kanan Road/Agoura Road intersection, at ultimate buildout of the AVSP area. The proposed roundabout was included in the Certified PEIR Project Description and evaluated throughout the Certified PEIR as the Preferred Alternative.[1] In September 2014, the City Council voted to not proceed with the Kanan Road/Agoura Road roundabout as the Preferred Alternative because of the large amount of property outside of the existing right-of-way (ROW) which would need to be acquired from property owners to construct the roundabout, and instead authorized the design of a widened standard four-leg signalized intersection, as the ultimate configuration (i.e., the Proposed Project). This altered design limits ROW acquisitions.

The Proposed Project proposes improvements to enhance traffic capacity and improve mobility, safety, and access within the City. The Kanan Road/Agoura Road intersection's high use and visibility make the Proposed Project a challenging and sensitive priority for the City.

[1] City of Agoura Hills. Agoura Village Specific Plan: Updated Final Revised and Recirculated Environmental Impact Report. August 2008.

The Proposed Project proposes improvements that include widening the intersection, providing pilasters and monument signs, and undergrounding overhead power/telecommunication lines, among others, as depicted on Exhibit 3A: Proposed Kanan Road/Agoura Road Intersection, and described below. Exhibit 3B: Proposed Kanan Road/Agoura Road Intersection Improvements provides a close-up view of the proposed improvements by segment. Although the pilasters and monument signs will be constructed at a later date by others, the environmental impacts from the pilasters and monument signs will be analyzed herein, including for construction, to provide a conservative analysis.

Intersection and Roadway Improvements

Modified road alignments, including elevations and widths, are proposed to accommodate a widened intersection with a configuration of turn pockets and adequate room for additional queuing capacity at all intersection approaches. The through lanes would vary between 10 and 13 feet wide. The proposed widened pavement improvements would generally match the existing Kanan Road and Agoura Road pavement structural sections, as further detailed below.

a. **North Leg:** Improvements on the north leg would occur within the 100-foot ROW and would extend from the Kanan Road/Agoura Road intersection to approximately 50 to 60 feet north. Improvements would be limited to new pedestrian curb ramps, relocation of traffic signals, landscape buffers, full-depth asphalt replacement, and a new terraced plaza at the northwest corner of the Kanan Road/Agoura Road intersection. The existing lane geometry would remain, with two northbound through lanes and five southbound lanes including two left-turn pockets, two through lanes, and one right-turn pocket lane.

b. **South Leg:** Improvements on the south leg would extend from the Kanan Road/Agoura Road intersection to approximately 250 feet south. Improvements include full depth asphalt replacement, asphalt mill and overlay, creation of a new right-turn pocket lane, relocation of existing utilities and traffic signals, and new pedestrian curb ramps and 12-foot sidewalk along northbound lanes. The northbound geometry would include a 12-foot left turn lane, two through lanes ranging from 12 to 13 feet, and a new right turn pocket lane measuring 13 feet. The existing ROW would be relocated further east to accommodate the proposed improvements. The two existing 15-feet southbound though lanes would remain.

c. **East Leg:** Improvements on the east leg would extend from the Kanan Road/Agoura Road intersection to approximately 530 feet east, terminating at the existing landscaped median on Agoura Road, near the vacant lot at 29125 Agoura Road. The existing eastbound and westbound 6-foot Class II bike lane would remain. Improvements include full depth asphalt replacement, asphalt mill and overlay, new green conflict striping, relocation of traffic signals and utilities, new pedestrian curb ramps, relocation of ROW by 10 feet to the south to allow for the bike lane and sidewalk to each be widened by 1 foot, and new landscape buffers. A Southern California Edison (SCE) transformer would need to be relocated to the south to avoid the newly widened sidewalk. A striped median ranging from 10 to 21 feet is also proposed. Left-turn access to the Speedway Gas Station would be maintained. Eastbound lanes would maintain two through lanes measuring 11 feet, eventually merging into one through lane until the Project terminus. Westbound lanes geometry would remain the same. One westbound through lane would expand into one 14-foot right turn pocket lane and 11-foot through lane, with the existing 6-foot bike lane with new green conflict striping in between. The westbound lane would terminate at the Kanan Road/Agoura Road intersection with the 12-foot right turn pocket lane, the existing 6-foot bike lane with new

green conflict striping, the existing 11-foot through lane, and the existing 11-foot left turn pocket at the Kanan Road/Agoura Road intersection.

- **West Leg:** Improvements on the west leg would extend from the Kanan Road/Agoura Road intersection to approximately 400 feet west, terminating just west of the existing AT&T driveway located west of the Tavern Tomoko & Ladyface Brewery and the existing driveways for the Agoura Pointe Shopping Center. Improvements include full depth asphalt replacement, asphalt mill and overlay, new green conflict striping for existing eastbound bike lane, relocation of traffic signals and utilities, new pedestrian curb ramps, relocation of ROW by 7 feet to the south to accommodate new 11-foot right turn pocket lane. Eastbound lanes would feature two 11-foot left turn pocket lanes, one 11-foot through lane, 6-foot Class II bike lane, and new 12-foot right turn pocket lane. Westbound lanes would feature a 11 foot through lane with 7 foot Class II bike lane. Approximately 190 feet west of the Kanan Road/Agoura Road intersection, a set of stairs will be created to connect the westbound sidewalk to the Agoura Pointe Shopping Center parking lot. The development of the stairway connection would remove the existing parking spot and would open into the parking lot. The parking spot would be replaced with a landing zone and would be surrounded by a landscape buffer to the west and the existing island with an oak tree on the east. Three mature oak trees, two of which are located north of Agoura Road and one which is located south of Agoura Road, would be protected and remain in place as part of the Proposed Project.

Ancillary improvements such as minor utility modifications/relocations would be required to accommodate the above improvements; see also *Underground Utility Improvements* Section below. Existing pedestrian and street lighting would also be relocated; however, no new pedestrian or street lighting would be added.

Monument Signage Improvements

The Proposed Project includes entryway and statement signage (i.e., pilasters and monuments) on Kanan Road and Agoura Road. The new signage would adhere to AVSP Design Guidelines (Chapter 5), as applicable. The sign improvements are comprised of pilasters and monument signs. In total, six pilasters are proposed, as described below. The pilasters would be up to approximately 10 feet tall, and up to approximately 10 feet wide by 10 feet long. A 15-foot landscaped buffer would be provided surrounding the base of the pilasters. Thus, the total base footprint of the pilasters with the landscaped buffer would be approximately 1,600 square feet each. The monuments would be up to approximately 15 feet tall, and up to approximately 24 feet wide by 24 feet long. A 5-foot landscaped buffer would be provided surrounding the base of the monuments. Thus, the total base footprint of the monuments with the landscaped buffer would be approximately 1,156 square feet each.

- Agoura Road East and West Pilasters: Four pilasters are proposed on Agoura Road at the two locations depicted on Exhibit 3A (two pilasters for each location, offset from each other on either side of the road). These pilasters are intended to establish the character of the AVSP area;

- Kanan Road South Pilasters: Two pilasters are proposed on Kanan Road at the location depicted on Exhibit 3A (two pilasters for this location, offset from each other on either side of the road) to establish the AVSP area's southern boundary. The proposed locations would be approximate with the conceptual driveway locations of the proposed developments east and west of Kanan Road; and

- Kanan Road Monuments: Two monuments are proposed on Kanan Road at the location depicted

on Exhibit 3A**,** near the Kanan Road/Cornell Road intersection. The monuments are intended to approximately establish the City's southern limit.

The new signage, along with other aesthetic improvements from new landscaping islands, activated pedestrian corners, and street furnishings are intended to contribute and define a unique "gateway for the City." Minor lighting would be provided at the pilasters and monuments for illumination and safety purposes.

Underground Utility Improvements

The Proposed Project proposes undergrounding two existing overhead power/telecommunication lines on the south leg along the east side of Kanan Road, for approximately 1,105 linear feet, from approximately 160 feet south of Agoura Road to Cornell Way; see Exhibit 3A and Exhibit 3B.

The lighting poles that include luminaires will remain in place, and all other utility poles, excluding one located on northbound Kanan Road, will also remain in place. Utility poles may be installed/upgraded at the utility district's boundary where determined necessary for the transition from the existing overhead system to the proposed underground system. The final utility pole locations will be determined during final engineering design.

Further details concerning undergrounding the utilities is provided under the *Construction and Phasing* Section below.

Drainage and Water Quality

Under existing conditions within the Project area, surface flows are directed to two inlets on the northeast and southeast corners of the Kanan Road/Agoura Road intersection. Under proposed Project conditions, these inlets would be relocated to accommodate the widening of Agoura Road. The associated drain lines would be extended; however, flows would remain generally unchanged.

Construction and Phasing

The Proposed Project improvements are proposed to occur in a single phase.[2] Prior to the start of construction, the City will need to purchase the ROW and coordinate temporary construction easements. This process will be approximately 6 to 9 months. After the purchase and receipt of the easements, construction will start and is anticipated to occur over approximately 12 months, beginning as early as 2023 and ending as early as 2024. The proposed improvements would be located mostly within existing City ROW but would require partial permanent acquisitions and temporary construction easements (TCE) from adjacent properties; see Table 1: Proposed Right-of-Way. As indicated in Table 1, approximately 0.18-acre of permanent property acquisitions and approximately 6.04-acre of temporary construction easements are required for the proposed Project. The pilasters and monument signs would be located in approximate areas within the marked areas in Exhibit 3B; therefore, the areas for improvements are approximate. It should be noted that the Proposed Project would not result in acquisitions or TCE for the pilasters; if and when the properties that are identified for the monument signs are developed, then the ROW.

[2] For purposes of the analysis, it is conservatively assumed that the construction activities would occur in a single phase to present the most conservative (e.g., highest) daily maximum construction emissions.

Table 1: Proposed Right-of-Way		
Parcel	**Required Permanent Property Acquisitions**	**Required Temporary Construction Easements (TCE)**
City Right of Way	--	5.33
2061-032-021	0.04	--
2061-031-020	0.14	0.16
2061-004-034	--	0.2
2061-032-022	--	0.02
2061-032-028	--	0.11
2061-007-905	--	0.07
2061-029-004	--	0.02
2061-004-046	--	0.04
2061-032-025	--	0.09
Source: Kimley-Horn, 2022.		

To underground the two existing overhead power/telecommunication lines on the south leg along the east side of Kanan Road, the Proposed Project would require approximately 1,105 linear feet of trenching approximately 4.5 feet deep and 2.5 feet wide, generally between Agoura Road and Cornell Road. Undergrounding the power lines would involve removing the existing overhead utility lines and poles, installing conduit and substructures (e.g., transformers on concrete pads), installing cable through the conduits, and backfilling.

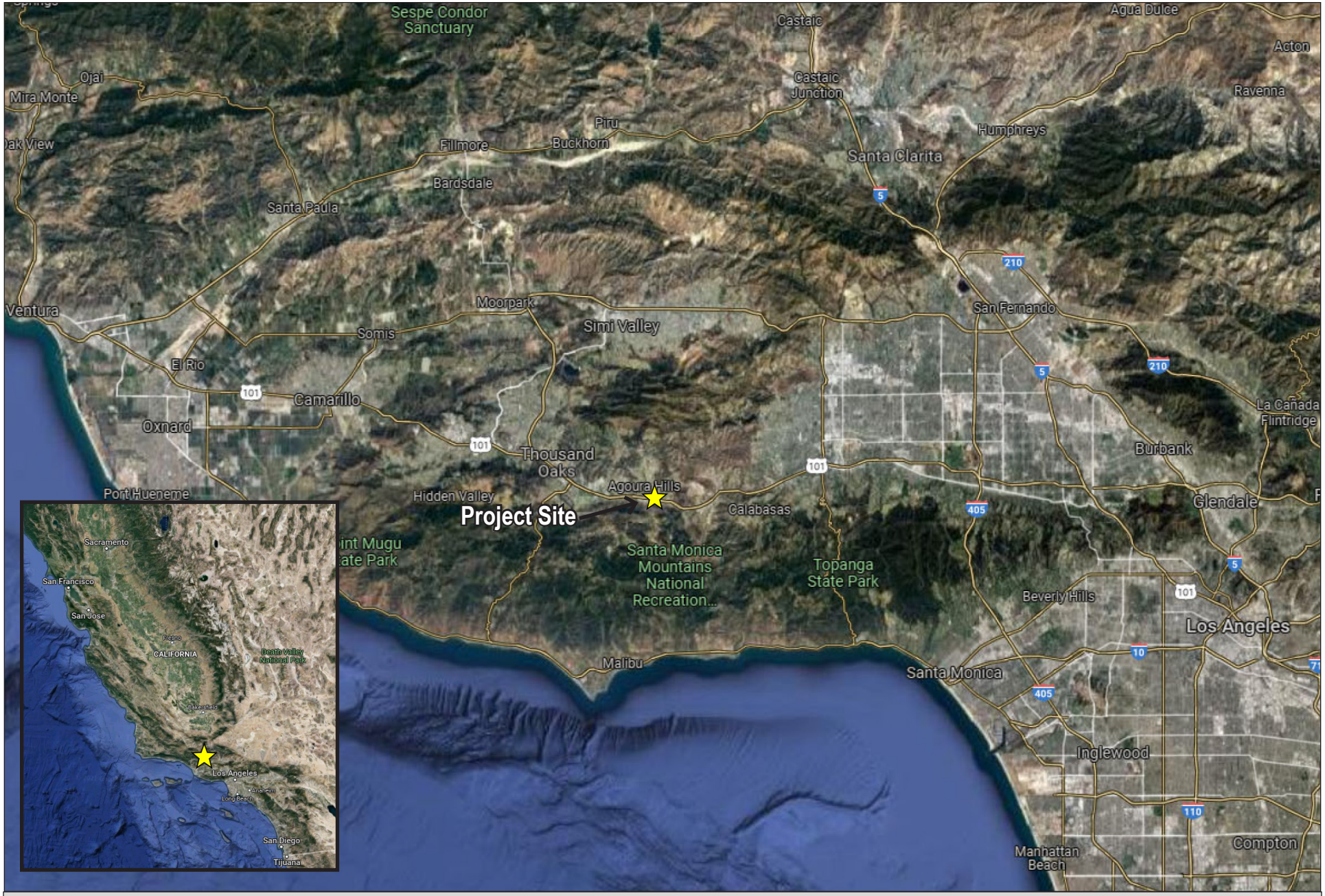

EXHIBIT 1: REGIONAL VICINITY MAP

Kanan Road/Agoura Road Ultimate Intersection Improvements Project

NOT TO SCALE

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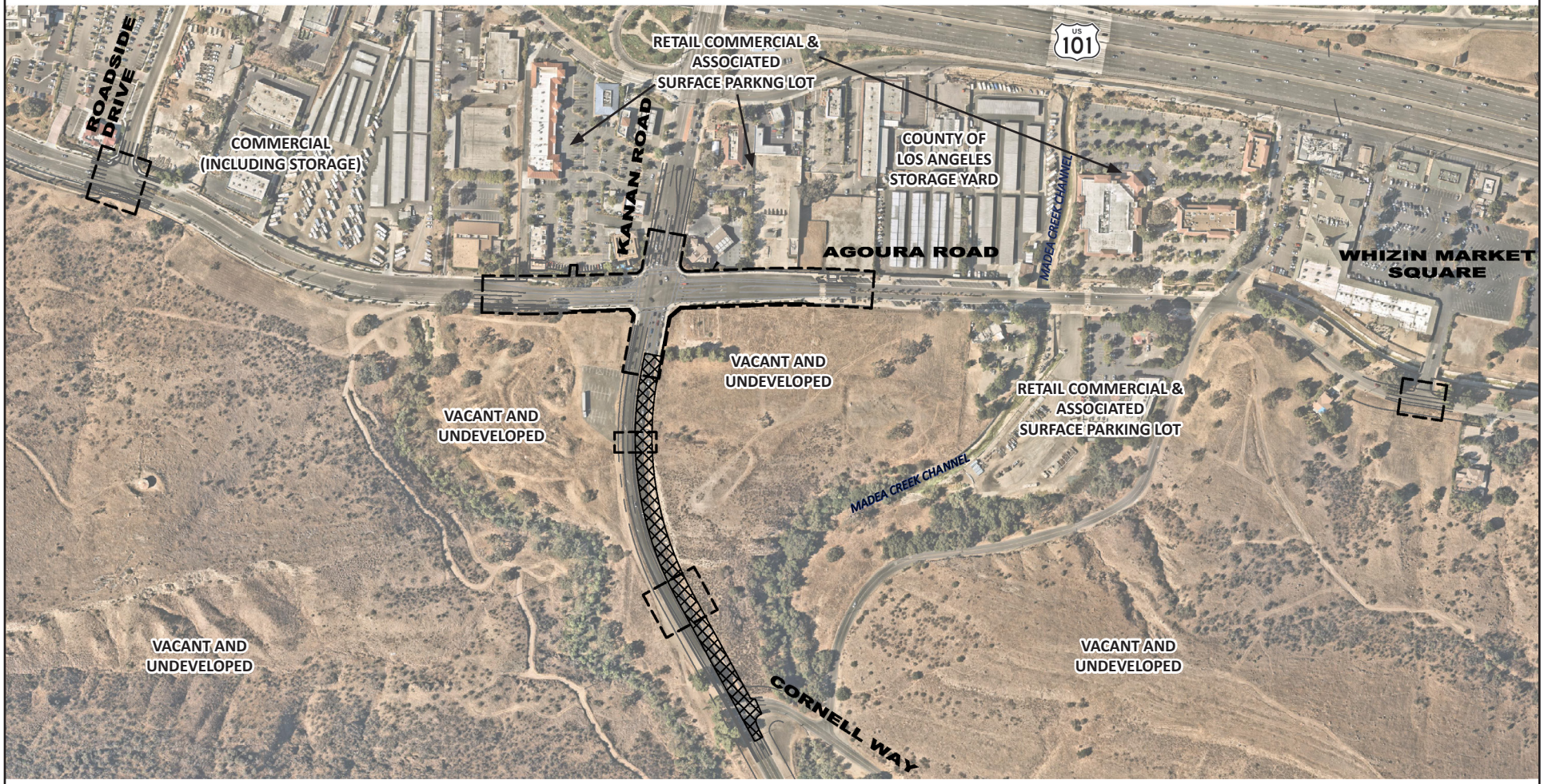

EXHIBIT 2: LOCAL VICINITY MAP

Kanan Road/Agoura Road Ultimate Intersection Improvements Project

SCALE: 1" = 300'

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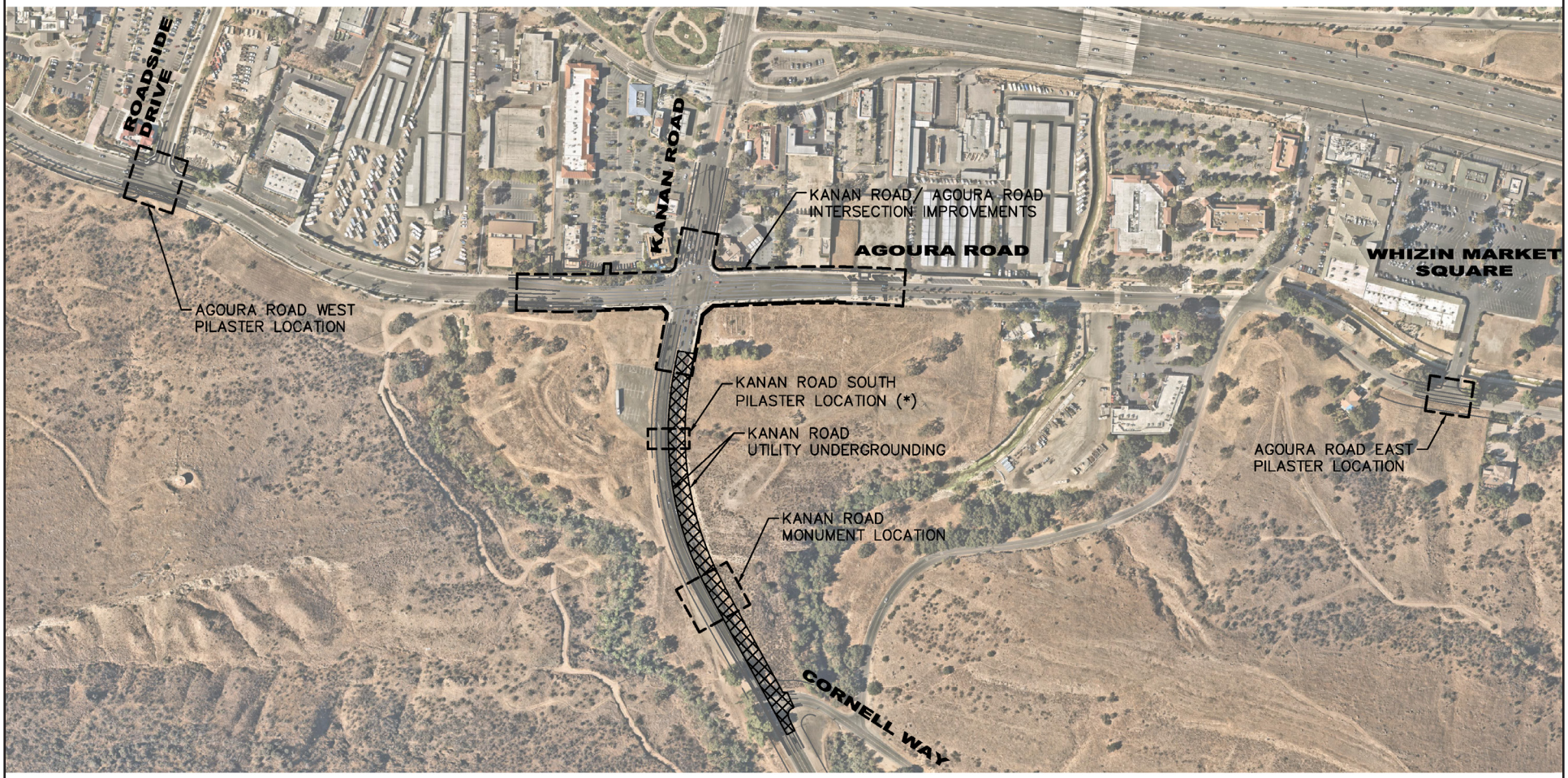

LEGEND

(*) – APPROXIMATE LOCATION. WILL BE DETERMINED WHEN DRIVEWAYS ARE APPROVED.

EXHIBIT 3A: PROPOSED KANAN ROAD/AGOURA ROAD INTERSECTION

Kanan Road/Agoura Road Ultimate Intersection Improvements Project

SCALE: 1" = 300'

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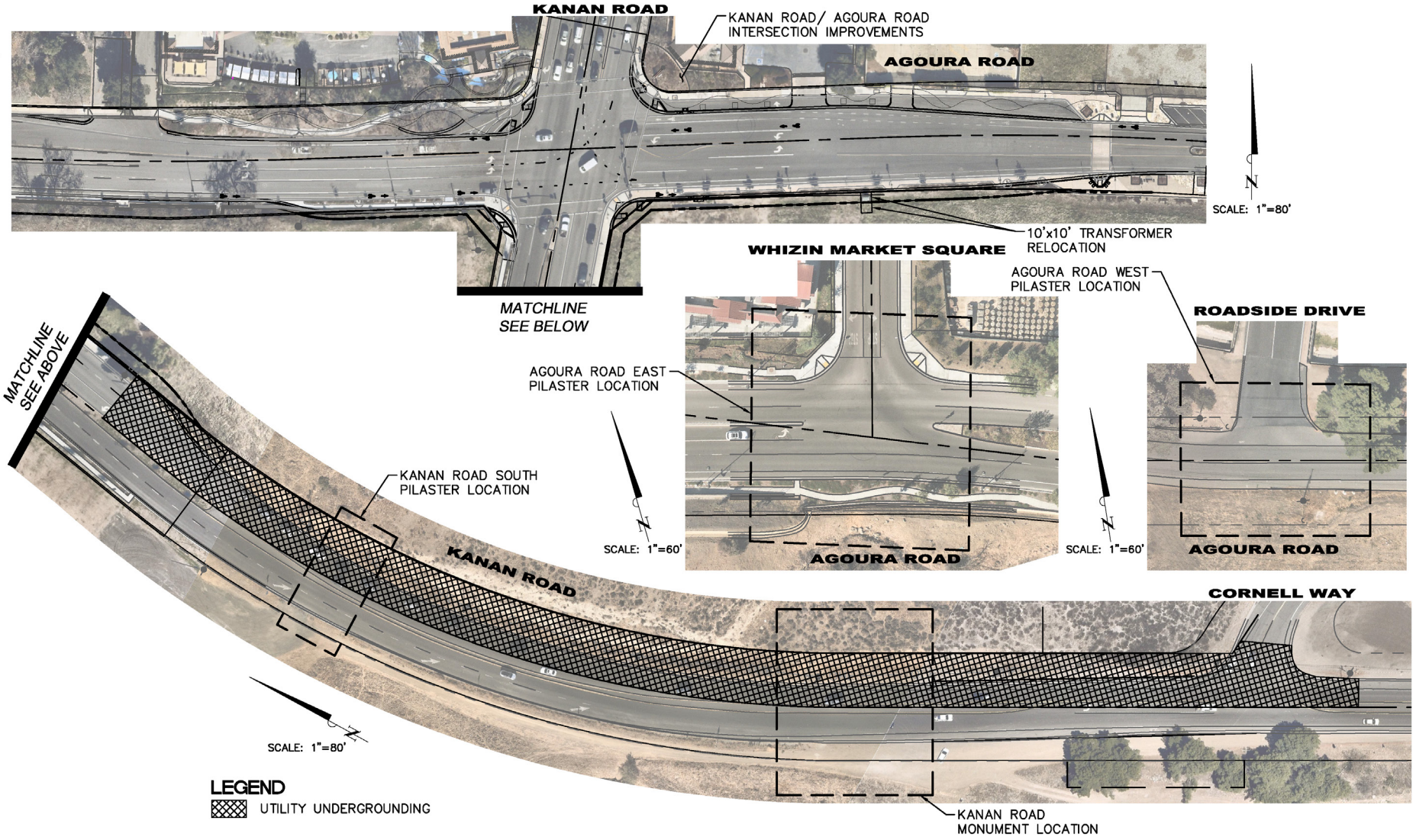

EXHIBIT 3B: PROPOSED KANAN ROAD/AGOURA ROAD INTERSECTION IMPROVEMENTS

Kanan Road/Agoura Road Ultimate Intersection Improvements Project

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2 ACOUSTIC FUNDAMENTALS

2.1 Sound and Environmental Noise

Acoustics is the science of sound. Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a medium (e.g., air) to human (or animal) ear. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second, or hertz (Hz).

Noise is defined as loud, unexpected, or annoying sound. In acoustics, the fundamental model consists of a noise source, a receptor, and the propagation path between the two. The loudness of the noise source, obstructions, or atmospheric factors affecting the propagation path, determine the perceived sound level and noise characteristics at the receptor. Acoustics deal primarily with the propagation and control of sound. A typical noise environment consists of a base of steady background noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources. These sources can vary from an occasional aircraft or train passing by to continuous noise from traffic on a major highway. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a large range of numbers. To avoid this, the decibel (dB) scale was devised. The dB scale uses the hearing threshold of 20 micropascals (µPa) as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The dB scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels correspond closely to human perception of relative loudness. Table 2: Typical Noise Levels provides typical noise levels.

Table 2: Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	– 110 –	Rock Band
Jet fly-over at 1,000 feet		
	– 100 –	
Gas lawnmower at 3 feet		
	– 90 –	
Diesel truck at 50 feet at 50 miles per hour		Food blender at 3 feet
	– 80 –	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower, 100 feet	**– 70 –**	Vacuum cleaner at 10 feet
Commercial area		Normal Speech at 3 feet
Heavy traffic at 300 feet	**– 60 –**	
		Large business office
Quiet urban daytime	**– 50 –**	Dishwasher in next room
Quiet urban nighttime	**– 40 –**	Theater, large conference room (background)
Quiet suburban nighttime		
	– 30 –	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	– 20 –	
		Broadcast/recording studio
	– 10 –	
Lowest threshold of human hearing	**– 0 –**	Lowest threshold of human hearing

Source: California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.

Noise Descriptors

The dB scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. The equivalent noise level (L_{eq}) represents the continuous sound pressure level over the measurement period, while the day-night noise level (L_{dn}) and Community Equivalent Noise Level (CNEL) are measures of energy average during a 24-hour period, with dB weighted sound levels from 7:00 p.m. to 7:00 a.m. Most commonly, environmental sounds are described in terms of L_{eq} that has the same acoustical energy as the summation of all the time-varying events. Each is applicable to this analysis and defined in Table 3: Definitions of Acoustical Terms.

Table 3: Definitions of Acoustical Terms

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

A-Weighted Decibels

The perceived loudness of sounds is dependent on many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable and can be approximated by the A-weighted decibel (dBA) sound level scale, which gives greater weight to the frequencies of sound to which the human ear is most sensitive. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends on the distance between the receptor and the noise source. There is a strong correlation between dBA and the way the human ear perceives sound. For this reason, the dBA has become the standard tool of environmental noise assessment. All noise levels reported in this document are in terms of dBA, but are expressed as dB, unless otherwise noted.

Addition of Decibels

The dB scale is logarithmic, not linear, and therefore sound levels cannot be added or subtracted through ordinary arithmetic. Two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic dB is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound and twice as loud as a 60-dBA sound. When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dBA higher than one source under the same conditions. Under the dB scale, three sources of equal loudness together would produce an increase of 5 dBA.

Sound Propagation and Attenuation

Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6 dB for each doubling of distance from a stationary or point source. Sound from a line source, such as a highway, propagates outward in a cylindrical pattern. Sound levels attenuate at a rate of approximately 3 dB for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics. No excess attenuation is assumed for hard surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed. For line sources, an overall attenuation rate of 3 dB per doubling of distance is assumed.

Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The way older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units is generally 30 dBA or more.

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet, suburban, residential streets with noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Regarding increases in dBA, the following relationships should be noted:

- Except in carefully controlled laboratory experiments, a 1-dBA change cannot be perceived by humans.
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference.
- A minimum 5-dBA change is required before any noticeable change in community response would be expected. A 5-dBA increase is typically considered substantial.
- A 10-dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

Effects of Noise on People

Hearing Loss. While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise. The Occupational Safety and Health Administration (OSHA) has a noise exposure standard that is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over 8 hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

Annoyance. Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative

annoyance of these different sources. A noise level of about 55 dBA L_{dn} is the threshold at which a substantial percentage of people begin to report annoyance.[3]

2.2 Groundborne Vibration

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

Table 4: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations, displays the reactions of people and the effects on buildings produced by continuous vibration levels. The annoyance levels shown in the table should be interpreted with care since vibration may be found to be annoying at much lower levels than those listed, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high noise environments, which are more prevalent where groundborne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

Table 4: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations

Maximum PPV (in/sec)	Vibration Annoyance Potential Criteria	Vibration Damage Potential Threshold Criteria	FTA Vibration Damage Criteria
0.008	--	Extremely fragile historic buildings, ruins, ancient monuments	--
0.01	Barely Perceptible	--	--
0.04	Distinctly Perceptible	--	--
0.1	Strongly Perceptible	Fragile buildings	--
0.12	--	--	Buildings extremely susceptible to vibration damage
0.2	--	--	Non-engineered timber and masonry buildings
0.25	--	Historic and some old buildings	--
0.3	--	Older residential structures	Engineered concrete and masonry (no plaster)
0.4	Severe	--	--
0.5	--	New residential structures, Modern industrial/commercial buildings	Reinforced-concrete, steel or timber (no plaster)

PPV = peak particle velocity; in/sec = inches per second; FTA = Federal Transit Administration

Source: California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, 2020 and Federal Transit administration, Transit Noise and Vibration Assessment Manual, 2018.

Ground vibration can be a concern in instances where buildings shake, and substantial rumblings occur. However, it is unusual for vibration from typical urban sources such as buses and heavy trucks to be perceptible. Common sources for groundborne vibration are planes, trains, and construction activities

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

such as earth-moving which requires the use of heavy-duty earthmoving equipment. For the purposes of this analysis, a PPV descriptor with units of inches per second (in/sec) is used to evaluate construction-generated vibration for building damage and human complaints.

3 REGULATORY SETTING

3.1 State

California Government Code

California Government Code Section 65302(f) mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines established by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of "normally acceptable", "conditionally acceptable", "normally unacceptable", and "clearly unacceptable" noise levels for various land use types, including single-family homes, multiple-family homes, schools, libraries, and churches. As none of these uses apply to the Proposed Project, these guidelines are not applicable.

3.2 Local

City of Agoura Hills General Plan

The City of Agoura Hills General Plan (General Plan) contains the following goals and policies that address noise as part of the Community Safety Element:

Goal N-1: Land Use Conflicts. Minimized land use conflicts between various noise sources and other human activities.

Policy N-1.1: **Noise Standards.** Require noise mitigation for all development where the projected noise levels exceed those shown in Table N-2, to the extent feasible.

Policy N-1.2: **Compatibility of Noise-Generating Uses with Sensitive Receptors.** Require buildings and sites to be designed such that surrounding noise sensitive uses are adequately buffered from noise generating uses.

Policy N-1.4: **Noise Mitigation Measures.** Ensure that all new development provides adequate sound insulation or other protection from existing and anticipated noise sources.

Policy N-1.5: **Sensitive Receptors.** Incorporate ambient noise level considerations into land use decisions involving schools, hospitals, and similar noise-sensitive uses.

Policy N-1.6: **Noise Standards.** Enforce standards that specify acceptable noise limits for various land uses throughout the City. Table N-1 (Noise/Land Use Compatibility Matrix) shows criteria used to assess the compatibility of proposed land uses with the noise environment. These criteria are the bases of specific Noise Standards. These standards, presented in Table N-2 (Interior and Exterior Noise Standards), define City policy related to land uses and acceptable noise levels.

Goal N-2: Motor Vehicles. Minimized motor vehicle traffic noise impacts on sensitive noise receptors.

Policy N-2.1: **State Motor Vehicle Noise Standards.** Encourage the enforcement of state motor vehicle noise standards for cars, trucks, and motorcycles through coordination with the California Highway Patrol and the Los Angeles County Sheriff's Department.

Policy N-2.2: **Roadway Mitigation Measures.** Ensure the employment of noise mitigation measures in the design of roadway improvement projects consistent with funding capability. Support efforts by the California Department of Transportation and others to provide for acoustical protection of existing noise-sensitive land uses affected by these projects.

Policy N-2.3: **Noise Mitigation Along Major Arterials.** Require sound-attenuating devices, such as walls and berms, in the design of residential and other noise-sensitive land uses that are adjacent to the Ventura Freeway and major arterials.

Goal N-3: Non-Transportation-Related Noise. Minimized non-transportation-related noise impacts on sensitive noise receptors.

Policy N-3.3: **Enforcement of Hours of Construction and Maintenance Activity.** Continue to enforce restrictions on hours of construction activity so as to minimize the impacts of noise and vibration from the use of trucks, heavy drilling equipment, and other heavy machinery, including property maintenance equipment, to adjacent uses, particularly in residential areas.

The Community Safety Element also includes the following compatibility standards, as provided in Table 5: Noise/Land Use Compatibility Matrix. The noise level ranges shown in the table serve as guidelines with respect to the placement of land uses in the City.

Table 5: Noise/Land Use Compatibility Matrix

Land Use Category		Community Noise Exposure (CNEL)						
Categories	**Uses**	**<55**	**60**	**65**	**70**	**75**	**80>**	
Residential	Single Family, Duplex, Multiple Family	A	A	B	B	C	D	D
Residential	Mobile Homes	A	A	B	C	C	D	D
Commercial Regional, District	Hotel, Motel, Transient Lodging	A	A	B	B	C	C	D
Commercial Regional, Village District, Special	Commercial Retail, Bank, Restaurant, Movie Theater	A	A	A	A	B	B	C
Commercial Industrial Institutional	Office Building, Research and Development, Professional Offices, City Office Building	A	A	A	B	B	C	D
Commercial Recreation **Institutional** Civic Center	Amphitheater, Concert Hall Auditorium, Meeting Hall	B	B	C	C	D	D	D
Commercial Recreation	Children's Amusement Park, Miniature Golf Course, Go-cart track; Equestrian Center, Sports Club	A	A	A	B	B	D	D
Commercial General, Special **Industrial, Institutional**	Automobile, Service Station, Auto Dealership, Manufacturing, Warehousing, Wholesale, Utilities	A	A	A	A	B	B	B
Institutional General	Hospital, Church, Library, Schools' Classroom	A	A	B	C	C	D	D
Open Space	Parks	A	A	A	B	C	D	D
Open Space	Golf Course, Cemeteries, Nature Centers, Wildlife Habitat	A	A	A	A	B	C	C

Notes:

Zone A (Clearly Compatible): Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements

Zone B (Normally Compatible): New construction or development should be undertaken only after detailed analysis of the noise reduction requirements are made and needed noise insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.

Zone C (Normally Incompatible): 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 the design.

Zone D (Clearly incompatible): New construction or development should generally not be undertaken.

Source: City of Agoura Hills, *Community Safety Element*, 2004.

City of Agoura Hills Municipal Code

The Agoura Hills Municipal Code (AHMC) establishes the following noise provisions relative to the Project:

Section 9656.1. – Designated noise zone.

All residential properties are hereby assigned to the following noise zones:

A. Noise *zone 1*: All properties located in residential zone districts.

Section 9656.2. – Exterior noise standards.

A. The following noise standards, unless otherwise specifically indicated, shall apply to all residential property within a designated noise zone.

Table 6: Noise Standards in Noise Zone 1	
Noise level	**Time period**
55 db(A)	7:00 a.m. – 10 p.m.
50 db(A)	10:00 p.m. – 7 a.m.

In the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by five (5) db(A).

B. It shall be unlawful for any person at any location within the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, when the foregoing causes the noise level, when measured on any other residential property, either incorporated or unincorporated, to exceed:

1. The noise standard for a cumulative period of more than fifteen (15) minutes in any hour; or

2. The noise standard plus five (5) db(A) for a cumulative period of more than ten (10) minutes in any hour; or

3. The noise standard plus ten (10) db(A) for a cumulative period of more than five (5) minutes in any hour; or

4. The noise standard plus fifteen (15) db(A) for a cumulative period of more than one (1) minute in any hour; or

5. The noise standard plus twenty (20) db(A) for any period of time.

C. In the event the ambient noise level exceeds any of the noise limit categories above, the noise level applicable to said category shall be increased to reflect said ambient noise level.

Section 9656.3. – Interior noise standards.

A. The following interior noise standards, unless otherwise specifically indicated, shall apply to all residential property within a designated noise zone:

Table 7: Interior Noise Standards in Noise Zone 1	
Noise level	**Time period**
45 db(A)	7:00 a.m. – 10 p.m.
45 db(A)	10:00 p.m. – 7 a.m.

In the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by five (5) db(A).

B. It shall be unlawful for any person at any location within the city to create any noise, or to allow the creation of any noise on property owned, leased occupied, or otherwise controlled by such person, when the foregoing causes the noise level when measured within any other dwelling unit on any residential property, either incorporated or unincorporated, to exceed:

1. The interior standard for a cumulative period of more than five (5) minutes in any hour; or

2. The interior noise standard plus five (5) db(A) for a cumulative period of more than one (1) minute in any hour; or

3. The interior noise standard plus ten (10) db(A) for any period of time.

C. In the event the ambient noise level exceeds either of the first two (2) noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the third noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

Section 9656.4. – Special provisions.

The following activities shall be exempted from the provisions of these sections:

A. Activities conducted on the grounds of any public or private nursery, elementary, intermediate or secondary school or college.

B. Public dances, provided said events are conducted pursuant to a permit issued by the city.

C. Activities conducted on any authorized park or playground provided such park or playground is owned and operated by a public entity.

D. Any mechanical device, apparatus or equipment used, related to or connected with any emergency machinery, vehicle or work.

E. Noise sources associated with construction, repair, remodeling, or grading of any real property, provided said activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or at any time on Sunday or a legal holiday.

F. Mobile noise sources associated with agricultural operations provided such operations do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or at any time on Sunday or a legal holiday.

G. Noise sources associated with the maintenance of real property provided said activities take place between the hours of 7:00 a.m. and 8:00 p.m. on any day except Sunday or a legal holiday, or between the hours of 9:00 a.m. and 8:00 p.m. on Sunday or a legal holiday.

H. Any activity to the extent regulation thereof has been preempted by state or federal law.

Section 9656.5. – Schools, hospitals and churches; special provisions.

It shall be unlawful for any person to create any noise which causes the noise level at any school, hospital or church while the same is in use, to exceed the noise limits as specified in section 9656.2, prescribed for the assigned noise zone in which the school, hospital or church is located, or which noise level unreasonably interferes with the use of such institution or which unreasonably disturbs or annoys patients in a hospital provided conspicuous signs are displayed in three (3) separate locations within one-tenth of a mile of the institution indicating the presence of a school, church or hospital.

4 EXISTING CONDITIONS

4.1 Existing Noise Sources

Stationary Sources

The Proposed Project area is generally urbanized. The primary sources of stationary noise in the Proposed Project vicinity are urban-related activities (i.e., mechanical equipment, and pedestrians). The sources of stationary noise nearest the Project site emanates from retail commercial, self-storage, light industrial (printing and light manufacturing), and restaurant uses to the north. Noise sources from these land uses typically include mechanical equipment such as heating ventilation and air conditioning (HVAC), automobile-related noise such as cars starting and doors slamming, truck activity, and landscaping equipment. The noise associated with these sources may represent a single-event noise occurrence or short-term noise.

Mobile Sources

The majority of the existing noise in the Project area is generated from traffic along Kanan Road and Agoura Road. According to the City of Agoura Hills General Plan Noise Element, the Project site lies within the 65-70 dBA CNEL traffic noise contour.[4]

4.2 Sensitive Receptors

Sensitive populations are more susceptible to the effects of noise impacts than is the general population. Land uses considered sensitive receptors include residences, schools, playgrounds, childcare centers, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. Land uses located north of the Project site include retail commercial, self-storage, light industrial (printing and light manufacturing), and restaurant. South of the Project site is vacant and undeveloped land. Sensitive land uses nearest to the Project site are shown in Table 8: Sensitive Receptors and are measured from the closest Project site boundary to the sensitive receptor. The sensitive receptors nearest to the Project site include church uses approximately 40 feet northwest of the proposed construction boundary.

Table 8: Sensitive Receptors

Receptor Description	Distance and Direction from the Proposed Project
Church	40 feet to the northwest
Dental Facility	650 feet to the northwest
Veterinary Center	930 feet to the northwest
Single Family Homes	1,800 feet to the southeast

Source: Google Maps, 2022

[4] City of Agoura Hills. (2010). *Final General Plan Update – March 2010 Part II.* https://www.agourahillscity.org/home/showpublisheddocument/8304/635045247851600000.

5 SIGNIFICANCE CRITERIA AND METHODOLOGY

5.1 CEQA Thresholds

Based upon the criteria derived from State CEQA Guidelines Appendix G, a project would have a significant effect on the environment if it would:

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

5.2 Methodology

Construction

Construction noise levels were based on typical noise levels generated by construction equipment published by the Federal Transit Administration (FTA) and the Federal Highway Administration (FHWA). Construction noise is assessed in dBA L_{eq}. This unit is appropriate because L_{eq} can be used to describe noise level from operation of each piece of equipment separately, and levels can be combined to represent the noise level from all equipment operating during a given period.

Construction noise modeling was conducted using the FHWA Roadway Construction Noise Model (RCNM). Reference noise levels are used to estimate operational noise levels at nearby sensitive receptors based on a standard noise attenuation rate of 6 dB per doubling of distance (line-of-sight method of sound attenuation for point sources of noise). Noise level estimates do not account for the presence of intervening structures or topography, which may reduce noise levels at receptor locations. Therefore, the noise levels presented herein represent a conservative, reasonable worst-case estimate of actual temporary construction noise.

Operations

The analysis of the Without Project and With Project noise environments is based on noise calculations and empirical observations. Operational traffic noise levels in the Project vicinity were qualitatively analyzed consistent with methodologies utilized by the California Department of Transportation (Caltrans) and the FHWA.

Vibration

Groundborne vibration levels associated with construction-related activities for the Proposed Project were evaluated utilizing typical groundborne vibration levels associated with construction equipment, obtained from FTA published data for construction equipment. Potential groundborne vibration impacts

related to building/structure damage and interference with sensitive existing operations were evaluated, considering the distance from construction activities to nearby land uses and typically applied criteria.

For a structure built traditionally, without assistance from qualified engineers, the FTA guidelines show that a vibration level of up to 0.20 in/sec PPV is considered safe and would not result in any vibration damage. FTA guidelines show that modern engineered buildings built with reinforced-concrete, steel or timber can withstand vibration levels up to 0.50 in/sec PPV and not experience vibration damage. The Caltrans 2020 *Transportation and Construction Vibration Guidance Manual* identifies the vibration threshold for human annoyance, vibrations levels of 0.10 in/sec PPV begin to cause annoyance and levels of 0.20 in/sec are considered annoying.

6 POTENTIAL IMPACTS AND MITIGATION

6.1 Acoustical Impacts

Threshold 6.1 Would the Project generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

The Proposed Project would be constructed within the hours restricted by the City's Noise Ordinance. As daytime construction activity is exempt from City Noise Ordinance restrictions, noise impacts from Proposed Project construction would be less than significant. The Proposed Project would implement intersection improvements, pilasters, and monument signs, which would not result in any changes to the noise levels that already exist at the Project site. No stationary noise sources would be included as part of the Proposed Project (e.g., parking lots, HVAC, or mechanical equipment). The Proposed Project would include a new terraced plaza at the northwest corner of the Kanan Road/Agoura Road intersection, which would allow for an open space gathering area. While the accumulation of people and loud speaking may create a new stationary noise source, the terraced plaza would be located adjacent to the Kanan Road/Agoura Road intersection. Therefore, the mobile noise sources would be louder and more continuous than the people who would gather at the terraced plaza area and would not constitute a substantial increase in noise levels. Further, there are no noise-sensitive receptors located in proximity of the proposed terraced plaza who would be affected by the increase in noise levels. Mobile noise sources (i.e., vehicles) would utilize the proposed intersection, however, no change in traffic volumes would occur as a result of the Proposed Project, thus, no change in mobile source noise would occur. Therefore, the Proposed Project would not generate a substantial temporary or permanent increase in ambient noise levels in the vicinity in excess of established standards. Impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

Level of Significance: Less than significant impact.

Threshold 6.2 Would the Project generate excessive groundborne vibration or groundborne noise levels?

Construction can generate varying degrees of ground vibration, depending on the construction procedures and equipment. Ground disturbing activity as part of the Proposed Project would entail excavation for grading and access to underground utilities. The ground disturbing activities require heavy machinery that could generate excessive groundborne vibrations, which can spread through the ground and diminish with distance from the source. Construction on the Project site would have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and the operations involved.

The FTA has published standard vibration velocities for construction equipment operations. In general, the FTA architectural damage criterion for continuous vibrations (i.e., 0.20 in/sec PPV) appears to be conservative. The types of construction vibration impacts include human annoyance and building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. Building damage can be cosmetic or structural. Ordinary buildings that are not particularly fragile would not experience any cosmetic damage (e.g., plaster cracks)

at distances beyond 30 feet. This distance can vary substantially depending on the soil composition and underground geological layer between vibration source and receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment. For example, for a building that is constructed with reinforced concrete with no plaster, the FTA guidelines show that a vibration level of up to 0.20 in/sec PPV is considered safe and would not result in any construction vibration damage.

Table 9: Typical Construction Equipment Vibration Levels, lists vibration levels at 25 feet for typical construction equipment. Groundborne vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. As indicated in Table 9, based on FTA data, vibration velocities from typical heavy construction equipment operations that would be used during Proposed Project construction range from 0.003 to 0.089 in/sec PPV at 25 feet from the source of activity.

Table 9: Typical Construction Equipment Vibration Levels

Equipment	Peak Particle Velocity at 25 Feet (in/sec)	Peak Particle Velocity at 40 Feet (in/sec)[1]
Large Bulldozer	0.089	0.031
Loaded Trucks	0.076	0.027
Small Bulldozer	0.003	0.001
Vibratory Roller	0.210	0.104
Jackhammer	0.035	0.012

Notes:
1. Calculated using the following formula: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$, where: PPV_{equip} = the peak particle velocity in in/sec of the equipment adjusted for the distance; PPV_{ref} = the reference vibration level in in/sec from Table 7-4 of the Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, 2018; D = the distance from the equipment to the receiver.

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, 2018.

The nearest structure to the Project site is approximately 40 feet away. Table 9 shows that at 40 feet the vibration velocities from construction equipment would not exceed 0.104 in/sec PPV, which is below the FTA's 0.20 in/sec PPV threshold for building damage. It is also acknowledged that construction activities would occur throughout the Project site and would not be concentrated at the point closest to the nearest structure. Therefore, Proposed Project construction vibration impacts would be less than significant.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Threshold 6.3 For a Project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels?

The Project site is not within two miles of a private airstrip or an airport land use plan. Therefore, the Proposed Project would not result in excessive airport-related noise levels for people residing or working in the Proposed Project area. Therefore, no impact would occur.

Mitigation Measures: No mitigation is required.

Level of Significance: No impact.

7 REFERENCES

1. California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.

2. California Department of Transportation, *Transportation and Construction Vibration Guidance Manual, 2020 and Federal Transit administration*, Transit Noise and Vibration Assessment Manual, 2018.

3. City of Agoura Hills, *Final General Plan Update – March 2010 Part II*, 2010.

4. City of Agoura Hills, *General Plan*, 2004.

5. City of Agoura Hills, *Municipal Code*, 2022.

6. County of Los Angeles, *Code of Ordinances*, 2022.

7. Federal Highway Administration, *Roadway Construction Noise Model*, 2006.

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

9. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.