CAJALCO COMMERICAL CENTER PROJECT

21419 AND 21425 CAJALCO ROAD, PERRIS, CA

NOISE STUDY

Prepared for:

Lagos Investment Group
3343 Deputy Evans
Norco, CA 92860

Prepared by:

BPG
BIRDSEYE
PLANNING GROUP

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CAJALCO COMMERCIAL CENTER PROJECT
PERRIS, CALIFORNIA
Noise Study

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CAJALCO COMMERCIAL CENTER PROJECT
PERRIS, CALIFORNIA
NOISE STUDY

This report is an analysis of the potential noise and vibration impacts associated with the Cajalco Commercial Center project, a commercial center proposed for construction and operation along the south side of Cajalco Road west of Clark Street in unincorporated Riverside County west of the City of Perris, California. The report has been prepared by Birdseye Planning Group, LLC, under contract to the applicant to support the entitlement process and address a request from the Riverside County Planning Department. This study analyzes the potential for temporary impacts associated with construction activity, long-term impacts associated with traffic noise generated on neighboring roadways and construction of a commercial center adjacent to and south of Cajalco Road on west of Clark Street.

PROJECT DESCRIPTION

The proposed project is located on three parcels comprising 1.68 acres in the Mead Valley Area Plan within unincorporated Riverside County. The site is located at 21419 and 21425 Cajalco Road west of the southwest corner of the Clark Street intersection (380-140-028, -029, -007) (see Figure 1 – Vicinity Map). The applicant is proposing construction and operation of a 3,100 square foot convenience store and 1,622 square feet of retail, including a restaurant with a drive thru aisle, along the eastern site boundary. A canopy over a 12-dispenser gasoline fueling island would be constructed near the center of the site. An 1,850 square foot restaurant with a drive thru and 2,566 square feet of retail space would be constructed on the west side of the site. A total of 81 surface parking spaces would be provided. All fuel tanks would be underground and located beneath the fueling areas. The preliminary site plan is shown on Figure 2 – Proposed Site Plan.

The southern one-half (approximate) of the site is located in Flood Zone A; the northern one-half is located in Flood Zone X. Thus, design features have been incorporated into the project that will mimic preconstruction permeability conditions and avoid exacerbating potential flood conditions on the southern portion of the site during a 100-year storm event. This will be achieved by maintaining the existing grade to the extent feasible in the flood plain and minimally grading the remainder of the site. Further, the project will use self-treating and self-retaining areas that will aid in flood control management. These measures consist of permeable paving and at-grade landscaping. Further, no curbs will be installed within the Flood Zone A area.

Primary access would be from Cajalco Road near the center of the site and constructed to a minimum of 24-feet in width to accommodate emergency vehicle and semi-truck access. Secondary access will be via a new driveway to the east connecting to Clark Street. Construction of the project is expected to begin in early 2022 and completed in mid-2022.

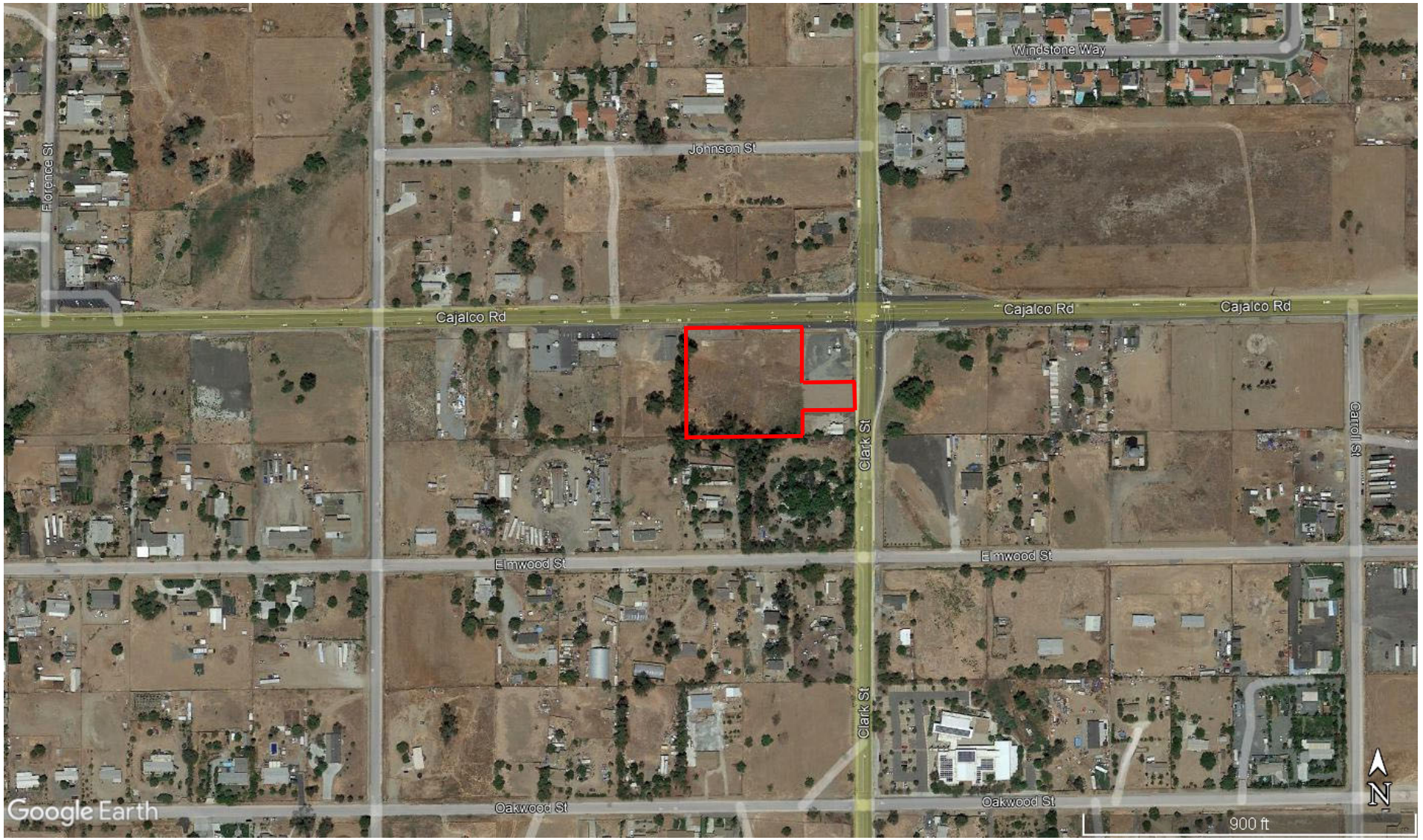
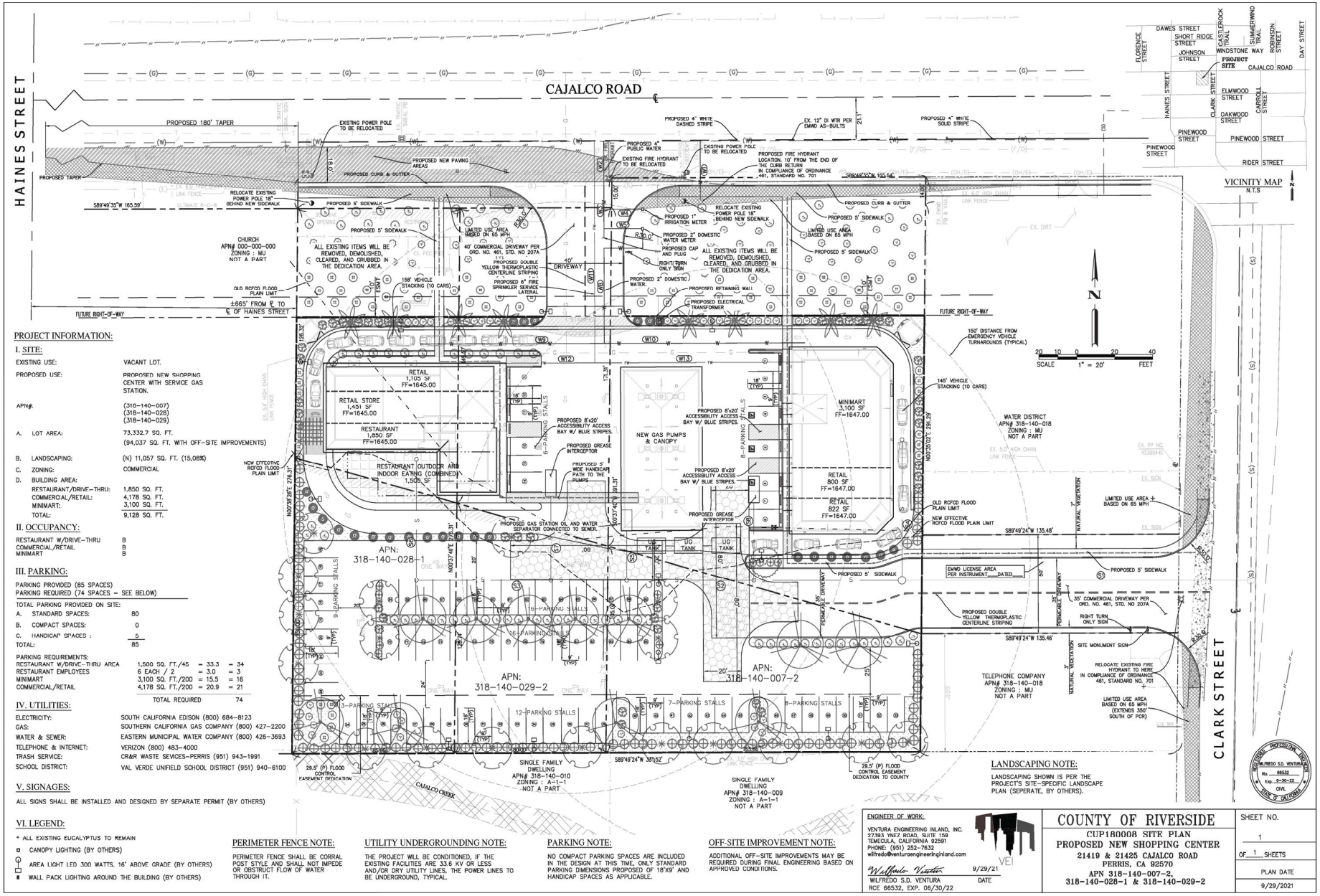


Figure 1 — Vicinity Map **- Project Site**



PROJECT INFORMATION:

I. SITE:

EXISTING USE:	VACANT LOT.	
PROPOSED USE:	PROPOSED NEW SHOPPING CENTER WITH SERVICE GAS STATION.	
APN#:	(318-140-007) (318-140-028) (318-140-029)	
A. LOT AREA:	73,332.7 SQ. FT. (94,037 SQ. FT. WITH OFF-SITE IMPROVEMENTS)	
B. LANDSCAPING:	(N) 11,057 SQ. FT. (15.08%)	
C. ZONING:	COMMERCIAL	
D. BUILDING AREA:		
RESTAURANT/DRIVE-THRU:	1,850 SQ. FT.	
COMMERCIAL/RETAIL:	4,178 SQ. FT.	
MINIMART:	3,100 SQ. FT.	
TOTAL:	9,128 SQ. FT.	

II. OCCUPANCY:

RESTAURANT W/DRIVE-THRU	B
COMMERCIAL/RETAIL	B
MINIMART	B

III. PARKING:

PARKING PROVIDED (85 SPACES)
PARKING REQUIRED (74 SPACES – SEE BELOW)

TOTAL PARKING PROVIDED ON SITE:

A. STANDARD SPACES:	80	
B. COMPACT SPACES:	0	
C. HANDICAP SPACES :	5	
TOTAL:	85	

PARKING REQUIREMENTS:

RESTAURANT W/DRIVE-THRU AREA	1,500 SQ. FT./45	= 33.3	= 34
RESTAURANT EMPLOYEES	6 EACH / 2	= 3.0	= 3
MINIMART	3,100 SQ. FT./200	= 15.5	= 16
COMMERCIAL/RETAIL	4,178 SQ. FT./200	= 20.9	= 21
	TOTAL REQUIRED		74

IV. UTILITIES:

ELECTRICITY:	SOUTH CALIFORNIA EDISON (800) 684-8123
GAS:	SOUTHERN CALIFORNIA GAS COMPANY (800) 427-2200
WATER & SEWER:	EASTERN MUNICIPAL WATER COMPANY (800) 426-3693
TELEPHONE & INTERNET:	VERIZON (800) 483-4000
TRASH SERVICE:	CR&R WASTE SEVICES-PERRIS (951) 943-1991
SCHOOL DISTRICT:	VAL VERDE UNIFIELD SCHOOL DISTRICT (951) 940-6100

V. SIGNAGES:

ALL SIGNS SHALL BE INSTALLED AND DESIGNED BY SEPARATE PERMIT (BY OTHERS)

VI. LEGEND:

* ALL EXISTING EUCALYPTUS TO REMAIN
▫ CANOPY LIGHTING (BY OTHERS)
AREA LIGHT LED 300 WATTS, 16' ABOVE GRADE (BY OTHERS)
▪ WALL PACK LIGHTING AROUND THE BUILDING (BY OTHERS)

PERIMETER FENCE NOTE:
PERIMETER FENCE SHALL BE CORRAL POST STYLE AND SHALL NOT IMPEDE OR OBSTRUCT FLOW OF WATER THROUGH IT.

UTILITY UNDERGROUNDING NOTE:
THE PROJECT WILL BE CONDITIONED, IF THE EXISTING FACILITIES ARE 33.6 KV OR LESS AND/OR DRY UTILITY LINES, THE POWER LINES TO BE UNDERGROUND, TYPICAL.

PARKING NOTE:
NO COMPACT PARKING SPACES ARE INCLUDED IN THE DESIGN AT THIS TIME, ONLY STANDARD PARKING DIMENSIONS PROPOSED OF 18'X9' AND HANDICAP SPACES AS APPLICABLE.

OFF-SITE IMPROVEMENT NOTE:
ADDITIONAL OFF-SITE IMPROVEMENTS MAY BE REQUIRED DURING FINAL ENGINEERING BASED ON APPROVED CONDITIONS.

LANDSCAPING NOTE:
LANDSCAPING SHOWN IS PER THE PROJECT'S SITE-SPECIFIC LANDSCAPE PLAN (SEPERATE, BY OTHERS).

ENGINEER OF WORK:
VENTURA ENGINEERING INLAND, INC.
27393 YNEZ ROAD, SUITE 159
TEMECULA, CALIFORNIA 92591
PHONE: (951) 252-7632
wilfredo@venturaengineeringinland.com
WILFREDO S.D. VENTURA
RCE 66532, EXP. 06/30/22
9/29/21
DATE

COUNTY OF RIVERSIDE
CUP180008 SITE PLAN
PROPOSED NEW SHOPPING CENTER
21419 & 21425 CAJALCO ROAD
PERRIS, CA 92570
APN 318-140-007-2,
318-140-028-1 & 318-140-029-2

SHEET NO. 1 OF 1 SHEETS
PLAN DATE 9/29/2021

Figure 2—Site Plan

SETTING

Overview of Sound Measurement

Noise level (or volume/loudness) is generally measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels to be consistent with that of human hearing response, which is most sensitive to frequencies around 4,000 Hertz (about the highest note on a piano) and less sensitive to low frequencies (below 100 Hertz).

Sound pressure level is measured on a logarithmic scale with the 0 dB level based on the lowest detectable sound pressure level that people can perceive (an audible sound that is not zero sound pressure level). Based on the logarithmic scale, a doubling of sound energy is equivalent to an increase of 3 dBA, and a sound that is 10 dBA less than the ambient sound level would be half as loud and influence the character of ambient noise without influencing the overall sound level. Because of the nature of the human ear, a sound must be about 10 dBA greater than the reference sound to be judged as twice as loud. In general, a 3 dBA change in community noise levels is noticeable, while 1-2 dB changes generally are not perceived. Quiet suburban areas typically have noise levels in the range of 40-50 dBA, while arterial streets are in the 50-60+ dBA range. Normal conversational levels are in the 60-65 dBA range, and ambient noise levels greater than 65 dBA can interrupt conversations. Noise levels typically attenuate (or drop off) at a rate of 6 dBA per doubling of distance from point sources (i.e., industrial machinery). Noise from lightly traveled roads typically attenuates at a rate of about 4.5 dBA per doubling of distance. Noise from heavily traveled roads typically attenuates at about 3 dBA per doubling of distance. 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 manner in which older homes in California were constructed (approximately 30 years old or older) 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 and office buildings construction to California Energy Code standards is generally 30 dBA or more (FTA 2018).

In addition to the actual instantaneous measurement of sound levels, the duration of sound is important since sounds that occur over a long period of time are more likely to be an annoyance or cause direct physical damage or environmental stress. One of the most frequently used noise metrics that considers both duration and sound pressure level is the equivalent noise level (Leq). The Leq is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time (essentially, the average noise level). Typically, Leq is summed over a one-hour period. Lmax is the highest RMS (root mean squared) sound pressure level within the measuring period, and Lmin is the lowest RMS sound pressure level within the measuring period.

The time period in which noise occurs is also important since noise that occurs at night tends to be more disturbing than that which occurs during the day. Community noise is usually measured using Day-Night Average Level (Ldn), which is the 24-hour average noise level with a 10-dBA penalty for noise occurring during nighttime (10 p.m. to 7 a.m.) hours, or Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a 5 dBA penalty for noise occurring from 7 p.m. to 10 p.m. and a 10 dBA penalty for noise occurring from 10 p.m. to 7 a.m. Noise levels described by Ldn and CNEL usually do not differ by more than 1 dB. Table 1 shows sounds levels of typical noise sources in Leq.

Sensitive Receptors

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with each of these uses. Urban areas contain a variety of land use and development types that are noise sensitive including residences, schools, churches, hospitals and convalescent care facilities. Nearby sensitive receptors are single-family residences located approximately 200 feet south and 260 feet east of the site. Single-family residences are located on the north side of Cajalco Road. The closest is located approximately 320 feet to the northeast. A residence is located approximately 490 feet northwest of the site and is the closest residential property in proximity to both the site and Cajalco Road.

Project Site Setting

The project area is urbanizing and along Cajalco Road, an east/west arterial connecting the City of Perris to the east with the City of Corona to the west. The most common and primary sources of noise in the project site vicinity are motor vehicles (e.g., automobiles and trucks) operating on Cajalco Road. Motor vehicle noise is of concern because where a high number of individual events occur, it can create a sustained noise level. Aircraft overflights occur but do not noticeably contribute to the ambient noise environment.

To gather data on the general noise environment at the project site, one weekday morning 15-minute noise measurement was taken on the site on May 27, 2021, using an ANSI Type II integrating sound level meter. The predominant noise source was traffic. The temperature during monitoring was 64 degrees Fahrenheit with no perceptible wind.

The monitoring site (Site 1) is located near the center of the project site approximately 50 feet south of the eastbound lanes of Caljalco Road. During monitoring, 272 cars/light trucks, 14 medium trucks (six tires/two axles) and 24 heavy trucks (all vehicles with three or more axles) passed the site. The dominant noise source was traffic on Cajalco Road. Traffic on Clark Street located east of the site was not audible nor did it contribute to the measured sound levels. Table 2 identifies the noise measurement location and measured noise level.

Table 1. Sound Levels of Typical Noise Sources and Noise Environments

Noise Source (at Given Distance)	Noise Environment	A-Weighted Sound Level (Decibels)	Human Judgment of Noise Loudness (Relative to Reference Loudness of 70 Decibels*)
Military Jet Takeoff with Afterburner (50 ft)	Carrier Flight Deck	140	128 times as loud
Civil Defense Siren (100 ft)		130	64 times as loud
Commercial Jet Take-off (200 ft)		120	32 times as loud **Threshold of Pain**
Pile Driver (50 ft)	Rock Music Concert Inside Subway Station (New York)	110	16 times as loud
Ambulance Siren (100 ft) Newspaper Press (5 ft) Gas Lawn Mower (3 ft)		100	8 times as loud **Very Loud**
Food Blender (3 ft) Propeller Plane Flyover (1,000 ft) Diesel Truck (150 ft)	Boiler Room Printing Press Plant	90	4 times as loud
Garbage Disposal (3 ft)	Noisy Urban Daytime	80	2 times as loud
Passenger Car, 65 mph (25 ft) Living Room Stereo (15 ft) Vacuum Cleaner (10 ft)	Commercial Areas	70	Reference Loudness **Moderately Loud**
Normal Speech (5 ft) Air Conditioning Unit (100 ft)	Data Processing Center Department Store	60	½ as loud
Light Traffic (100 ft)	Large Business Office Quiet Urban Daytime	50	¼ as loud
Bird Calls (distant)	Quiet Urban Nighttime	40	1/8 as loud **Quiet**
Soft Whisper (5 ft)	Library and Bedroom at Night Quiet Rural Nighttime	30	1/16 as loud
	Broadcast and Recording Studio	20	1/32 as loud **Just Audible**
		0	1/64 as loud **Threshold of Hearing**

Source: Compiled by dBF Associates, Inc., 2016

Table 2
Noise Monitoring Results

Measurement Location	Primary Noise Source	Sample Time	Leq (dBA)
Project site approximately 50 feet south of the eastbound lanes of Cajalco Road	Traffic	Weekday morning	62.4

Source: Field visit using ANSI Type II Integrating sound level meter.

The monitoring location is shown in Figure 3. As shown in Table 2, the measured Leq was 62.4 dBA. The monitoring data sheet is provided in Appendix A.

Regulatory Setting

In 1976, the California Department of Health, State Office of Noise Control published a recommended noise/land use compatibility matrix which many jurisdictions have adopted as a standard in their general plan noise elements. The California State Office of Planning and Research 2017 updates to the General Plan Guidelines, Appendix D Noise Element Guidelines, Figure 2, shows that exterior noise levels up to 60 dBA (CNEL or Ldn) are normally compatible in rural residential areas. Noise levels up to 70 dBA (CNEL or Ldn) are conditionally compatible.

Riverside County Noise Ordinance

The County of Riverside Noise Ordinance is codified in Title 9 of the Riverside County Code of Ordinances. Section 9.52.040 establishes the exterior and interior noise level criteria for properties affected by operational (stationary) noise sources. For residential properties the exterior noise level shall not exceed 55 dBA Leq during daytime hours (7:00 a.m. to 10:00 p.m.) and 45 dBA Leq during the nighttime hours (10:00 p.m. to 7:00 a.m.). The 55/45 dBA daytime/nighttime limit is discussed because of its applicability to some of the surrounding land uses (i.e., Rural Community – Very Low Density Residential). The site abuts utility uses to the east, a church building and commercial uses to the west and single-family residential to the south and north across Cajalco Road. Noise levels within commercial/office are limited to 65 dBA Leq during the daytime hours (i.e., 7:00 a.m. to 10:00 p.m.) and 55 dBA Leq during nighttime hours (10:00 p.m. to 7:00 a.m.). For the purpose of conservatively estimating stationary source noise levels and related affects to adjacent uses, noise levels are estimated at the at the nearest property line.

Per the Riverside County General Plan Noise Element Appendix (*Requirements for Determining and Mitigation Traffic Noise Impacts to Residential Structure*s), the limits for traffic noise are 65 dBA Ldn/CNEL for exterior areas and 45 dBA Ldn/CNEL for interior spaces.

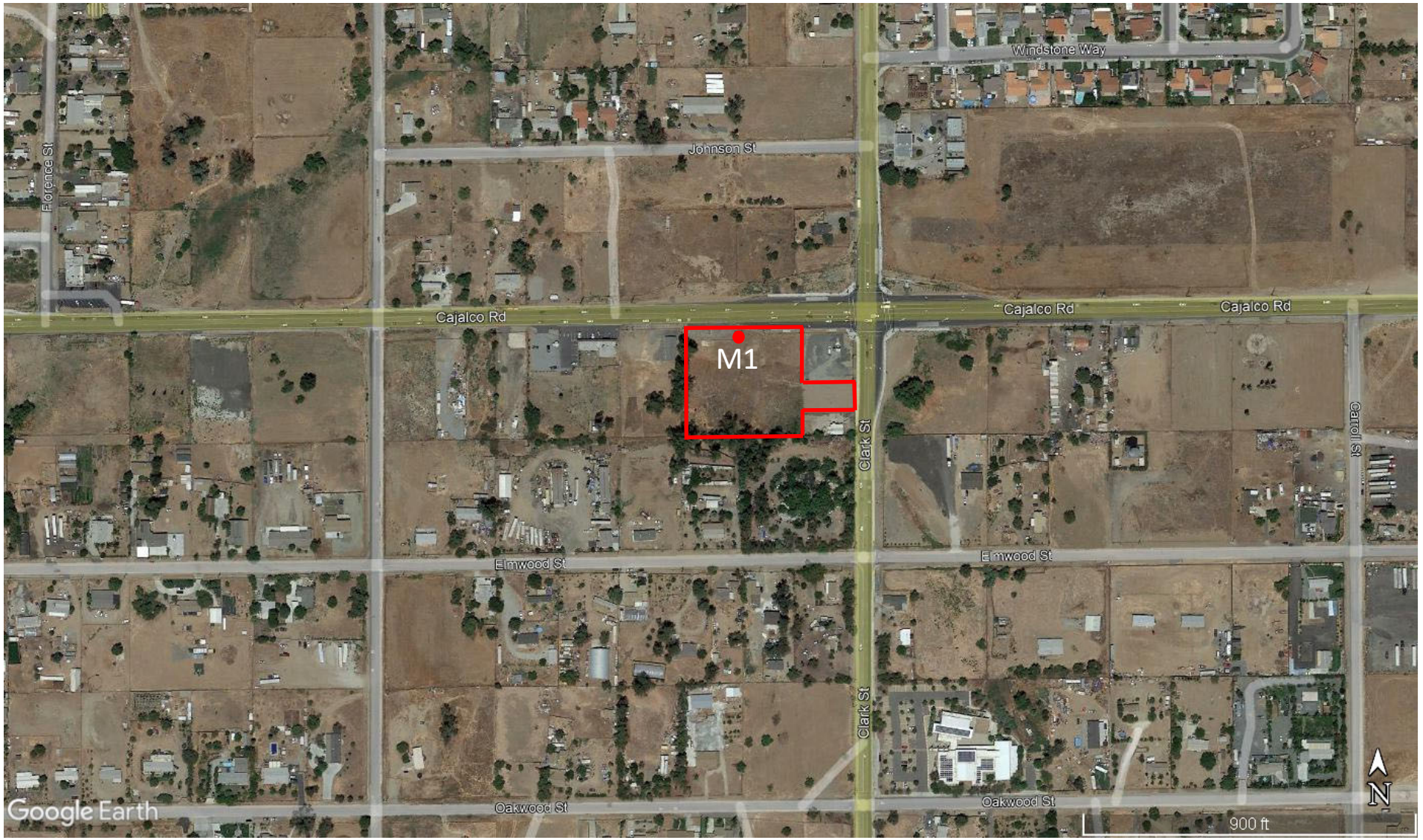


Figure 3 — Monitoring Location **- Project Site** - Noise Monitoring Location

Section 9.52.020 of the County's Noise Ordinance states that noise sources associated with any private construction activity located within one-quarter of a mile from an inhabited dwelling is permitted between the hours of 6:00 a.m. and 6:00 p.m., during the months of June through September, and 7:00 a.m. and 6:00 p.m., during the months of October through May. While the County of Riverside limits the hours of construction activity, it does not specifically address construction noise limits. Thus, construction activities occurring between the prescribed hours are considered exempt from the ambient noise standards of the ordinance. Thus, noise from construction sites occurring within those hours are presumed to have a less than significant impact for the purposes of CEQA review.

Vibration Standards

Vibration is a unique form of noise as the energy is transmitted through buildings, structures and the ground whereas audible noise energy is transmitted through the air. Thus, vibration is generally felt rather than heard. The ground motion caused by vibration is measured as peak particle velocity in inches per second and is referenced as vibration decibels (VdB). The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels.

The Riverside County Code does not address construction-related vibration; thus, for the purpose of evaluating project-related vibration impacts, thresholds established in the Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment* (September 2018) (Table 6-3) are used. A threshold of 65 VdB is used for buildings where low ambient vibration is essential for interior operations. These buildings include hospitals and recording studios. A threshold of 72 VdB is used for residences and buildings where people normally sleep (i.e., hotels and rest homes). A threshold of 75 VdB is used for institutional land uses where activities occur primarily during the daytime (i.e., churches and schools). The threshold used for the proposed project is 72 VdB as single-family residences are the nearest sensitive receptors to the site.

Construction activities such as blasting, pile driving, demolition, excavation or drilling have the potential to generate ground vibrations. With respect to ground-borne vibration impacts on structures, the FTA states that ground-borne vibration levels in excess of 90 VdB would damage buildings extremely susceptible to vibration damage. No historic buildings or buildings extremely susceptible to vibration damage are known to occur near the site; thus, 94 VdB (PPV 0.2), the standard for non-engineered timber and masonry buildings is used herein to evaluate potential vibration impacts to neighboring structures. Construction activities referenced above that would generate significant vibration levels are not proposed. However, to provide information for use in completing the CEQA evaluation, construction-related vibration impacts are evaluated using the above referenced criteria.

IMPACT ANALYSIS

Methodology and Significance Thresholds

Construction noise estimates are based upon noise levels reported by the Federal Transit Administration, Office of Planning and Environment, and the distance to nearby sensitive receptors. Reference noise levels from that document were used to estimate noise levels at nearby sensitive receptors based on a standard noise attenuation rate of 6 dB per doubling of distance (free field propagation of sound attenuation).

The proposed project would be a new use; thus, noise levels associated with existing and future traffic were based on the difference in trip volumes between existing conditions and the proposed use. A doubling of traffic volumes would be required to cause a noticeable increase (3 dBA) in traffic noise. As stated, baseline conditions currently exceed 60 dBA Leq, the normally acceptable sound level depicted in Table N-1 of the Riverside County General Plan Noise Element. However, existing noise levels do not exceed 65 dBA, the conditionally compatible noise level. Baseline and with project sound levels were calculated to determine whether project traffic, when added to baseline traffic, would exceed the conditionally compatible standard or noticeably increase (+3 dBA or greater) the Leq over baseline conditions. Stationary sources are evaluated separately and compared to the 55 dBA Leq daytime standard and 45 dBA Leq for neighboring residential properties.

As noted, a noise increase greater than 3 dBA is readily perceptible to the average human ear; and thus, is the level considered a substantial noise increase related to traffic operations. For the purpose of this evaluation, the peak hour Leq is used for traffic noise as it provides a conservative estimate of potential noise levels. As discussed, existing noise levels exceed the normally acceptable sound levels but are within the conditionally acceptable range as described above for single-family residential receivers. Thus, the impact determination is based on whether noise levels would exceed those levels considered acceptable for single-family residential areas and whether the stationary exterior and interior standard of 55 dBA Leq and 45 dBA Leq respectively, would be met.

Temporary Construction Noise

The main sources of noise during construction activities would include heavy machinery used during, demolition, grading and clearing the site, as well as equipment used during building construction and paving. Table 3 demonstrates the typical noise levels associated with heavy construction equipment. As shown, average noise levels associated with the use of heavy equipment at construction sites can range from about 81 to 95 dBA at 25 feet from the source, depending upon the types of equipment in operation at any given time and phase of construction (FTA 2018).

The noise level used to estimate the typical maximum noise level that could occur is based on use of a bulldozer as it is likely to be the noisiest type of equipment used over a sustained period of time adjacent to nearby residences during demolition, site preparation and grading activities. Actual noise levels will fluctuate throughout the day and may periodically exceed 88 dBA at the property line depending on the type and location of equipment used and whether multiple pieces of equipment are operating simultaneously in the same area.

Table 3
Typical Maximum Construction Equipment Noise Levels

Equipment Onsite	Typical Maximum Level (dBA) 25 Feet from the Source	Typical Maximum Level (dBA) 50 Feet from the Source	Typical Maximum Level (dBA) 100 Feet from the Source
Air Compressor	84	79	73
Backhoe	84	79	73
Bobcat Tractor	84	79	73
Concrete Mixer	85	78	72
Bulldozer	88	82	76
Jack Hammer	95	89	83
Pavement Roller	86	80	74
Street Sweeper	88	82	76
Man Lift	81	75	69
Dump Truck	82	76	70

Source: Noise levels based on FHWA Roadway Construction Noise Model (2006) Users Guide Table 1.
Noise levels based on actual maximum measured noise levels at 50 feet (Lmax).
Noise levels assume a noise attenuation rate of 6 dBA per doubling of distance.

Noise-sensitive uses near the project site are existing single-family residences located approximately 80 feet south of the southern property line and approximately 300 feet north of the site across Cajalco Road. Typical maximum construction noise levels at 80 feet from the southern property line will attenuate to approximately 78 dBA based on a reference distance of 82 dBA at 50 feet (Table 4).

Section 9.52.020 of the County's Noise Ordinance states that noise sources associated with any private construction activity located within one-quarter of a mile from an inhabited dwelling is permitted between the hours of 6:00 a.m. and 6:00 p.m., during the months of June through September, and 7:00 a.m. and 6:00 p.m., during the months of October through May. The nearest sensitive properties are located within one quarter mile of the site; however, as long as construction occurs within the hours prescribed above, noise is exempt from regulation per Riverside County code.

Table 4
Typical Maximum Construction Noise Levels at Various Distances from Project Construction

Distance from Construction	Typical Maximum Noise Level at Receptor (dBA)
25 feet	88
50 feet	82
100 feet	76
250 feet	68
500 feet	62
1,000 feet	56

While construction noise would be periodically audible at residences located south of the project site, the proposed project would comply with limitations on hours of construction activity defined in Section 9.52.020 of the Riverside County Code; thus, noise impacts during construction of each phase would be **less than significant**. However, temporary construction noise can be reduced by implementing one or more of the following measures:

N-1 **Construction Equipment**. Electrical power shall be used to run air compressors and similar power tools. Internal combustion engines should be equipped with a muffler of a type recommended by the manufacturer and in good repair. All diesel equipment shall be operated with closed engine doors and be equipped with factory-recommended mufflers. Construction equipment that continues to generate substantial noise at the project boundaries shall be shielded with temporary noise barriers, such as barriers that meet a sound transmission class (STC) rating of 25, sound absorptive panels, or sound blankets on individual pieces of construction equipment. Stationary noise-generating equipment, such as generators and compressors, shall be located as far as practically possible from the nearest residential property lines.

N-2 **Limit Operations Adjacent to Receivers**. Limit the number of large pieces of equipment (i.e., bulldozers or concrete mixers) operating adjacent to receivers to one at any given time.

N-3 **Neighbor Notification**. Provide notification to residential occupants nearest to the project site at least two weeks prior to initiation of construction activities that could result in substantial

noise levels at outdoor or indoor living areas. This notification shalll include the anticipated hours and duration of construction and a description of noise reduction measures being implemented at the project site. The notification shall include a telephone number for local residents to call to submit complaints associated with construction noise. The notification should be posted along Cajalco Road, Clark Street and Elmwood Avenue and be visible from adjacent properties.

Temporary Construction-Related Vibration

The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels for many people. If a roadway is smooth, the groundborne vibration from traffic is barely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration velocity, to 94 VdB, which is the standard for non-engineered timber and masonry buildings. Cajalco Road carries heavy truck traffic; however, there are no activities occurring in the project area that generate perceptible groundborne vibration.

Construction activity on the project site would be temporary and any vibration would not persist for long periods. Assuming vibration levels would be simlar to those associated with a large bulldozer, typical groundborne vibration levels would be 91 VdB at 25 feet, 85 VdB at 50 feet, and 79 Vdb at 100 feet, based on the Federal Transit Administration's (FTA's) *Transit Noise and Vibration Impact Assessment* (September 2018) as shown in Table 5.

As referenced, the closest single-family residence is approximately 80 feet south of the southern property line. Based on the information presented in Table 5, vibration levels would attenuate to between 82 and 79 VdB at this residence during construction at the southern property line assuming a bulldozer is the heaviest piece of equipment used during grading or site clearing. As discussed below, 94 VdB is the threshold where minor damage can occur in non-engineered timber and masonry buildings. Vibration levels are projected to be under this threshold; thus, structural damage is not expected to occur as a result of construction activities associated with the proposed project.

Vibration may be perceptible at the nearest receiver periodically during equipment pass by events. Any vibration would be temporary in duration and occur within the timeframe designated in the County of Riverside Code as referenced above. Thus, temporary vibration impacts would be **less than significant**.

Table 5
Vibration Source Levels for Construction Equipment

Equipment	Approximate VdB				
	25 Feet	50 Feet	60 Feet	75 Feet	100 Feet
Large Bulldozer	91	85	83	82	79
Loaded Trucks	90	84	82	81	78
Jackhammer	94	88	86	85	82
Loader	86	80	78	77	74

Source: FTA, 2018

Operational Noise Exposure

Operation of the proposed project was evaluated for potential exterior traffic related impacts caused by increased traffic volumes associated with the project as well as interior noise levels caused by traffic. The proposed project is considered a typical development that would not significantly contribute new vehicle trips to the existing road network or distribution of nighttime traffic. The majority of all project traffic would be concentrated on Cajalco Road rather than on adjacent streets during daytime and nighttime operation. The Ldn/CNEL values associated with project-related traffic are estimated by adding 1 dB to predicted peak-hour Leq traffic noise levels for comparison with the Riverside County Noise Element criteria for exterior and interior noise levels generated by traffic.

Exterior Traffic Noise. Traffic is the primary noise source that would be generated by the proposed project. Existing noise levels were measured at the project site on May 27, 2021. The Leq during the 15-minute monitoring period was 62.4 dBA. Existing measured noise levels do not exceed the 65 dBA Ldn/CNEL exterior standard referenced above. Measured baseline and with project sound levels were calculated to determine whether project traffic, when added to baseline traffic, would exceed the standard or noticeably increase (+3 dBA or greater) the Ldn/CNEL over baseline conditions.

The roadway network adjacent to the project site was modeled using the Federal Highway Administration Traffic Noise Model (TNM) version 2.5 software. The model calculates traffic noise at receiver locations based on traffic volumes, travel speed, mix of vehicle types operating on the roadways (i.e., cars/trucks, medium trucks and heavy trucks) and related factors. Traffic volumes used to establish the vehicle mix on Cajalco Road are based on traffic counts obtained during the monitoring period.

Hourly average baseline noise levels (Leq) were calculated for the residential receivers located along the north side of Cajalco Road and south of the site along Elmwood Street to establish

baseline conditions. These are the closest receivers to the project site and would experience the highest concentration of project-related traffic.

1. Single-family residence at 21314 Cajalco Road west of the site;
2. Single-family residence at 21487 Elmwood Street south of the site; and
3. Single-family residence at 21457 Elmwood Street south of the site.

Noise levels associated with the project were calculated by distributing the 179 A.M. peak hour project trips into the baseline traffic volumes on Cajalco Road, Clark Street and Elmwood Street based on the distribution assignment provided in the Traffic Impact Assessment (K2 Engineering, June 2021). Volumes were concentrated in this area for the purpose of evaluating worst case noise conditions. The receiver locations are shown in Figure 4 and the modeling results are shown in Table 6. Project traffic will have no noticeable effect on baseline conditions.

Table 6
Modeled Noise Levels

Receptor	Existing Leq	Existing Ldn/CNEL	With Project Leq	With Project Ldn/CNEL	Decibel Change	Significant Impact
Site 1	63.8	64.8	64.0	65.0	+.2	No
Site 2	62.8	62.8	63.1	64.1	+.3	No
Site 3	62.5	62.5	62.7	63.7	+.2	No

Interior Traffic Noise. California Energy Code Title 24 standards specify construction methods and materials that result in energy efficient structures up to a 30 dBA reduction in exterior noise levels (assuming windows are closed). This includes operation of mechanical ventilation (e.g., heating and air conditioning), in combination with standard building construction that includes dual-glazed windows with a minimum Sound Transmission Class (STC) rating of 26 or higher. When windows are open, the insertion loss drops to about 10 dBA.

The residences within the project area appear to have been constructed before Title 24 standards were implemented. As stated, the manner in which older homes in California were constructed (approximately 30 years old or older) generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. Assuming windows are closed and a 20 dBA insertion loss, interior noise levels at residences modeled would range between 43.7 dBA and 45 dBA. Interior noise levels could reach but not exceed the 45 dBA interior standard. In all cases modeled, the existing interior noise levels would not noticeably change with the addition of project traffic.

Stationary Source Noise Evaluation

Drive Thru Window Speakers. Speaker noise is a variable noise source and subject to change based on volume settings. The drive thru speaker would be located on the east side of the retail/drive thru restaurant building proposed for construction on the east side of the site. A second drive-thru is located along the southwest side of the site. There are no sensitive

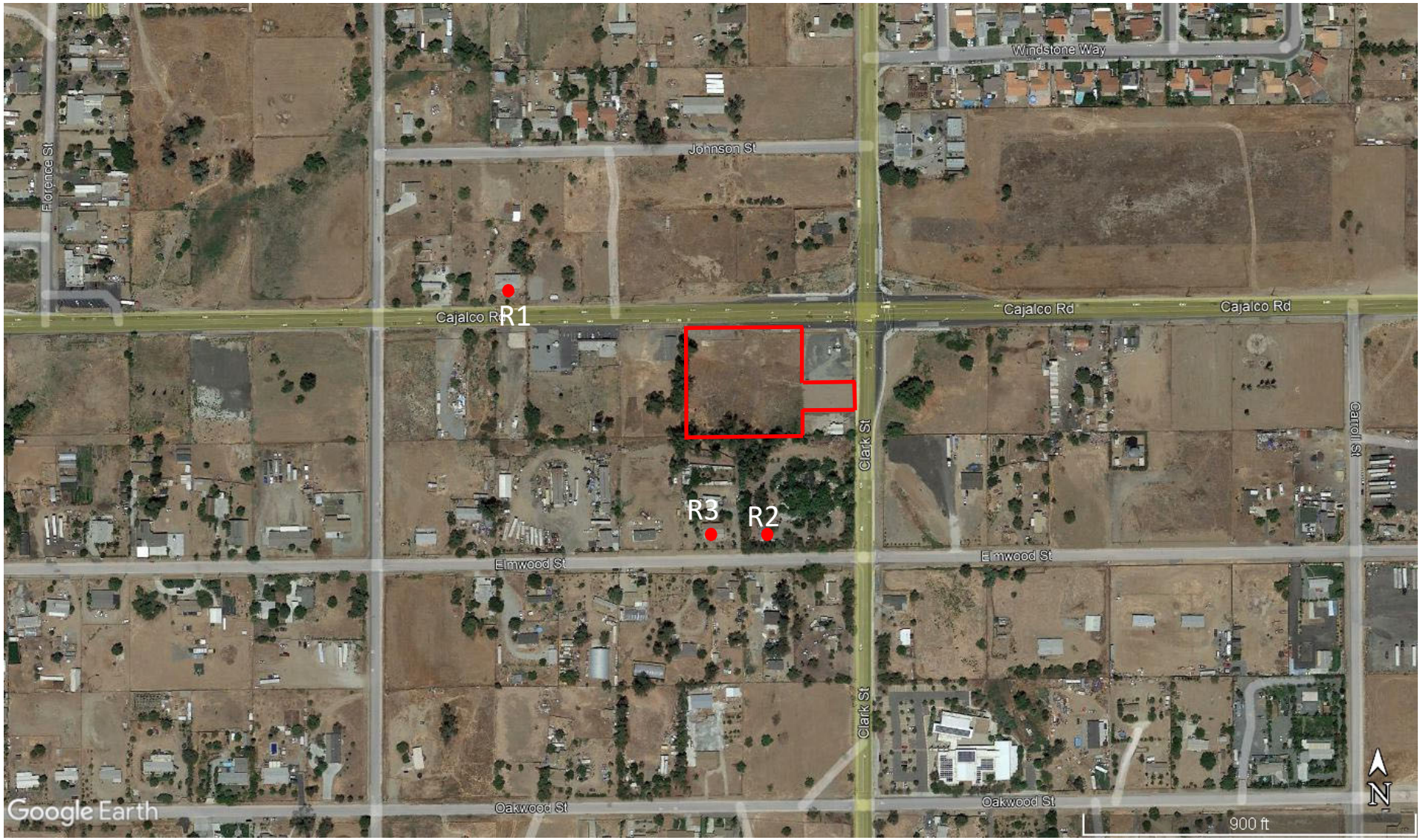


Figure 4 — Noise Receivers **- Project Site** **- Noise Receiver Locations**

receptors proximal to and east of the site. Sensitive receivers are located south of the site. The menu/speaker board is located approximately 150 feet north of Receivers 2 and 3. Reference noise levels range from 58 to 65 dBA at 30 feet from the source (Illingworth & Rodkin, 2010).

Assuming a reference level of 65 dBA at 30 feet, sound levels at 150 feet would attenuate to 52 dBA.

- [65 - *20 log (150 ft) / (30 ft)] = 52*

While speaker noise would meet the 55 dBA residential standard, it is recommended that the project be conditioned to ensure the drive thru speaker noise be inaudible beyond the immediate drive thru lane, order and pick-up window.

HVAC Systems. The HVAC system proposed for use on the site has not been specified and noise levels vary depending on the size of the system. However, it is assumed that two HVAC systems will be installed on the roof-top of each restaurant/retail buildings located along the east and west side of the site. Reference noise levels for the project are based on noise measurements made at similar facilities. HVAC noise levels can be expected to range from 60 to 70 dBA at 5 feet from the roof top equipment and ventilation openings (Illingworth & Rodkin, 2011). It was assumed the closest HVAC units would be 100 feet north of the southern property lines and the furthest would be approximately 150 feet north of the southern property line, the combined sound level would attenuate to 46 dBA Leq at the southern property line. HVAC noise from the four units would be approximately 49 dBA Leq assuming all are running simultaneously. This would meet the 55 dBA Leq daytime standard. Without design conditions to address noise levels from the HVAC systems, noise levels could exceed the 45 dBA Leq nighttime standard at the southern property line when in operation. The following measures should be implemented as project conditions to address noise generated by operation of the HVAC units:

> **Condition N-1**. Install noise controls around the rooftop fan unit that could include a fan silencer, enclosures or screen walls located around the fan unit. The system should be designed to attenuate noise levels to below 45 dBA Leq at the southern property line while allowing sufficient ventilation through the unit.
>
> **Condition N-2.** A qualified acoustical consultant shall be retained to review mechanical equipment systems during final design of the proposed project. The consultant shall review selected equipment and determine specific noise reduction measures necessary to comply with the Riverside County stationary noise standards.

With implementation of conditions N-1 and N-2, the County stationary source standards applicable to project would be met.

CONCLUSION

The proposed project will have no adverse construction or operational traffic noise impacts. Section 9.52.020 of the County's Noise Ordinance states that noise sources associated with any private construction activity located within one-quarter of a mile from an inhabited dwelling is permitted between the hours of 6:00 a.m. and 6:00 p.m., during the months of June through September, and 7:00 a.m. and 6:00 p.m., during the months of October through May. Thus, construction activities occurring between the prescribed hours are considered exempt from the ambient noise standards of the ordinance. No significant or adverse noise impacts would occur as a result of project construction. Project related traffic would not noticeably change existing noise levels along Cajalco Road or Elmwood Street. Noise from the drive thru window speakers would not exceed the residential or commercial standards. With the implementation of recommended conditions N-1 and N-2 to address nighttime operation of the HVAC units, the stationary daytime and nighttime standards would not be exceeded at the southern property line.

REFERENCES

County of Riverside, Section 9.52.020 of the Noise Ordinance, amended November 2019

County of Riverside General Plan, Noise Element, Tables N-1 and N-2, December 2015.

dBF & Associates, Inc., Reference Noise Level Compilation Table, 2016.

Federal Highway Administration. *Roadway Construction Noise Model. 2006.* Users Guide Table 1.

Federal Highway Administration, Traffic Noise Model Version 2.5, 2004.

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

Federal Rail Administration (FRA) Guidelines (Report Number 293630-1), December 1998.

Illingworth & Rodkin. *Capital Toyota Expansion Initial Study-MND Noise Impact Assessment*, City of San Jose, May, 2014.

Illingworth & Rodkin. *Noise and Vibration Assessment for the Curtner/Union Retail Project*, City of San Jose, December 2011.

Illingworth & Rodkin. In-and-Out Burger, North Main Street, Noise and Vibration Impact Assessment, City of Pleasant Hill, June 2010.

K2 Engineering, *Traffic Impact Study, Proposed Gas Station, Restaurant and Retail Stores, 21419 and 21425 Cajalco Road, Perris, CA*, June 2021.

Appendix A

Monitoring Data Sheet and Modeling Results

FIELD NOISE MEASUREMENT DATA

Project Name: Cajalco Commercial/Auto Page 1 of
Project #: Day / Date May 27, 2021 My Name.

Sound Level Meter
Model # Piccolo II
Serial # P0218051702
Weighting: (A) / C / Flat
Response: (Slow) / Fast / Impl
Windscreen: (Yes) / No

Calibrator
Model # 94 Calibrating
Serial #
Pre-Test: 114 dBA SPL
Post-Test: 114 dBA SPL

Weather Meter
Model # Serial #
Terrain: Hard / Soft / (Mixed)
Topo: (Flat) / Hilly (describe)
Wind: (Steady) / Gusty

ID	Time Start	Time Stop	Leq	Lmin	Lmax	L10	L50	L90	Wind Spd/ Dir (mph)	Temp (°F)	RH (%)	Bar Psr (in Hg)	Cloud Cover (%)
1	7:00	7:15	62.4	47.0	72.0	66.5	59.8	52.6	0/-	64°	-	-	-

Roadway Name: Cajalco Road
Location(s) / GPS Reading(s):

Speed (post/obs): 50+
Number of Lanes: 4 / Median
Width (pave/row): 60
1- or 2- way: 2
Grade: 0/-
Bus Stops: x10
Stoplights: yes @ each street
Street Parking: x10
Automobiles: 272
Medium Trucks: 14
Heavy Trucks: 24

Other Noise Sources: distant (aircraft) (roadway traffic) trains / landscaping / rustling leaves / children playing / dogs barking / birds vocalizing

Notes and Sketches on Reverse

Site 1

Start Date	5/27/2021
Start Time	7:00:26 AM
End Time	7:15:25 AM
Duration	00:14:59
Meas Mode	Single
Input Range	High
Input Type	Mic
SPL Time Weight	Slow
LN% Freq Weight	dBA
Overload	No
UnderRange	No
Sensitivity	18.44mV/Pa

LZeq	73.7
LCeq	72.6
LAeq	62.4
LZSmax	85.5
LCSmax	84.9
LASmax	72.0
LZSmin	62.3
LCSmin	59.6
LASmin	47.0
LZE	103.2
LCE	102.1
LAE	91.9
LZpeak	97.2
LCpeak	96.6
LApeak	91.1
1%	70.0
2%	69.2
5%	67.9
8%	66.9
10%	66.5
25%	63.7
50%	59.8
90%	52.6
95%	50.9
99%	48.7

<Organization?>
<Analysis By?>

7 December 2021
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: <Project Name?>
RUN: Cajalco Gas Station - with Project

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Cajalco Road @ Clark WB	12.0	Robinson	1	634.0	24.0	0.00				Average	
		Carroll	2	0.0	24.0	0.00					
Cajalco Road @ Carroll WB	12.0	Carroll Str	3	0.0	24.0	0.00	Signal	0.00	100	Average	
		Day Street	4	-1,280.0	24.0	0.00					
Cajalco Road EB Day Street	12.0	Day Street	5	-1,280.0	0.0	0.00				Average	
		Carrol Stre	6	-24.0	0.0	0.00					
Cajalco Road @ Clark Street EB	12.0	Carroll Str	7	0.0	0.0	0.00				Average	
		Robinson	8	634.0	0.0	0.00					
Clark Street NB	12.0	Elmwood	9	0.0	-900.0	0.00	Stop	0.00	100	Average	
		Cajalco	10	0.0	0.0	0.00					
Clark Street SB	12.0	Cajalco Rc	11	-24.0	0.0	0.00				Average	
		Elmwood	12	-24.0	-970.0	0.00					
Elmwood East West Clark	24.0	Elmwood (	13	-25.0	-670.0	0.00	Stop	0.00	100	Average	
		Elmwood I	14	-1,300.0	-670.0	0.00					

<Organization?>
<Analysis By?>

7 December 2021
TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: <Project Name?>
RUN: Cajalco Gas Station - with Project

Roadway Name	Points Name	No.	Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Cajalco Road @ Clark WB	Robinson	1	544	40	28	40	48	40	0	0	0	0
	Carroll	2										
Cajalco Road @ Carroll WB	Carroll Street	3	605	40	28	40	48	40	0	0	0	0
	Day Street	4										
Cajalco Road EB Day Street	Day Street	5	605	40	28	40	48	40	0	0	0	0
	Carrol Street	6										
Cajalco Road @ Clark Street EB	Carroll Street	7	544	40	28	40	48	40	0	0	0	0
	Robinson Stre	8										
Clark Street NB	Elmwood	9	388	35	0	0	0	0	0	0	0	0
	Cajalco	10										
Clark Street SB	Cajalco Road	11	388	35	0	0	0	0	0	0	0	0
	Elmwood	12										
Elmwood East West Clark	Elmwood @ C	13	506	30	0	0	0	0	0	0	0	0
	Elmwood East	14										

<Organization?>
<Analysis By?>

7 December 2021
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: <Project Name?>
RUN: Cajalco Gas Station - with Project

Receiver Name	No.	#DUs	Coordinates (ground)			Height above Ground	Input Sound Levels and Criteria				Active in Calc.
			X	Y	Z		Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	
			ft	ft	ft	ft	dBA	dBA	dB	dB	
Receiver1	1	1	-982.0	80.0	0.00	4.92	0.00	66	10.0	8.0	Y
Receiver2	2	1	-200.0	-630.0	0.00	4.92	0.00	66	10.0	8.0	Y
Receiver3	3	1	-420.0	-630.0	0.00	4.92	0.00	66	10.0	8.0	Y

<Organization?>
<Analysis By?>

7 December 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: Cajalco Gas Station - Existing
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h		Increase over existing		Type Impact	With Barrier Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
Receiver2	2	1	0.0	62.8	66	62.8	10	----	62.8	0.0	8	-8.0
Receiver3	3	1	0.0	62.5	66	62.5	10	----	62.5	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	3	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

<Organization?>
<Analysis By?>

7 December 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: Cajalco Gas Station - with Project
BARRIER DESIGN: INPUT HEIGHTS

ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h		Increase over existing		Type Impact	With Barrier Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
Receiver2	2	1	0.0	63.1	66	63.1	10	----	63.1	0.0	8	-8.0
Receiver3	3	1	0.0	62.7	66	62.7	10	----	62.7	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	3	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0