

NOISE IMPACT ANALYSIS

**VERANO RESIDENTIAL PROJECT
CATHEDRAL CITY, CALIFORNIA**



January 2024

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VERANO RESIDENTIAL PROJECT CATHEDRAL CITY, CALIFORNIA

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LIST OF ABBREVIATIONS AND ACRONYMS

ALUC	Airport Land Use Compatibility
CEQA	California Environmental Quality Act
City	City of Cathedral City
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibel(s)
FHWA	Federal Highway Administration
ft	foot/feet
FTA	Federal Transit Administration
FTA Manual	<i>FTA Transit Noise and Vibration Impact Assessment Manual</i>
L_{dn}	day-night average noise level
L_{eq}	equivalent continuous sound level
L_{max}	maximum instantaneous sound level
mi	mile/miles
Noise Element	Cathedral City General Plan Noise Element
project	Verona Residential Project
STC	Sound Transmission Class

INTRODUCTION

This noise impact analysis has been prepared to evaluate the potential noise impacts and reduction measures associated with the proposed Verano Residential Project (project) in Cathedral City, California. This report is intended to satisfy the City of Cathedral City's (City) requirement for a project-specific noise impact analysis by examining the impacts of the project site and evaluating noise reduction measures that the project may require.

PROJECT LOCATION AND DESCRIPTION

The proposed project is located north of Verona Road and west of Landau Boulevard in Cathedral City, California.

The project consists of 459 single-family detached units and 375 attached and detached multi-family condominium units on an approximately 129-acre site. The site is currently vacant. The project site is surrounded by existing single-family homes to the south and east, vacant land to the west, south, and north, and the existing Union Pacific Railroad line to the northeast. Further northeast of the project site is Interstate 10 (I-10). An existing berm and masonry block wall run parallel to a portion of the site's northeastern boundary. Figures 1 and 2 show the project location and site plan, respectively.

EXISTING LAND USES IN THE PROJECT AREA

The project site is irregularly shaped and surrounded primarily by residential uses and vacant parcels. The areas adjacent to the project site include the following uses:

- **North:** Existing vacant land;
- **Northeast:** Existing Union Pacific Railroad followed by Interstate 10;
- **East:** Existing single-family residences followed by vacant land;
- **South:** Existing single-family residences; and
- **West:** Existing vacant land.

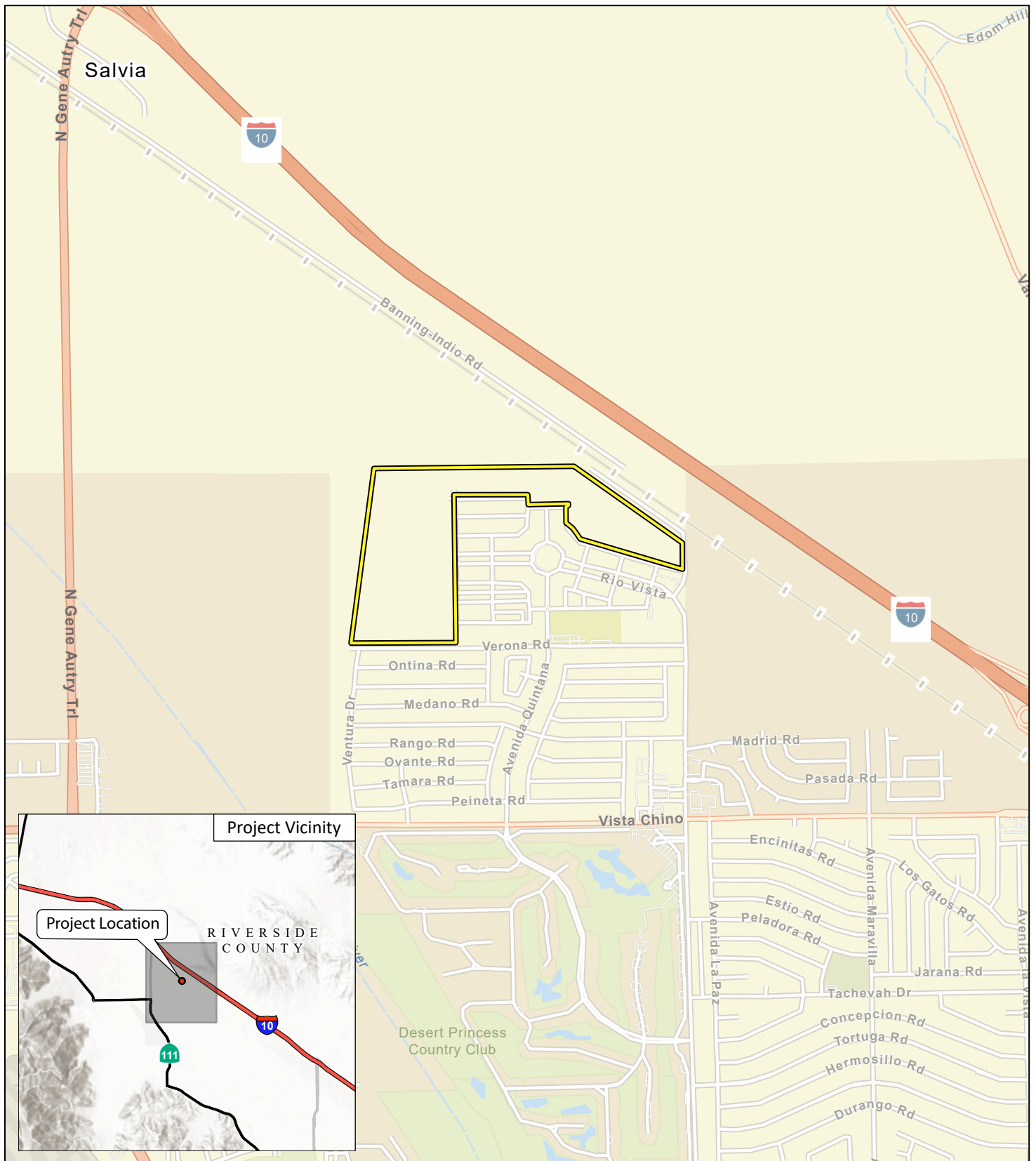
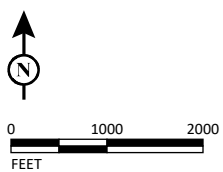


FIGURE 1

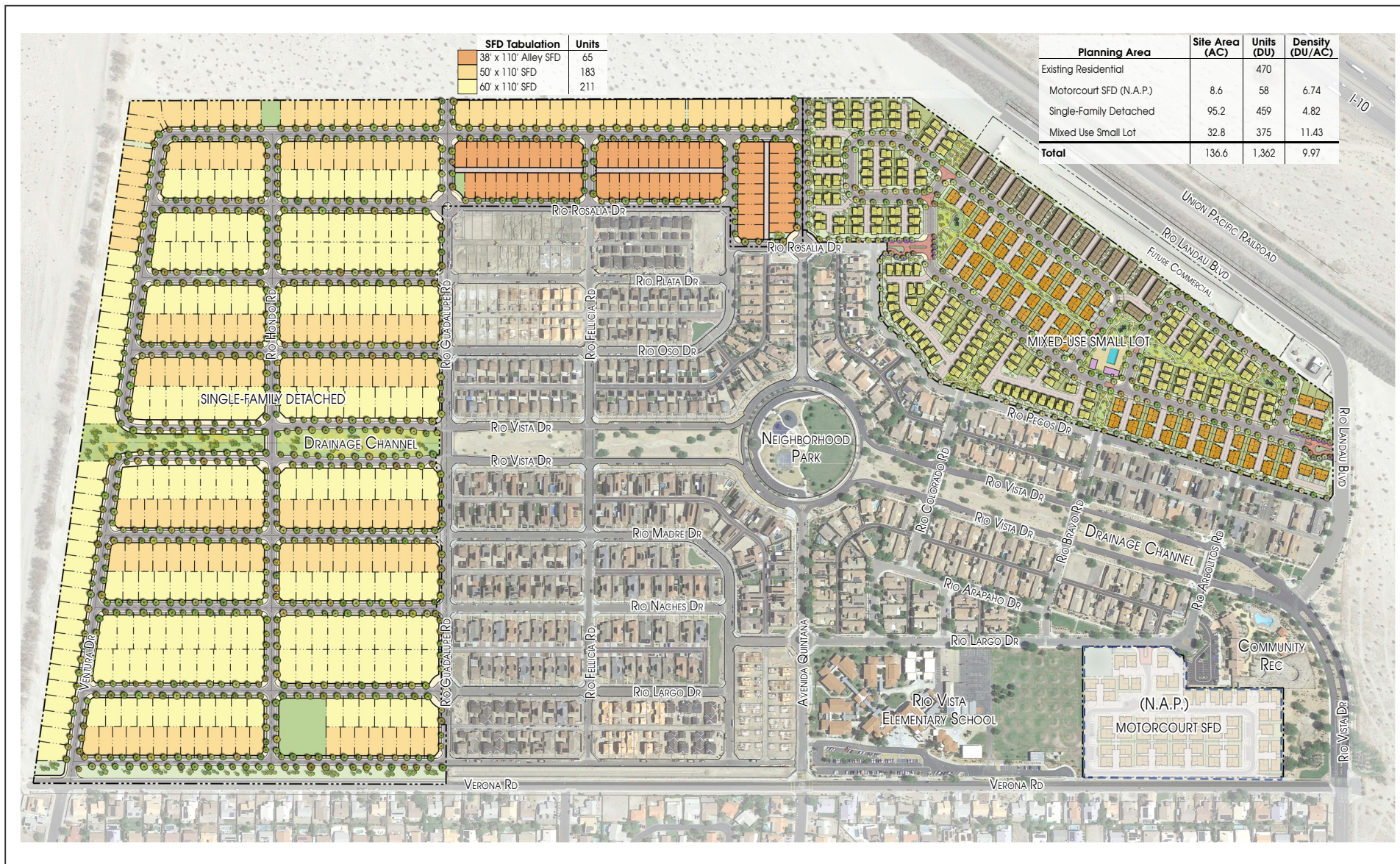
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SOURCE: ESRI Street Map, 2023

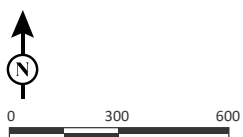
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Verona Residential
Project Location



LSA

FIGURE 2



SOURCE: WHA

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Verona Residential
Site Plan

NOISE FUNDAMENTALS

CHARACTERISTICS OF SOUND

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

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

MEASUREMENT OF SOUND

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

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

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

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. The equivalent continuous sound level (L_{eq}) is the total sound energy of time-varying noise over a sample period. However, the predominant rating scales for human communities in the State of California are the L_{eq} and Community Noise Equivalent Level (CNEL) or the day-night average noise level (L_{dn}) based on A-weighted decibels. CNEL is the time-weighted average noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and a 10 dBA weighting factor applied to noises occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale but without the adjustment for events occurring during relaxation hours. CNEL and L_{dn} are within 1 dBA of each other and are normally interchangeable. The City uses the CNEL noise scale for long-term traffic noise impact assessment.

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

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

Physiological Effects of Noise

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

loss of equilibrium. The ambient or background noise problem is widespread and generally more concentrated in urban areas than in outlying, less developed areas.

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

Table A: Definitions of Acoustical Terms

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

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

Table B: Common Sound Levels and Their Noise Sources

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

Source: Compiled by LSA (2022).

REGULATORY SETTING

APPLICABLE NOISE STANDARDS

The applicable noise standards governing the project site include the criteria in the California Code of Regulations, the Noise Element of the City's General Plan (Noise Element), and the City of Cathedral City Municipal Code. In addition, the project proposes to buildout the last phase and remaining residential units of the previously approved Rio Vista Village Specific Plan; therefore, the findings and associated mitigation measures from the Initial Study / Mitigated Negative Declaration for the Rio Vista Village, General Plan Amendment 97-67, Specific Plan 97-55, and Tentative Tract Map 28639 completed November 12, 1997 (RVVSP MND) are also summarized below.

California Code of Regulations

Interior noise levels for residential habitable rooms are regulated by Title 24 of the California Code of Regulations California Noise Insulation Standards. Title 24, Chapter 12, Section 1206.4, of the 2019 California Building Code requires that interior noise levels attributable to exterior sources not exceed 45 CNEL in any habitable room. A habitable room is a room used for living, sleeping, eating, or cooking. Bathrooms, closets, hallways, utility spaces, and similar areas are not considered habitable rooms for this regulation (Title 24 California Code of Regulations, Chapter 12, Section 1206.4).

City of Cathedral City

Noise Element of the General Plan

For residential uses, the standards are derived from standards contained in the General Plan Guidelines, a publication of the California Office of Noise Control Land Use. These standards are used by many California cities and counties. The Noise Element includes standards for land use compatibility for community noise exposure. The noise compatibility matrix in Table V-2 of the City's General Plan establishes the community noise exposure levels limits by land use category. At different exterior noise levels, individual land uses are identified as "normally acceptable," "conditionally acceptable," "normally unacceptable" and "clearly unacceptable." The noise compatibility matrix criteria are designed to ensure noise compatibility of proposed land uses with the predicted future noise environment.

For noise sensitive residential uses, the City Noise Element requires an exterior noise level of less than 65 dBA CNEL for outdoor living areas and an interior noise level of less than 45 dBA CNEL. In the context of this noise analysis, the noise impacts associated with the project are controlled by the City Noise Element.

The goals, objectives, and policies in the City's General Plan Noise Element are designed to provide noise-compatible land use relationships by establishing noise standards utilized for design and siting purposes and minimize noise impacts from significant noise generators. The following goals and policies are applicable to the proposed project:

- **Goal:** A noise environment that complements the City's low density residential character and its various land uses.
 - **Policy 1:** Protect noise sensitive land uses, including residential neighborhoods, schools, hospitals, libraries, churches, resorts and community open space, as well as land uses proposed in the vicinity of the railway, Interstate 10, the Mid-Valley Parkway, and Da Vall Drive from high noise levels generated by existing and future noise sources.
 - **Policy 2:** The relationship between land use designations in the Land Use Element and changes in the circulation pattern of the City, as well as individual developments shall be monitored and mitigated.
 - **Policy 3:** Private sector project proposals shall include measures that assure that noise exposures levels comply with State of California noise insulation standards as defined in Title 25 (California Noise Insulation Standards).
 - **Policy 7:** The City shall restrict grading and construction activities that may impact residential neighborhoods to specified days of the week and times of day.

City of Cathedral City Municipal Code

Section 8.14.040(E) states that grading and equipment operations shall only be completed between the hours of 7:00 a.m. to 7:00 p.m. Monday through Friday, excluding holidays and from 8:00 a.m. to 4:00 p.m. on Saturday.

Section 11.80.030(D)(7) of the City's Municipal Code limits construction and demolition activities to between the hours of 7:00 a.m. and 8:00 p.m. every day. No person shall operate or allow the operation of any tools or equipment used in construction, drilling, repair, or alteration or demolition work outside of these hours to prevent noise disturbances.

Rio Vista Village MND Summary of Findings and Mitigation Measures

Project Impacts

An acoustical analysis was completed to determine the exterior and interior noise exposure and the necessary noise mitigation measures for the Rio Vista Village project. The results of this analysis indicated that future vehicle noise from the I-10 Freeway and the Southern Pacific Railroad tracks are the principal source of community noise that will impact the site. However, noise levels on the project site will meet the City's outdoor 65 CNEL exterior standard for outdoor areas and 45 CNEL interior noise standards, if the project's perimeter wall is constructed and the recommended mitigation measures including a "windows closed" condition requiring a mechanical ventilation system and upgraded windows for those residential units exposed to the I-10 Freeway and the Union Pacific Railroad tracks.

Recommended Mitigation Measures

The following mitigation measures are recommended to mitigate the project's potential noise impacts:

- (1) **Traffic Noise Mitigation Measures.** Prior to approval of any subsequent maps for the Rio Vista Village project, the developer shall coordinate with the City in providing mitigation of traffic noise impacts on existing residences. Specific mitigation shall include:
 - (a) Preparation of a detailed acoustical analysis determining precise needs for roadway attenuation,
 - (b) Construction of any improvements identified in the study as necessary to mitigate adverse impacts, and
 - (c) A fair-share assessment of fee responsibilities among the major developers for construction of improvements, based on each major development's contribution to traffic volumes along the impacted roadways.
- (2) **On-site Noise Mitigation Measures.** For all areas within the General Plan buildout (Post-2020) 65 CNEL roadway contours, residential lots and dwellings shall be sound attenuated against present and projected noise, which shall be the sum of all noise impacting the project, so as not to exceed an exterior standard of 65 CNEL in outdoor living areas and an interior standard of 45 dB CNEL in all habitable rooms. An acoustical study shall be prepared under the supervision of a person experienced in the field of acoustical engineering. Evidence that above standards will be satisfied in a manner consistent with applicable zoning regulations shall be submitted as follows:
 - (a) Prior to the recordation of a final tract/parcel map or prior to the issuance of Grading Permits, at the sole discretion of the City, an Acoustical Analysis Report shall be submitted to the City for approval. The report shall describe in detail the exterior noise environment and preliminary mitigation measures. Acoustical design features to achieve interior noise standards may be included in the report in which case it may also satisfy "B" below.
 - (b) An analysis report describing the acoustical design features of the structures required to satisfy the exterior and interior noise standards shall be submitted to the City for approval along with satisfactory evidence which indicates that the sound attenuation measures specified in the approved acoustical report(s) have been incorporated into the design of the project.
 - (c) Prior to the issuance of any Certificates of Use and Occupancy, field testing in accordance with California Administration Code Title 25 regulations may be required by the County, to verify compliance with Sound Transmission Class (STC) and Impact Insulation Class (IIC) design standards.

Construction Mitigation Measures

Construction shall not take place between 7:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or at any time on Sunday or a Federal holiday.

- (1) All construction vehicles or equipment fixed or mobile-operated shall be equipped with properly operating and maintained mufflers.

- (2) Stockpiling and/or vehicle staging areas shall be located as far as practical from noise sensitive areas.

Unit Ventilation

When the operable doors and windows are open, it is expected that the interior 45 CNEL limit for the Rio Vista Village may be exceeded for those residential units exposed to the 1-10 Freeway and the Union Pacific Railroad tracks. Therefore, a windows "Closed" condition is required for this use to meet the interior noise standard. For this windows closed condition, a means of mechanical ventilation may be provided using one of the following alternative methods:

- (1) A "summer switch" on the forced air heating/cooling unit for the building. The summer switch permits fan operations for ventilation at reference points 1 and 2, independent of the heating and cooling function. The UBC requires that the system shall be capable of supplying a minimum of 5 cubic feet per minute of outside air per occupant, with a total circulated of not less than 15 cubic feet per minute per occupant in all portions of the building, during such time as the building is occupied. If the velocity of the air at the register exceeds 10 feet per second, the register shall be placed more than 8 feet above the floor directly beneath. The fresh air intake duct should be a flexible fiberglass sound attenuating construction. The duct may be at least ten (10) feet long or at least six (6) feet long with one sharp damper before the fan.
- (2) A through wall air conditioner or heat pump. Such a unit must supply a minimum of 5 cubic feet per minute outside air per occupant for the total circulated air of not less than 15 cubic feet per minute per occupant in all portions of the building, during such time as the building is occupied. The unit should have an approximate overall dimension of 18" x 24" or less with a vent opening no greater than 6" in diameter. Or, the unit may be an approved alternative with acceptable acoustical transmission performance.
- (3) An attic fan system. Such a system would bring outside air to the building interior and exhaust the interior area air past a ceiling fan into the attic space and out the attic vent. The air may be ducted into the building through 10 feet of flexible fiberglass ducting, with one sharp 90° bend. The intake opening for the ducting should be in the side of the building which faces away from the I-10 Freeway. As required by the UBC, the system must provide 5 cubic feet per minute of outside air per occupant, with a total circulated of not less than 15 cubic feet per minute per occupant within all portions of the building, during such time as the building is occupied.
- (4) Any other method of ventilation which meets the UBC requirements for 5 cubic feet per minute of outside air per occupant, with the total circulated of not less than 15 cubic feet per minute per occupant in all portions of the building, during such time as the building is occupied.

Noise Control Barrier Construction Materials

The necessary noise barrier mitigation will be accomplished if the noise barrier construction materials have a weight of at least 4 pounds per square foot of face area. The recommended barrier

must present a solid face from top to bottom, and no openings or decorative cutouts should be made. All gaps (except for weep holes) should be filled with grout or caulking. The required noise control barriers may be constructed using one of the following alternative materials:

- (1) Masonry block;
- (2) Stucco veneer over wood framing (or foam core), or 1 inch thick tongue and groove wood of sufficient weight per square foot;
- (3) 1/4 inch thick glass, acrylic plastic, or other transparent materials with sufficient weight per square foot may be used to provide views;
- (4) Any combination of these materials or other construction materials with a minimum weight of 3.5 pounds per square foot of face area.

OVERVIEW OF THE EXISTING NOISE ENVIRONMENT

The primary existing noise sources in the project area are transportation facilities. Traffic on I-10 is a steady source of ambient noise while sporadic train activities also add to the noise environment. Lastly, given the climate, noise levels can be influenced by typical high winds.

AMBIENT NOISE MEASUREMENTS

Long-Term Noise Measurements

A long-term (24-hour) noise level measurement was conducted on July 11 and 12, 2023, using a Larson Davis Spark 706RC Dosimeter. Table C provides a summary of the measured hourly noise levels from the long-term noise level measurement. Daily noise levels at the northeastern portion of the project site closest to the Union Pacific Railroad and I-10 were approximately 72.5 dBA CNEL. Long-term noise monitoring data results are provided in Appendix A. Figure 3 shows the long-term monitoring locations.

An existing berm and masonry block wall run parallel to a portion of the site's northeastern boundary. The long-term meter LT-1 was placed outside of the wall to capture noise from the railroad and the freeway.

Table C: Long-Term Ambient Noise Level Measurements

Location		Daytime Noise Levels ¹ (dBA L _{eq})	Evening Noise Levels ² (dBA L _{eq})	Nighttime Noise Levels ³ (dBA L _{eq})	Daily Noise Level (dBA CNEL) ⁴
LT-1	Located approximately 400 feet southwest of the existing Union Pacific Railroad west of the existing masonry wall on top of a berm near the proposed location of the future multi-family uses.	52.9-71.2	69.0-71.8	61.8-70.9	72.5

Source: Compiled by LSA (2023).

Note: Noise measurements were conducted from July 11 to July 12, 2023, starting at 1:00 p.m.

¹ Daytime Noise Levels = Noise levels during the hours from 7:00 a.m. to 7:00 p.m.

² Evening Noise Levels = Noise levels during the hours from 7:00 p.m. to 10:00 p.m.

³ Nighttime Noise Levels = Noise levels during the hours from 10:00 p.m. to 7:00 a.m.

CNEL = Community Noise Equivalent Level

dBA = A-weighted decibels

L_{eq} = equivalent continuous sound level

EXISTING AIRCRAFT NOISE

Airport-related noise levels are primarily associated with aircraft engine noise made while aircraft are taking off, landing, or running their engines while still on the ground. The closest airport to the proposed project site is Palm Springs International Airport located approximately 1.5 miles (mi) southwest of the project site. Based on the Riverside County Airport Land Use Compatibility Plan (County of Riverside 2014) the project is located well outside of the 60 dBA CNEL noise contour of the airport.



LSA

LEGEND

- Project Site Boundary
- LT-1 - Long-term Noise Monitoring Location



0 500 1000
FEET

SOURCE: Google Earth, 2023

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FIGURE 3

Verona Residential
Noise Monitoring Locations

PROJECT IMPACT ANALYSIS

SHORT-TERM CONSTRUCTION NOISE IMPACTS

Two types of short-term noise impacts could occur during the construction of the proposed project. First, construction crew commutes and the transport of construction equipment and materials to the site for the proposed project would incrementally increase noise levels on access roads leading to the site. Although there would be a relatively high single-event noise-exposure potential causing intermittent noise nuisance (passing trucks at 50 ft would generate up to 84 dBA L_{max}), the effect on longer-term ambient noise levels would be small when compared to existing daily traffic volumes on nearby roadways. Because construction-related vehicle trips would not approach existing daily traffic volumes, traffic noise would not increase by 3 dBA CNEL. A noise level increase of less than 3 dBA would not be perceptible to the human ear in an outdoor environment. Therefore, short-term, construction-related impacts associated with worker commute and equipment transport to the project site would be less than significant.

The second type of short-term noise impact is related to noise generated during construction, which includes site preparation, grading, building construction, paving, and architectural coating on the project site. Construction is completed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on the site and, therefore, the noise levels surrounding the site as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase.

Construction noise impacts are expected to be similar to those assessed in the RVVSP MND as the general construction methods will match those of the prior site plan. Additionally, consistent with the RVVSP MND, the following mitigation measures would be implemented:

- Construction shall not take place between 7:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or at any time on Sunday or a Federal holiday.
- All construction vehicles or equipment fixed or mobile-operated shall be equipped with properly operating and maintained mufflers.
- Stockpiling and/or vehicle staging areas shall be located as far as practical from noise sensitive areas.

LONG-TERM OFF-SITE TRAFFIC NOISE IMPACTS

In order to assess the potential traffic impacts related to the proposed project, a *Transportation Impact Analysis Screening* (EPD Solutions, Inc. 2023) has been prepared. The Transportation Impact Analysis Screening evaluated the proposed project's consistency with the previously approved traffic analysis prepared for the 1997 RVVSP MND (Rio Vista Village Specific Plan Traffic Impact Analysis prepared by Robert Kahn, John Kain & Associates Inc. on October 8, 1997). The RVVSP Traffic Impact Analysis (TIA) prepared for the 1997 RVVSP MND analyzed 1,365 units and determined buildout of

the proposed development would generate a total of 11,680 daily trips, 925 AM peak hour trips, and 1,140 PM peak hour trips. The RVVSP MND analyzed the development of 1,362 residential units within the entire 303-acre RVVSP area. Since 1998, a total of 528 residential units have been approved (470 constructed and 58 approved but not constructed). The proposed project would develop the remainder of the 834 units, consisting of 459 single-family residences and 375 multi-family residential condominium units. Based on the analysis results, it was determined that as the number of units analyzed in the traffic analysis supporting the RVVSP MND is more conservative than the total number of single-family detached residential units and the multi-family residential units in the Specific Plan Amendment and associated tentative tract maps, no new trips would be generated as a part of the proposed development. Because there would be no increase in trips for the proposed project, no new off-site traffic noise impacts would occur. Impacts would be less than significant.

LAND USE COMPATIBILITY

The dominant source of noise in the project vicinity is traffic noise from I-10 and rail activities on the adjacent Union Pacific Railroad line in the vicinity of the project.

EXTERIOR NOISE ASSESSMENT

The City requires noise levels below 65 dBA CNEL for outdoor living areas. The project proposes a 6-foot wall along the northern property line and an 8-foot wall along the northeastern property line. With the incorporation of the 6-foot wall along the northern project boundary and the 8-foot high property line wall along the northeast project boundary parallel to the Union Pacific Railroad, the exterior noise levels would be reduced to below 65 dBA CNEL for outdoor sensitive areas along the first row of residential units closest to I-10 and Union Pacific Railroad. Consistent with RVVSP mitigation measures, once final grading plans are available, and the grading pad heights are known, the noise measurements will be validated, and the height of the property line walls may be refined¹.

INTERIOR NOISE ASSESSMENT

As discussed above, per the California Code of Regulations, an interior noise level standard of 45 dBA CNEL or less is required for all noise-sensitive rooms. Based on the exterior noise levels that may occur with less shielding provided by the proposed walls the lots closest to the rail line and I-10 have the potential to approach 73 dBA CNEL and a minimum noise reduction of 28 dBA would be required. This can be typically achieved with windows having an STC rating of 28 or higher, depending on the wall-to-window ratio of the future products.

Consistent with RVVSP mitigation measures, once final plans are available to detail the exterior wall construction and a window manufacturer has been chosen, a Final Acoustical Report (FAR) would be required to confirm the reduction capability of the exterior façades and to identify any specific upgrades necessary to achieve an interior noise level of 45 dBA CNEL or below.

¹ Including the potential of extending the 8-foot existing masonry block wall that runs parallel to a portion of the project site's northeastern boundary if feasible.

REFERENCES

- City of Cathedral City. 2009. *General Plan Environmental Hazards Element*. November 18.
- . 2023. *Municipal Code*. Website: <https://www.cathedralcity.gov/i-want-to/view/municipal-code> (accessed January 2024).
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- County of Riverside. 2014. *Riverside County Airport Land Use Compatibility Plan*. November.
- EPD Solutions, Inc. 2023. *North of Verona Road and West of Landau Boulevard Transportation Impact Analysis Screening*. July 11.
- Federal Highway Administration (FHWA). 2006. *Roadway Construction Noise Model User's Guide*. January. Washington, D.C. Website: www.fhwa.dot.gov/environment/noise/construction_noise/rcnm/rcnm.pdf (accessed January 2024).
- Federal Transit Administration (FTA). 2018. *Transit Noise and Vibration Impact Assessment Manual*. Office of Planning and Environment. Report No. 0123. September.
- Harris, Cyril M., editor. 1991. *Handbook of Acoustical Measurements and Noise Control*. Third Edition.
- State of California. 2020. *2019 California Green Building Standards Code*.

APPENDIX A

NOISE MONITORING DATA

Noise Measurement Survey – 24 HR

Project Number: ESL2201.67

Test Personnel: Kevin Nguyendo

Project Name: Verano

Equipment: Spark 706RC (SN:906)

Site Number: LT-1 Date: 7/11/23

Time: From 1:00 p.m. To 1:00 p.m.

Site Location: Located north of the project site just west of where the brick wall ends on a
Fencing pole.

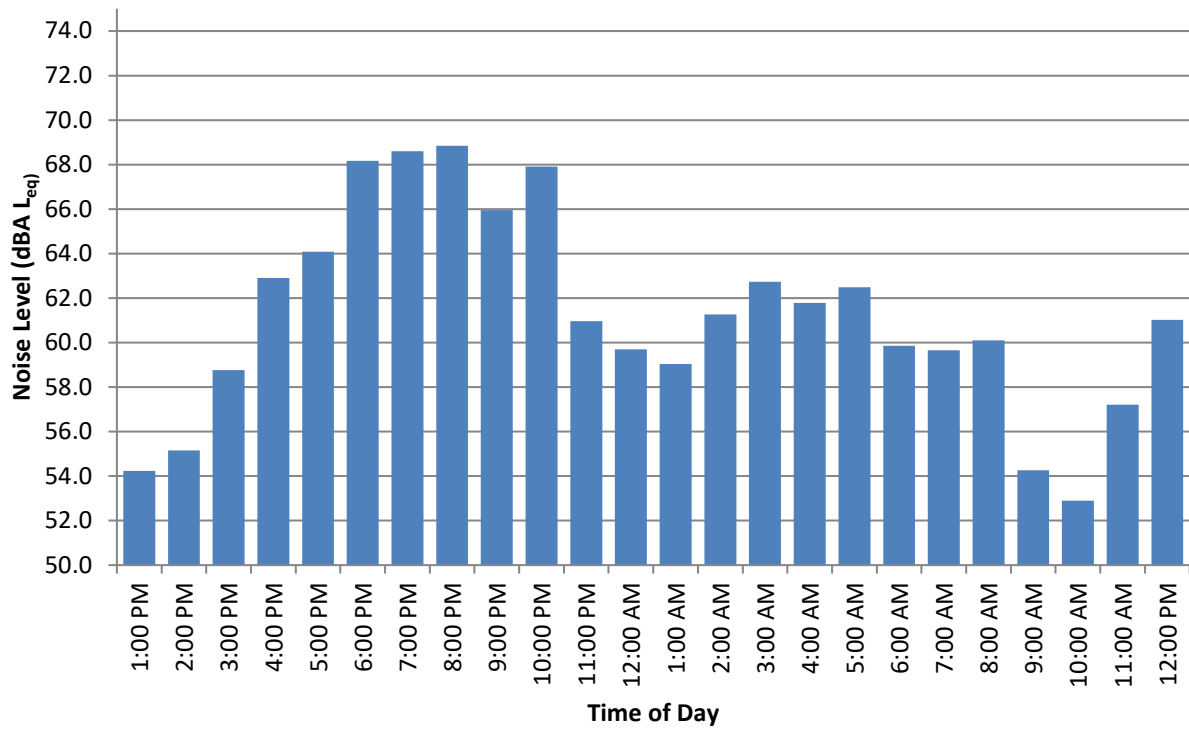
Primary Noise Sources: Train traffic activity noise northeast of the project site.

Comments: _____

Photo:



Average Hourly Noise Levels



MEMORANDUM

DATE: November 16, 2023

To: Konnie Dobрева, EPD Solutions Inc.

FROM: J.T. Stephens, Principal / Noise and Vibration Specialist

SUBJECT: Vibration Monitoring at the Verano Residential Project in the City of Cathedral City, California

INTRODUCTION

The following memorandum presents a results summary of the vibration monitoring at the proposed Verano Residential Project in the City of Cathedral City, California. The purpose of the vibration monitoring is to assess vibration levels generated by freight train activities to the north of the project site and compare those levels to applicable annoyance criteria. Vibration measurement points are shown in Figure 1 (Attachment A).

CHARACTERISTICS OF VIBRATION AND REGULATORY FRAMEWORK

Vibrating objects in contact with the ground radiate vibration waves through various soil and rock strata to the foundations of nearby buildings. As the vibration propagates from the foundation throughout the remainder of the building, the vibration of floors and walls may cause perceptible vibration from the rattling of windows or a rumbling noise. The rumbling sound caused by the vibration of room surfaces is called groundborne noise. When assessing annoyance from groundborne noise, vibration is typically expressed as root mean square (rms) velocity in units of decibels of 1 micro-inch per second. To distinguish vibration levels from noise levels, the unit is written as "VdB." Human perception to vibration starts at levels as low as 67 VdB and sometimes lower. Annoyance due to vibration in residential settings starts at approximately 70 VdB. Groundborne vibrations is almost never annoying to people who are outdoors. Although the motion of the ground may be perceived, without the effects associated with the shaking of the building, the motion does not provoke the same adverse human reaction.

In extreme cases, excessive groundborne vibration has the potential to cause structural damage to buildings. Common sources of groundborne vibration include trains and construction activities such as blasting, pile driving and operating heavy earthmoving equipment. Table A shows the groundborne vibration impact criteria.

Table A: Vibration Criteria for Detailed Analysis

Land Use	Max L_v (VdB) ¹	Description of Use
Workshop	90	Vibration that is distinctly felt. Appropriate for workshops and similar areas not as sensitive to vibration.
Office	84	Vibration that can be felt. Appropriate for offices and similar areas not as sensitive to vibration.
Residential Day	78	Vibration that is barely felt. Adequate for computer equipment and low-power optical microscopes (up to 20×).
Residential Night and Operating Rooms	72	Vibration is not felt, but ground-borne noise may be audible inside quiet rooms. Suitable for medium-power microscopes (100×) and other equipment of low sensitivity.

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

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

FTA = Federal Transit Administration

L_v = velocity in decibels

VdB = vibration velocity decibels

Max = maximum

VIBRATION MONITORING RESULTS

Six (6) separate vibration monitoring locations using INFRA C22 Wireless Triaxial Vibration Monitors, as shown in Figure 1, were set up for seven (7) days to record vibration events from operations on the rail line to the north. Two (2) sets of three (3) monitors were placed at distances perpendicular to the rail line. The close monitoring locations, N-1 and E-1 were 250 feet from the rail line. The middle monitoring locations, N-2 and E-2, were 500 feet from the rail line. The far monitoring locations, N-3 and E-3, were 1,200 feet and 900 feet from the rail line, respectively.

Table B below provides a summary of the number of events, also known as triggers, associated with rail activity, which occurred over the seven-day period which exceeded the 72 VdB threshold from September 1 to September 8, 2023. Attachment B provides details on the measurement points.

Table B: Summary of Vibration Exceedances

Date	Number of Exceedances ¹					
	Monitoring Location N-1 250 feet	Monitoring Location E-1 250 feet	Monitoring Location N-2 500 feet	Monitoring Location E-2 500 feet	Monitoring Location N-3 1,200 feet	Monitoring Location E-3 900 feet
September 1	0	1	0	0	0	0
September 2	0	0	0	0	0	0
September 3	0	2	0	1	0	1
September 4	0	3	0	1	0	1
September 5	0	9	0	0	0	0
September 6	0	3	0	0	0	0
September 7	0	8	0	0	0	1
September 8	0	2	0	0	0	0

Source: Compiled By LSA (2023)

1. The number of exceedances represent the number of events that occurred which exceeded 72 VdB from 12:00 p.m. on September 1 through 11:00 a.m. on September 8.

VIBRATION IMPACT ASSESSMENT

Exposure to groundborne vibration would be primarily associated with trains traveling on the adjacent Union Pacific railroad tracks. As presented above in Table B, over the seven-day period, there were no exceedances at the northern N-1, N-2 or N-3 locations. While no exceedances occurred at northern location N-1 closest to the rail line (250 feet), there were 28 instances at the eastern monitoring location E-1 closest to rail line (250 feet), which exceeded the 72 VdB threshold. The exceedances ranged between 71.0 VdB to 75.9 VdB. Based on a site visit and aerial photography, it appears that the ground under the eastern monitoring locations (E-1, E-2, and E-3) has been previously graded or modified which could be the explanation of the differences between the E-1 and N-1 monitoring locations.

There were two instances at location E-2 in which the level of 72 VdB was exceeded. While it is not known what would cause these levels to occur during only a few of the freight train pass-bys, the elevated levels could be due to the weight of the specific rail cars for those trains.

There were three instances at the farthest eastern monitoring location E-3 (900 feet from the exiting rail line) which exceeded the 72 VdB threshold. However, these exceedances have been identified as anomalies because they were not generated from the direction of the rail line, but from the direction of existing residential uses to the west. There were no exceedances at the farthest northern monitoring location N-3. Therefore, 500 feet from the physical rail line (i.e., monitoring locations N-2 and E-2) represents the limit of potential rail line related vibratory impacts within the Project's Specific Plan Amendment Area. Consistent with the data gathered, the rest of the SPA does not have the potential to experience vibration impacts.

As of result of these elevated vibration levels, it is recommended that additional vibration measurements be taken to validate the data gathered once site preparation and grading is finalized, prior to the pouring of building foundations. The measurements should be gathered at distances of 250 feet, 400 feet, and 600 feet from the rail line to help determine if vibration levels exceedances still occur and to identify the final limits of any such exceedances. A maximum 600-foot distance is selected as it represents a conservative distance. Should the results of the additional vibration measurements differ from the readings gathered herein, an update to this vibration report shall be prepared and include appropriate measures, if needed.

If the additional vibration measurements show similar readings to those contained herein, the following measures shall be implemented:

To reduce exposure of sensitive receptors to groundborne vibration exceeding the FTA's vibration impact criteria of 72 VdB applicable standard, vibration reduction measures shall be implemented to parcels within 600 feet of the physical rail line, as shown on Figure 2 in Attachment B. A variety of building modifications are available to provide the necessary 4 VdB reduction to meet the 72 VdB threshold, including the installation of vibration damping products such as VibraFoam or VibraDyn from Purasys. With implementation of vibration reduction measures, groundborne vibration levels would not exceed the FTA's vibration impact criteria of 72VdB.

ATTACHMENT A

VIBRATION MONITOR LOCATIONS

Vibration Measurement Survey

Project Number: ESL2201.67

Test Personnel: Corey Knips

Project Name: Verano Cathedral City

Equipment: INFRA C22

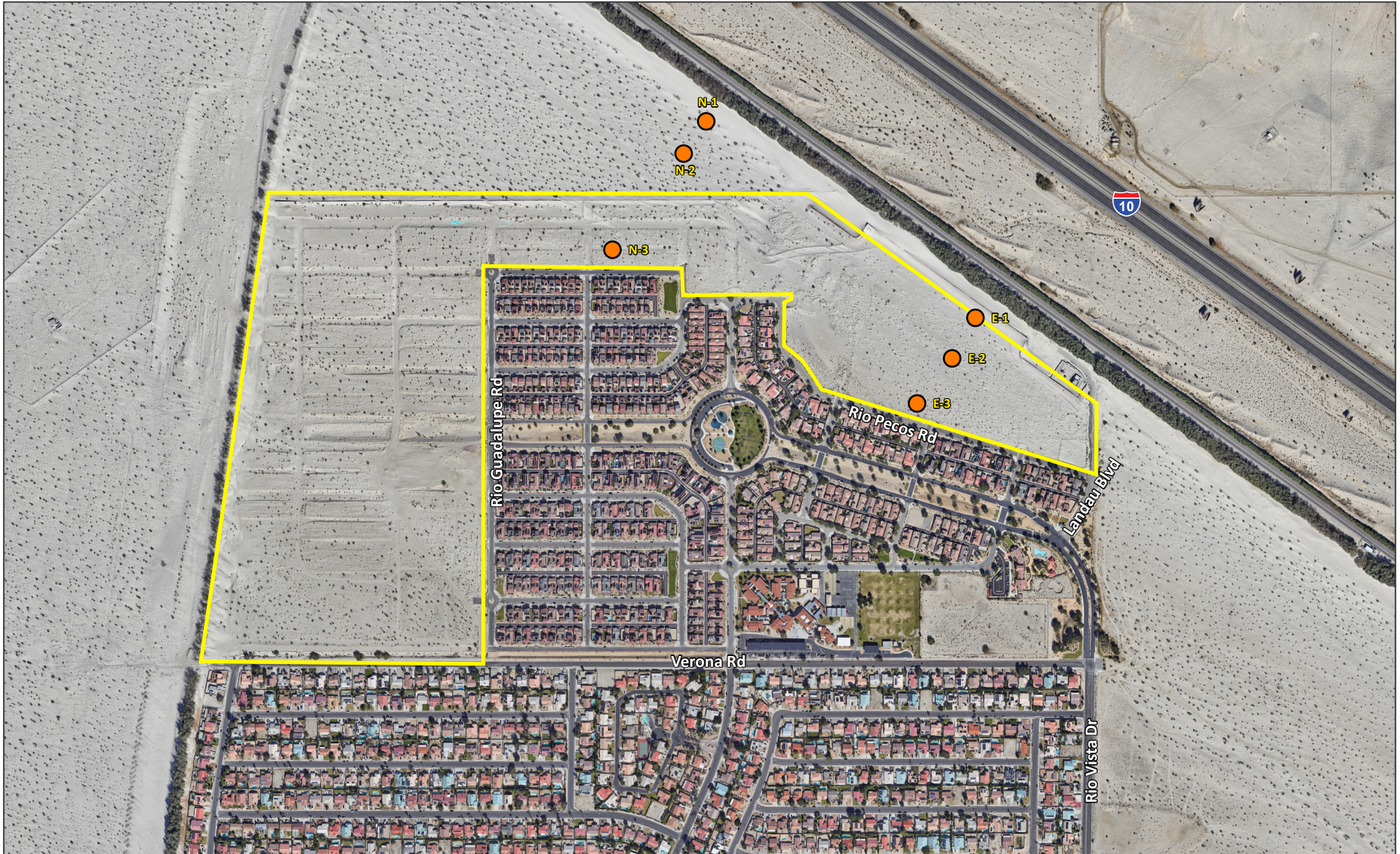
Dates: 8/31/2023 through 9/8/2023

Time: From 12 p.m. To 10 a.m.

Site Location: South of I-10 and rail line, between Gene Autry Trail and Date Palm Drive.

Primary Sources: Train activity on the nearby tracks.

Vibration Monitor List	
S-1 East (SN:111688)	250 ft southwest (perpendicular) from centerline of nearest tracks, at chain link fence. Y axis increases towards tracks. 33°51'27.09"N, 116°28'40.43"W
S-2 East (SN:111505)	500 ft southwest (perpendicular) from centerline of nearest tracks. Y axis decreases towards tracks. 33°51'25.04"N, 116°28'42.08"W
S-3 East (SN:111065)	900 ft southwest (perpendicular) from centerline of nearest tracks, and 20 ft north of inner fence along Rio Bravo Road. X axis decreases towards tracks. 33°51'21.58"N, 116°28'44.48"W
S-1 North (SN:111705)	250 ft southwest (perpendicular) from centerline of nearest tracks. Y axis decreases towards tracks. 33°51'37.69"N, 116°28'58.43"W
S-2 North (SN:111728)	500 ft southwest (perpendicular) from centerline of nearest tracks. X axis increases towards tracks. 33°51'35.53"N, 116°28'59.88"W
S-3 North (SN:111884)	1200 ft southwest (perpendicular) from centerline of nearest tracks, and 50 ft north of fence along Rio Rosalia Drive. X axis decreases towards tracks. 33°51'30.04"N, 116°29'4.85"W



LSA



- LEGEND
-  - Project Site Boundary
 -  - Vibration Monitoring Locations



FIGURE 1

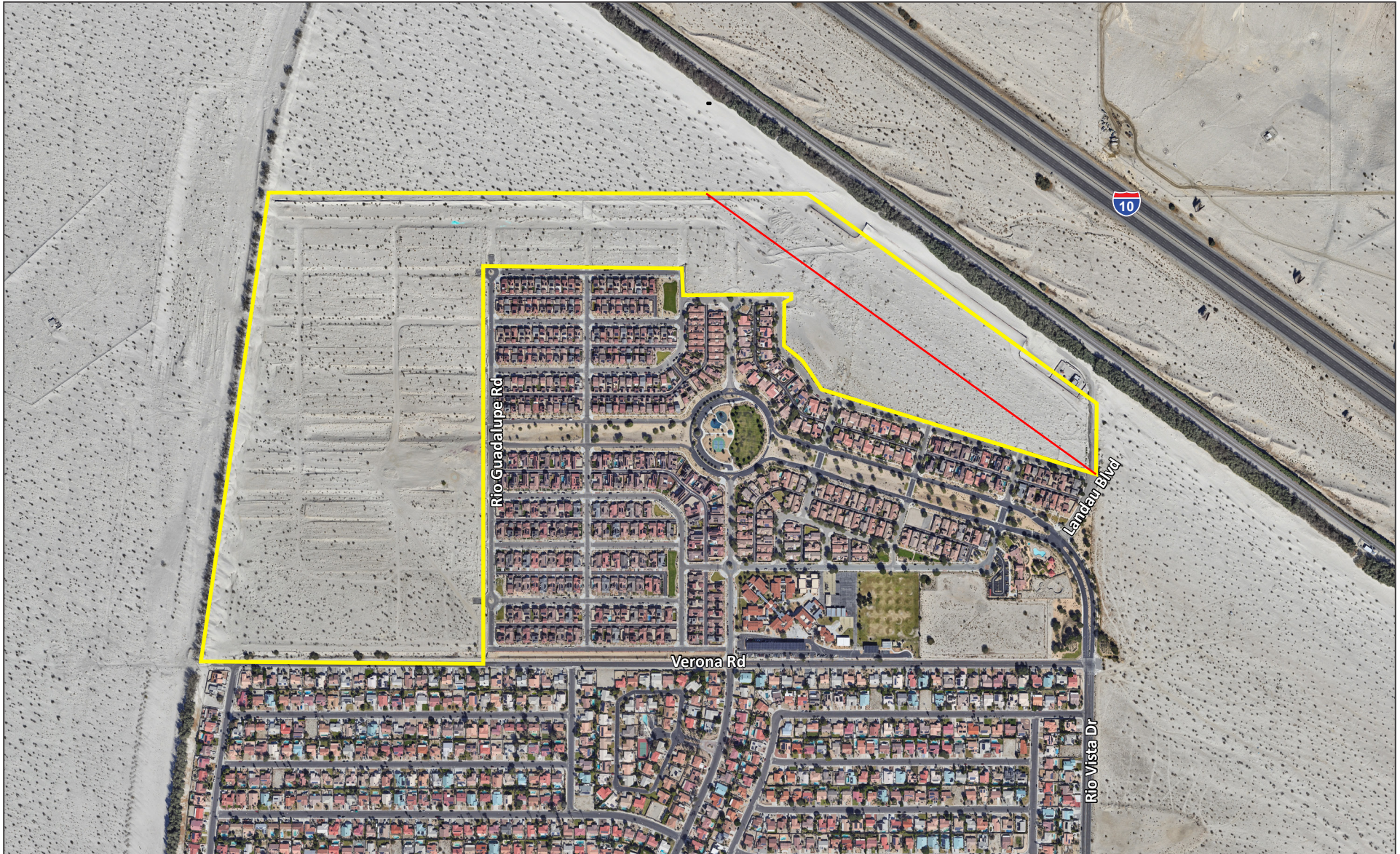
ATTACHMENT B

VIBRATION EXCEEDANCE DATA

	N-1 North	E-1 East	N-2 North	E-2 East	N-3 North	E-3 East	
2023-09-01 19:26:00		66.3	72.3	65.8	61.4	51.5	56
2023-09-03 08:48:00		70.2	73.9	68.9	71.1	65.6	72.5
2023-09-03 17:38:00		68.1	75	66	73.2	61.8	70.4
2023-09-04 05:24:00		69.9	75.2	67	69	59.3	66.7
2023-09-04 13:26:00		67.7	72	63.9	63.2	54.5	60.1
2023-09-04 15:22:00		70.7	75.3	68.4	72.7	66.9	72
2023-09-05 05:10:00		64.6	72.7	62	69.3	58.1	65.7
2023-09-05 05:26:00		68	75	63.7	67	59.7	68.1
2023-09-05 08:24:00		67.4	73.3	65.3	64.4	56.1	60.9
2023-09-05 14:58:00		69	72.8	63	62.9	54.7	60.1
2023-09-05 15:12:00		68.6	72.2	66.4	64.8	56.6	60.3
2023-09-05 16:48:00		69.1	73.9	68.1	70	66.6	70.8
2023-09-05 18:18:00		56.4	72	56.2	69	55.2	63.4
2023-09-05 20:50:00		66.8	75.9	63.7	71.6	62	68.2
2023-09-05 22:44:00		67.8	72.1	66.8	65	56.8	62.5
2023-09-06 12:58:00		66.5	74.3	66.8	68.3	57.7	63.1
2023-09-06 15:42:00		67	72	65.4	64.3	55.6	60.6
2023-09-06 17:48:00		67.8	72.2	66.8	68.4	64.3	67.4
2023-09-07 03:54:00		67.6	72.1	63.9	64.4	52.8	58.6
2023-09-07 04:40:00		67.5	74.1	66.2	69.9	62.7	69.4
2023-09-07 05:02:00		70.4	73.7	68.2	69.4	62.4	67.8
2023-09-07 10:12:00		65.3	73.2	63.2	65.1	57.9	64.5
2023-09-07 13:42:00		69.5	75.2	67.2	68.9	63.4	67.4
2023-09-07 16:40:00		69.8	72.7	67.2	65.2	57.1	62.5
2023-09-07 18:16:00		69	75.2	66.1	71.4	64.3	73.3
2023-09-07 21:48:00		69.7	72.3	65.7	65.6	57.5	60.1
2023-09-08 00:38:00		69	72.5	68.2	65.7	56.9	61.3
2023-09-08 04:24:00		69.6	73.3	67.2	66.6	58.9	62.8

Note: Levels in VdB

Data gathered between 12:00 p.m. on September 1 and 11:00 a.m. on September 8, 2023.



LSA

LEGEND

- Estimated contour of vibration impacts.
- Approximately 600 feet from rail line.



0 500 1000
FEET

SOURCE: Google Earth, 2023

I:\ESL2201.67\G\Noise_Locs.ai (10/24/2023)

FIGURE 2

Verona Residential
Estimated Contour of Vibration Impact

Date: April 24, 2024

Prepared by: Maryam Javanmardi, Meghan Macia T.E.

To: City of Cathedral City

Site: Intersection of Landau Boulevard/Rio Vista Drive (EPD Project Number 23-044)

Subject: Traffic Signal Warrant Analysis

Introduction

This memo evaluates the need for a traffic signal at the intersection of Landau Boulevard/Rio Vista Drive in Cathedral City. The location of the Intersection is shown in Figure 1. The total analysis volume for the warrant is based on traffic counts collected on December 5, 2023, as provided in the Attachment A, plus the addition of traffic that would be generated by 834 dwelling units that were previously evaluated in the Rio Vista Village Specific Plan but have not yet been constructed. The trip generation for the additional 834 units was calculated using trip rates from the Institute of Transportation Engineers (ITE), *Trip Generation* 11th Edition (2021). Table 1 shows the trip generation of the unbuilt units.

There are three entry and exit points along Verona Road: Ventura Drive, Avenida Quintana, and Rio Vista Drive. Given the location of the unbuilt units and the fact that Ventura Drive is not connected to Vista Chino, the project trips were assigned to Avenida Quintana and Rio Vista Drive to make a conservative assumption of exiting condition. Therefore, it was estimated that approximately half would use Avenida Quintana to travel from Vista Chino to the project. The other half would use Landau Boulevard/Verona Road intersection. Therefore, 25% of the project trip generation was assigned to Verona Road, 25% was assigned to Rio Vista Drive-Landau Boulevard, and of that, 12.5% was equally assigned to Landau Boulevard and Rio Vista Drive. Proposed project volumes during the non-peak hours were derived from using National Cooperative Highway Research Program (NCHRP) Report 255, Table A-14, for the 4-hour and 8-hour signal warrants respectfully and are provided in Attachment B. Existing plus proposed project volumes were utilized for the purpose of this analysis and are provided in the attachments.

Table 1: Project Trip Generation

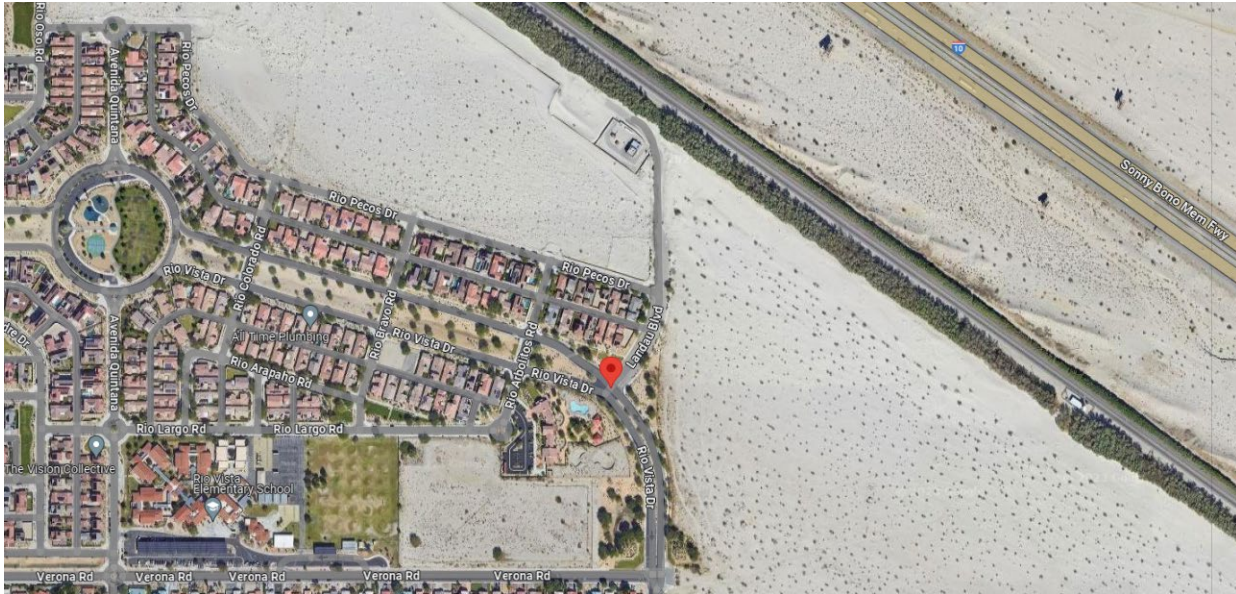
Land Use	Units	Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
<u>Proposed Project Trip Rate</u>								
Single Family Detached Housing ¹	DU	9.43	0.18	0.52	0.70	0.59	0.35	0.94
Multifamily Housing (Low-Rise) ²	DU	6.74	0.10	0.30	0.4	0.32	0.19	0.51
<u>Proposed Project Trip Generation</u>								
Single Family Detached	459 DU	4,328	84	238	322	272	160	432
Condominium	375 DU	2,528	36	114	150	120	71	191
Total Trip Generation		6,856	120	352	472	392	231	623

TSF = Thousand Square Feet

¹ Trip rates from the Institute of Transportation Engineers, *Trip Generation*, 11th Edition, 2021. Land Use Code 210 - Single Family Detached.

² Trip rates from the Institute of Transportation Engineers, *Trip Generation*, 11th Edition, 2021. Land Use Code 220 - Multifamily Housing (Low-Rise)

Figure 1: Intersection Location



Traffic Signal Control Warrant Assessment

A traffic signal control warrant assessment has been conducted in accordance with the latest California Manual on Uniform Traffic Control Devices (CAMUTCD) to determine if a traffic signal control is warranted at the intersection of the Rio Vista Drive/ Landau Boulevard. According the CAMUTCD's Chapter 4C. *Traffic Control Signal Needs Studies*, there are nine warrants examining factors related to operation and safety at the intersection. The CAMUTCD notes that "satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal". The following text provides a summary of each warrant and whether the warrant is met in the project opening year.

Warrant 1: Eight-Hour Vehicular Volume (Warrant not Met)

MUTCD Guidance: The Minimum Vehicular Volume, Condition A, is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal. The Interruption of Continuous Traffic, Condition B, is intended for application at locations where Condition A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street. It is intended that Warrant 1 be treated as a single warrant. If Condition A is satisfied, then Warrant 1 is satisfied and analyses of Condition B and the combination of Conditions A and B are not needed. Similarly, if Condition B is satisfied, then Warrant 1 is satisfied and an analysis of the combination of Conditions A and B is not needed.

- A. The vehicles per hour given in both of the 100 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; or*
- B. The vehicles per hour given in both of the 100 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.*

In applying each condition, the major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of these 8 hours. If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a

population of less than 10,000, the traffic volumes in the 70 percent columns in Table 4C-1 may be used in place of the 100 percent columns. Although Rio Vista Drive has a posted speed limit of 25 mph, the analysis adopted a more conservative approach by applying the 45 mph speed limit as a continuation of the speed limit posted on Landau Boulevard, between Vista Chino and Verano Road. Consequently, for Rio Vista Drive (Major Street), a speed of 45 mph was used. This decision led to the application of the 70% threshold in the intersection assessment.

Table 4C-1. Warrant 1, Eight-Hour Vehicular Volume

Condition A—Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% ^a	80% ^b	70% ^c	56% ^d	100% ^a	80% ^b	70% ^c	56% ^d
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

Condition B—Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% ^a	80% ^b	70% ^c	56% ^d	100% ^a	80% ^b	70% ^c	56% ^d
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

^a Basic minimum hourly volume

^b Used for combination of Conditions A and B after adequate trial of other remedial measures

^c May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

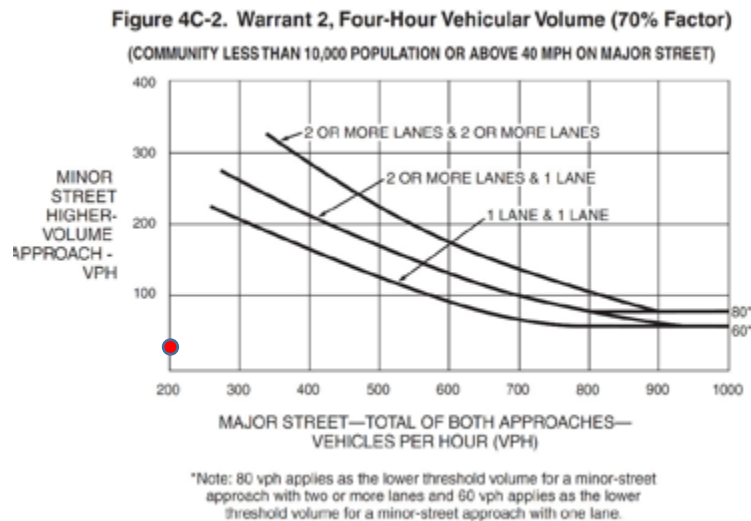
^d May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

- **The threshold of Condition A – Minimum Vehicular Volume (70% column) would apply since the major street speed limit is 45 MPH. The threshold is 420 vehicles per hour on major street (total of both approaches) and 105 vehicles per hour on higher-volume minor-street approach (one direction only). The highest average of 8 hours was determined to be from 12:45PM-8:45PM. Worksheets are provided in Attachment C. For the highest average of 8-hours, the forecast volume is 186 vehicles per average hour on the major street (total of both approaches); whereas on the minor street (one direction only) there would be 27 vehicles per average hour. Therefore, this criterion is not met.**
- **The threshold of Condition B – Interruption of Continuous Traffic (70% column) would apply since the major street speed limit is 45 MPH. The threshold is 630 vehicles per hour on major street (total of both approaches) and 53 vehicles per hour on higher-volume minor-street approach (one direction only). For the highest average of 8-hours, there would be 186 vehicles per average hour on the major street (total of both approaches), whereas on the minor street (one direction only) there would be 27 vehicles per the average hour. Therefore, this criterion is not met.**

Warrant 2: Four-Hour Vehicular Volume (**Warrant Not Met**)

MUTCD Guidance: *The need for a traffic control signal shall be considered if an engineering study finds that, for each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) all fall above the applicable curve in Figure 4C-1 for the existing combination of approach lanes. On the minor street, the higher volume shall not be required to be on the same approach during each of these 4 hours. If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-2 may be used in place of Figure 4C-1. Although Rio Vista Drive has a posted speed limit of 25 mph, the analysis adopted a more conservative approach by applying the 45 mph speed limit as a continuation of the speed limit posted on Landau Boulevard, between Vista Chinoa and Verano Road. Consequently, for Rio Vista Drive (Major Street), a speed of 45 mph was used. This decision led to the application of the 70% factor (Figure 4C-2) in the intersection assessment.*

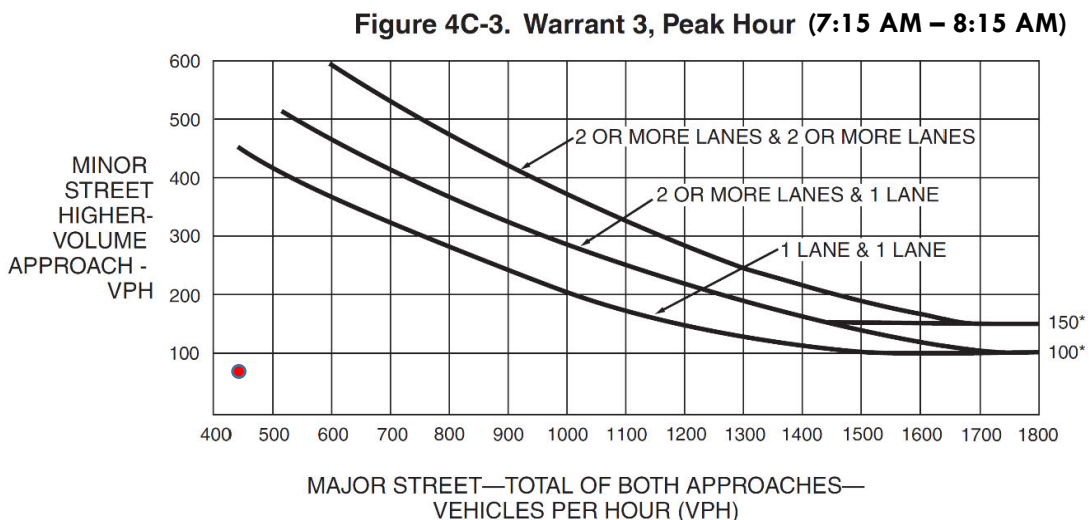
- **The highest average of 4 hours was taken for the 4 hours of the day and was determined to be 2:15PM-6:15PM. Worksheets are provided in Attachment D. For the highest average of 4-hours, the forecast volume is 187 vehicles per average hour on the major street (total of both approaches); whereas on the minor street (one direction only) there would be 20 vehicles per average hour. Because the speed limit on the major street is 45 mph, Figure 4C-2 is used. As shown in Figure 4C-2 the volumes would not exceed the threshold. Therefore, this criterion is not satisfied.**



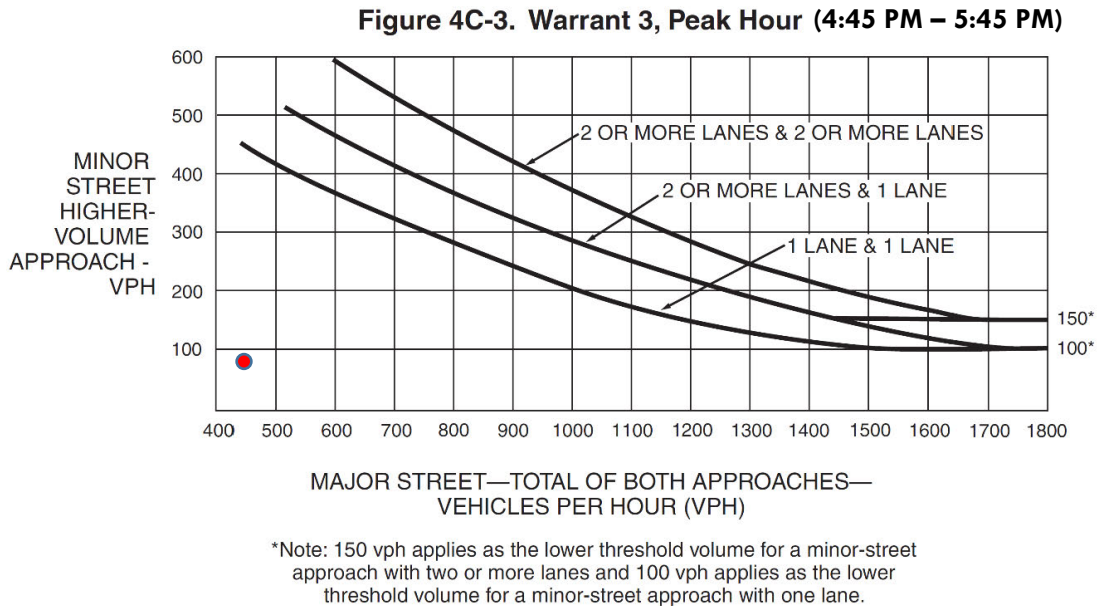
Warrant 3: Peak Hour Volume **(Warrant Not Met)**

MUTCD Guidance: *The need for a traffic control signal shall be considered if an engineering study finds that the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.*

- **For the AM peak hour (7:15 AM – 8:15 AM), 440 vehicles (major street – total of both approaches) and 70 vehicles (minor street – higher volume approach) would utilize the intersection. Peak Hour worksheet is provided in Attachment E. As shown in Figure 4C-3 – Warrant 3, Peak Hour (AM), the volume corresponding point falls below the threshold curve. Therefore, this criterion is not met.**
- **For the PM peak hour (4:45 PM – 5:45 PM), 447 vehicles (major street – total of both approaches) and 87 vehicles (minor street – higher volume approach) would utilize the intersection. Peak Hour worksheet is provided in Attachment E. As shown in Figure 4C-3 – Warrant 3, Peak Hour (PM), the volume corresponding point falls below the threshold curve. Therefore, this criterion is not met.**



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.



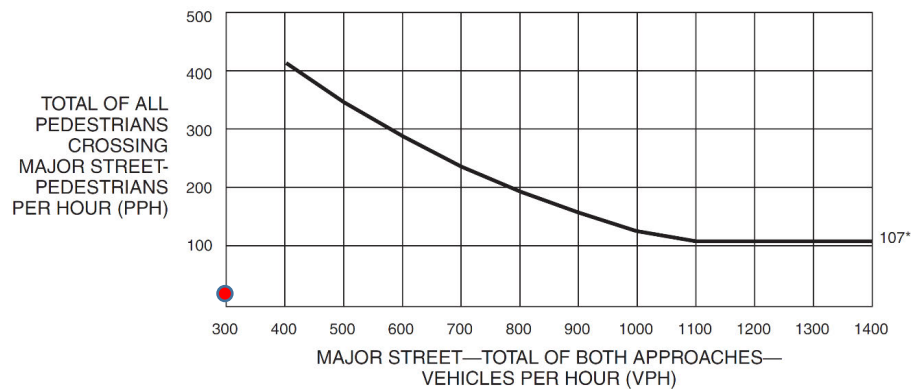
Warrant 4: Pedestrian Volume (*Warrant Not Met*)

MUTCD Guidance: *The need for a traffic control signal at an intersection or midblock crossing shall be considered if an engineering study finds that one of the following criteria is met:*

- A. For each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) all fall above the curve in Figure 4C-5; or
- B. For 1 hour (any four consecutive 15-minute periods) of an average day, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) falls above the curve in Figure 4C-7.

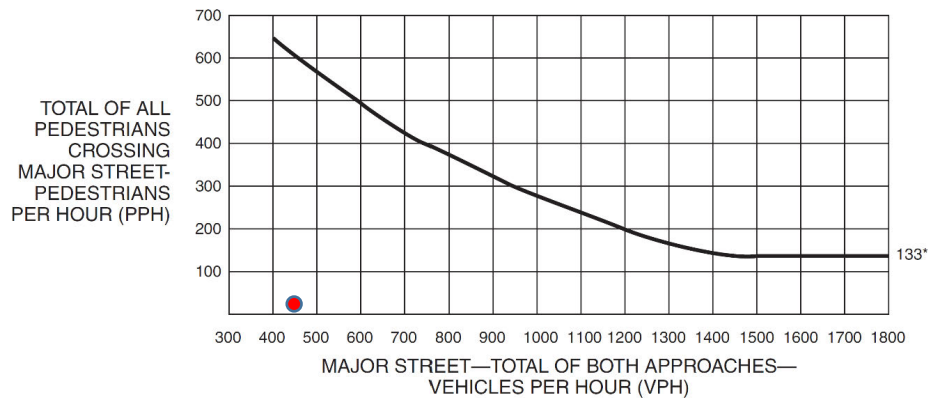
The pedestrian volume is shown in the count sheets (attached). The highest pedestrian volume experienced during each of any 4 hours is 2 pedestrians. The highest pedestrians during any hour of the day is 9. Based on the volume of pedestrians neither the warrant for Pedestrian Four-Hour Volume (minimum hourly volume of 107 pedestrians) nor the Pedestrian Peak Hour Volume (minimum hourly volume of 133 pedestrians) would be satisfied. It should be noted that currently, there are no crosswalks at the intersection along the major road. However, to adopt a more conservative approach, this analysis was also conducted.

Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume



*Note: 107 pph applies as the lower threshold volume.

Figure 4C-7. Warrant 4, Pedestrian Peak Hour



*Note: 133 pph applies as the lower threshold volume.

Warrant 5: School Crossing (**Warrant Not Met**)

MUTCD Guidance: *The School Crossing signal warrant is intended for application where the fact that schoolchildren cross the major street is the principal reason to consider installing a traffic control signal. The need for a traffic control signal shall be considered when an engineering study of the frequency and adequacy of gaps in the vehicular traffic stream as related to the number and size of groups of schoolchildren at an established school crossing across the major street shows that the number of adequate gaps in the traffic stream during the period when the schoolchildren are using the crossing is less than the number of minutes in the same period (see Section 7A.03) and there are a minimum of 20 schoolchildren during the highest crossing hour.*

- **Less than 20 pedestrians would utilize this crossing during the highest crossing hour; therefore, this warrant is not met. Based on the location of future housing units, the number of schoolchildren crossing the intersection of Rio Vista Drive/ Landau Boulevard would not be increased with construction of the proposed housing units. The intersection is not located along any logical walking route from the proposed housing to the Rio Vista Elementary School.**

Warrant 6: Coordinated Signal System **(No Data Available)**

MUTCD Guidance: *The Progressive movement in a coordinated signal system sometimes necessitates installing traffic control signals at intersections where they would not otherwise be needed in order to maintain proper platooning of vehicles. The need for a traffic control signal shall be considered if an engineering study finds that one of the following criteria is met:*

- A. *On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning.*
- B. *On a two-way street, adjacent traffic control signals do not provide the necessary degree of platooning and the proposed and adjacent traffic control signals will collectively provide a progressive operation.*
- **Data pertaining to degree of platooning is not available to determine if traffic signal is needed to provide a progressive operation. Furthermore, the intersection would provide entry into a multi-family residential neighborhood, therefore signal progression or maintenance of platoons is not a priority at this location.**

Warrant 7: Crash Experience **(Warrant Not Met)**

MUTCD Guidance: *The Crash Experience signal warrant conditions are intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal. The need for a traffic control signal shall be considered if an engineering study finds that all of the following criteria are met:*

- A. *Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency; and*
- B. *Five or more reported crashes of types susceptible to correction by a traffic control signal, have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for a reportable crash; and*
- C. *For each of any 8 hours of an average day, the vehicles per hour (vph) given in both of the 80 percent columns of Condition A in Table 4C-1 (see Section 4C.02), or the vph in both of the 80 percent columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection, or the volume of pedestrian traffic is not less than 80 percent of the requirements specified in the Pedestrian Volume warrant. These major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.*
- **Crash data was obtained through Transportation Injury Mapping System (TIMS) provided by UC Berkeley between January 1, 2017, and December 31, 2023, as provided in Attachment F, at the intersection of Rio Vista Drive/Landau Boulevard. There were no crashes (0) or fatalities (0) at this intersection during this period. Therefore, this warrant is not met.**

Warrant 8: Roadway Network **(Warrant Not Met)**

MUTCD Guidance: *Installing a traffic control signal at some intersections might be justified to encourage concentration and organization of traffic flow on a roadway network. The need for a traffic control signal shall be considered if an engineering study finds that the common intersection of two or more major routes meets one or both of the following criteria:*

- A. *The intersection has a total existing, or immediately projected, entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday and has 5-year projected traffic volumes, based on an engineering study, that meet one or more of Warrants 1, 2, and 3 during an average weekday; or*
- B. *The intersection has a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a non-normal business day (Saturday or Sunday).*
 - **The intersection's existing plus project traffic volume does not exceed the 1,000 vehicles threshold and warrant 2 is not met. Therefore, Criteria A is not met. Weekend data is not available for this location, however, since the intersection serves adjacent residential and school uses, weekend traffic volumes are likely to be less during the weekend as the school would not be in operation and weekend trip rates for residential uses are similar to weekday day trip rates. Therefore, Criteria B is not met.**

Warrant 9: Intersection Near a Grade Crossing (**Warrant Not Met**)

MUTCD Guidance: *The need for a traffic control signal shall be considered if an engineering study finds that a grade crossing exists on an approach controlled by a STOP or YIELD sign and the center of the track nearest to the intersection is within 140 feet of the stop line or yield line on the approach.*

- **There is no grade crossing within 140 feet of the intersection; therefore, this criteria doesn't apply.**

Summary

A traffic signal control warrant assessment has been conducted for the intersection of Rio Vista Drive and Landau Boulevard in accordance with the latest version of CAMUTCD. The following nine (9) warrants were assessed to determine if the intersection is warranted for the installation of a traffic signal. Warrants 1, 2, 3, 4, 5, 7, and 9 were not met. Warrant 6 could not be assessed due to a lack of available data. Based on the data provided herein, the Landau Boulevard at Rio Vista Drive intersection does not meet signal warrants and is not warranted for a traffic signal at this time.

- Warrant 1: Eight-Hour Vehicular Volume (**Warrant not Met**)
- Warrant 2: Four-Hour Vehicular Volume (**Warrant not Met**)
- Warrant 3: Peak Hour Volume (**Warrant Not Met**)
- Warrant 4: Pedestrian Volume (**Warrant Not Met**)
- Warrant 5: School Crossing (**Warrant Not Met**)
- Warrant 6: Coordinated Signal System (**No Data Available**)
- Warrant 7: Crash Experience (**Warrant Not Met**)
- Warrant 8: Roadway Network (**Warrant Not Met**)
- Warrant 9: Intersection Near a Grade Crossing (**Warrant Not Met**)

If you have any questions about this information, please feel free to contact EPD Solutions at (949) 794-1180 or techservices@epdsolutions.com.

ATTACHMENT A – 24-HOUR TRAFFIC COUNT DATA

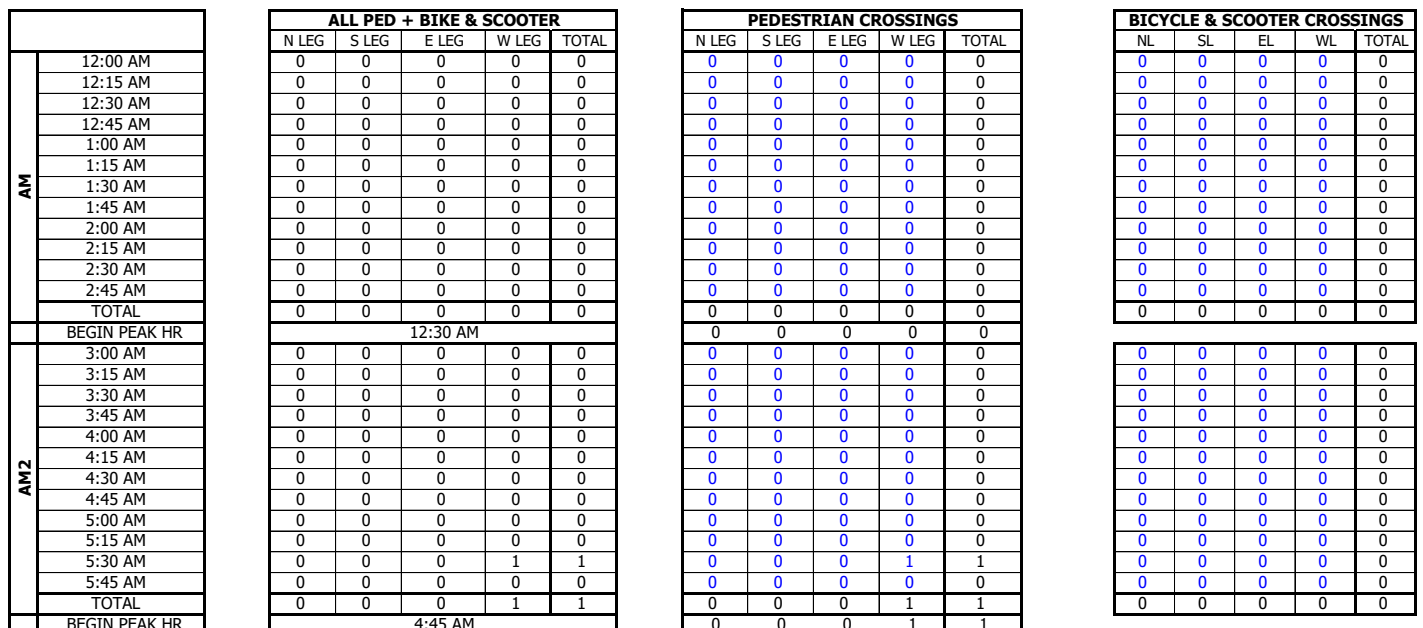
PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

PROJECT #: SC4348
LOCATION #: 1
CONTROL: STOP ALL

▲
N
S
▼

U-TURNS				
NB 0	SB 0	EB 0	WB 0	TTL

0	1	0	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	1	0	0	1



PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

PROJECT #: SC4348
LOCATION #: 1
CONTROL: STOP ALL

AM		▲	
PM		N	
MD	◀ W		E ▶
OTHER		S	
OTHER		▼	

U-TURNS				
NB 0	SB 0	EB 0	WB 0	TTL

0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1	0	0	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1	0	0	0	1

[illegible]

The diagram illustrates the intersection of Rio Vista Dr and Landau Blvd. It shows four legs of the intersection: North Leg, South Leg, West Leg, and East Leg. Rio Vista Dr runs vertically, and Landau Blvd runs horizontally. Arrows indicate the direction of traffic flow for each leg.

PEDESTRIAN CROSSINGS				
N LEG	S LEG	E LEG	W LEG	TOTAL
0	0	2	1	3
0	0	0	2	2
0	0	1	0	1
0	0	0	0	0
0	0	0	2	2
0	0	0	2	2
1	0	0	0	1
0	0	2	2	4
0	0	0	0	0
0	0	0	1	1
0	0	1	2	3
0	0	0	0	0
1	0	6	12	19
1	0	2	4	7
0	0	0	1	1
0	0	0	0	0
0	0	0	0	0
0	0	0	1	1
0	0	0	0	0
0	0	1	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	1	0	1	2
0	0	0	0	0
0	1	1	3	5
0	1	0	1	2

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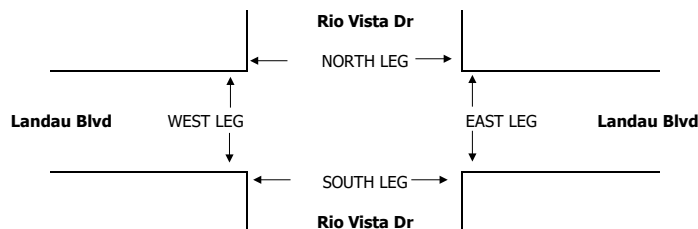
PROJECT #: SC4348
LOCATION #: 1
CONTROL: STOP ALL

AM		▲	
PM		N	
MD	◀ W		E ▶
OTHER		S	
OTHER		▼	

U-TURNS				
NB 0	SB 0	EB 0	WB 0	TTL

0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1	0	0	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1	0	0	0	1

0	0	0	0	0
1	0	0	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1	0	0	0	1



ALL PED + BIKE & SCOOTER				
N LEG	S LEG	E LEG	W LEG	TOTAL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	2	0	2	4
0	0	0	0	0
0	0	0	0	0
0	1	1	1	3
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	3	1	3	7
2:00 PM				
0	1	1	0	2
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1	0	0	2	3
0	0	0	0	0
0	0	0	1	1
0	0	0	0	0
0	0	0	2	2
0	0	1	2	3
0	0	0	2	2
0	0	0	2	2
1	1	2	11	15
4:45 PM				

PEDESTRIAN CROSSINGS				
N LEG	S LEG	E LEG	W LEG	TOTAL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	2	0	2	4
0	0	0	0	0
0	0	0	0	0
0	1	1	0	2
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	3	1	2	6
0	0	0	0	0
0	1	1	0	2
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1	0	0	2	3
0	0	0	0	0
0	0	0	1	1
0	0	0	0	0
0	0	0	2	2
0	0	0	2	2
0	0	0	2	2
0	0	0	2	2
1	1	1	11	14
0	0	0	6	6

BICYCLE & SCOOTER CROSSINGS				
NL	SL	EL	WL	TOTAL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	1	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	1	1

0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	1	0	1
0	0	0	0	0
0	0	0	0	0
0	0	1	0	1

INTERSECTION TURNING MOVEMENT COUNTS

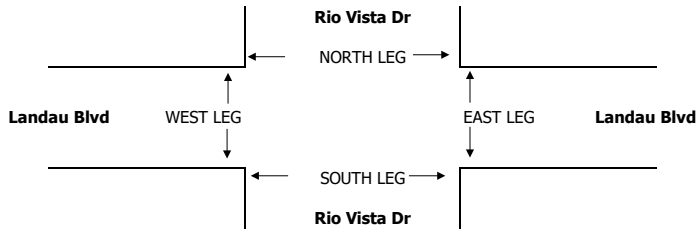
PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Tue, Dec 5, 23	LOCATION: Cathedral City NORTH & SOUTH: Rio Vista Dr EAST & WEST: Landau Blvd	PROJECT #: SC4348 LOCATION #: 1 CONTROL: STOP ALL
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NOTES:	<div> <div>AM</div> <div>PM</div> <div>MD</div> <div>OTHER</div> </div> <div> <div>W</div> <div>E</div> </div> <div> <div>N</div> <div>S</div> </div>
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	NORTHBOUND Rio Vista Dr			SOUTHBOUND Rio Vista Dr			EASTBOUND Landau Blvd			WESTBOUND Landau Blvd			TOTAL	U-TURNS				
LANES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR		NB	SB	EB	WB	TTL
	X	2	0	1	2	X	X	X	X	1	X	1		0	0	0	0	0
6:00 PM	0	8	4	0	11	0	0	0	0	0	0	0	23	0	0	0	0	0
6:15 PM	0	19	0	0	8	0	0	0	0	1	0	0	28	0	0	0	0	0
6:30 PM	0	8	1	0	5	0	0	0	0	2	0	0	16	0	0	0	0	0
6:45 PM	0	21	1	0	7	0	0	0	0	1	0	0	30	0	0	0	0	0
7:00 PM	0	7	1	0	7	0	0	0	0	0	0	0	15	0	0	0	0	0
7:15 PM	0	12	0	0	3	0	0	0	0	1	0	0	16	0	0	0	0	0
7:30 PM	0	8	1	0	6	0	0	0	0	1	0	0	16	0	0	0	0	0
7:45 PM	0	8	1	0	5	0	0	0	0	0	0	2	16	0	0	0	0	0
8:00 PM	0	11	0	0	6	0	0	0	0	0	0	0	17	0	0	0	0	0
8:15 PM	0	9	3	0	4	0	0	0	0	3	0	0	19	0	0	0	0	0
8:30 PM	0	8	1	0	7	0	0	0	0	0	0	1	17	0	0	0	0	0
8:45 PM	0	5	0	0	2	0	0	0	0	1	0	0	8	0	0	0	0	0
VOLUMES	0	124	13	0	71	0	0	0	0	10	0	3	221	0	0	0	0	0
APPROACH %	0%	91%	9%	0%	100%	0%	0%	0%	0%	77%	0%	23%						
APP/DEPART	137	/	127	71	/	81	0	/	13	13	/	0	0					
BEGIN PEAK HR	6:00 PM																	
VOLUMES	0	56	6	0	31	0	0	0	0	4	0	0	97					
APPROACH %	0%	90%	10%	0%	100%	0%	0%	0%	0%	100%	0%	0%						
PEAK HR FACTOR	0.705			0.705			0.000			0.500			0.808					
APP/DEPART	62	/	56	31	/	35	0	/	6	4	/	0	0					

PM	6:00 PM	0	8	4	0	11	0	0	0	0	0	0	23	0	0	0	0	0
	6:15 PM	0	19	0	0	8	0	0	0	1	0	0	28	0	0	0	0	0
	6:30 PM	0	8	1	0	5	0	0	0	2	0	0	16	0	0	0	0	0
	6:45 PM	0	21	1	0	7	0	0	0	1	0	0	30	0	0	0	0	0
	7:00 PM	0	7	1	0	7	0	0	0	0	0	0	15	0	0	0	0	0
	7:15 PM	0	12	0	0	3	0	0	0	1	0	0	16	0	0	0	0	0
	7:30 PM	0	8	1	0	6	0	0	0	1	0	0	16	0	0	0	0	0
	7:45 PM	0	8	1	0	5	0	0	0	0	0	2	16	0	0	0	0	0
	8:00 PM	0	11	0	0	6	0	0	0	0	0	0	17	0	0	0	0	0
	8:15 PM	0	9	3	0	4	0	0	0	3	0	0	19	0	0	0	0	0
	8:30 PM	0	8	1	0	7	0	0	0	0	0	1	17	0	0	0	0	0
	8:45 PM	0	5	0	0	2	0	0	0	1	0	0	8	0	0	0	0	0
	VOLUMES	0	124	13	0	71	0	0	0	10	0	3	221	0	0	0	0	0
	APPROACH %	0%	91%	9%	0%	100%	0%	0%	0%	77%	0%	23%						
	APP/DEPART	137	/	127	71	/	81	0	/	13	13	/	0	0				
	BEGIN PEAK HR	6:00 PM																
	VOLUMES	0	56	6	0	31	0	0	0	4	0	0	97					
	APPROACH %	0%	90%	10%	0%	100%	0%	0%	0%	100%	0%	0%						
	PEAK HR FACTOR	0.705			0.705			0.000			0.500			0.808				
	APP/DEPART	62	/	56	31	/	35	0	/	6	4	/	0	0				
PM2	9:00 PM	0	5	0	0	4	0	0	0	0	0	0	9	0	0	0	0	0
	9:15 PM	0	9	2	0	2	0	0	0	0	0	0	13	0	0	0	0	0
	9:30 PM	0	9	1	0	3	0	0	0	0	0	0	13	0	0	0	0	0
	9:45 PM	0	8	0	0	1	0	0	0	1	0	0	10	0	0	0	0	0
	10:00 PM	0	6	0	0	3	0	0	0	0	0	0	9	0	0	0	0	0
	10:15 PM	0	3	0	0	2	0	0	0	0	0	0	5	0	0	0	0	0
	10:30 PM	0	4	0	0	5	0	0	0	2	0	0	11	0	0	0	0	0
	10:45 PM	0	13	0	0	2	0	0	0	1	0	0	16	0	0	0	0	0
	11:00 PM	0	7	2	0	2	0	0	0	0	0	1	12	0	0	0	0	0
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	11:30 PM	0	9	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0
	11:45 PM	0	1	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0
	VOLUMES	0	80	5	0	27	0	0	0	4	0	1	117	0	0	0	0	0
	APPROACH %	0%	94%	6%	0%	100%	0%	0%	0%	80%	0%	20%						
	APP/DEPART	85	/	81	27	/	31	0	/	5	5	/	0	0				
	BEGIN PEAK HR	10:30 PM																
	VOLUMES	0	30	2	0	11	0	0	0	3	0	1	47					
	APPROACH %	0%	94%	6%	0%	100%	0%	0%	0%	75%	0%	25%						
	PEAK HR FACTOR	0.615			0.550			0.000			0.500			0.734				
	APP/DEPART	32	/	31	11	/	14	0	/	2	4	/	0	0				



PM	6:00 PM	0	8	4	0	11	0	0	0	0	0	0	23	0	0	0	0	0
	6:15 PM	0	19	0	0	8	0	0	0	1	0	0	28	0	0	0	0	0
	6:30 PM	0	8	1	0	5	0	0	0	2	0	0	16	0	0	0	0	0
	6:45 PM	0	21	1	0	7	0	0	0	1	0	0	30	0	0	0	0	0
	7:00 PM	0	7	1	0	7	0	0	0	0	0	0	15	0	0	0	0	0
	7:15 PM	0	12	0	0	3	0	0	0	1	0	0	16	0	0	0	0	0
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	8:30 PM	0	8	1	0	7	0	0	0	0	0	1	17	0	0	0	0	0
	8:45 PM	0	5	0	0	2	0	0	0	1	0	0	8	0	0	0	0	0
	TOTAL	0	124	13	0	71	0	0	0	10	0	3	221	0	0	0	0	0
	BEGIN PEAK HR	6:00 PM																
PM2	9:00 PM	0	5	0	0	4	0	0	0	0	0	0	9	0	0	0	0	0
	9:15 PM	0	9	2	0	2	0	0	0	0	0	0	13	0	0	0	0	0
	9:30 PM	0	9	1	0	3	0	0	0	0	0	0	13	0	0	0	0	0
	9:45 PM	0	8	0	0	1	0	0	0	1	0	0	10	0	0	0	0	0
	10:00 PM	0	6	0	0	3	0	0	0	0	0	0	9	0	0	0	0	0
	10:15 PM	0	3	0	0	2	0	0	0	0	0	0	5	0	0	0	0	0
	10:30 PM	0	4	0	0	5	0	0	0	2	0	0	11	0	0	0	0	0
	10:45 PM	0	13	0	0	2	0	0	0	1	0	0	16	0	0	0	0	0
	11:00 PM	0	7	2	0	2	0	0	0	0	0	1	12	0	0	0	0	0
	11:15 PM	0	6	0	0	2	0	0	0	0	0	0	8	0	0	0	0	0
	11:30 PM	0	9	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0
	11:45 PM	0	1	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0
	TOTAL	0	80	5	0	27	0	0	0	4	0	1	117	0	0	0	0	0
	BEGIN PEAK HR	10:30 PM																

ALL PED + BIKE & SCOOTER				
N LEG	S LEG	E LEG	W LEG	TOTAL
0	0	0	0	0

		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
		Rio Vista Dr (Major Street)			Rio Vista Dr (Major Street)			Landau Boulevard (Minor Street)			Landau Boulevard (Minor Street)			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
LANES:		1	2	1	1	2	0	1	2	1	2	3	0	
AM	12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:15 AM	0	3	0	0	0	0	0	0	0	0	0	0	3
	12:30 AM	0	1	0	0	1	0	0	0	0	0	0	0	2
	12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	1:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	2
	1:15 AM	0	3	0	0	0	0	0	0	0	0	0	0	3
	1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	1:45 AM	0	0	0	0	1	0	0	0	0	0	0	0	1
	2:00 AM	0	0	0	0	0	0	0	0	0	2	0	0	2
	2:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	1
AM2	2:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	2:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	1
	3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 AM	0	1	0	0	3	0	0	0	0	0	0	0	4
	3:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	1
	3:45 AM	0	0	0	0	2	0	0	0	0	1	0	0	3
	4:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	1
	4:15 AM	0	2	1	0	3	0	0	0	0	0	0	0	6
	4:30 AM	0	0	0	0	3	0	0	0	0	1	0	0	4
	4:45 AM	0	0	0	0	4	0	0	0	0	1	0	0	5
AM	5:00 AM	0	2	0	0	3	0	0	0	0	0	0	0	5
	5:15 AM	0	1	0	0	4	0	0	0	0	0	0	0	5
	5:30 AM	0	1	0	0	6	0	0	0	0	0	0	0	7
	5:45 AM	0	1	0	0	3	0	0	0	0	0	0	0	4
	6:00 AM	0	2	0	0	1	0	0	0	0	1	0	0	4
	6:15 AM	0	5	0	0	3	0	0	0	0	1	0	0	9
	6:30 AM	0	4	0	0	10	0	0	0	0	1	0	0	15
	6:45 AM	0	0	0	0	8	0	0	0	0	1	0	0	9
	7:00 AM	0	5	0	0	14	0	0	0	0	0	0	0	19
	7:15 AM	0	22	0	0	35	0	0	0	0	4	0	0	61
MD	7:30 AM	0	34	0	0	49	0	0	0	0	4	0	0	87
	7:45 AM	0	8	1	0	23	0	0	0	0	1	0	0	33
	8:00 AM	0	5	3	0	24	0	0	0	0	2	0	0	34
	8:15 AM	0	5	0	0	18	0	0	0	0	5	0	0	28
	8:30 AM	0	11	0	0	15	0	0	0	0	1	0	1	28
	8:45 AM	0	10	0	0	16	0	0	0	0	2	0	0	28
	9:00 AM	0	15	0	0	10	0	0	0	0	0	0	0	25
	9:15 AM	0	4	1	0	10	0	0	0	0	1	0	0	16
	9:30 AM	0	8	1	0	6	0	0	0	0	0	0	0	15
	9:45 AM	0	3	2	0	6	0	0	0	0	2	0	0	13
MD	10:00 AM	0	8	0	0	2	0	0	0	0	2	0	0	12
	10:15 AM	0	5	1	0	6	0	0	0	0	1	0	0	13
	10:30 AM	0	5	1	0	10	0	0	0	0	1	0	0	17
	10:45 AM	0	6	0	0	11	0	0	0	0	0	0	0	17
	11:00 AM	0	11	0	0	6	0	0	0	0	0	0	0	17
	11:15 AM	0	8	1	0	11	0	0	0	0	2	0	0	22
	11:30 AM	0	6	0	0	6	0	0	0	0	3	0	0	15
	11:45 AM	0	11	2	0	17	0	0	0	0	1	0	1	32
	12:00 PM	0	5	1	0	9	0	0	0	0	0	0	0	15
	MD	12:15 PM	0	10	1	0	10	0	0	0	0	1	0	0
12:30 PM		0	8	0	0	12	0	0	0	0	0	0	1	21
12:45 PM		0	14	1	0	11	0	0	0	0	0	0	1	27
1:00 PM		0	8	0	0	13	0	0	0	0	2	0	0	23
1:15 PM		0	6	2	0	10	0	0	0	0	1	0	1	20
1:30 PM		0	12	0	0	12	0	0	0	0	0	0	1	25
1:45 PM		0	10	2	0	9	0	0	0	0	1	0	1	23
2:00 PM		0	7	0	1	10	0	0	0	0	0	0	1	19
2:15 PM		0	24	0	0	5	0	0	0	0	0	0	0	29
2:30 PM		0	23	0	1	44	0	0	0	0	2	0	0	70
PM	2:45 PM	0	15	1	0	27	0	0	0	0	3	0	1	47
	3:00 PM	0	19	0	0	11	0	0	0	0	2	0	0	32
	3:15 PM	0	16	0	0	15	0	0	0	0	1	0	1	33
	3:30 PM	0	4	0	0	10	0	0	0	0	1	0	1	16
	3:45 PM	0	21	3	0	9	0	0	0	0	0	0	1	34
	4:00 PM	0	16	0	0	9	0	0	0	0	1	0	0	26
	4:15 PM	0	16	3	0	7	0	0	0	0	1	0	0	27
	4:30 PM	0	14	0	0	13	0	0	0	0	0	0	0	27
	4:45 PM	0	19	3	0	16	0	0	0	0	3	0	0	41
	5:00 PM	0	12	2	0	19	0	0	0	0	1	0	0	34
PM	5:15 PM	0	20	0	0	13	0	0	0	0	0	0	0	33
	5:30 PM	0	22	0	0	9	0	0	0	0	4	0	1	36
	5:45 PM	0	24	1	0	14	0	0	0	0	0	0	0	39
	6:00 PM	0	8	4	0	11	0	0	0	0	0	0	0	23
	6:15 PM	0	19	0	0	8	0	0	0	0	1	0	0	28
	6:30 PM	0	8	1	0	5	0	0	0	0	2	0	0	16
	6:45 PM	0	21	1	0	7	0	0	0	0	1	0	0	30
	7:00 PM	0	7	1	0	7	0	0	0	0	0	0	0	15
	7:15 PM	0	12	0	0	3	0	0	0	0	1	0	0	16
	7:30 PM	0	8	1	0	6	0	0	0	0	1	0	0	16
PM2	7:45 PM	0	8	1	0	5	0	0	0	0	0	0	2	16
	8:00 PM	0	11	0	0	6	0	0	0	0	0	0	0	17
	8:15 PM	0	9	3	0	4	0	0	0	0	3	0	0	19
	8:30 PM	0	8	1	0	7	0	0	0	0	0	0	1	17
	8:45 PM	0	5	0	0	2	0	0	0	0	1	0	0	8
	9:00 PM	0	5	0	0	4	0	0	0	0	0	0	0	9
	9:15 PM	0	9	2	0	2	0	0	0	0	0	0	0	13
	9:30 PM	0	9	1	0	3	0	0	0	0	0	0	0	13
	9:45 PM	0	8	0	0	1	0	0	0	0	1	0	0	10
	10:00 PM	0	6	0	0	3	0	0	0	0	0	0	0	9
PM2	10:15 PM	0	3	0	0	2	0	0	0	0	0	0	0	5
	10:30 PM	0	4	0	0	5	0	0	0	0	2	0	0	11
	10:45 PM	0	13	0	0	2	0	0	0	0	1	0	0	16
	11:00 PM	0	7	2	0	2	0	0	0	0	0	0	1	12
	11:15 PM	0	6	0	0	2	0	0	0	0	0	0	0	8
	11:30 PM	0	9	0	0	0	0	0	0	0	0	0	0	9
	11:45 PM	0	1	0	0	1	0	0	0	0	0	0	0	2

Time		4 Hour		Time		8 Hour	
From	To	NORTHBOUND (Major)	SOUTHBOUND (Major)	From	To	NORTHBOUND (Major)	SOUTHBOUND (Major)
12:00 AM	3:45 AM	12	8	12:00 AM	7:45 AM	102	177
12:15 AM	4:00 AM	13	8	12:15 AM	8:00 AM	110	201
12:30 AM	4:15 AM	13	11	12:30 AM	8:15 AM	112	219
12:45 AM	4:30 AM	12	13	12:45 AM	8:30 AM	122	233
1:00 AM	4:45 AM	12	17	1:00 AM	8:45 AM	132	249
1:15 AM	5:00 AM	13	19	1:15 AM	9:00 AM	146	258
1:30 AM	5:15 AM	11	23	1:30 AM	9:15 AM	148	268
1:45 AM	5:30 AM	12	29	1:45 AM	9:30 AM	157	274
2:00 AM	5:45 AM	13	31	2:00 AM	9:45 AM	162	279
2:15 AM	6:00 AM	15	32	2:15 AM	10:00 AM	170	281
2:30 AM	6:15 AM	19	35	2:30 AM	10:15 AM	175	287
2:45 AM	6:30 AM	23	45	2:45 AM	10:30 AM	181	297
3:00 AM	6:45 AM	22	53	3:00 AM	10:45 AM	186	308
3:15 AM	7:00 AM	27	67	3:15 AM	11:00 AM	197	314
3:30 AM	7:15 AM	48	99	3:30 AM	11:15 AM	205	322
3:45 AM	7:30 AM	81	148	3:45 AM	11:30 AM	210	328
4:00 AM	7:45 AM	90	169	4:00 AM	11:45 AM	223	343
4:15 AM	8:00 AM	97	193	4:15 AM	12:00 PM	228	352
4:30 AM	8:15 AM	99	208	4:30 AM	12:15 PM	236	359
4:45 AM	8:30 AM	110	220	4:45 AM	12:30 PM	244	368
5:00 AM	8:45 AM	120	232	5:00 AM	12:45 PM	259	375
5:15 AM	9:00 AM	133	239	5:15 AM	1:00 PM	265	385
5:30 AM	9:15 AM	137	245	5:30 AM	1:15 PM	272	391
5:45 AM	9:30 AM	145	245	5:45 AM	1:30 PM	283	397
6:00 AM	9:45 AM	149	248	6:00 AM	1:45 PM	294	403

ATTACHMENT B – PROJECT VOLUMES THROUGHOUT THE DAY

Hour	% ADT	Hourly ADT (25%)
12:00 AM	1.00%	17
1:00 AM	1.00%	17
2:00 AM	1.00%	17
3:00 AM	0.50%	9
4:00 AM	1.00%	17
5:00 AM	2.00%	34
6:00 AM	3.00%	51
7:00 AM	6.00%	103
8:00 AM	4.50%	77
9:00 AM	4.00%	69
10:00 AM	5.00%	86
11:00 AM	5.00%	86
12:00 PM	5.00%	86
1:00 PM	6.00%	103
2:00 PM	6.50%	111
3:00 PM	7.00%	120
4:00 PM	9.00%	154
5:00 PM	8.50%	146
6:00 PM	6.50%	111
7:00 PM	5.50%	94
8:00 PM	4.00%	69
9:00 PM	3.50%	60
10:00 PM	2.50%	43
11:00 PM	2.00%	34

Land Use	Units	Daily	AM Peak Hour			PM Peak Hour			
			In	Out	Total	In	Out	Total	
<u>Proposed Project Trip Rate</u>									
Single Family Detached Housing ¹	DU	9.43	0.18	0.52	0.70	0.59	0.35	0.94	
Multifamily Housing (Low-Rise) ²	DU	6.74	0.10	0.30	0.4	0.32	0.19	0.51	
<u>Proposed Project Trip Generation</u>									
Single Family Detached	459	DU	4,328	84	238	322	272	160	432
Condominium	375	DU	2,528	36	114	150	120	71	191
Total Trip Generation			6,856	120	352	472	392	231	623

TSF = Thousand Square Feet

¹ Trip rates from the Institute of Transportation Engineers, *Trip Generation*, 11th Edition, 2021 . Land Use Code 210 - Single Family Detached.

² Trip rates from the Institute of Transportation Engineers, *Trip Generation*, 11th Edition, 2021. Land Use Code 220 - Multifamily Housing (Low-Rise)

ATTACHMENT C – 8-HOUR AVERAGE WORKSHEET

INTERSECTION TURNING MOVEMENT COUNTS

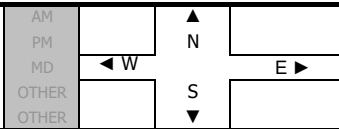
PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:
Tue, Dec 5, 23

LOCATION: Cathedral City
NORTH & SOUTH: Rio Vista Dr
EAST & WEST: Landau Blvd

PROJECT #: SC4348
LOCATION #: 1
CONTROL: STOP ALL

NOTES:



Existing Plus Project 8-Hour Volumes

		NORTHBOUND				Total Volume per Hour	SOUTHBOUND				Total Volume per Hour	WESTBOUND				Total Volume per Hour	Total Project per Hour (25%)		
		Rio Vista Dr (Major Street)					Rio Vista Dr (Major Street)					Landau Boulevard (Minor Street)							
		LANES:	NL	NT	NR		Total Volume	SL	ST	SR		Total Volume	WL	WT	WR			Total Volume	
		x	2	0			1	2	x			1	x	1					
PM	12:45 PM	0	14	1	15	43	0	11	0	11	46	0	0	1	1	6	17		
	1:00 PM	0	8	0	8		0	13	0	13		2	0	0	2				
	1:15 PM	0	6	2	8		0	10	0	10		1	0	1	2				
	1:30 PM	0	12	0	12		0	12	0	12		0	0	1	1				
	1:45 PM	0	10	2	12	0	9	0	9	1	0	1	2						
	2:00 PM	0	7	0	7	1	10	0	11	0	0	1	1						
	2:15 PM	0	24	0	24	0	5	0	5	0	0	0	0						
	2:30 PM	0	23	0	23	66	1	44	0	45	70	2	0	0	2	5	17		
MD	2:45 PM	0	15	1	16	55	0	27	0	27	63	3	0	1	4	10	9		
	3:00 PM	0	19	0	19		0	11	0	11		2	0	0	2				
	3:15 PM	0	16	0	16		0	15	0	15		1	0	1	2				
	3:30 PM	0	4	0	4		0	10	0	10		1	0	1	2				
	3:45 PM	0	21	3	24	0	9	0	9	0	0	1	1						
	4:00 PM	0	16	0	16	0	9	0	9	1	0	0	1						
	4:15 PM	0	16	3	19	0	7	0	7	1	0	0	1						
	4:30 PM	0	14	0	14	73	0	13	0	13	38	0	0	0	0	3	17		
	4:45 PM	0	19	3	22	0	16	0	16	3	0	0	3						
	5:00 PM	0	12	2	14	0	19	0	19	1	0	0	1						
	5:15 PM	0	20	0	20	0	13	0	13	0	0	0	0						
	5:30 PM	0	22	0	22	78	0	9	0	9	57	4	0	1	5	9	34		
	5:45 PM	0	24	1	25	0	14	0	14	0	0	0	0						
	6:00 PM	0	8	4	12	0	11	0	11	0	0	0	0						
6:15 PM	0	19	0	19	0	8	0	8	1	0	0	1							
6:30 PM	0	8	1	9	65	0	5	0	5	38	2	0	0	2	3	51			
PM	6:45 PM	0	21	1	22	51	0	7	0	7	23	1	0	0	1	3	103		
	7:00 PM	0	7	1	8		0	7	0	7		0	0	0	0				
	7:15 PM	0	12	0	12		0	3	0	3		1	0	0	1				
	7:30 PM	0	8	1	9		0	6	0	6		1	0	0	1				
	7:45 PM	0	8	1	9	0	5	0	5	0	0	2	2						
	8:00 PM	0	11	0	11	0	6	0	6	0	0	0	0						
	8:15 PM	0	9	3	12	0	4	0	4	3	0	0	3						
	8:30 PM	0	8	1	9	41	0	7	0	7	22	0	0	1	1	6	77		
		Average Hourly Existing Volume				59	Average Hourly Volume				45	Average Hourly Volume				6	41		
		Average Hourly Project Volume (25%)				41	Average Hourly Project Volume (25%)				41	Average Hourly Project Volume (12.5%)				21			
		Existing + Project Hour Volume				100	Existing + Project Hour Volume				86	Existing + Project Hour Volume				27			
Major Street Volume (Total of Both Approaches)											186								

ATTACHMENT D – 4-HOUR AVERAGE WORKSHEET

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:
Tue, Dec 5, 23

LOCATION:
NORTH & SOUTH:
EAST & WEST:

Cathedral City
Rio Vista Dr
Landau Blvd

PROJECT #: SC4348
LOCATION #: 1
CONTROL: STOP ALL

NOTES:

AM		▲	
PM		N	
MD	◀ W		E ▶
OTHER		S	
OTHER		▼	

Existing Plus Project 4-Hour Volumes

		NORTHBOUND Rio Vista Dr (Major Street)				Total Volume per Hour	SOUTHBOUND Rio Vista Dr (Major Street)				Total Volume per Hour	WESTBOUND Landau Boulevard (Minor Street)				Total Volume per Hour	Total Project per Hour (25%)
LANES:		NL x	NT 2	NR 0	Total Volume		SL 1	ST 2	SR x	Total Volume		WL 1	WT x	WR 1	Total Volume		
PM	2:15 PM	0	24	0	24		0	5	0	5		0	0	0	0		
	2:30 PM	0	23	0	23		1	44	0	45		2	0	0	2		
	2:45 PM	0	15	1	16		0	27	0	27		3	0	1	4		
	3:00 PM	0	19	0	19	82	0	11	0	11	88	2	0	0	2	8	9
	3:15 PM	0	16	0	16		0	15	0	15		1	0	1	2		
	3:30 PM	0	4	0	4		0	10	0	10		1	0	1	2		
	3:45 PM	0	21	3	24		0	9	0	9		0	0	1	1		
	4:00 PM	0	16	0	16	60	0	9	0	9	43	1	0	0	1	6	17
PM	4:15 PM	0	16	3	19		0	7	0	7		1	0	0	1		
	4:30 PM	0	14	0	14		0	13	0	13		0	0	0	0		
	4:45 PM	0	19	3	22		0	16	0	16		3	0	0	3		
	5:00 PM	0	12	2	14	69	0	19	0	19	55	1	0	0	1	5	34
	5:15 PM	0	20	0	20		0	13	0	13		0	0	0	0		
	5:30 PM	0	22	0	22		0	9	0	9		4	0	1	5		
	5:45 PM	0	24	1	25		0	14	0	14		0	0	0	0		
	6:00 PM	0	8	4	12	79	0	11	0	11	47	0	0	0	0	5	51
Average Hourly Existing Volume						73	Average Hourly Volume				58	Average Hourly Volume				6	28
Average Hourly Project Volume (25%)						28	Average Hourly Project Volume (25%)				28	Average Hourly Project Volume (12.5%)				14	
Existing + Project Hour Volume						101	Existing + Project Hour Volume				86	Existing + Project Hour Volume				20	
Major Street Volume (Total of Both Approaches)											187						

ATTACHMENT E – PEAK-HOUR AVERAGE WORKSHEET

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

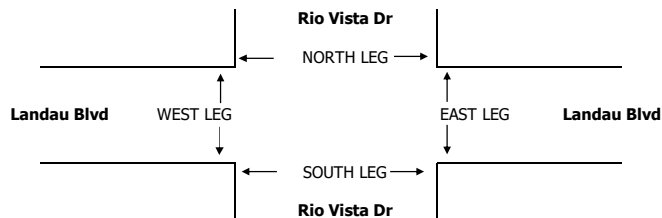
PROJECT #: SC4348
LOCATION #: 1
CONTROL: STOP ALL

AM		▲	
PM		N	
MD	◀ W		E ▶
OTHER		S	
OTHER		▼	

U-TURNS				
NB	SB	EB	WB	TTL
0	0	0	0	

[illegible]

0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1	0	0	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
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0	0	0	0	0
1	0	0	0	1

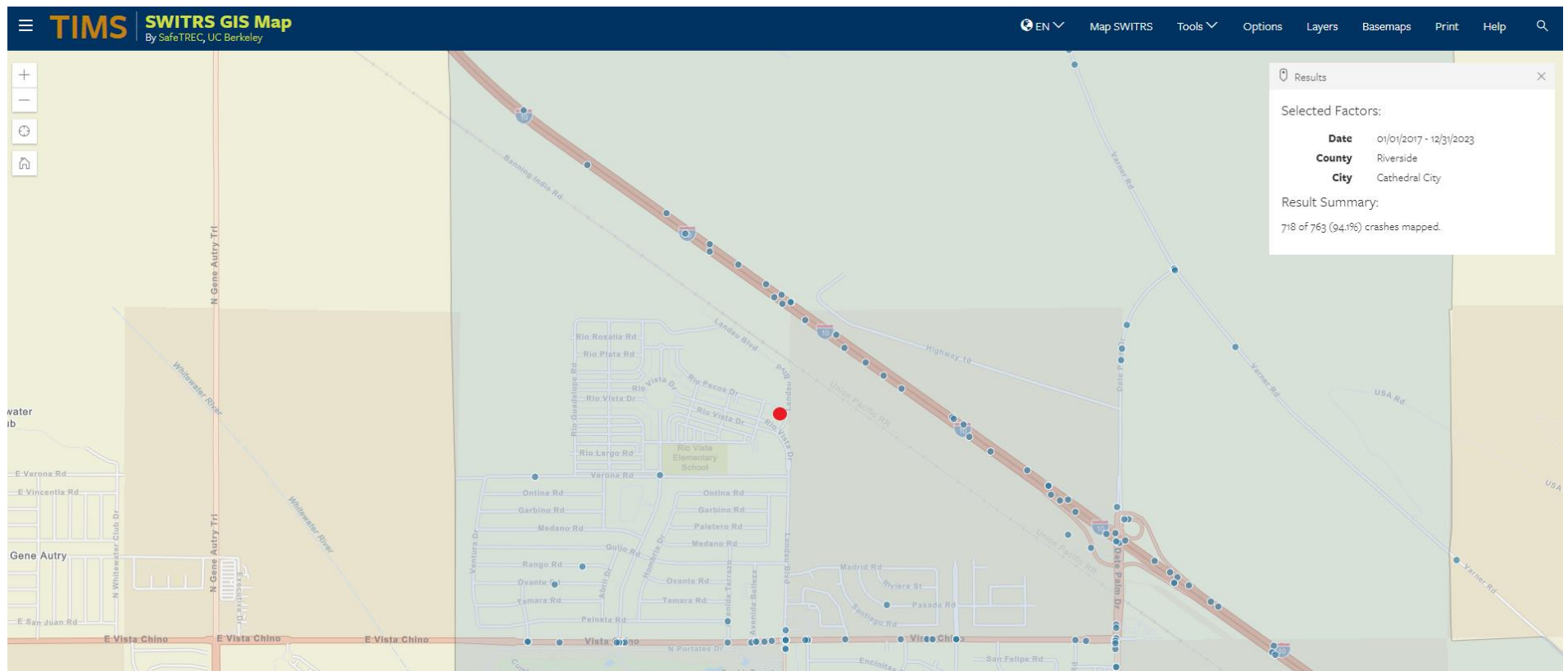


ALL PED + BIKE & SCOOTER				
N LEG	S LEG	E LEG	W LEG	TOTAL
0	0	2	1	3
0	0	0	2	2
0	0	1	0	1
0	0	0	0	0
0	0	0	2	2
0	0	0	2	2
1	0	0	0	1
0	0	2	2	4
0	0	0	0	0
0	0	0	1	1
0	0	1	2	3
0	0	0	0	0
1	0	6	12	19
7:15 AM				
0	0	0	1	1
0	0	0	0	0
0	0	0	0	0
0	0	0	1	1
0	0	0	0	0
0	0	1	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	1	0	1	2
0	0	0	0	0
0	1	1	3	5
11:00 AM				

PEDESTRIAN CROSSINGS				
N LEG	S LEG	E LEG	W LEG	TOTAL
0	0	2	1	3
0	0	0	2	2
0	0	1	0	1
0	0	0	0	0
0	0	0	2	2
0	0	0	2	2
1	0	0	0	1
0	0	2	2	4
0	0	0	0	0
0	0	0	1	1
0	0	1	2	3
0	0	0	0	0
1	0	6	12	19
1	0	2	4	7
0	0	0	1	1
0	0	0	0	0
0	0	0	0	0
0	0	0	1	1
0	0	0	0	0
0	0	1	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	1	0	1	2
0	0	0	0	0
0	1	1	3	5
0	1	0	1	2

[illegible]

ATTACHMENT F – CRASH EXPERIENCE (TIMS)



● Intersection of Landau Boulevard/Rio Vista Drive Location