

TRAFFIC IMPACT ANALYSIS

PROFESSIONAL DESIGN OFFICE
57392 PRIMEROSE DRIVE,
YUCCA VALLEY, CALIFORNIA
AUGUST, 2023



1 EXECUTIVE SUMMARY

This Executive Summary presents the key findings and objectives of the Traffic Impact Analysis (TIA) conducted for the proposed PROFESSIONAL DESIGN OFFICE Construction Project in Yucca Valley, San Bernardino County, California.

1.1 Objective and Project Overview

The primary aim of this TIA is to comprehensively evaluate the potential traffic and transportation impacts that may arise from the development of the PROFESSIONAL DESIGN OFFICE project. This analysis seeks to achieve three main objectives:

Understand the existing traffic conditions in the project vicinity, estimate traffic generation, and assess the resulting impact on external traffic, including adjacent roads and nearby junctions.

Evaluate parking arrangements and internal traffic circulation to ensure compliance with regulatory requirements.

Identify potential transportation issues associated with the proposed site development and recommend necessary remedial measures to mitigate these concerns.

The project comprises a single-story building spanning 4,000 square feet on a 0.35-acre site. It features three exterior parking spaces, three interior parking spaces, and one handicapped parking space. Access to the project site is provided via two entry points, Lupine Drive and Primrose Drive. The project timeline is scheduled to commence in November 2023, with completion expected by June 2024.

1.2 Regulatory Framework and Analysis Scenarios

This TIA adheres to the mandates set forth by the City, California Department of Transportation (Caltrans), and the San Bernardino County Transportation Authority's (SBCTA) Congestion Management Plan (CMP) TIA Guidelines (2016). Additionally, this analysis satisfies requirements for disclosing potential impacts and mitigation measures as per the California Environmental Quality Act (CEQA).

1.3 Six distinct scenarios are considered in the analysis

- Existing conditions.
- Existing conditions with project modifications.
- Opening year conditions without project modifications.
- Opening year conditions with project modifications.
- Year 2024 conditions without project modifications.

- Year 2024 conditions with project modifications.

1.4 Methodology and Key Concepts

This TIA employs the Vehicle Miles Traveled (VMT) metric as introduced by Senate Bill 743 (SB 743) and adopts the VMT analysis guidelines established by the City of Redlands. Level of Service (LOS) definitions are employed to gauge roadway operations and congestion levels. LOS categories range from A (minimal congestion) to F (severe congestion).

1.5 Impact Assessment and Mitigation Measures

The study area encompasses intersections, roadways, and surrounding access points. The analysis evaluates factors such as LOS, signalization, and proximity to existing junctions. Notably, projects serving the local community with the potential to reduce VMT, such as office developments under 10,000 square feet, are generally exempt from VMT assessment. Given the project's size of 4,000 square feet, VMT analysis is not required.

1.6 Conclusion

In conclusion, the Traffic Impact Analysis assesses the potential traffic and transportation effects associated with the PROFESSIONAL DESIGN OFFICE Construction Project. It encompasses a holistic understanding of existing conditions, proactive identification of potential challenges, and recommendations for mitigative measures. By adhering to regulatory guidelines and considering future scenarios, this analysis ensures that the proposed project aligns with traffic and transportation standards while contributing positively to the local community

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1 INTRODUCTION

This Traffic Impact Analysis (TIA) has been prepared to assess the potential traffic and transportation impacts associated with the proposed PROFESSIONAL DESIGN OFFICE Construction Project in Yucca Valley, San Bernardino County, California.

The objectives of this study are:

1. To understand existing traffic conditions around the site, to estimate traffic generation and thereby to evaluate the impact to the external traffic environment (adjacent Roads and close by Junctions).
2. To evaluate parking arrangements and internal traffic circulation with regulatory requirements.
3. To identify possible transportation issues related to the proposed site development and to acknowledge the developer about required remedial measures to avoid those issues

1.1 PROJECT DESCRIPTION

The proposed project is a single-story building which consists of a 4,000 square feet (sf) office on a 0.35-acre site. It was designed with three exterior parking spaces and three interior parking spaces with one handy cap space. The project has 2 accesses from Lupine drive and Primrose DR.

The figure 1 illustrates the location map of the project in Google Maps.

The figure 2 illustrates the project site map.

The figure 3 illustrates the project layout.

The project is located at 34°07'18.7"N 116°24'43.4"W

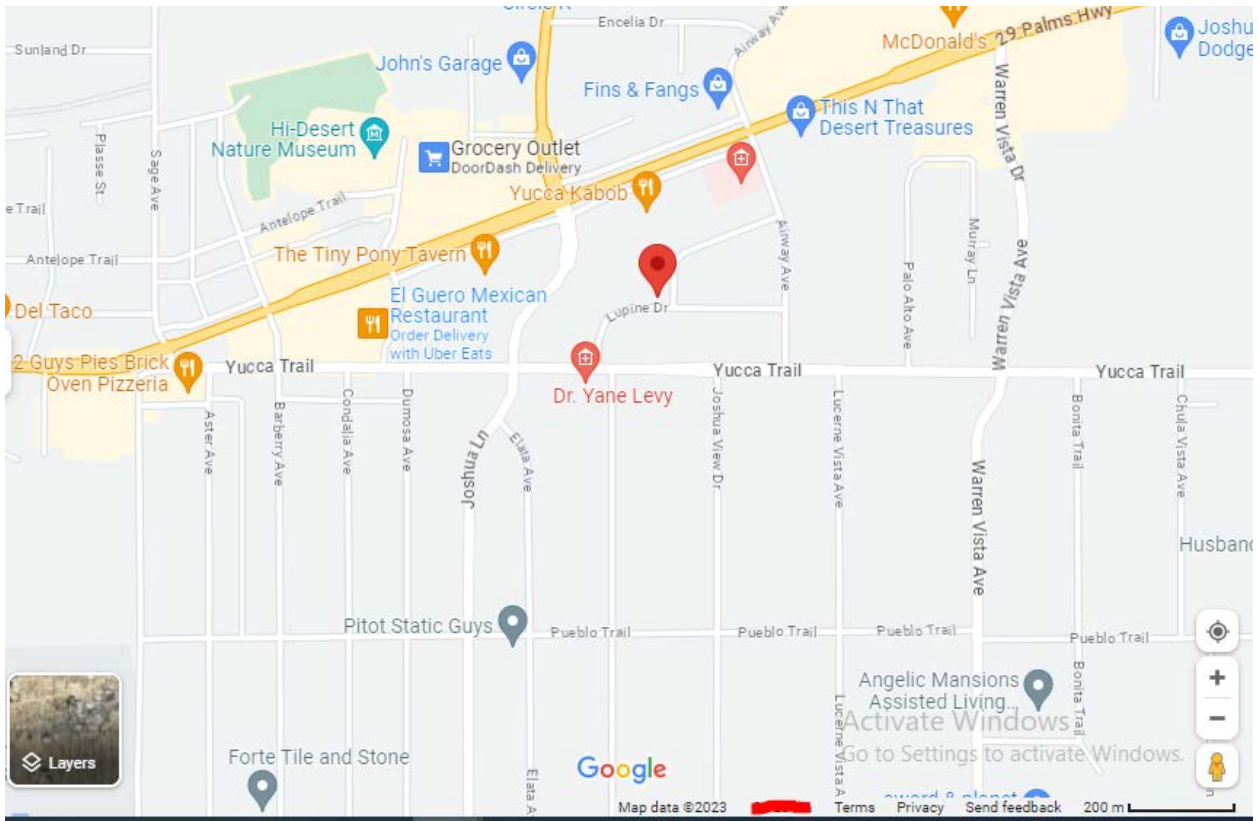


Figure 1 Project Location Source: Google Maps

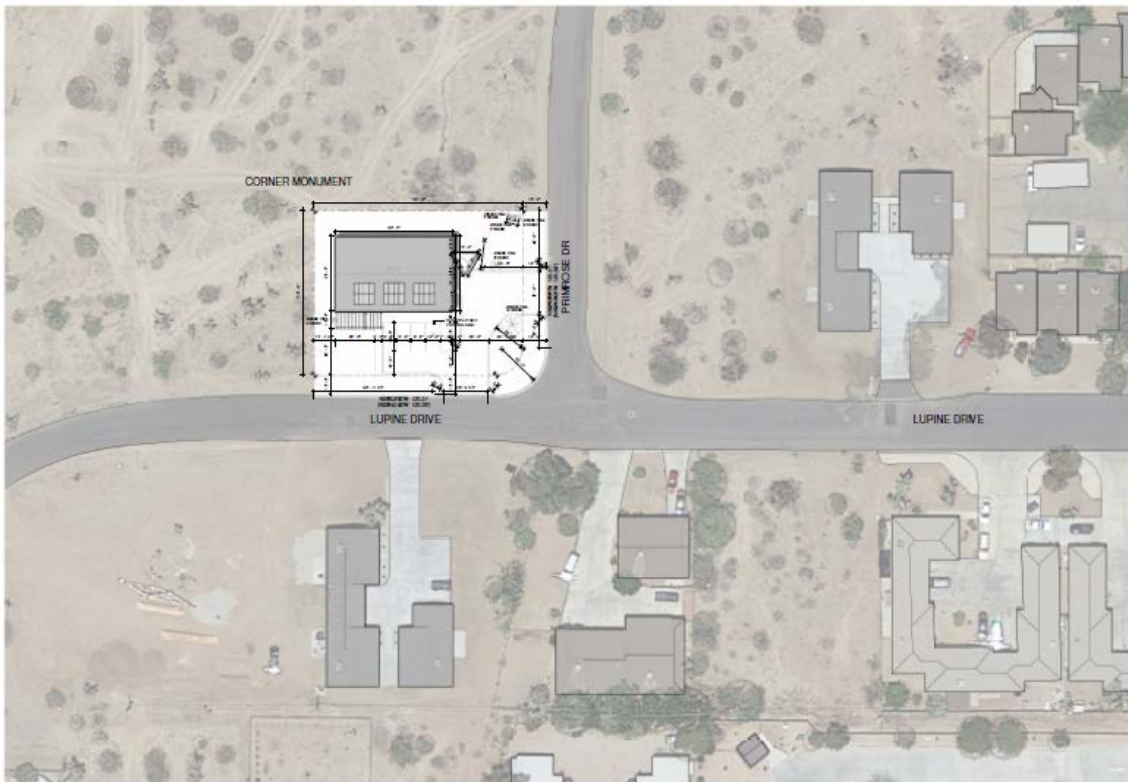


Figure 2 Project Site Map

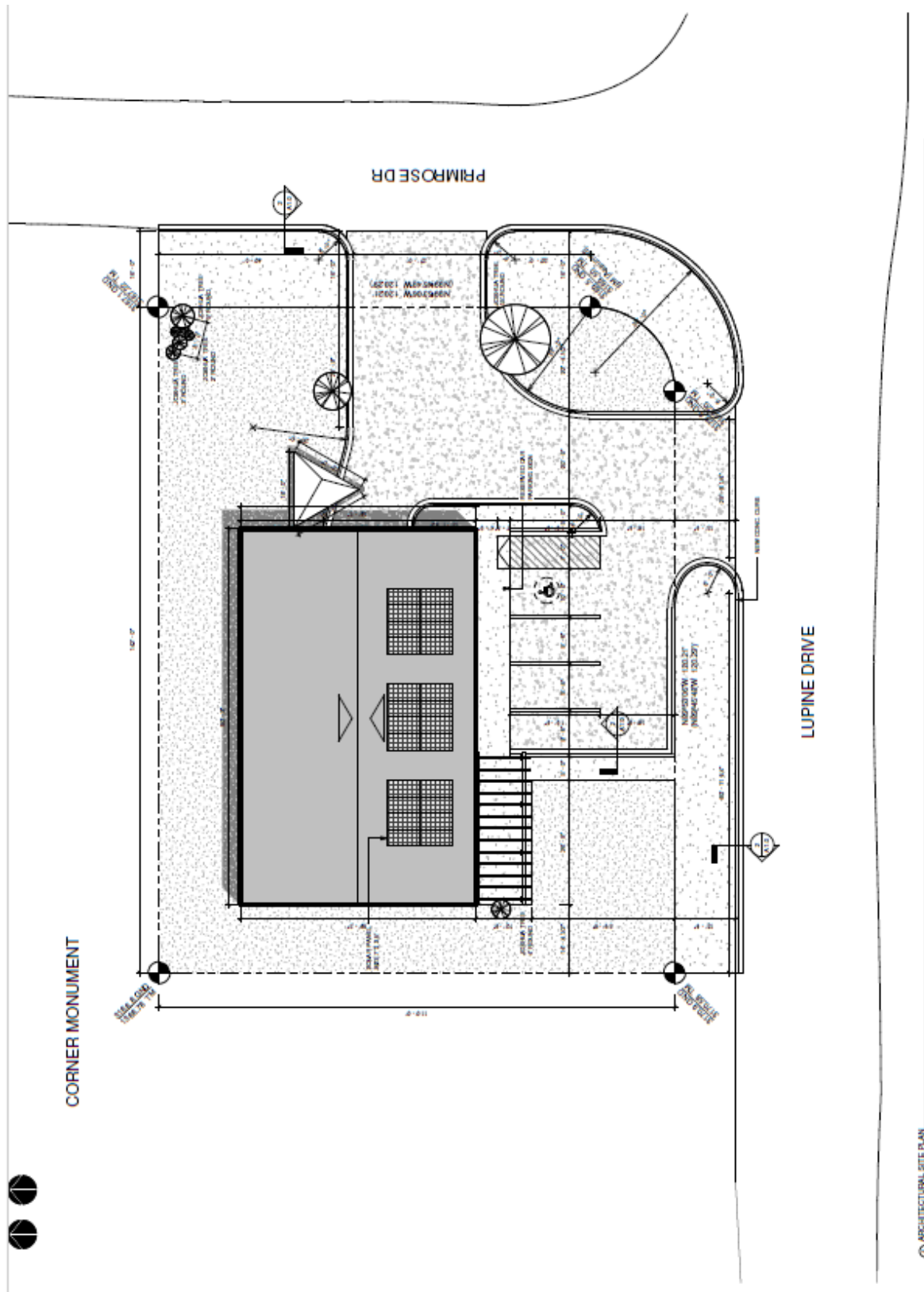


Figure 3 Project Layout

The project is planned to commence in November 2023 and complete in June 2024.

1.2 STUDY AREA

This report is intended to satisfy the requirements established by the City, the California Department of Transportation (Caltrans), and the San Bernardino County Transportation Authority's (SBCTA) Congestion Management Plan (CMP) TIA Guidelines (2016), as well as the requirements for the disclosure of potential impacts and mitigation measures pursuant to the California Environmental Quality Act (CEQA).

This study examines traffic operations in the vicinity of the proposed project under the following six scenarios:

- Existing conditions;
- Existing with project conditions;
- Opening year without project conditions;
- Opening year with project conditions;
- Year 2024 without project conditions; and
- Year 2024 with project conditions.

Traffic conditions were examined for the weekday a.m. and p.m. peak hour conditions. The a.m. peak hour is defined as the one hour of highest traffic volumes occurring between 7:00 and 9:00 a.m. The p.m. peak hour is the one hour of highest traffic volumes occurring between 4:00 and 6:00 p.m. The project opening year is anticipated to be 2023.

Senate Bill 743 (SB 743) required changes to be made to CEQA regulations by introducing Vehicle Miles Traveled (VMT) as the new metric for determining project traffic impacts. The City recently adopted its VMT analysis guidelines.

2 ANALYSIS METHODOLOGY AND IMPACT THRESHOLDS

2.1 LEVEL OF SERVICE DEFINITIONS

Roadway operations and the relationship between capacity and traffic volumes are generally expressed in terms of levels of service (which are defined using the letter grades A through F). These levels recognize that, while an absolute limit exists as to the amount of traffic traveling through a given intersection (the absolute capacity), the conditions that motorists experience rapidly deteriorate as traffic approaches the absolute capacity. Under such conditions, congestion is experienced.

There is general instability in the traffic flow, which means that relatively small incidents (e.g., momentary engine stall) can cause considerable fluctuations in speeds and delays. This near-capacity situation is labeled Level of Service (LOS) E. Beyond LOS E, capacity has been exceeded and arriving traffic will exceed the ability of the intersection to accommodate it. An upstream queue will then form and continue to expand in length until the demand volume again declines complete description of the meaning of level of service can be found in the Transportation Research Board Special Report 209, Highway Capacity Manual (HCM).

The HCM establishes levels of service A through F for intersections which is shown as below in table 1 and table 2: Level of Service Definition for intersection.

Table 1 Level of Service Definition for Intersection

LOS	Description
A	No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. Typically, the approach appears quite open, turns are made easily and nearly all drivers find freedom of operation.
B	This service level represents stable operation, where an occasional approach phase is fully utilized and a substantial number are approaching full use. Many drivers begin to feel restricted within platoons of vehicles
C	This level still represents stable operating conditions. Occasionally drivers may have to wait through more than one red signal indication, and backups may develop behind turning vehicles. Most drivers feel somewhat restricted, but not objectionably so

D	This level encompasses a zone of increasing restriction approaching instability at the intersection. Delays to approaching vehicles may be substantial during short peaks within the peak period; however, enough cycles with lower demand occur to permit periodic clearance of developing queues, thus preventing excessive backups
E	Capacity occurs at the upper end of this service level. It represents the most vehicles that any particular intersection approach can accommodate. Full utilization of every signal cycle is seldom attained no matter how great the demand
F	This level describes forced flow operations at low speeds, where volumes exceed capacity. These conditions usually result from queues of vehicles backing up from a restriction downstream. Speeds are reduced substantially and stoppages may occur for short or long periods of time due to the congestion. In the extreme case, both speed and volume can drop to zero

Level of Service	Unsignalized Intersection Average Delay per Vehicle (sec.)	Signalized Intersection Average Delay per Vehicle (sec.)
A	<10	<10
B	10-15	10-20
C	15-25	20-35
D	25-35	35-55
E	35-50	55-80
F	>50	>80

2.2 LEVEL OF SERVICE PROCEDURES AND THRESHOLDS

The area to be studied should include all intersections, which the proposed project will add 50 or more trips during any peak hour and roadway segments adjacent to the project if directed by the County.

Further, following area would be studied as stated in table 2.

Table 2 TIA Study Area

Study area	Action taken
Site access driveways	Will be considered
On-site circulation	Will be considered
Roadway(s) adjacent to the project (if requested by County staff)	Will be considered
Intersections in the immediate vicinity of the project	Will be considered
Pedestrian and bicycle circulation	Not applicable
Any intersection on which the project will add 50 or more peak hour project trips	Will be considered

As outlined in the Transportation Impact Study Guidelines by San Bernardino County, projects that cater to the immediate local community and possess the capacity to diminish Vehicle Miles Traveled (VMT) are typically exempt from undergoing a VMT assessment.

This exemption commonly applies to "typical" office developments spanning less than 10,000 sqft., which do not necessitate a VMT analysis. Given that the dimensions of this project amount to 4,000 sqft., it follows that a VMT analysis would not be required..

3 EXISTING CONDITION

3.1 Existing road way network

Following is a brief description of major roadways within the TIA study area:

- **Yuca Trail:** Based on the City's General Plan, Yuca Trail is designated as an Arterial. Within the study area, Yuca Trail Street is a four-lane, divided arterial with no provision
- **Airway avenue:** Based on the City's General Plan, Airway Ave is designated as a Collector Road. Within the study area, Airway ave is a two-lane.
- **Lupine Dr:** Based on the City's General plan, Lupine Dr is designated as a local road which has single lane.
- **Primerose DR:** Based on the City's General plan, Lupine Dr is designated as a local road which has single lane.

3.2 Existing Interconnection Network and Existing Level of Service

Based on the project's location, two access roads have been identified: Lupine Dr and Airway Ave.

A total of five intersections have also been pinpointed for in-depth analysis, aiming to assess any potential traffic condition changes resulting from the project's impact. These specific locations are clearly illustrated in Figure 4 for easy reference.

The propose project site location is illustrated in Figure 5.

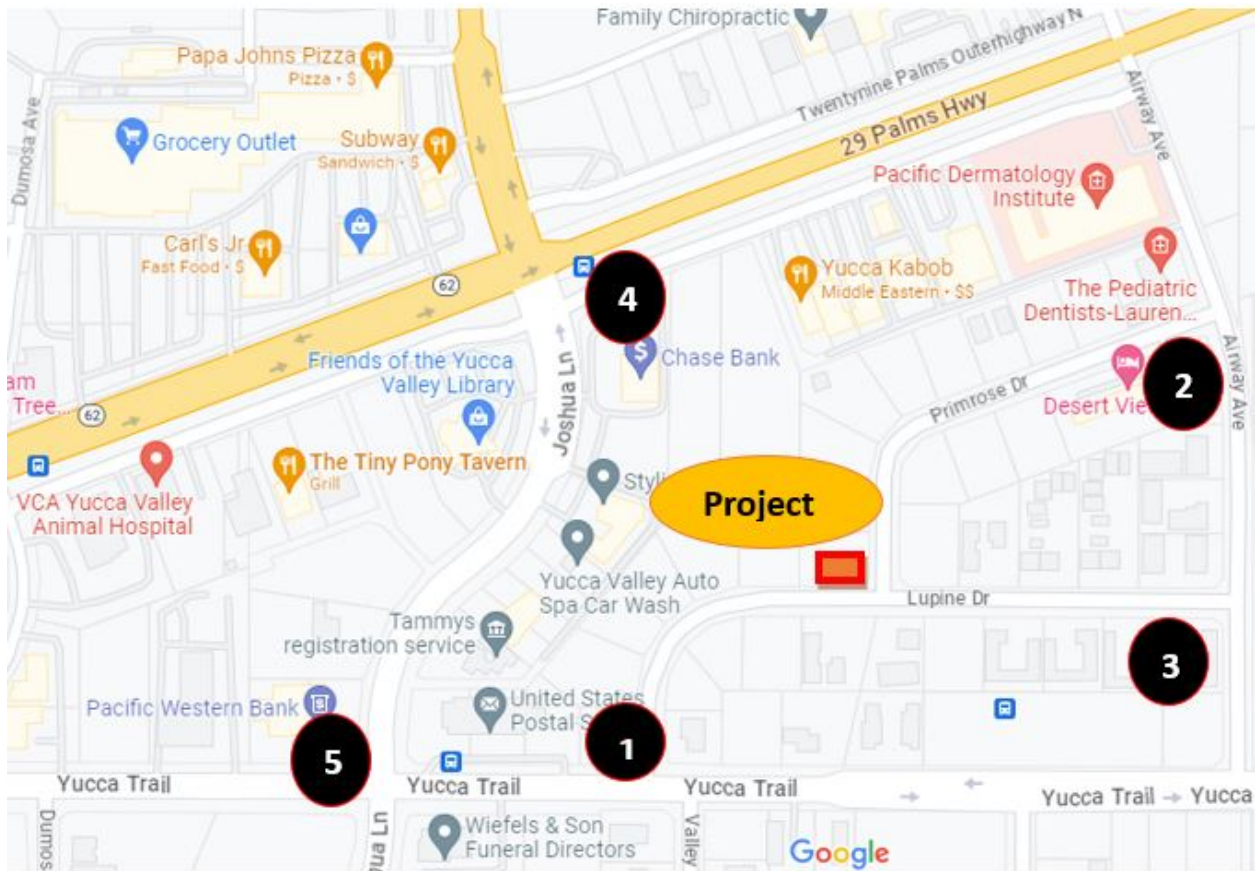


Figure 4 Nearby Interconnection Network

The distance from the nearby junctions were taken and illustrated in Table 3.

Table 3 Identified Existing Interconnection Details

Intersection	Existing LOS at intersection	Signalized/ Unsignalized	Distance from junction to project (miles)
1	A	Unsignalized	0.2
2	A	Unsignalized	0.2
3	A	Unsignalized	0.1
4	C	Signalized	0.5
5	A	Signalized	0.3

Note: For all study intersections, existing traffic volumes and LOS are based on counts collected by Counts Unlimited in November 2019 and February 2020. For purposes of this analysis, year 2019 has been considered as existing conditions as a conservative approach.



Figure 5 Project Location; Source: Google Street View

4 PROJECT TRAFFIC

4.1 Project Trip Generation

The trip generation for the proposed project was developed using rates from the ITE Trip Generation Manual (10th Edition) for Land Use 710 - "General Office Building", Setting/Location - "General Urban/Suburban." The calculated trip generation for the project illustrated in Table 4.

Table 4 Project Trip Generation

CRA901 - ESRI Office Building 4tsf	A.M. Peak hour			P.M. Peak hour			Daily
	In	Out	Total	In	Out	Total	
Trip/Unit (per 1,000 sqf)	1.00	0.16	1.16	0.18	0.97	1.15	9.74
Trip Generation	4	1	5	1	4	5	40

Notes:

tsf: Thousand square feet

The project trip generations are in PCU

4.2 The Project trip Distribution

The Project trip distribution and assignment process represents the directional orientation of traffic to and from the Project site. The trip distribution pattern of passenger cars is heavily influenced by the geographical location of the site, the location of surrounding uses, and the proximity to the regional freeway system.

The distribution of project trips was developed based on the regional roadway network and the locations of residential, employment, and commercial centers in relation to the proposed project.

Since the trip generation of the project is at a low value, which is less than 5, analysis for the road segments and intersections will be carried out, considering 100% trip distribution for each particular part conservatively.

5 TRAFFIC VOLUMES FOR WITH PROJECT SCENARIOS

As mentioned in the above chapter, the maximum trip generation of the project is 5 in the peak hour while 40PCU in daily basis.

The analysis shall be carried out for the opening year,2024 and horizon year 2040.

According to the Traffic Impact Guidelines for San Bernardino, there is no requirement to conduct an intersection traffic analysis because the identified intersections are located 500 feet away from the project.

The affected roads named Lupine Dr, Yucca Trail, Airway ave and Primerose Dr are designated as road with LOS A.

Since the maximum project trip generation is 5PCU/hr, this will not effect to change the LOS of either above mentioned roads and intersections.

6 SITE ACCESS ANALYSIS

6.1 SITE ACCESS AND ON SITE CIRCULATION

This section summarizes Project site access and on-site circulation recommendations.

In accordance with Cal. Code Regs. tit. 14 § 1273.09, gate entrances are required to be at least two feet wider than the width of the traffic lane(s) that serve the gate. Additionally, a minimum unobstructed horizontal clearance of fourteen (14) feet and an unobstructed vertical clearance of thirteen feet, six inches (13' 6") must be maintained.

The access roads, namely Lupine Dr and Primrose Dr, have a width of 15 feet each. Therefore, to meet the minimum access road width (entrance) requirement, it should be 17 feet.

The project features two access gates with widths of 29 and 27 feet, respectively, both of which fulfill the specified conditions as shown in figure 6

In the project, two gates have been designated for entry and exit, each equipped with clearly visible signboards for road users, effectively indicating the points of entry and exit.

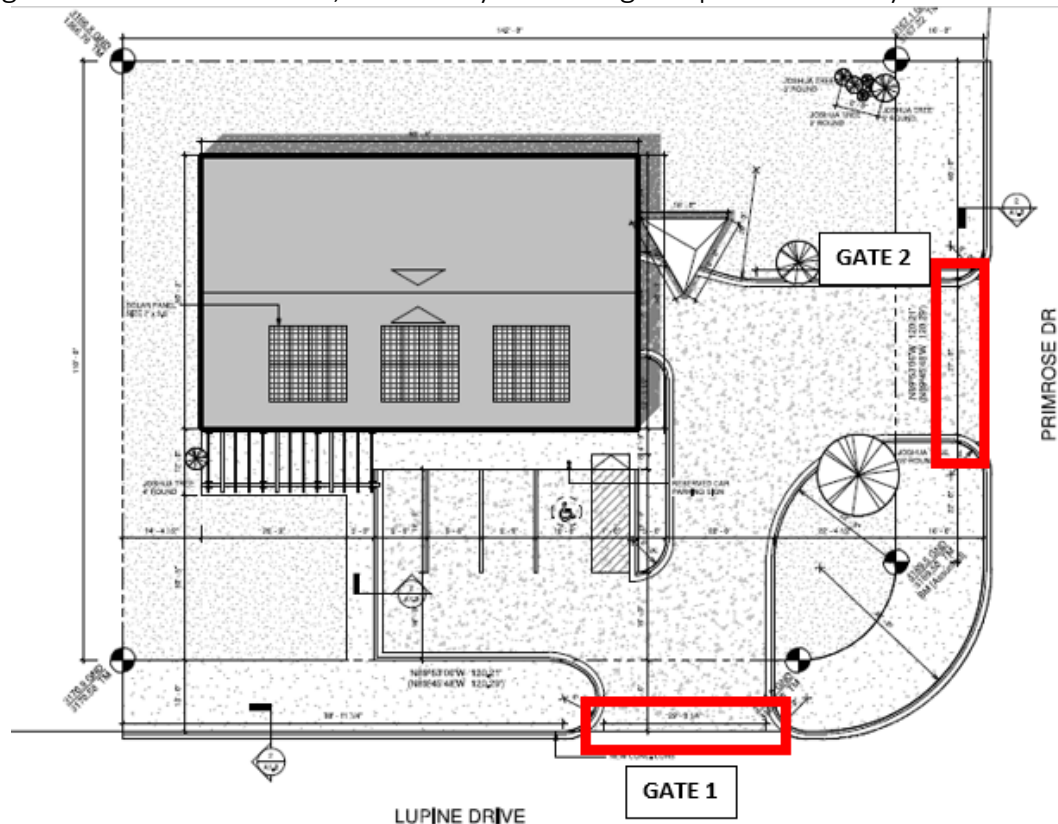


Figure 6 The project access gates

6.2 PARKING ARRANGEMENT

According to California regulations, one parking space is required for every 300 sqft. In this project, the gross floor area, excluding parking, is 2086 sqft, necessitating 7 parking slots.

Shower and locker facilities are also provided. Developments with twenty (20) or more employees may reduce their parking requirement by one (1) space for every three (3) clothing locker facilities provided for bicycle-commuting employees. Additionally, the developer must offer shower facilities for both men and women, with a maximum reduction of ten percent (10%) of the required parking. Complying with these stipulations, it is recommended to have 6 parking slots.

Furthermore, one handicapped parking slot is required for every 5-10 parking slots. Therefore, the recommendation is to provide 1 handicapped parking slot.

The minimum width for 90-degree parking is 8 feet 6 inches, and the minimum depth is 18 feet. The aisle width should be a minimum of 24 feet.

For 45-degree parking, the minimum width and depth are both 8 feet 6 inches and 19 feet, respectively. The aisle width for one-way traffic is 13 feet, and for two-way traffic, it should be 20 feet. Given that the parking lot accommodates 3 angled spaces at 45 degrees, a one-way traffic configuration can be adopted with an accepted minimum aisle width of 13 feet.

Figure 7 and figure 8 illustrates the parking arrangement of exterior and interior respectively.

The entry/exit gates should be paved with a proper material and need to be kept at the same level of the access road. Further, any permanent or temporary structures should not be constructed in these areas and those areas need to be kept clear always. Signs of the entry /exit locations should be clearly produced in the way those can be seen properly by vehicle users

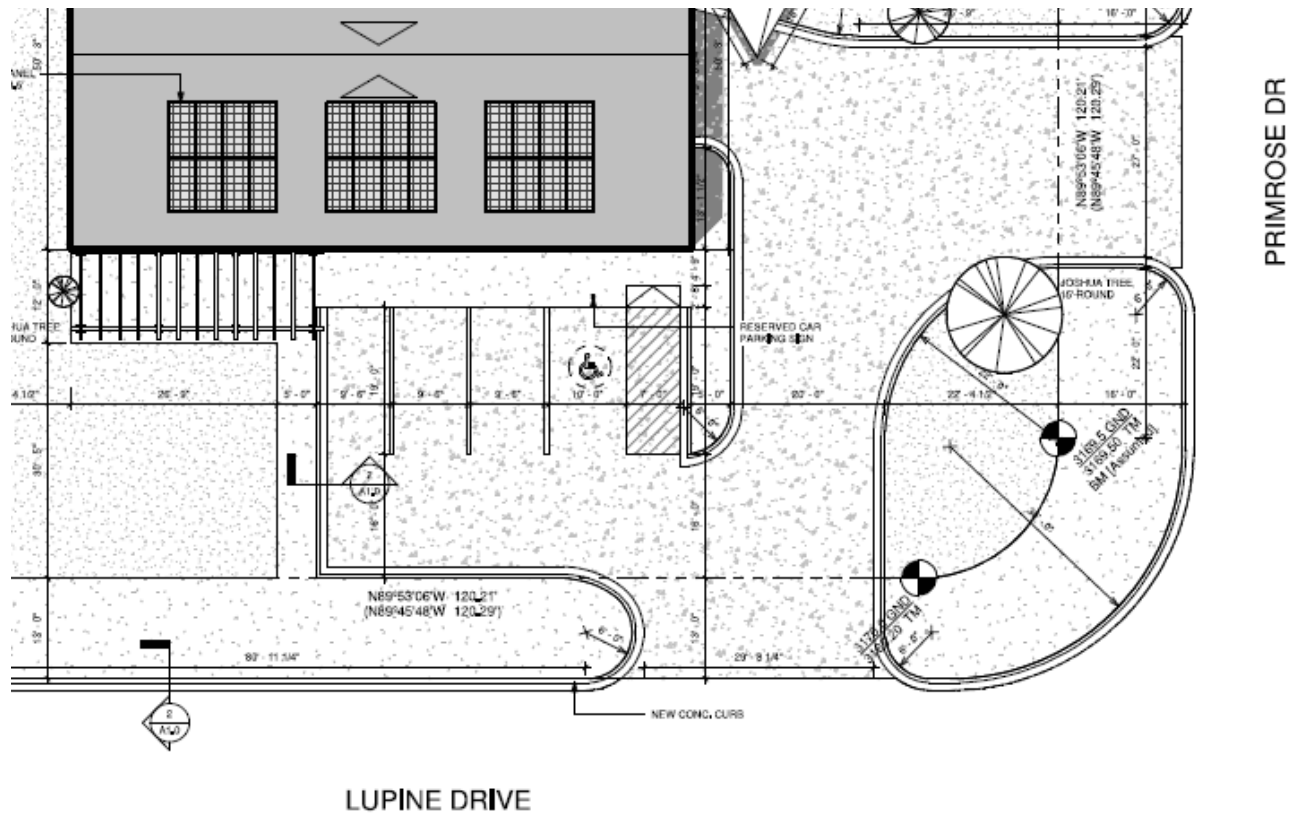


Figure 7 Exterior Parking Arrangement

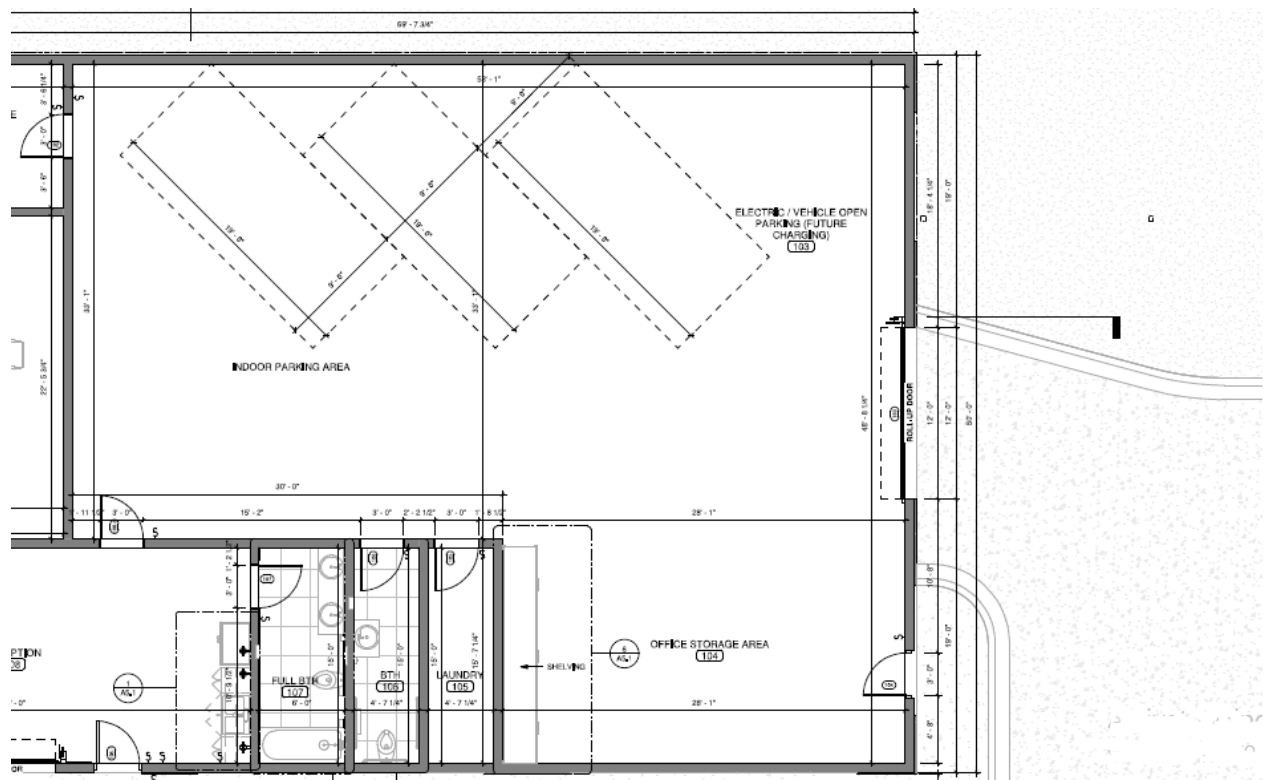


Figure 8 Interior Parking Arrangement

7 IMPROVEMENT AND RECOMMENDATION

As discussed in Chapter 5, the project's minimal traffic generation results in negligible impact, thus necessitating no additional improvements for the connected intersections and roads.

Regarding the parking arrangement, it is advisable to adjust the exterior parking aisle width to a minimum of 20 feet.

Moreover, given the potential proximity of pedestrians and vehicles, prioritizing pedestrian safety is crucial. To address this concern, the installation of a speed bump measuring 100 mm in height and 500 mm in length is recommended in internal access road.

During the construction phase, all vehicles transporting materials should access the site, with a suggestion to schedule material transportation during off-peak hours to minimize disruption.

As there are currently no signboards on both Alpine Dr and Primrose Dr indicating the connected byroad ahead, it is advisable to install such signboards complying with regulations and county approvals. Additionally, providing a clear signboard to direct entry at the In gate is recommended for enhanced guidance and clarity.