Appendix

Transportation Analysis

Hexagon Transportation Consultants, Inc.

Memorandum

Date: January 28, 2019

To: Ms. Karly Kaufman, Rincon Consultants

From: Gary Black, AICP
Lance Knox, AICP

Subject: Transportation Analysis for 4256 El Camino Real Hotel in Palo Alto, California

Hexagon Transportation Consultants, Inc. has completed a transportation study for the proposed Caterina Hotel development at 4256 El Camino Real in Palo Alto, California. The project site is located on the west side of El Camino Real, just north of the El Camino Real/Dinahs Court intersection (see Figure 1). As proposed, the project would consist of a hotel comprising 100 hotel rooms, a fitness room, business center, valet parking service, and a restaurant and bar. Currently, the project site is occupied by the Su Hong Eatery restaurant. The proposed project would replace the existing structure on the project site. Access to the site would be provided via two driveways on El Camino Real.

This study was conducted for the purpose of identifying the potential transportation impacts related to the proposed development. The potential impacts of the project were evaluated in accordance with the standards set forth by the City of Palo Alto and the Santa Clara Valley Transportation Authority (VTA) Congestion Management Program (CMP). Since it is estimated that the project would generate fewer than 100 peak hour vehicle trips, an analysis in accordance with the VTA's CMP guidelines was not required. The traffic study includes an analysis of AM and PM peak hour traffic conditions at the El Camino Real/Dinahs Court intersection near the project site. The project would generate U-turns at the intersection of El Camino Real and Charleston Road/Arastradero Road. However, the intersection was not analyzed given the low volume of traffic the project is estimated to generate compared to the existing volume at the intersection. The study also includes an analysis of site access and on-site circulation, vehicle queuing, and impacts to transit, bicycle, and pedestrian access.

Intersection Operations Analysis

Hexagon conducted AM and PM peak period traffic counts on January 24, 2019 at the El Camino Real/Dinahs Court intersection. This is the closest intersection to the site and would experience the greatest increase in traffic due to the project. Figure 2 shows the existing traffic volumes at the study intersection.

Traffic conditions were observed in the field during the typical weekday morning (7:00 - 9:00 AM) and evening (4:00 - 6:00 PM) peak hours in order to identify existing operational deficiencies and to confirm the accuracy of calculated intersection levels of service. The purpose of this effort was (1) to identify any existing traffic problems that may not be directly related to level of service, and (2) to identify any locations where the level of service analysis does not accurately reflect existing traffic conditions.

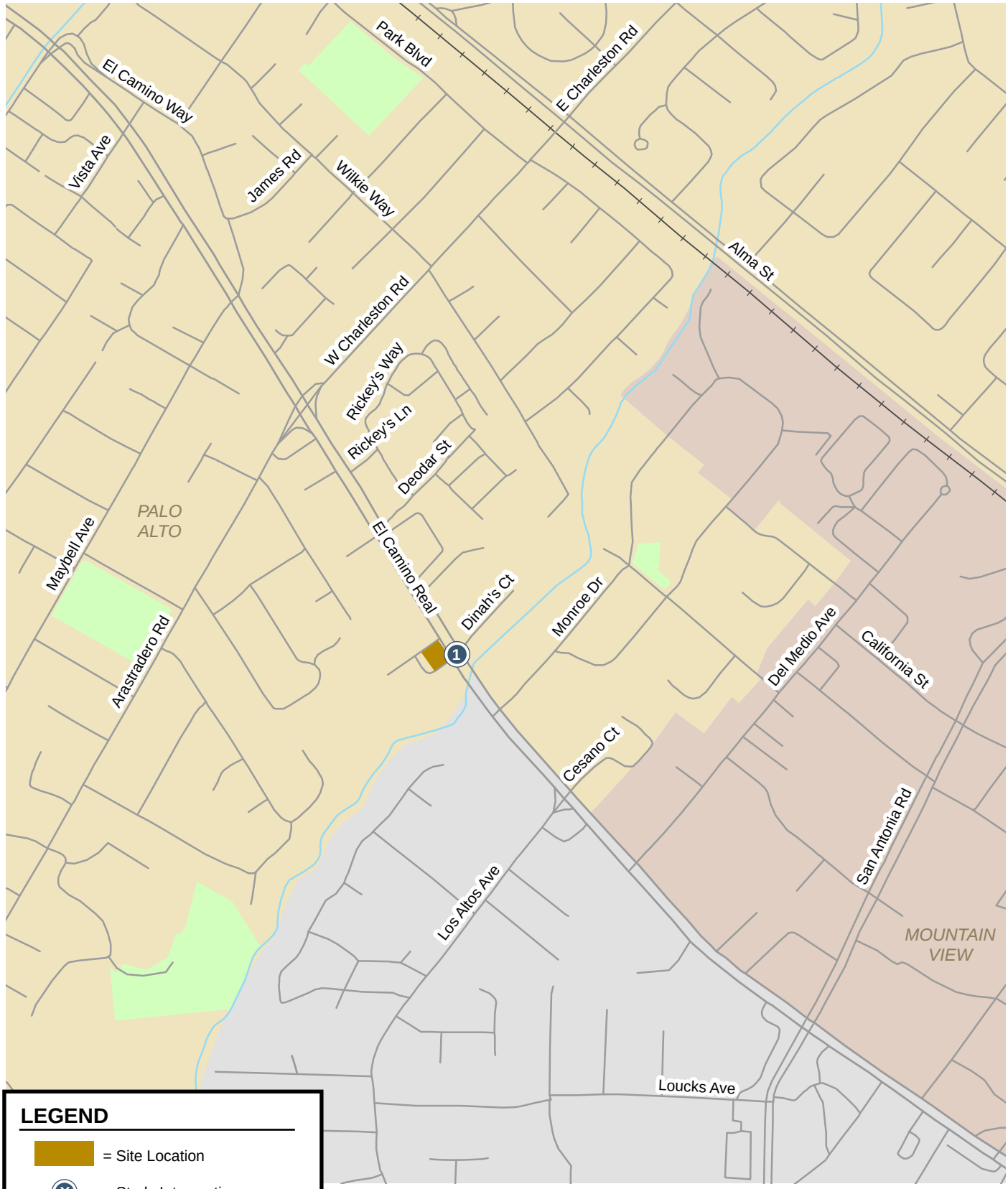


Figure 1
Site Location and Study Intersection

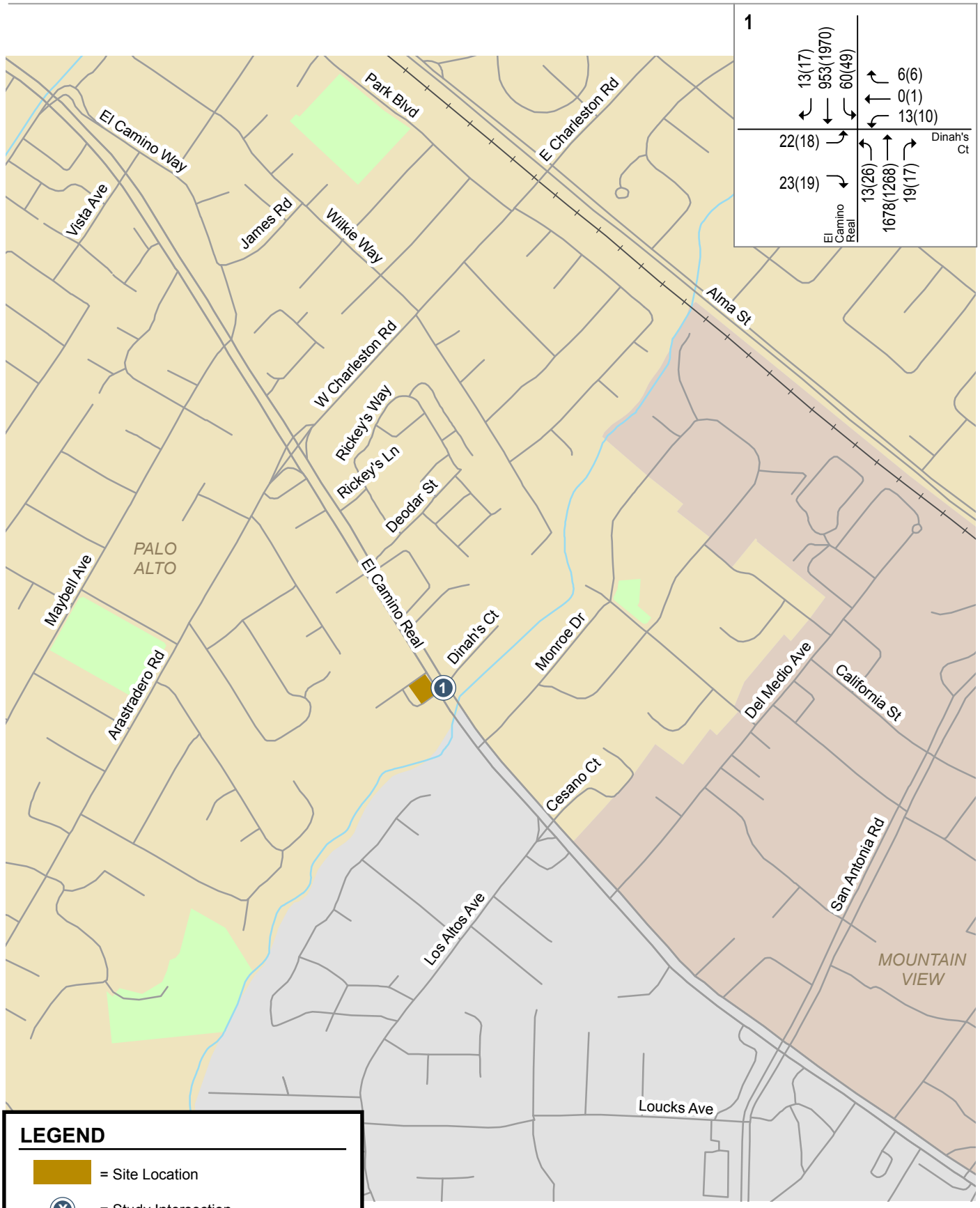


Figure 2
Existing Traffic Volumes

El Camino Real carries heavy traffic volume during peak hours. During the AM and PM peak hours, congestion along El Camino Real results in some long vehicular queues, and considerable delays for the minor streets (i.e. Dinahs Court). However, the field observations did not reveal any significant traffic-related issues, and the study intersection operated adequately during both the AM and PM peak hours of traffic. Thus, the reported level of service analysis appears to accurately reflect actual existing traffic conditions.

Project Trip Estimates

The magnitude of traffic produced by a new development and the locations where that traffic would appear were estimated using a three-step process: (1) trip generation, (2) trip distribution, and (3) trip assignment. In determining project trip generation, the magnitude of traffic traveling to and from the proposed hotel project was estimated for the AM and PM peak hours. As part of the project trip distribution, the directions to and from which the project trips would travel were estimated. In the project trip assignment, the project trips were assigned to specific streets and intersections. These procedures are described below.

Trip Generation

Through empirical research, data have been collected that quantify the amount of traffic expected to be produced by common land uses. Thus, for the most common land uses there are standard trip generation rates that can be applied to help predict the future traffic increases that would result from a new development. The standard trip generation rates are published in the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*.

Project trip generation was estimated by applying the appropriate trip generation rates obtained from the ITE *Trip Generation Manual, 10th Edition* (2017). The Hotel category in the ITE manual typically include sleeping accommodations as well as supporting facilities such as restaurants, cocktail lounges, meeting and banquet rooms or convention facilities, limited recreational facilities (i.e., pool, fitness room), and some retail and service shops. Therefore, the average trip generation rates for Hotel (Land Use 310) were applied to the project. Based on the project description and ITE trip generation rates, the proposed development would generate a total of 817 gross daily vehicle trips, with 53 gross trips (31 inbound and 22 outbound) occurring during the AM peak hour and 60 gross trips (32 inbound and 28 outbound) occurring during the PM peak hour (see Table 1).

Trip Reductions and Adjustments

The proposed project includes a parking reduction. Therefore, according to the *2030 Palo Alto Comprehensive Plan*, the proposed project would be required to develop a comprehensive Transportation Demand Management (TDM) plan to reduce vehicle trips by at least 30 percent, given that the project site is located within the El Camino Real Corridor. Therefore, a 30 percent trip reduction was assumed. As part of its TDM Plan, the project proposes to offer a dedicated shuttle for hotel employees and guests. The shuttle destinations would be determined based on hotel employee and guest preferences. It is initially thought that shuttles would serve both the San Francisco International Airport and Mineta International Airport, downtown Mountain View and Palo Alto, Caltrain, and other major employment centers and destinations in the area.

The existing occupied building's trip generation can be credited against the proposed hotel development. The current trips generated by the existing occupied restaurant (Su Hong Eatery Restaurant) on the site can be subtracted from the trip generation estimates for the hotel. The existing restaurant's trip generation was estimated based on published ITE rates for Quality Restaurant (Land Use 931). Based on the ITE trip generation rates, it is estimated that the

restaurant is generating 297 daily trips, with 25 trips occurring in the PM peak hour. Given that the restaurant is closed in the morning on weekdays, no trips were estimated for the AM peak hour.

Net Project Trips

After applying the ITE trip rates, appropriate trip reductions, and existing site trip credits, the project would generate 275 new daily vehicle trips, with 37 new trips occurring during the AM peak hour and 17 new trips occurring during the PM peak hour (See Table 1).

Table 1
Project Trip Generation Estimates

		Daily		AM Peak Hour				PM Peak Hour			
Land Use	**Size**	**Rate**	**Trips**	**Rate**	**In**	**Out**	**Total**	**Rate**	**In**	**Out**	**Total**
Proposed Use											
Boutique Hotel [1]	100 rooms	8.17	817	0.53	31	22	53	0.60	32	28	60
TDM Program (30%)			(245)		(9)	(7)	(16)		(10)	(8)	(18)
Subtotal			572		22	15	37		22	20	42
Existing Use											
Su Hong Eatery Restaurant [2]	3.30 ksf	89.95	(297)		-	-	-	7.49	(17)	(8)	(25)
Total New Project Trips			**275**		**22**	**15**	**37**		**5**	**12**	**17**

Notes:
KSF = 1,000 square feet
[1] Hotel (Land Use 310) average rates published in ITE's *Trip Generation Manual, 9th Edition, 2012.*
[2] Quality Restaurant (Land Use 931) average rates published in ITE's *Trip Generation Manual, 9th Edition, 2012.*
[3] In accordance with the *2030 Palo Alto Comprehensive Plan* , the project site is located within the El Camino Real Corridor, thus a comprehensive Transportation Demand Management (TDM) plan is required to reduce vehicle trips by at least 30 percent.

Project Trip Distribution and Assignment

The trip distribution pattern for the project was estimated based on existing travel patterns on the surrounding roadway system and the locations of complementary land uses. The peak hour vehicle trips generated by the project were assigned to the roadway network in accordance with the trip distribution pattern. The project driveways would provide limited-access, only allowing right inbound and outbound turns to and from El Camino Real. Given that a raised median along El Camino Real exists between Charleston Road and Dinahs Court, outbound vehicles seeking to travel north of the project site must make a U-turn at Dinahs Court, while inbound vehicles coming from south of the site must make a U-turn at Charleston Road to access the project driveway. Based on the project trip distribution, an estimated total (existing + new trips) of 6 vehicles during the AM and 5 vehicles during the PM would be making a U-turn at Dinah's Court, while 13 vehicles and 3 vehicles would be making a U-turn at Charleston Road during the AM and PM peak hours, respectively. Figure 3 shows the trip distribution pattern and net trip assignment of project traffic on the local network.

Project trips, as represented in the above project trip assignment, were added to existing traffic volumes to obtain existing plus project traffic volumes. The existing plus project traffic volumes are shown on Figure 4.

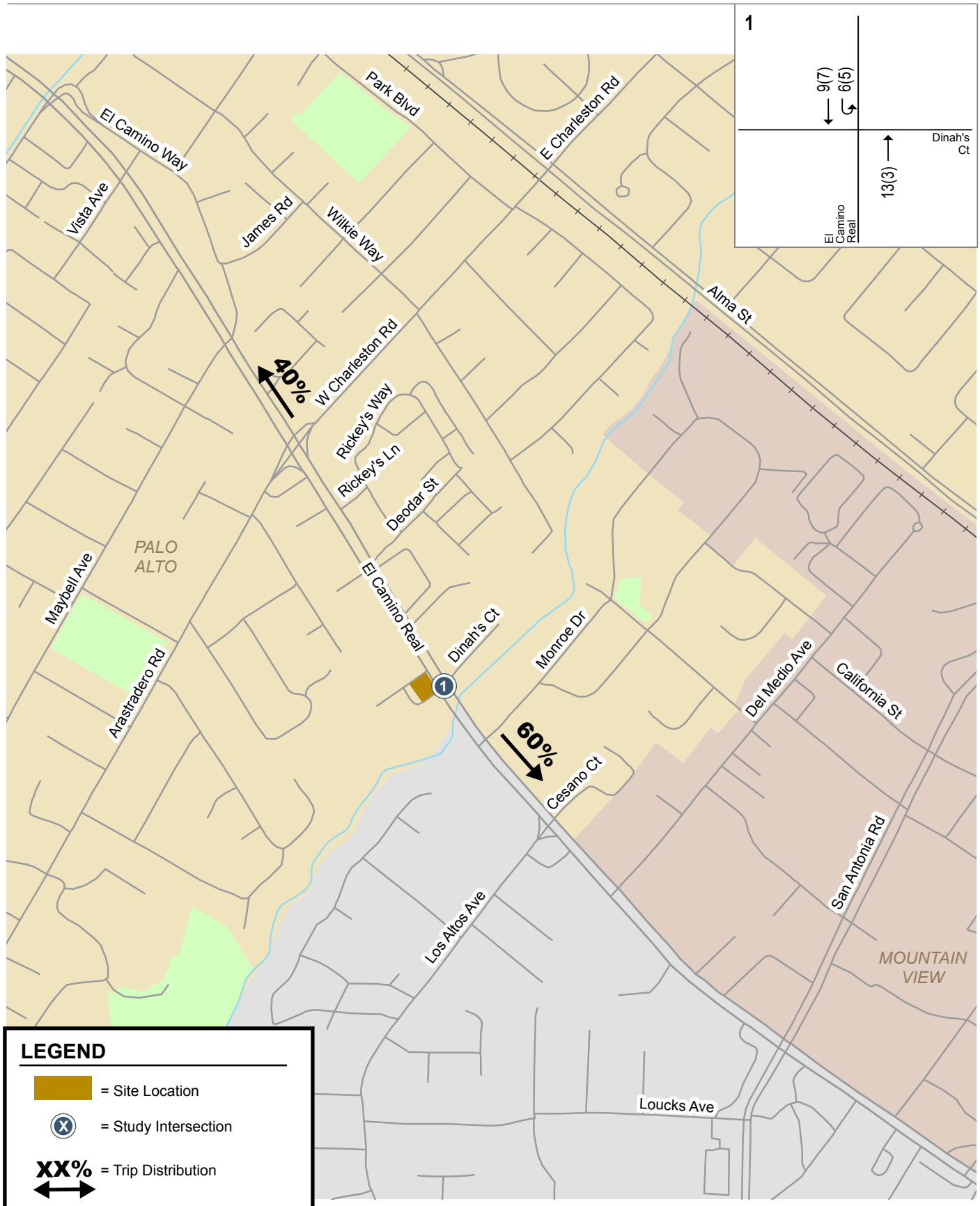


Figure 3
Project Trip Distribution and Net Assignment

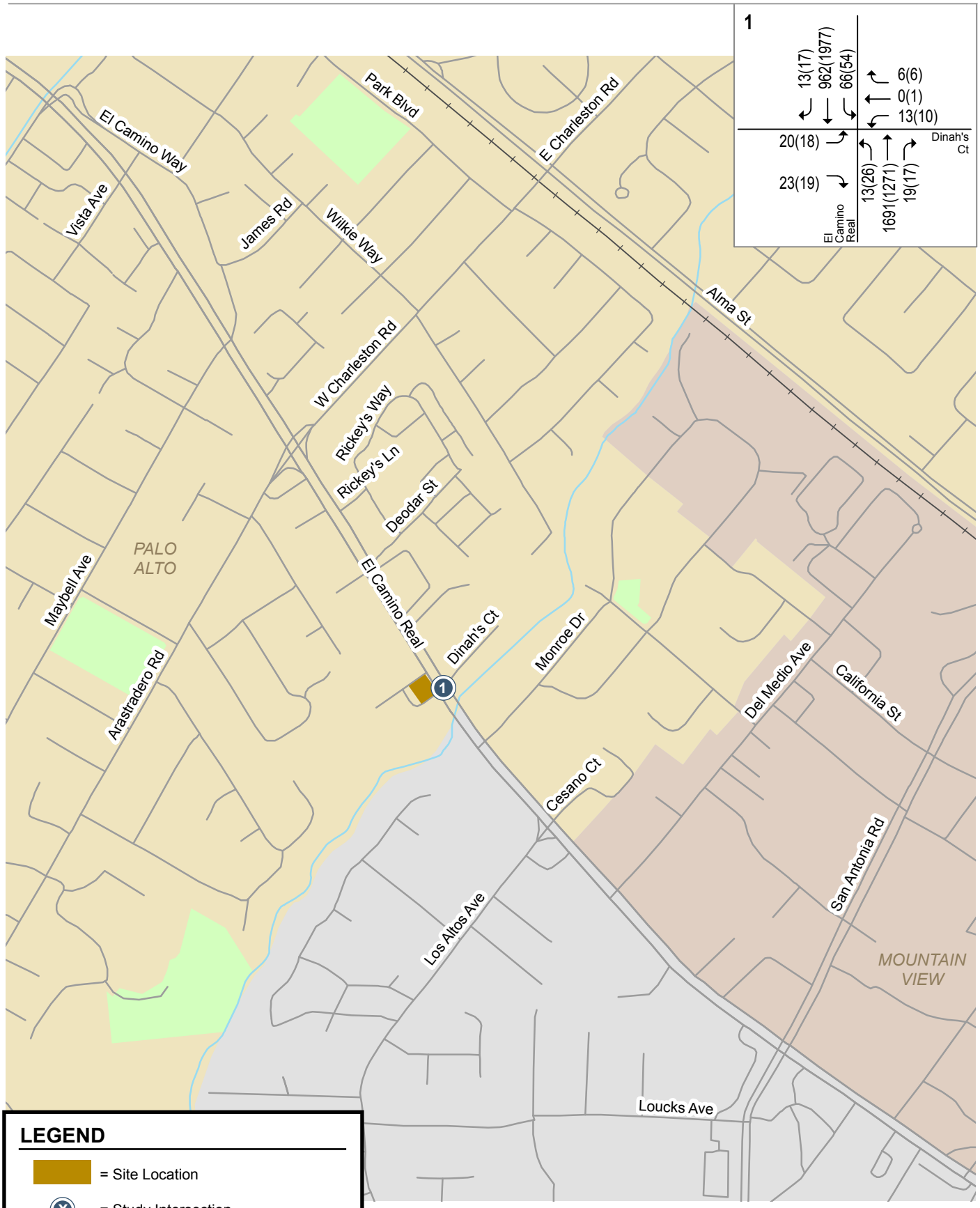


Figure 4
Existing Plus Project Traffic Volumes

Palo Alto LOS Standard for Signalized Intersections

Traffic conditions at the study intersection were evaluated using level of service (LOS). *Level of Service* is a qualitative description of operating conditions ranging from LOS A, or free-flow conditions with little or no delay, to LOS F, or jammed conditions with excessive delays. The analysis method is described below.

The signalized study intersections in the City of Palo Alto are subject to the City of Palo Alto level of service standards. The City of Palo Alto evaluates level of service at signalized intersections based on the *2000 Highway Capacity Manual* (HCM) level of service methodology using TRAFFIX software. This method evaluates signalized intersection operations on the basis of average control delay time for all vehicles at the intersection. The City of Palo Alto level of service standard for signalized intersections is LOS D or better. Table 2 shows the level of service definitions for signalized intersections.

Table 2
Signalized Intersection Level of Service Definitions Based on Control Delay

Level of Service	Description	Average Control Delay Per Vehicle (sec.)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	Up to 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	10.1 to 20.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.1 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lenghts, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 55.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurences. This is considered to be the limit of acceptable delay.	55.1 to 80.0
F	Operation with delays unacceptable to most drivers occurring due to oversaturation, poor progression, or very long cycle lengths.	Greater than 80.0

Source: Transportation Research Board, *2000 Highway Capacity Manual* , (Washington, D.C., 2000).

Level of Service Analysis Results

Intersection levels of service were evaluated against City of Palo Alto standards. Intersection levels of service were calculated for existing and existing plus project conditions and are summarized in Table 3. The results of the analysis show that under both scenarios with and without the project, the signalized study intersection would operate at LOS B or better during the AM and PM peak hours.

Table 3
Intersection Level of Service Summary

#	Intersection	Peak Hour	Existing Conditions: No Project Avg. Delay (sec)	No Project LOS	with Project Avg. Delay (sec)	with Project LOS	Incr. in Critical Delay (sec)	Incr. in Critical V/C
1	El Camino Real and Dinahs Court	AM	9.7	A	10.0	A	0.5	0.006
		PM	7.6	A	7.7	A	0.0	0.001

Per the intersection level of service analysis, the southbound left-turn movement at the Dinahs Court intersection currently operates at LOS E, due to a short green-time and priority given to the north and south through-movements (El Camino Real). However, field observations showed a vehicle queue of no greater than 6 vehicles compared to a vehicle storage capacity of 9 vehicles. With the addition of project traffic, the southbound left-turn movement at the study intersection would continue to operate at LOS E. This indicates that U-turning project vehicles at this intersection would experience significant delays; however, the addition of project-generated traffic is expected to have a minimal effect on intersection operations (see Vehicle Queuing Analysis below).

Site Access and On-Site Circulation

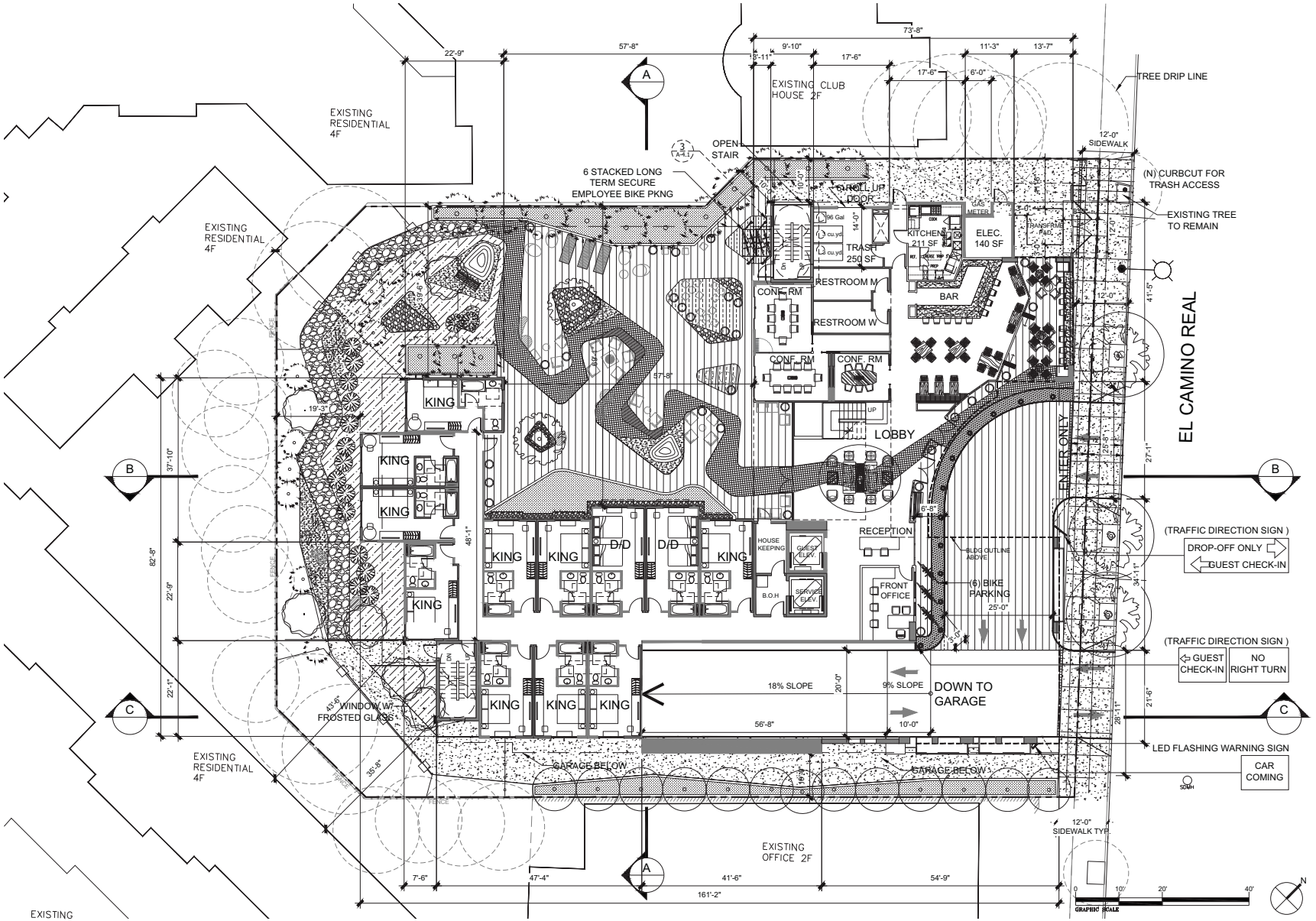
The evaluation of the project's site access and circulation is based on the site plan prepared by Studio T Square Architecture, dated October 17, 2018 (see Figure 5). Site access was evaluated to determine the adequacy of the site's driveways with regard to the following: traffic volume, delays, vehicle queues, geometric design, and corner sight distance. Figures 6 and 7 show the layouts of the two-level (B1 and B2) subterranean parking garage. On-site vehicular circulation was reviewed in accordance with generally accepted traffic engineering standards and transportation planning principles.

Project Driveway Design

Vehicular access to the project site would be provided via two driveways on El Camino Real. The southern driveway would be located at approximately the same location as the existing restaurant exit only driveway. The northern driveway would be located approximately 40 feet south of the existing restaurant enter only driveway. The driveways are shown to be 22 feet wide (northern driveway) and 20 feet wide (southern driveway). The northern driveway would be for inbound traffic only and is intended to accommodate drop-offs and deliveries under the Porte Cochere. The southern driveway would accommodate inbound and outbound traffic and would connect to the subterranean parking garage. Both driveways would meet the City's minimum width requirement of 20 feet. Parking for hotel registration is intended to occur in the subterranean parking garage.

Nearby Driveways

The location of the project driveways was reviewed with respect to other driveways in the vicinity of the project. Nearby driveways are located approximately 125 feet north and 75 feet south of the project driveways. While the project driveways would be close in proximity to the Crowne Plaza driveway south of the project, vehicles are still expected to be able to make turns in and out of the project driveways without affecting similar operations at the adjacent driveway, given that driveways along El Camino Real generally allow only right turns and because of the small number of trips that the project would generate. Therefore, the proposed driveway locations were found to be adequate.



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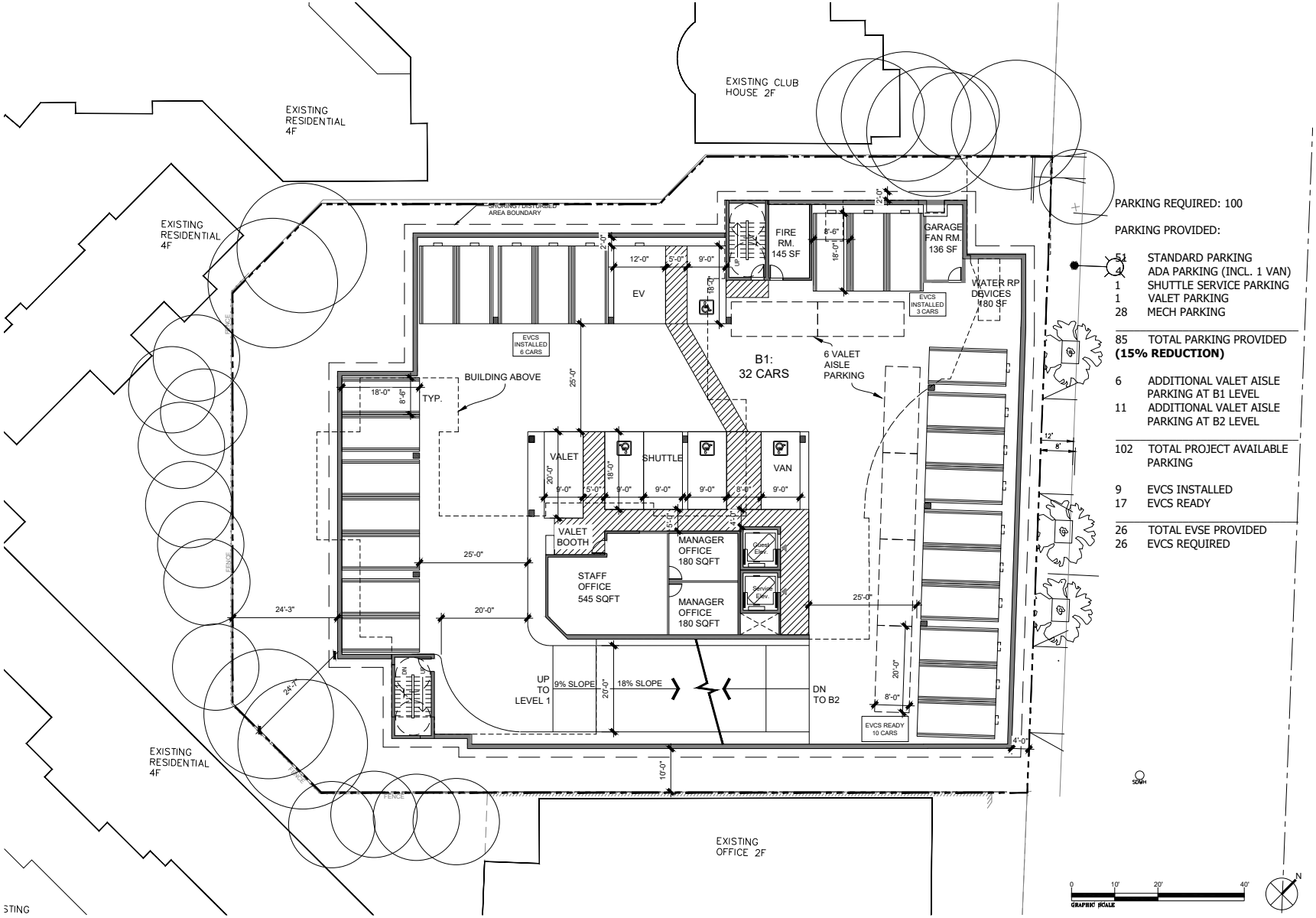
Sheet Title: Floor Plan - Site Plan

Job No. 17001
Date: 10/17/2018
Scale:
Drawn By:

Sheet No: A-3.0

Figure 5
Project Site Plan



PARKING REQUIRED: 100

PARKING PROVIDED:

51	STANDARD PARKING
4	ADA PARKING (INCL. 1 VAN)
1	SHUTTLE SERVICE PARKING
1	VALET PARKING
28	MECH PARKING
85	TOTAL PARKING PROVIDED
	(15% REDUCTION)
6	ADDITIONAL VALET AISLE PARKING AT B1 LEVEL
11	ADDITIONAL VALET AISLE PARKING AT B2 LEVEL
102	TOTAL PROJECT AVAILABLE PARKING
9	EVCS INSTALLED
17	EVCS READY
26	TOTAL EVSE PROVIDED
26	EVCS REQUIRED

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Sheet Title:
Floor Plan - Garage Plan B1

Job No. 17001
Date: 12/18/2018
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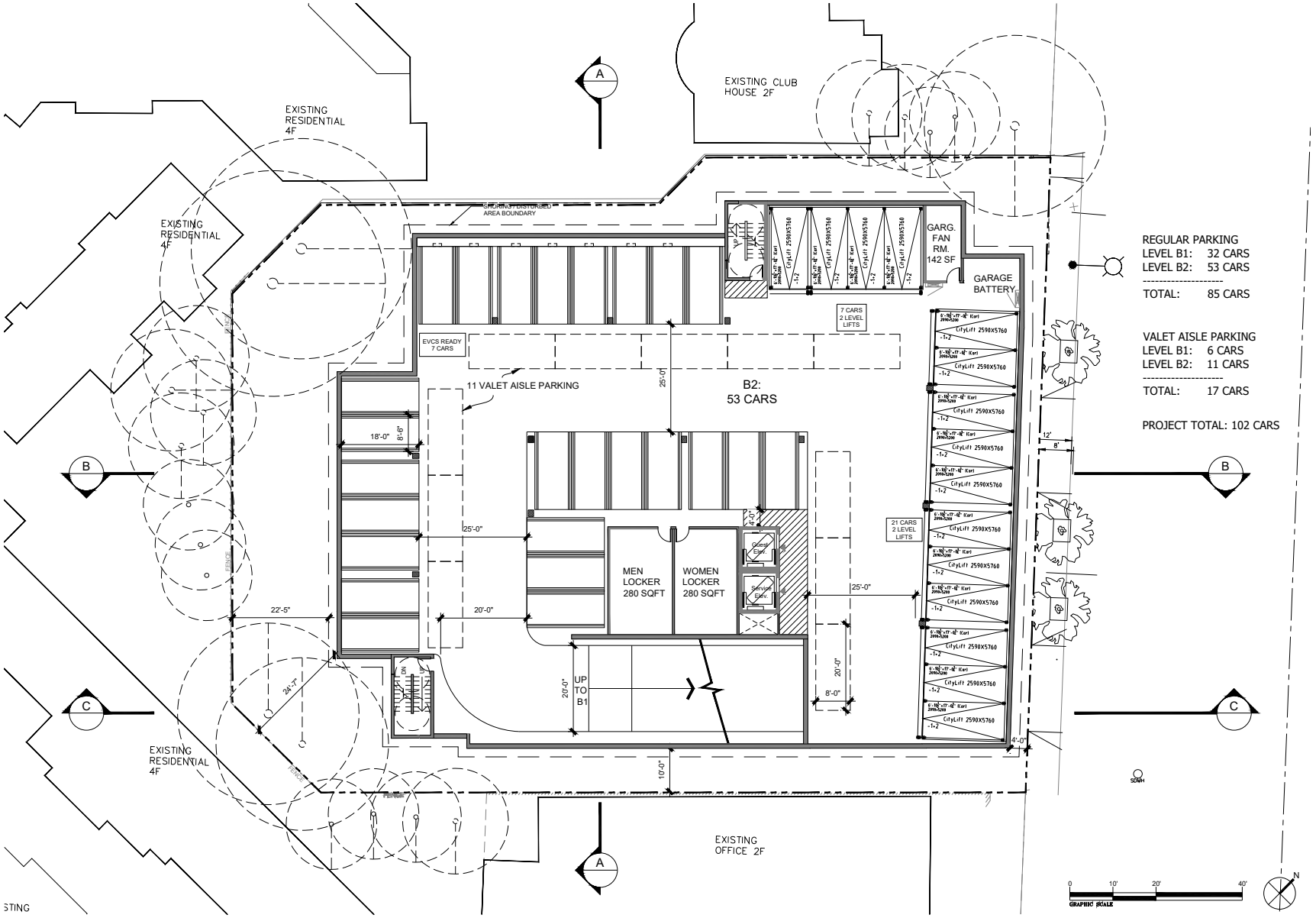
A-3.6

Figure 6
Subterranean Parking Structure Level B1



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Sheet Title:
Floor Plan - Garage Plan B2

Job No. 17001
Date: 12/18/2018
Scale:
Drawn By:

Sheet No:
A-3.7

Figure 7
Subterranean Parking Structure Level B2

Sight Distance

Adequate sight distance (sight distance triangles) should be provided at the project driveways in accordance with Caltrans standards. Sight distance triangles should be measured approximately 10 feet back from the traveled way. Providing the appropriate sight distance reduces the likelihood of a collision at a driveway or intersection and provides drivers with the ability to exit a driveway or locate sufficient gaps in traffic. The minimum acceptable sight distance is often considered the Caltrans stopping sight distance. Sight distance requirements vary depending on the roadway speeds. El Camino Real has a posted speed limit of 35 mph, for which the Caltrans stopping sight distance is 300 feet (based on a design speed of 40 mph). Thus, a driver exiting the site must be able to see 300 feet to the left along El Camino Real in order to make a safe turn.

On-street parking is currently permitted along El Camino Real adjacent to the project. Combined with the existing street trees aligned along the project frontage, sight distance for vehicles exiting the site would be obscured when turning onto El Camino Real. Therefore, to ensure an unobstructed view for drivers exiting the site, red curb should be painted between the two project driveways.

Project Driveway Operations

The project-generated trips that are estimated to occur at the project driveway are 22 inbound trips and 15 outbound trips during the AM peak hour, and 22 inbound trips and 20 outbound trips during the PM peak hour. Although high traffic volumes exist near the project site, observations of existing traffic operations along El Camino Real showed adequate gaps for the small number of trips that the project would generate. Outbound vehicle queues are expected to rarely exceed 1 or 2 vehicles in length during the peak hours, and no queuing issues are expected to occur. Inbound vehicles are not expected to queue because most traffic would be directed to the subterranean garage. Only drop-offs and deliveries would use the northern driveway and the Porte Cochere.

Appropriate wayfinding signs are shown on the site plan at the project driveways and parking garage entrance to direct drop-off traffic and guests seeking to check-in. Guests checking in or returning to the hotel would drive into the garage to the valet kiosk, which is shown adjacent to the elevators. The valet kiosk should be clearly marked.

On-Site Circulation

On-site vehicular circulation was reviewed in accordance with the City of Palo Alto Zoning Code and generally accepted traffic engineering standards. On-site parking would be provided in a subterranean parking garage that would be comprised of two levels: the upper level (B1) and the lower level (B2). A portion of the onsite parking in the subterranean garage would be provided by parking lifts, which are shown on the lower B2 level of the parking garage. In addition, potential valet parking is shown in the drive aisles at both levels on the site plan. It would not be feasible to have guests self-park in the lift spaces. Therefore, the lift spaces would be used by employees or by parking valets. It is assumed that the hotel would utilize valet parking during periods of peak occupancy.

The project would provide 90-degree parking stalls throughout the two levels of the subterranean parking garage. The City's standard minimum width for two-way drive aisles is 25 feet wide where 90-degree parking is provided. This allows sufficient room for vehicles to back out of the parking spaces. According to the site plan, the two-way drive aisles with parking available on either side measures 25 feet wide throughout the parking areas. Thus, adequate access to all parking stalls would be provided throughout the site.

Per the City's Zoning Code, garage ramps are to have no greater than a 22 percent slope with transition grades of 11 percent over a minimum length of 10 feet. The project site plan shows a slope of approximately 18 percent for the garage driveway ramp, with transition grades of 9 percent. Therefore, the proposed slope of the garage ramp adheres to the standards as specified in the Palo Alto Zoning Code. It should be noted that although the ramp would be adequate for vehicles, pedestrians and bicyclists are not expected to be using the ramp given that the slope's grade would be too difficult for pedestrians and bicyclists to traverse.

Parking Garage Circulation

Access to the two-level subterranean parking garage would be provided via a ramp located along the southern edge of the project site. The site plan shows one dead-end drive aisle located on the B2 parking level at the terminus of the north-south drive aisle (see Figure 7). However, the dead-end aisle is not expected to be problematic given that parking would be completed by valets, and the drive aisles are very short.

At the B1 level within the parking garage, 28 parking spaces would be served by a mechanical-stack parking system. Comprised of either five (5) or eight (8) parking spaces plus one (1) open space, the vehicle stackers would present an open parking stall that, once occupied, would automatically shift downward or rotate, presenting another open stall. This system would allow valets to retrieve vehicles without the need to move the accompanying vehicle.

The parking garage was also reviewed for vehicle access using vehicle turning-movement templates. Based on the site plan configuration, all vehicles entering the upper B1 level of the garage would be subject to the garage's 9' 7" height clearance. Because the four accessible parking spaces are located on the B1 level, this meets the minimum vertical clearance for accessible passenger loading zones. Vehicles entering the lower B2 level of the garage would be subject to an 8' 1" height clearance at the lowest point on the descending ramp. Both parking levels would accommodate all passenger vehicle sizes. Analysis using the appropriate turning templates also shows that passenger vehicles accessing the parking area of the garage would be required to make a sharp 90-degree right turn at the bottom of the ramp. The radius of the right turn would not allow vehicles to stay in their lane, and instead would encroach into the lane of vehicles traveling in the opposite direction. The project should consider including convex mirrors at the bottom of the ramp to allow vehicles going up or down the ramp to see each other around the turn.

Pedestrian access between the project parking structure and the on-site uses would be provided via elevators and stairways located within the garage. The elevators and stairways would provide direct access to either the building's main lobby, or to an exit corridor, and are located in the southwest corner, along the northern edge, and at the center of the garage (see Figure 6).

Parking Stall Dimensions

According to the project site plan, the project proposes standard-sized (8.5 feet wide by 18 feet long) stalls, which would meet the City's off-street parking design standard. Van accessibility is provided at one of the ADA accessible stall locations.

The City of Palo Alto Zoning Code states that mechanical-stack parking systems must at least accommodate full-size cars as well as mid-size sport utility vehicles. The project as proposed would include the use of the CityLift Model No. 3LP puzzle stacker system at the B2 level of the parking structure, which would consist of standard-size (8.5 feet wide by 18 feet long) parking stall dimensions and a height of about 7 feet. The 7-foot vehicle clearance would be adequate for almost all passenger cars and trucks as well as mid-sized vehicles. Therefore, the proposed mechanical-

stack parking system would comply with the City's Zoning Code. The site plan also shows 57 non-parking lift stalls (including five EV equipped) that could accommodate taller vehicles.

Bike and Pedestrian On-site Circulation

The project plan provides adequate pedestrian circulation on site, as well as between the site and the surrounding transportation system. The site plan shows continuous walkways along the western and southern edges of the site, including a pedestrian walkway that would connect the outdoor patio on the east side of the building to the sidewalks on El Camino Real. The outdoor patio would be supplied with benches and landscaping, as well as easy access to the hotel lobby and drop-off/pick-up area. The site plan shows visible and audible warning signs at the southern driveway to alert pedestrians and bicyclists of vehicles exiting the garage. The signs would be placed to be visible to pedestrians on the sidewalk.

Bicycle parking would be located adjacent to the drop-off/pick-up area near the building entrance and by the staircase on the north side of the building complex (see Figure 5). This would allow bicyclists to enter/leave the project site using either the project driveways or sidewalks along El Camino Real and connect to the Class III arterial bikeway on El Camino Real.

Truck Access and Circulation

As proposed, the project building would comprise a total of 51,300 gross floor area. In accordance with the City's Zoning Code (Section 18.52.040), a hotel building with a gross floor area between 10,000 square feet and 99,999 square feet is required to provide a minimum of one off-street loading/unloading space to serve deliveries. Truck activities for the project are not expected to occur within the garage due to height limitations. The required loading space is shown within the porte cochere drop-off/pick-up area, adjacent to the building entrance.

The porte cochere area was reviewed for truck access using truck turning-movement templates for a SU-30 truck type, which represent small emergency vehicles, garbage trucks, and small to medium delivery trucks. The analysis showed that the porte cochere could accommodate trucks of this type.

Garbage Collection

The site plan shows one on-site trash room located near the northern corner of the project site. A curb cut is shown for trucks to be able to access the trash area. The curb cut would ensure that cars would not park and block the trash area.

Parking Analysis

The City of Palo Alto Parking Code (Section 18.52.040) states that hotel uses are to provide 1.0 parking space per guestroom plus the applicable requirement for eating and drinking, banquet, assembly, commercial or other as required for such uses, less up to 75% of the spaces required for guestrooms. Given that the included business center and restaurant would only serve as ancillary uses to the hotel, the project as proposed is required to provide a minimum parking of 100 spaces based on the proposed 100 guest rooms. For non-residential projects with mechanical-stack parking systems, the City of Palo Alto Zoning Code requires a minimum of two spaces or 10 percent of the total parking spaces provided (whichever is greater) be non-mechanical parking spaces. Thus, of the required 100 spaces, at least 10 spaces are to be non-mechanical parking spaces.

Based on the project site plan dated October 17, 2018, the parking garage would provide a total of 85 parking spaces consisting a total of 57 non-lift spaces and 28 mechanical-stack parking spaces. The proposed parking supply would not meet the City's Parking Code, with the project being 15 parking spaces short of the City's parking requirement. This represents a parking deficit of approximately 15 percent. Given that the project proposes a parking reduction, a TDM Plan is required. Projects located within the El Camino Real Corridor providing a TDM Plan have a minimum trip reduction target of 30 percent, per the *2030 Palo Alto Comprehensive Plan*.

The Palo Alto Parking Code allows up to a 20 percent parking reduction for transportation and parking alternatives via a TDM plan. Thus, the proposed parking with a 15 percent reduction would comply with the City code. However, all parking reductions and adjustments are a discretionary action and subject to the Planning Director's approval. Therefore, the project applicant should coordinate with City staff to determine if the proposed transportation and parking alternatives within its TDM Plan are acceptable.

Per the California Building Code (CBC) Table 11B-6, four (4) ADA accessible spaces are required for projects with 76 to 100 parking spaces. Of the required accessible parking spaces, one van accessible space is required. The plans show a total of four (4) accessible spaces located within the below-grade parking structure. Of the provided ADA accessible spaces, one (1) is shown to be van accessible. Thus, the project adheres to the CBC accessible parking provisions.

Bicycle Parking

The City's municipal code requires a minimum bike parking supply of one space per 10 guestrooms, with all spaces being short-term stalls. Therefore, the project as proposed is required to provide a minimum bicycle parking of 10 spaces. As previously mentioned, the project would provide bicycle parking adjacent to the drop-off/pick-up area near the building entrance and by the staircase on the north side of the building complex. The bike area would consist of six (6) short-term bike racks comprising a total of 12 available spaces. Thus, the project as proposed would conform to the City's Bicycle Parking Code.

Vehicle Queuing Analysis

The analysis of intersection level of service was supplemented with an analysis of traffic operations at the El Camino Real/Dinahs Court intersection, where the project would add U-turns. The operations analysis is based on vehicle queuing for high demand left-turn movements at intersections. Vehicle queues were estimated using a Poisson probability distribution, which estimates the probability of "n" vehicles for a vehicle movement using the following formula:

$$P(x=n) = \frac{\lambda^n e^{-(\lambda)}}{n!}$$

Where:

P (x=n) = probability of "n" vehicles in queue per lane
n = number of vehicles in the queue per lane
λ = average # of vehicles in the queue per lane (vehicles per hr per lane/signal cycles per hr)

The basis of the analysis is as follows: (1) the Poisson probability distribution is used to estimate the 95th percentile maximum number of queued vehicles per signal cycle for a particular movement; (2) the estimated maximum number of vehicles in the queue is translated into a queue length, assuming 25 feet per vehicle; and (3) the estimated maximum queue length is compared to the

existing or planned available storage capacity for the movement. This analysis thus provides a basis for estimating future turn pocket storage requirements at signalized intersections.

The 95th percentile queue length value indicates that during the peak hour, a queue of this length or less would occur on 95 percent of the signal cycles. Or, a queue length longer than the 95th percentile queue would only occur on 5 percent of the signal cycles (about 3 cycles during the peak hour for a signal with a 60-second cycle length). Therefore, left-turn storage pocket designs based on the 95th percentile queue length would ensure that storage space would be exceeded only 5 percent of the time. The 95th percentile queue length is also known as the "design queue length."

The operations analysis shows that the estimated queues at Dinah's Court would not exceed the available storage length. Field observations confirmed that the existing queue lengths are contained within the pocket. (see Table 4).

Table 4
Queuing Analysis Summary

Measurement	El Camino Real and Dinahs Court SBL/SBU AM	El Camino Real and Dinahs Court SBL/SBU PM
Existing		
Cycle/Delay [1] (sec)	150	150
Volume (vphpl)	60	49
Total 95th %. Queue (veh.)	5	5
Total 95th %. Queue (ft.) [2]	125	125
Total Storage	225	225
Adequate (Y/N)	Y	Y
Existing Plus Project		
Cycle/Delay [1] (sec)	150	150
Volume (vphpl)	66	54
Total 95th %. Queue (veh.)	6	5
Total 95th %. Queue (ft.) [2]	150	125
Total Storage	225	225
Adequate (Y/N)	Y	Y

Notes:
SBL = southbound left movement; SBU = southbound U-turn movement
[1] Vehicle queue calculations based on cycle length for signalized intersections.
[2] Assumes 25 Feet Per Vehicle Queued.

Pedestrian, Bicycle, and Transit Analysis

Pedestrian and Bicycle Facilities

Pedestrian facilities in the study area consist of sidewalks, crosswalks, and pedestrian signals at signalized intersections. Currently, sidewalks exist along both sides of El Camino Real, and marked crosswalks with pedestrian push-buttons are provided along all approaches of the El Camino Real/Dinahs Court intersection, except along the southern approach. According to the project plans, the proposed project would widen the existing sidewalk (currently approximately 8 feet wide) to 12 feet wide along the project frontage on El Camino Real. The additional pedestrian space would provide adequate access to the hotel lobby area. This aligns with the goals found in the *2030 Palo Alto Comprehensive Plan* and the *2012 Palo Alto Bicycle + Pedestrian Transportation Plan* to provide improvements that improve bicycle and pedestrian connectivity as well as encourage and support bicycling and walking. Therefore, although some crosswalk connections are missing, the overall network of sidewalks and crosswalks in the study area has adequate connectivity and provides pedestrians with safe routes to transit services and other points of interest in the vicinity of the project site.

Bicycle facilities in the immediate vicinity of the project site consist of bike lanes along Arastradero Road/Charleston Road, between Foothill Expressway and Rengstorff Avenue. The *2012 Palo Alto Bicycle + Pedestrian Transportation Plan* lists several improvements for bicycle and pedestrian facilities in the study area, including installing a Class III shared bikeway along El Camino Real, between Maybell Avenue and the city limits.

Note that the project would not remove any pedestrian or bicycle facilities, nor would it conflict with any adopted plans or policies for new pedestrian or bicycle facilities.

Transit Services

The project site is adequately-served by transit. Existing transit services near the project site are provided by the Santa Clara Valley Transportation Authority (VTA). The nearest bus stops are located just south of the El Camino Real/Dinahs Court intersection and across from the project site at El Camino Real and Tamarack. The nearby bus stops provide access to Route 22 and Rapid Route 522, which both extend from the Palo Alto Transit Center to the Eastridge Transit Center with approximately 15-minute headways.

Per the 2016 U.S. Census, the City of Palo Alto comprises a modal split of approximately 5% for public transit services. This roughly equates to about two transit trips during the AM and one transit trip during the PM peak commute hours. Given that fact that transit riders would be dispersed throughout the peak hour between the two bus routes, the additional project-generated transit riders are not expected to exceed the carrying capacity of the bus services near the project site.

Conclusions

This study was conducted for the purpose of identifying potential traffic impacts related to the proposed Caterina Hotel development at 4256 El Camino Real in Palo Alto, California. Based on the standards set forth by the City of Palo Alto and the CMP, the results of the intersection level of service analysis show that the proposed project would not result in a significant impact at the nearby El Camino Real/Dinahs Court intersection under existing and existing plus project conditions.

- Given that the project proposes a parking reduction, a TDM Plan is required. Projects located within the El Camino Real Corridor providing a TDM Plan have a minimum trip reduction target of 30 percent, per the *2030 Palo Alto Comprehensive Plan*.

- Based on the sight distance at the project driveways, red curb should be painted between the two project driveways, to ensure an unobstructed view for drivers exiting the site.

- Based on the on-site circulation analysis, the project should consider including a convex mirror at the bottom of the parking ramps at both levels of the subterranean parking garage to assist drivers with the sharp turn.

- The proposed parking supply is 15 parking spaces short of the City's parking requirement, which represents a parking deficit of approximately 15 percent. Although this reduction is allowable when the project provides a TDM plan, all parking reductions and adjustments are a discretionary action and subject to the Planning Director's approval. Therefore, the project applicant should coordinate with City staff to determine if the proposed transportation and parking alternatives within its TDM Plan are acceptable.