URBAN | CROSSROADS

GOODMAN COMMERCE CENTER

TRAFFIC ANALYSIS

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Reference Number	Agency	Date
15593-05 TA Report	City of Cypress	January 11, 2024

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
CAMUTCD	California Manual on Uniform Traffic Control Devices
Caltrans	California Department of Transportation
CMP	Congestion Management Program
E+P	Existing plus Project
HCM	Highway Capacity Manual
ICU	Intersection Capacity Utilization
ITE	Institute of Transportation Engineers
LOS	Level of Service
OCTA	Orange County Transit Authority
PCE	Passenger Car Equivalent
PHF	Peak Hour Factor
Project	Goodman Commerce Center
SCAQMD	South Coast Air Quality Management District
TA	Traffic Analysis
v/c	Volume to Capacity
vphgpl	Vehicles per Hour Green per Lane

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1 INTRODUCTION

This report presents the results of the Traffic Analysis (TA) for Goodman Commerce Center development ("Project"), which is located at 5665 Plaza Drive (Assessor's Parcel Number: 241-101-26) in the City of Cypress, as shown on Exhibit 1-1. The purpose of this TA is to evaluate the potential circulation system deficiencies that may result from the development of the proposed Project, and where necessary recommend improvements to achieve acceptable operations consistent with the City's General Plan level of service goals and policies. This TA has been prepared in accordance with the City's Transportation Operational Assessment (Level-Of-Service Traffic Study) Guidelines (dated April 2023) and through consultation with City of Cypress staff during the scoping process. (1) The Project traffic study scoping agreement is provided in Appendix 1.1 of this TA, which has been reviewed and approved by the City of Cypress.

1.1 SUMMARY OF FINDINGS

The Project is to construct the following improvements as design features in conjunction with development of the site:

- Project to construct the site frontage improvements needed to accommodate site access along Plaza Drive/Douglas Drive.
- Project to install stop controls for all egress traffic from each Project driveway. All driveways along Plaza Drive/Douglas Drive will accommodate full access (no turn restrictions).

Additional details and intersection lane geometrics are provided in Section 1.6 *Recommendations* of this report. The Project is not anticipated to require the construction of any off-site improvements but would be subject to contribute fair share and/or pay requisite fees consistent with the City's requirements (see Section 7 *Local and Regional Funding Mechanisms)*.

1.2 PROJECT OVERVIEW

A preliminary site plan for the proposed Project is shown on Exhibit 1-2. The Project includes the development of a 191,394 square foot warehouse building. The TA evaluates 191,394 square feet of high-cube cold storage warehouse use. The proposed Project will replace an existing 150,626 square foot office building. The anticipated Opening Year for the proposed Project is 2025. Access to the site will be accommodated via two driveways at Plaza Drive and Douglas Drive. In order to develop the traffic characteristics of the proposed project, trip-generation statistics published in the Institute of Transportation Engineers (ITE) Trip Generation Manual (11th Edition, 2021). (2) The Project is anticipated to generate a total of 406 two-way trips per day with 21 AM peak hour trips and 24 PM peak hour trips (actual vehicles). The assumptions and methods used to estimate the Project's trip generation characteristics are discussed in greater detail in Section 4.1 *Project Trip Generation* of this report.

EXHIBIT 1-1: LOCATION MAP

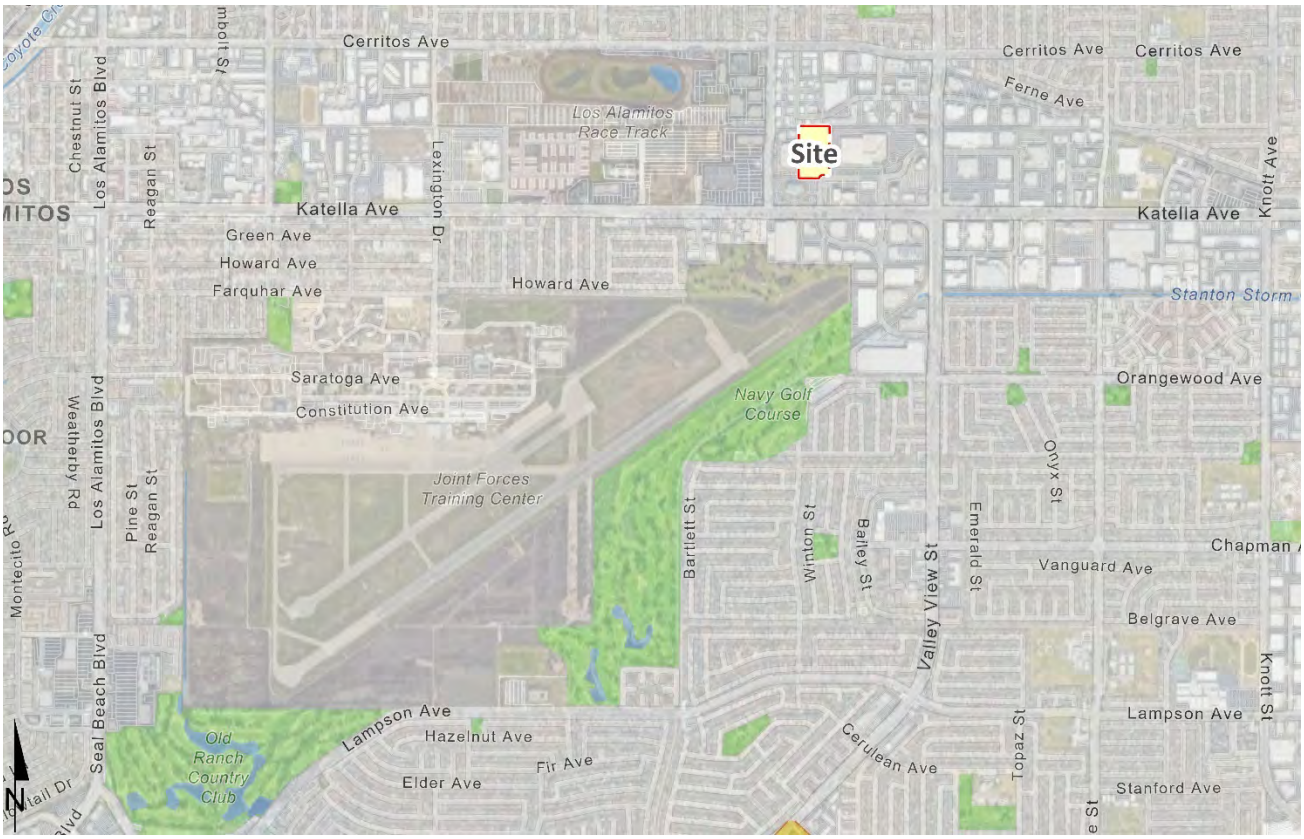
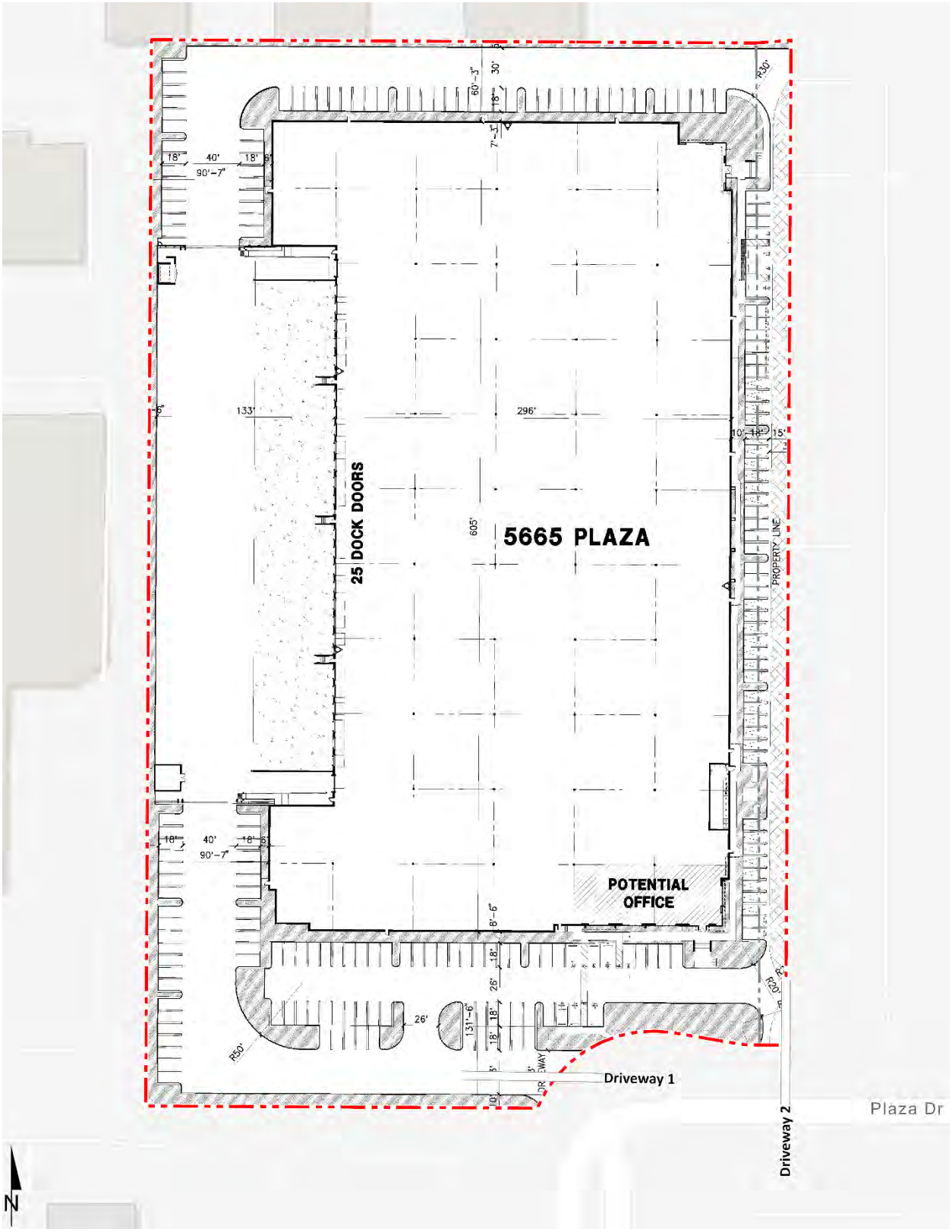


EXHIBIT 1-2: PRELIMINARY SITE PLAN



1.3 ANALYSIS SCENARIOS

For the purposes of this traffic study, potential deficiencies to traffic and circulation have been assessed for each of the following conditions:

- Existing (2023) Conditions
- Existing plus Project (E+P)
- Future Year (2025) Without Project
- Future Year (2025) With Project

1.3.1 EXISTING (2023) CONDITIONS

Information for Existing (2023) conditions is disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared. Traffic volume utilized for the intersection operations analyses are based on 2022 traffic counts in conjunction with the application of a two percent adjustment/growth factor to reflect 2023 traffic conditions. For a detailed discussion on the existing traffic counts, see Section 3.6 *Existing Traffic Counts*.

1.3.2 E+P CONDITIONS

The E+P conditions analysis determines the potential circulation system deficiencies based on a comparison of the E+P traffic conditions to Existing conditions. The roadway network is similar to Existing conditions except for new connections to be constructed by the Project. Cumulative development projects and ambient growth are not included for E+P traffic conditions.

1.3.3 FUTURE YEAR (2025) CONDITIONS

The Future Year (2025) traffic conditions analysis determines the potential near-term cumulative circulation system deficiencies. The roadway network is similar to Existing conditions except for new connections to be constructed by the Project. To account for background traffic growth, an ambient growth factor from Existing (2023) conditions of 4.04% (2 percent per year, compounded over 2 years) is included for Future Year (2025) traffic conditions. Conservatively, this TA estimates the area ambient traffic growth and then adds traffic generated by other known or probable related projects. These related projects are at least in part already accounted for in the assumed ambient growth rates; and some of these related projects may not be implemented and operational within the 2025 Opening Year time frame assumed for the Project. The resulting traffic growth utilized in the TA (ambient growth factor plus traffic generated by related projects) would therefore tend to overstate rather than understate background cumulative traffic deficiencies under 2025 conditions.

1.4 STUDY AREA

To ensure that this TA satisfies the City of Cypress's traffic study requirements, Urban Crossroads, Inc. prepared a Project traffic study scoping package for review by City of Cypress staff prior to the preparation of this report. This agreement provides an outline of the Project study area, trip generation, trip distribution, and analysis methodology. The agreement approved by the City is included in Appendix 1.1 of this TA.

The 4 study area intersections shown on Exhibit 1-3 and listed in Table 1-1 were selected for evaluation in this TA based on consultation with City of Cypress staff. At a minimum, the study area includes intersections where the Project is anticipated to contribute 25 or more peak hour trips per the City's Guidelines. (1) The 25 peak hour trip criterion has been used for the purposes of estimating a potential area of influence (i.e., study area).

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

#	Intersection	Jurisdiction	CMP?
1	Douglas Dr./Warland Dr. & Katella Av.	City of Cypress	No
2	Douglas Dr./Dwy. 2 & Dwy. 1/Plaza Dr.	City of Cypress	No
3	Existing Driveway/McDonnell Dr. & Plaza Dr.	City of Cypress	No
4	Valley View St. & Plaza Dr./Chip Av.	City of Cypress	No

The intent of a Congestion Management Program (CMP) is to more directly link land use, transportation, and air quality, thereby prompting reasonable growth management programs that will effectively utilize new transportation funds, alleviate traffic congestion and related deficiencies, and improve air quality. The County of Orange CMP became effective with the passage of Proposition 111 in 1990 and most recently updated in 2021. (3) There are no study area intersections identified as a CMP intersection.

1.5 DEFICIENCIES

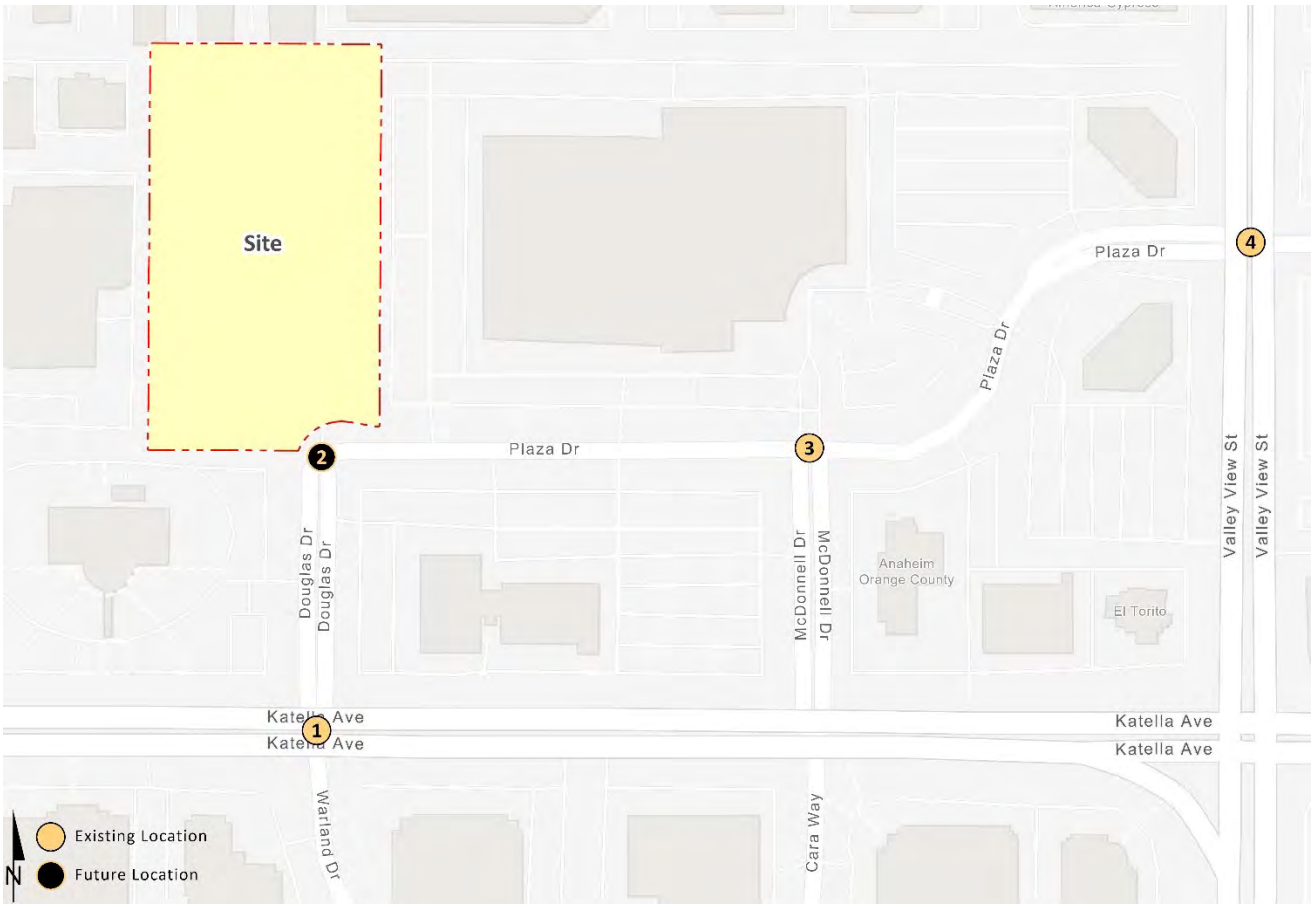
This section provides a summary of deficiencies by analysis scenario. Section 2 *Methodologies* provides information on the methodologies used in the analysis, Section 5 *Existing plus Project Traffic Conditions,* and Section 6 *Future Year (2025) Traffic Conditions* include the detailed analysis. A summary of level of service (LOS) results for all analysis scenarios is presented in Table 1-2.

TABLE 1-2: SUMMARY OF LOS

		Existing		E+P		2025 NP		2025 WP	
#	Intersection	AM	PM	AM	PM	AM	PM	AM	PM
1	Douglas Dr./Warland Dr. & Katella Av.	●	●	●	●	●	●	●	●
2	Douglas Dr./Dwy. 2 & Dwy. 1/Plaza Dr.	●	●	●	●	●	●	●	●
3	Existing Driveway/McDonnell Dr. & Plaza Dr.	●	●	●	●	●	●	●	●
4	Valley View St. & Plaza Dr./Chip Av.	●	●	●	●	●	●	●	●

● = A - D ● = E ● = F

EXHIBIT 1-3: STUDY AREA



1.5.1 EXISTING (2023) CONDITIONS

The study area intersections are currently operating at an acceptable LOS during the peak hours.

1.5.2 E+P CONDITIONS

The study area intersections are anticipated to continue to operate at an acceptable LOS during the peak hours with the addition of Project traffic.

1.5.3 FUTURE YEAR (2025) CONDITIONS

The study area intersections are anticipated to continue to operate at an acceptable LOS under Future Year (2025) Without and With Project traffic conditions.

1.6 RECOMMENDATIONS

The following recommendations are based on the minimum improvements needed to accommodate site access and maintain acceptable peak hour operations for the proposed Project.

Recommendation 1 – Driveway 2/Douglas Drive & Driveway 1/Plaza Drive (#2) – The following improvements are necessary to accommodate site access:

- Project to install a stop control on the southbound approach and eastbound approach (egress Project traffic) to implement an all-way stop-controlled intersection. Driveway 1/Driveway 2 will accommodate site access for passenger cars and trucks and will accommodate full access (no turn restrictions).
- The northwest curb of Driveway 2 should be modified to accommodate a 25-foot curb radius to accommodate the egress of heavy trucks.

Recommendation 2 – Truck Access & Routing Plan – A revised truck access and routing plan should be prepared for the proposed Project identifying the proposed signage that needs to be implemented on-site to direct trucks per the proposed circulation of trucks as noted in this report.

Recommendation 3 – Douglas Drive/Warland Drive & Katella Avenue – Install a new southbound signal head on the northwest corner for southbound approach vehicles in order to display the signal indication should a truck in the southbound lanes obstruct the existing signal heads on the mast arm. The new signal head is proposed to be mounted on the existing signal pole on the northwest corner.

On-site traffic signing and striping should be implemented agreeable with the provisions of the California Manual on Uniform Traffic Control Devices (CA MUTCD) and in conjunction with detailed in the master signing program and construction plans for the Project site.

Sight distance at each project access point should be reviewed with respect to standard Caltrans and City of Cypress sight distance standards at the time of preparation of final grading, landscape, and street improvement plans.

1.7 TRUCK ACCESS

Due to the typical wide turning radius of large trucks, a truck turning template has been overlaid on the site plan at Driveway 1 and Driveway 2 (at the intersection of Douglas Drive and Plaza Drive) which is anticipated to be utilized by heavy trucks in order to determine appropriate curb radii and to verify that trucks will have sufficient space to execute turning maneuvers. A WB-67 truck (53-foot trailer) has been utilized for the purposes of this analysis. Driveway 1 on Douglas Drive is anticipated to accommodate the ingress and egress of heavy trucks as currently designed to and from the east on Plaza Drive and south on Douglas Drive, however, the northwest curb of Driveway 2 should be modified to accommodate a 25-foot curb radius to accommodate the egress of heavy trucks. Ingress and egress of heavy trucks will also be permitted at Driveway 2 on Plaza Drive.

Exhibit 1-4 and Exhibit 1-5 reflect the inbound and outbound truck access at Driveway 1, respectively. Exhibit 1-6 and Exhibit 1-7 reflect the inbound and outbound truck access at Driveway 2, respectively.

Exhibit 1-8 and Exhibit 1-9 show the inbound and outbound on-site circulation of trucks via Driveway 2 around the north side of the building, respectively. Inbound and outbound on-site circulation of trucks via Driveway 1 around the south side of the building was previously shown on Exhibit 1-4 and Exhibit 1-5. On-site signage will be provided to direct trucks per the proposed/allowable circulation. Trucks backing into the dock bay on-site within the truck court for the building is shown on Exhibit 1-10. Lastly, applicable truck turns at the intersection of Douglas Drive/Warland Drive and Katella Avenue are shown on Exhibit 1-11.

EXHIBIT 1-4: INBOUND TRUCK ACCESS AT DRIVEWAY 1

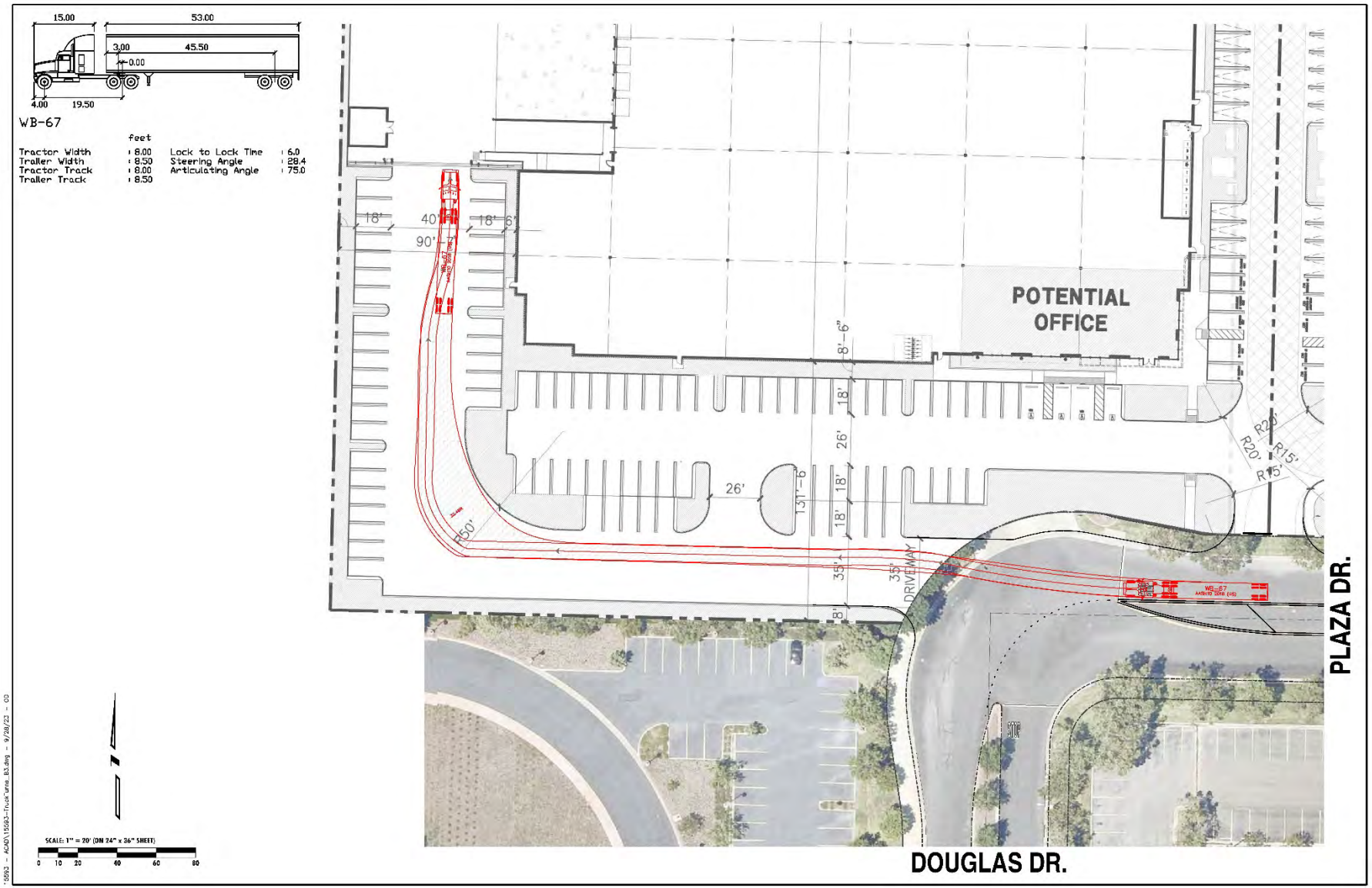


EXHIBIT 1-5: OUTBOUND TRUCK ACCESS AT DRIVEWAY 1

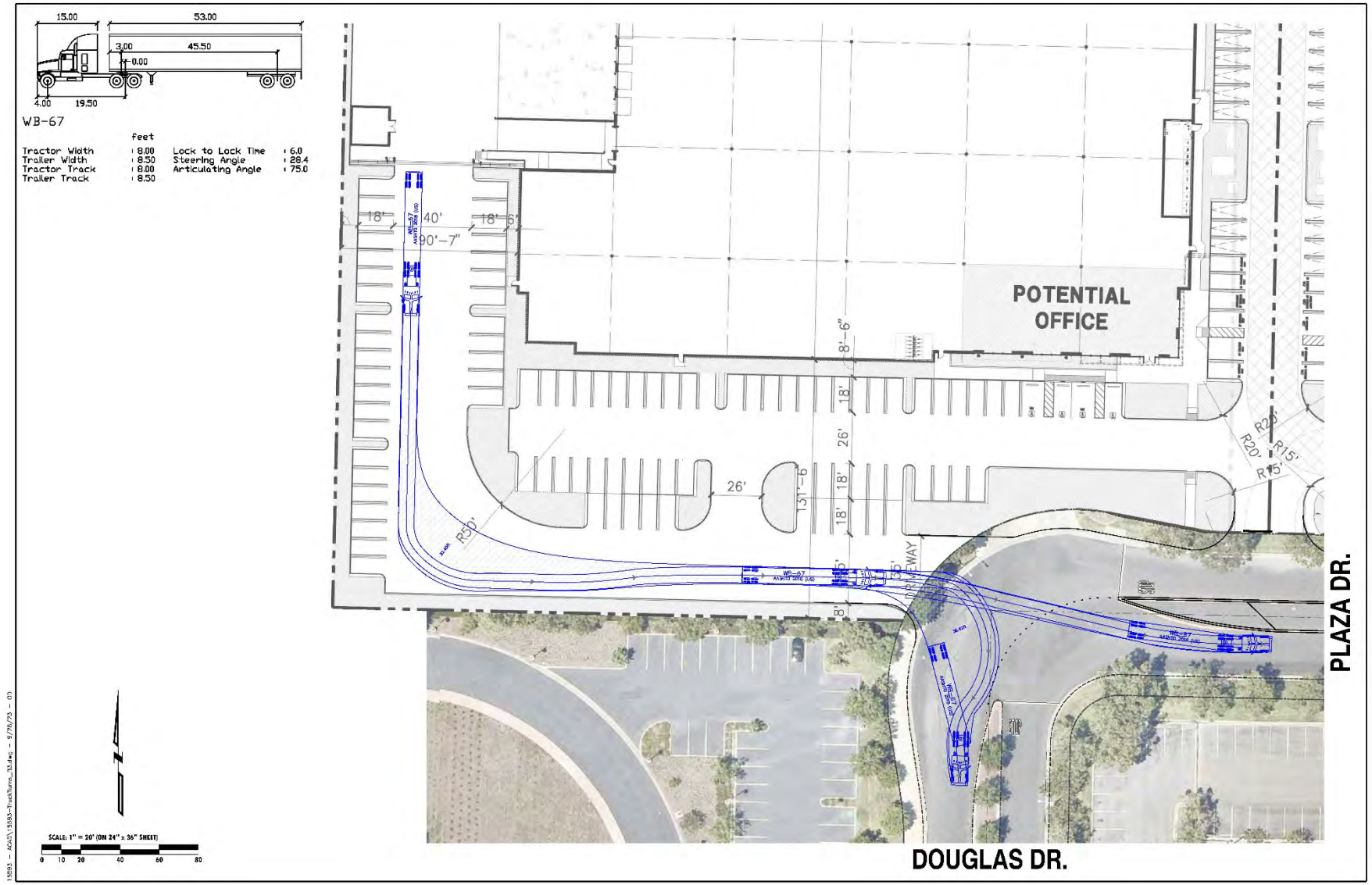


EXHIBIT 1-6: INBOUND TRUCK ACCESS AT DRIVEWAY 2

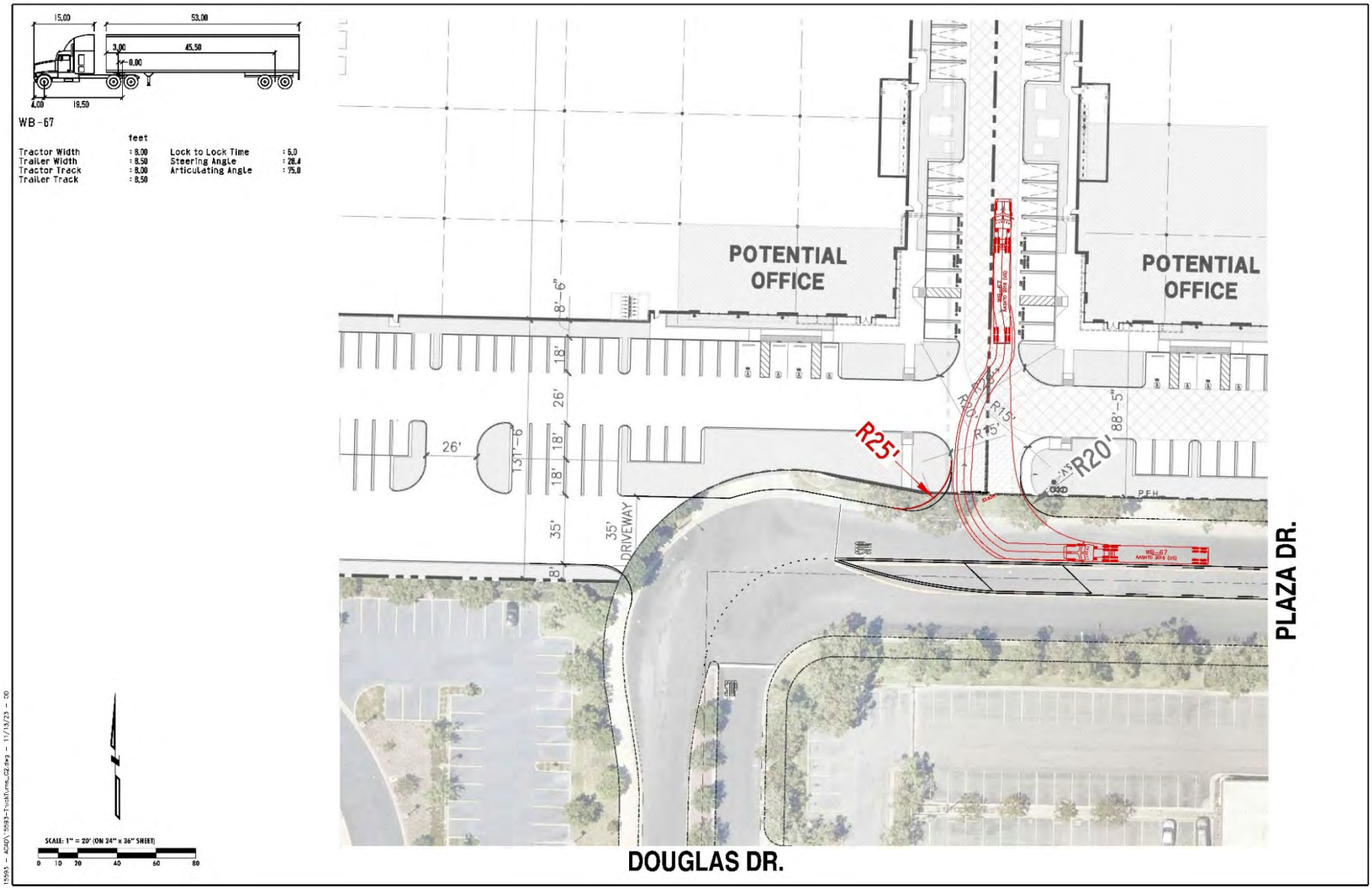


EXHIBIT 1-7: OUTBOUND TRUCK ACCESS AT DRIVEWAY 2

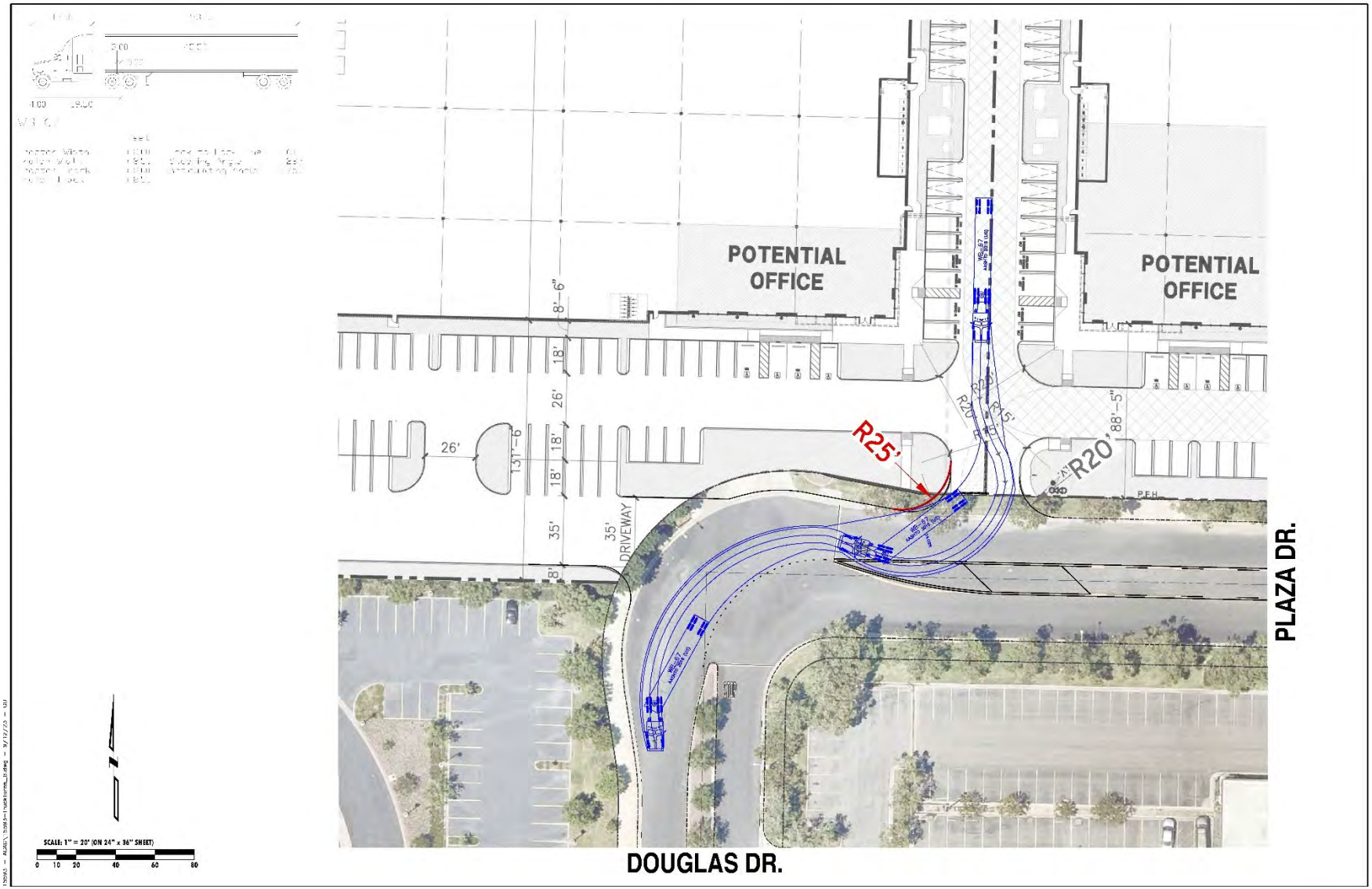


EXHIBIT 1-8: INBOUND ON-SITE TRUCK CIRCULATION VIA DRIVEWAY 2

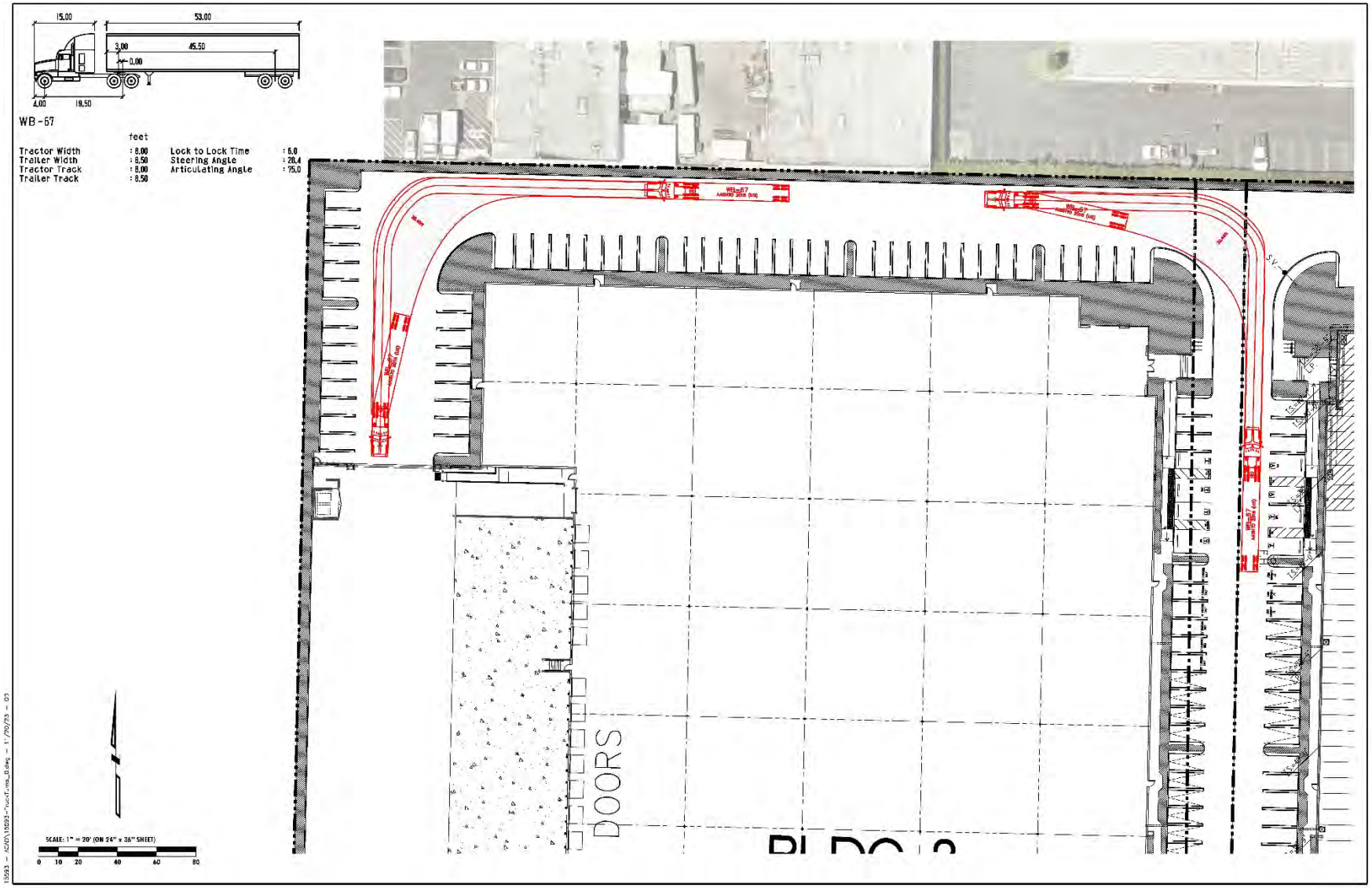


EXHIBIT 1-9: OUTBOUND ON-SITE TRUCK CIRCULATION VIA DRIVEWAY 2

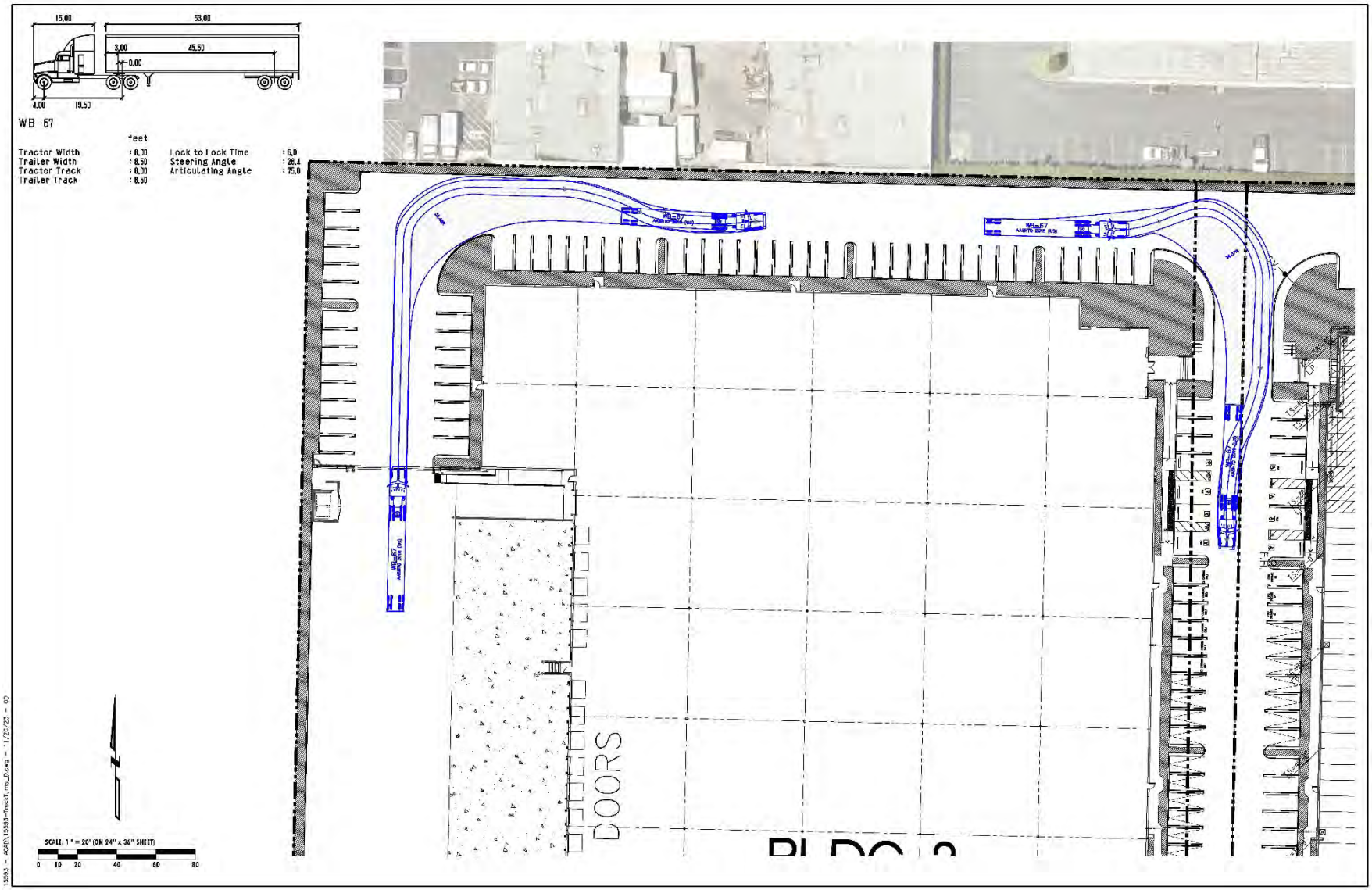


EXHIBIT 1-10: LOADING DOCK TRUCK CIRCULATION

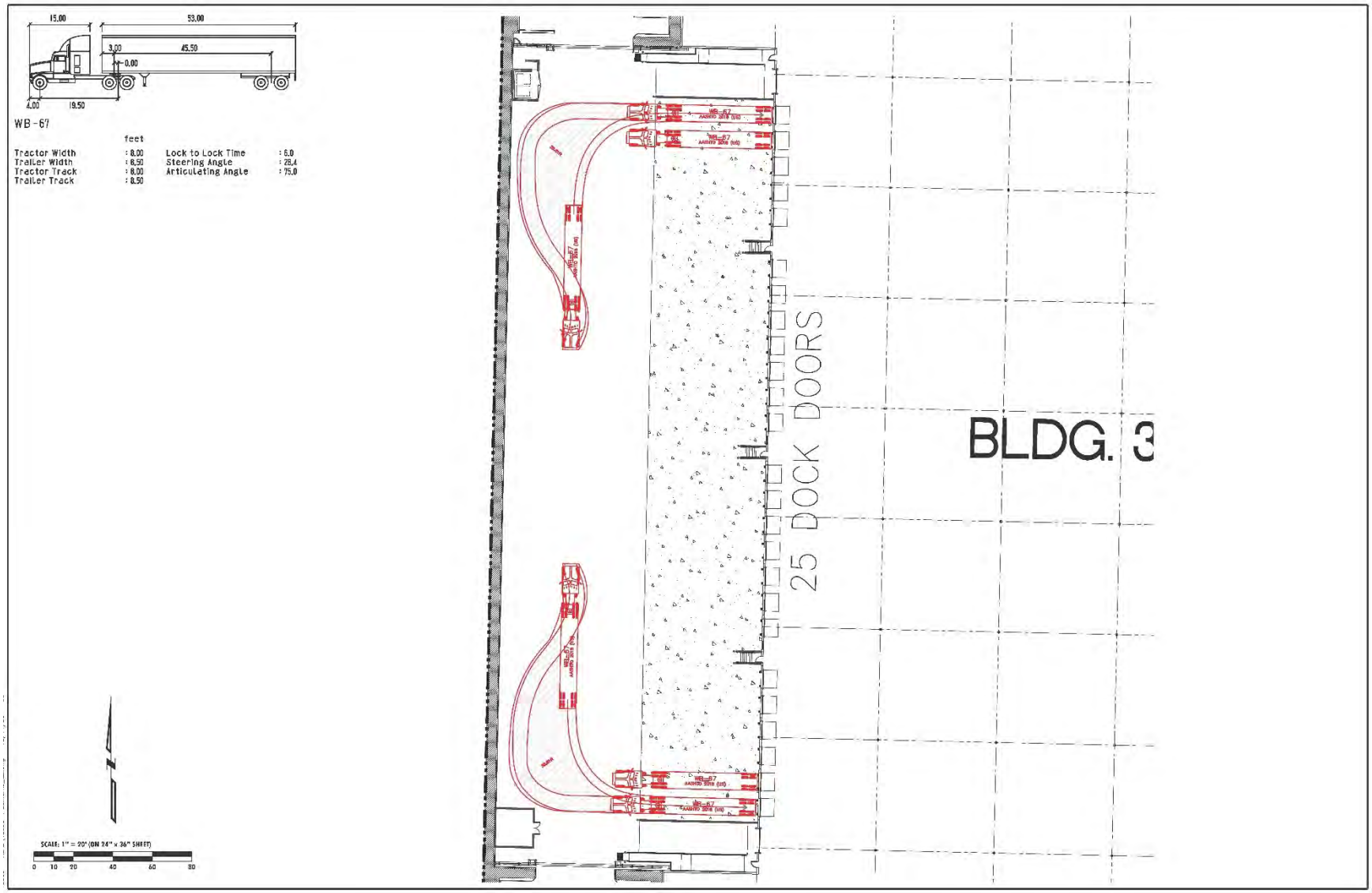
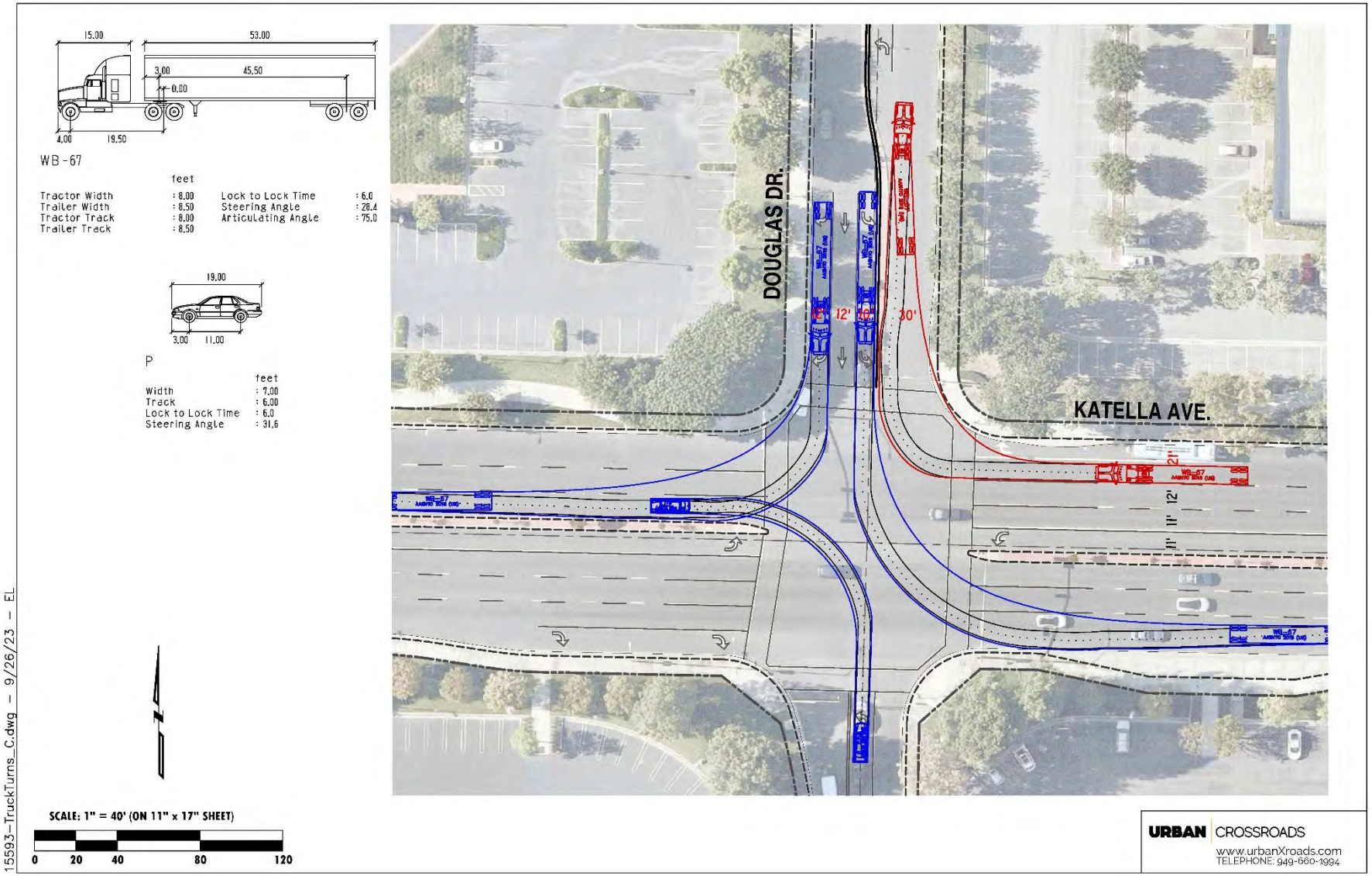


EXHIBIT 1-11: TRUCK ACCESS AT DOUGLAS DR./WARLAND DR. & KATELLA AV.



1.8 QUEUING ANALYSIS

The traffic modeling and signal timing optimization software package SimTraffic has been utilized to assess the queues. SimTraffic is designed to model networks of signalized and unsignalized intersections, with the primary purpose of checking and fine-tuning signal operations. SimTraffic uses the input parameters from Synchro to generate random simulations. These random simulations generated by SimTraffic have been utilized to determine the 95th percentile queue lengths observed for each applicable turn lane. A SimTraffic simulation has been recorded up to 5 times, during the weekday AM and weekday PM peak hours, and has been seeded for 15-minute periods with 60-minute recording intervals.

A queuing analysis has been conducted for all signalized study area intersections under Future Year (2025) With Project traffic conditions to ensure the existing and proposed left turn storage can accommodate the 95th percentile peak hour queues. The results of the queuing analysis are shown in Table 1-3 and the worksheets for the weekday AM and PM peak hours are provided in Appendix 1.2 of this report for Future Year (2025) With Project traffic conditions. As shown in Table 1-3, there are no improvements needed to the turn lane storage lengths.

TABLE 1-3: PEAK HOUR QUEUING ANALYSIS

Intersection	Movement	Available Stacking Distance (Feet)[3]	95th Percentile Queue (Feet) AM Peak	95th Percentile Queue (Feet) PM Peak	Acceptable? [1] AM	Acceptable? [1] PM
Douglas Dr./Warland Dr. & Katella Av.	NBL	115	57	105	Yes	Yes
	SBL	90	20	74	Yes	Yes
	SBR	90	31	53	Yes	Yes
	EBL	250	107	51	Yes	Yes
	EBR	100	39	61	Yes	Yes
	WBL	250	69	32	Yes	Yes
	WBR	130	43	12	Yes	Yes
Douglas Dr./Dwy. 2 & Dwy. 1/Plaza Dr.	NBL/T/R	185	54	54	Yes	Yes
	SBL/T/R	100	0	36	Yes	Yes
	EBL/T/R	100	28	40	Yes	Yes
	WBL/T/R	165	48	57	Yes	Yes
Valley View St. & Plaza Dr./Chip Av.	NBL	190	174	103	Yes	Yes
	EBL[2]	200	58	186	Yes	Yes

NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; L = Left; T = Through; R = Right

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 25 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

[2] The eastbound left turn pocket is striped with 110-feet of storage, however, an additional 90-feet of storage is accommodated before the reverse curve in the raised median (providing a total of 200-feet of storage).

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2 METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are consistent with the County's CMP Guidelines and the City's Transportation Operational Assessment (Level of Service Traffic Study) Guidelines.

2.1 LEVEL OF SERVICE

Traffic operations of roadway facilities are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on several factors, such as speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

2.2 INTERSECTION CAPACITY ANALYSIS

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The 6th Edition Highway Capacity Manual (HCM) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. (4) The HCM uses different procedures depending on the type of intersection control.

2.2.1 SIGNALIZED INTERSECTIONS

Intersection Capacity Utilization (ICU)

The City of Cypress requires signalized intersections are to be evaluated through ICU analysis which compares the peak hour traffic volumes to intersection capacity. Lane capacities of 1,700 vehicles per hour of green time have been assumed for the ICU calculations. 0.05 of volume to capacity (V/C) has been assumed representing 5 percent for the yellow and all-red signal indication and inherent vehicle delay between cycles with an assumed signal cycle of 100 seconds. The ICU LOS definitions based on V/C ratio are presented in Table 2-1. The Traffix software package has been utilized to evaluate the signalized intersections using the ICU methodology with the analysis parameters discussed above.

TABLE 2-1 INTERSECTION CAPACITY UTILIZATION (ICU) LOS DEFINITIONS

Level of Service	Critical Volume to Capacity Ratio
A	0.00 – 0.60
B	0.61 – 0.70
C	0.71 – 0.80
D	0.81 – 0.90
E	0.91 – 1.00
F	>1.00

Source: 2019 Orange County Congestion Management Program (CMP)

Highway Capacity Analysis (HCM)

Intersection LOS operations have also been reported based on the HCM methodology which are based on an intersection's average control delay. (4) Control delays include initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections LOS is related to the average control delay per vehicle and is correlated to a LOS designation as described in Table 2-2.

The traffic modeling and signal timing optimization software package Synchro (Version 11) has been utilized to analyze signalized intersections. Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

TABLE 2-2: SIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0[1]
Operations with very low delay occurring with favorable progression and/or short cycle length.	0 to 10.00	A
Operations with low delay occurring with good progression and/or short cycle lengths.	10.01 to 20.00	B
Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.01 to 35.00	C
Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.01 to 55.00	D
Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.01 to 80.00	E
Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	80.01 and up	F

Source: HCM, 6th Edition

[1] If V/C is greater than 1.0 then LOS is F per HCM.

A saturation flow rate of 1,700 has been utilized for all study area intersections. The peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15-minute volumes. Customary practice for LOS analysis is to use a peak 15-minute rate of flow. However, flow rates are typically expressed in vehicles per hour. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume (e.g., PHF = [Hourly Volume] / [4 x Peak 15-minute Flow Rate]). The use of a 15-minute PHF produces a more detailed analysis as compared to analyzing vehicles per hour. Existing PHFs have been used for all analysis scenarios. Per the HCM, PHF values over 0.95 often are indicative of high traffic volumes with capacity constraints on peak hour flows while lower PHF values are indicative of greater variability of flow during the peak hour. (4)

2.2.2 UNSIGNALIZED INTERSECTIONS

The ICU methodology is not applicable to unsignalized intersections. As such, the operations of unsignalized intersections be evaluated using the methodology described in the HCM. (4) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-3). At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled

movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. Delay for the intersection is reported for the worst individual movement at a two-way stop-controlled intersection. For all-way stop controlled intersections, LOS is computed for the intersection as a whole (average delay).

TABLE 2-3: UNSIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0[1]
Little or no delays.	0 to 10.00	A
Short traffic delays.	10.01 to 15.00	B
Average traffic delays.	15.01 to 25.00	C
Long traffic delays.	25.01 to 35.00	D
Very long traffic delays.	35.01 to 50.00	E
Extreme traffic delays with intersection capacity exceeded.	> 50.00	F

Source: HCM, 6th Edition

[1] If V/C is greater than 1.0 then LOS is F per HCM.

2.3 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term "signal warrants" refers to the list of established criteria used by the California Department of Transportation (Caltrans) and other public agencies to quantitatively justify or determine the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TA uses the signal warrant criteria presented in the latest edition of the Caltrans California Manual on Uniform Traffic Control Devices (CA MUTCD). (5)

The signal warrant criteria for Existing study area intersections are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. The CA MUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (5) Specifically, this TA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing traffic conditions and for all future analysis scenarios for existing unsignalized intersections. Warrant 3 is appropriate to use for this TA because it provides specialized warrant criteria for intersections with urban characteristics. For the purposes of this study, the speed limit was the basis for determining whether Urban or Rural warrants were used for a given intersection. Rural warrants should be used where posted speed limits on the major roadways with unsignalized intersections that are over 40 miles per hour while urban warrants would be used where posted speeds are 40 miles per hour or below.

Traffic signal warrant analyses were performed for the following study area intersection shown in Table 2-4:

TABLE 2-4: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS

#	Intersection
2	Douglas Dr./Dwy. 2 & Dwy. 1/Plaza Dr.
3	Existing Driveway/McDonnell Dr. & Plaza Dr.

The Existing conditions traffic signal warrant analysis is presented in the subsequent section, Section 3 *Area Conditions* of this report. The traffic signal warrant analyses for future conditions are presented in Section 5 *Future Year (2025) Traffic Conditions* of this report. It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

2.4 MINIMUM ACCEPTABLE LEVELS OF SERVICE (LOS)

The definition of an intersection deficiency has been obtained from the City's General Plan. The City of Cypress has adopted a LOS D or better as the desired citywide operating standard for most City streets. However, given the influence of regional traffic on Valley View Street, Lincoln Avenue, and Katella Avenue, which are beyond the control of the City of Cypress, LOS E or better has been adopted as the minimum operating LOS for street segments and intersections on the aforementioned arterials due to the high volume of traffic carried on these roadways.

2.5 DEFICIENCY CRITERIA

For the intersections that lie within the City of Cypress, determination of whether the Project has an adverse effect on intersection operations will be based on a comparison of without and with project levels of service.

For HCM Analysis: For signalized intersections, the traffic operations deficiency shall be determined in accordance with Table 2-5 below:

TABLE 2-5: HCM SIGNALIZED INTERSECTION DEFICIENCY CRITERIA

With Project LOS	Project-Related Increase in Delay (in seconds)
C or better	> 6.0 seconds
D	> 4.0 seconds
E, F	> 2.0 seconds

To determine whether a project's added traffic would result in a deficiency at a study area unsignalized intersection in accordance with the City's HCM methodology, the following criteria shall be applied:

a) Worsens the LOS at an unsignalized intersection from LOS D or better to LOS E or F;

b) Causes an increase in the delay equal to or more than three (3.0) seconds at an unsignalized intersection that operates at LOS E or F with project.

For ICU Analysis: a deficiency at both signalized study intersections will be determined in accordance with Table 2-6:

TABLE 2-6: ICU INTERSECTION DEFICIENCY CRITERIA

Without Project LOS	With Project Volume/Capacity (V/C) Ratio	With Project Level of Service
D	>0.900 or greater	LOS E or F
Without Project LOS	With Project Volume/Capacity (V/C) Ratio	Project-Related increase in V/C
E, F	>0.900 or greater	Equal to or greater than 0.03

Improvements: Any decrease beyond the minimum acceptable LOS due to the addition of project traffic requires alternative corrective measures to return the intersection to an acceptable LOS. For intersections operating below the minimum acceptable LOS prior to the addition of project traffic, and the LOS would be worsened with the addition of project traffic, corrective measures should be identified, if feasible, to return to "without project" condition LOS or V/C (volume/capacity ratio), whichever is greater. Alternative corrective measures to roadway widening which may include the reduction of project traffic volumes through application of signal system upgrades, phasing changes, synchronization, and/or project design improvements which are expected to improve capacity and/or efficiency within the transportation network (e.g., changes to a project's site access or internal circulation scheme) shall be identified with concurrence from the City Traffic Engineer.

3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the City of Cypress General Plan Circulation Network, and a review of existing peak hour intersection operations and traffic signal warrant analyses.

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the scoping agreement with City of Cypress staff (Appendix 1.1), the study area includes a total of 4 existing and future intersections as shown previously on Exhibit 1-3, where the Project is anticipated to contribute 25 or more peak hour trips or were added at the City's request during the scoping process. Exhibit 3-1 illustrates the study area intersections located near the proposed Project and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

3.2 CITY OF CYPRESS GENERAL PLAN CIRCULATION ELEMENT

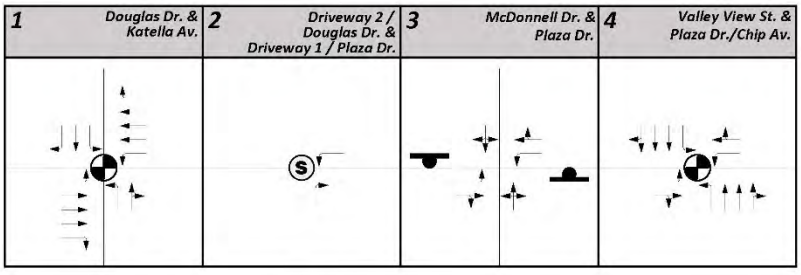
As noted previously, the Project site is located within the City of Cypress. The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on City of Cypress General Plan Circulation Element, are described subsequently. Exhibit 3-2 shows the City of Cypress General Plan Circulation Element and Exhibit 3-3 illustrates the City of Cypress General Plan roadway cross-sections.

Major roadways are six-lane roadways and typically include a raised median. These roadways typically have a 120-foot right-of-way and a 104-foot curb-to-curb measurement. These roadways typically direct traffic through major development areas. The following study area roadways within the City are classified as a Major:

- Katella Avenue
- Valley View Street

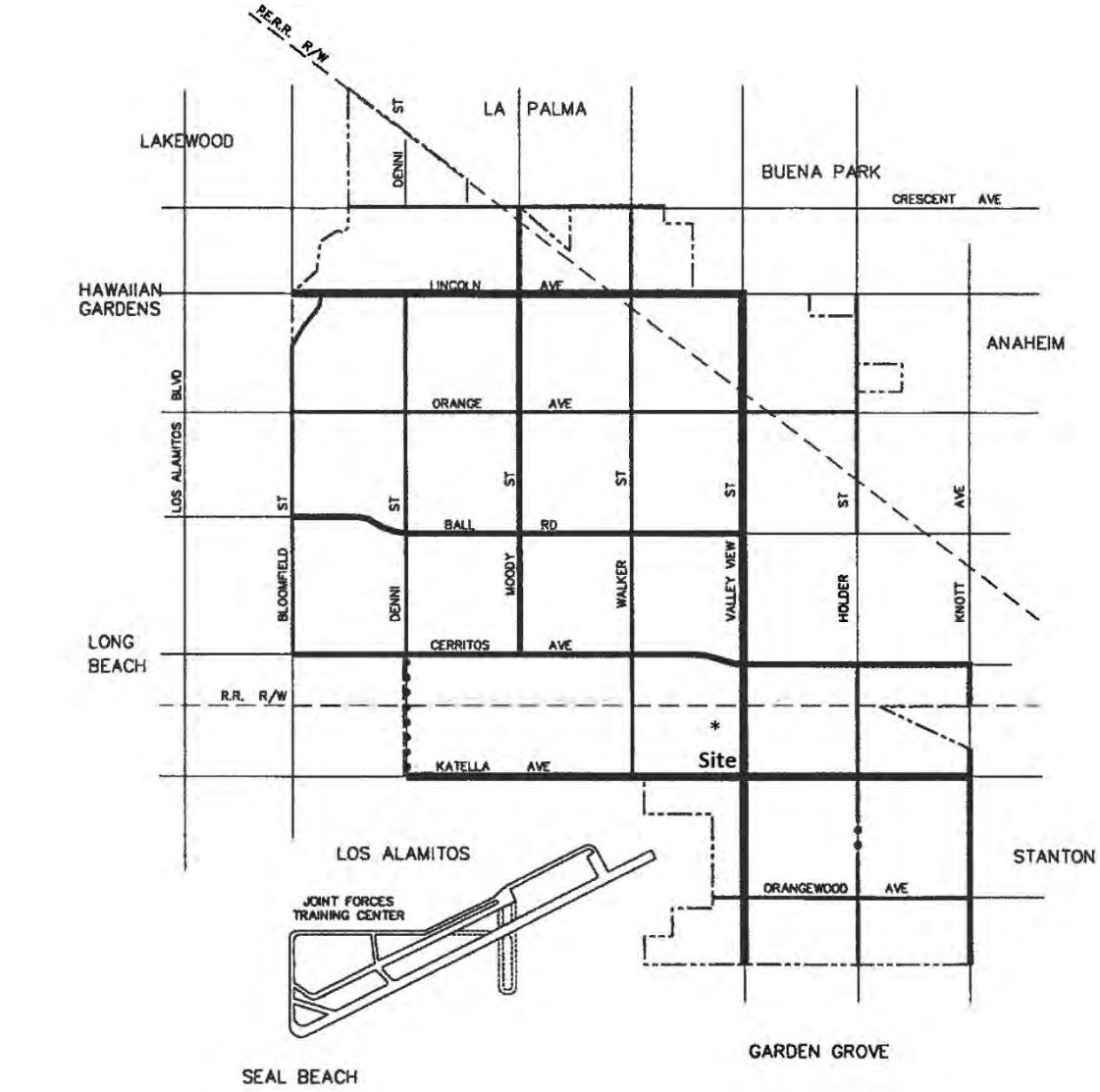
Plaza Drive/Douglas Drive is not a classified General Plan roadway.

EXHIBIT 3-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS



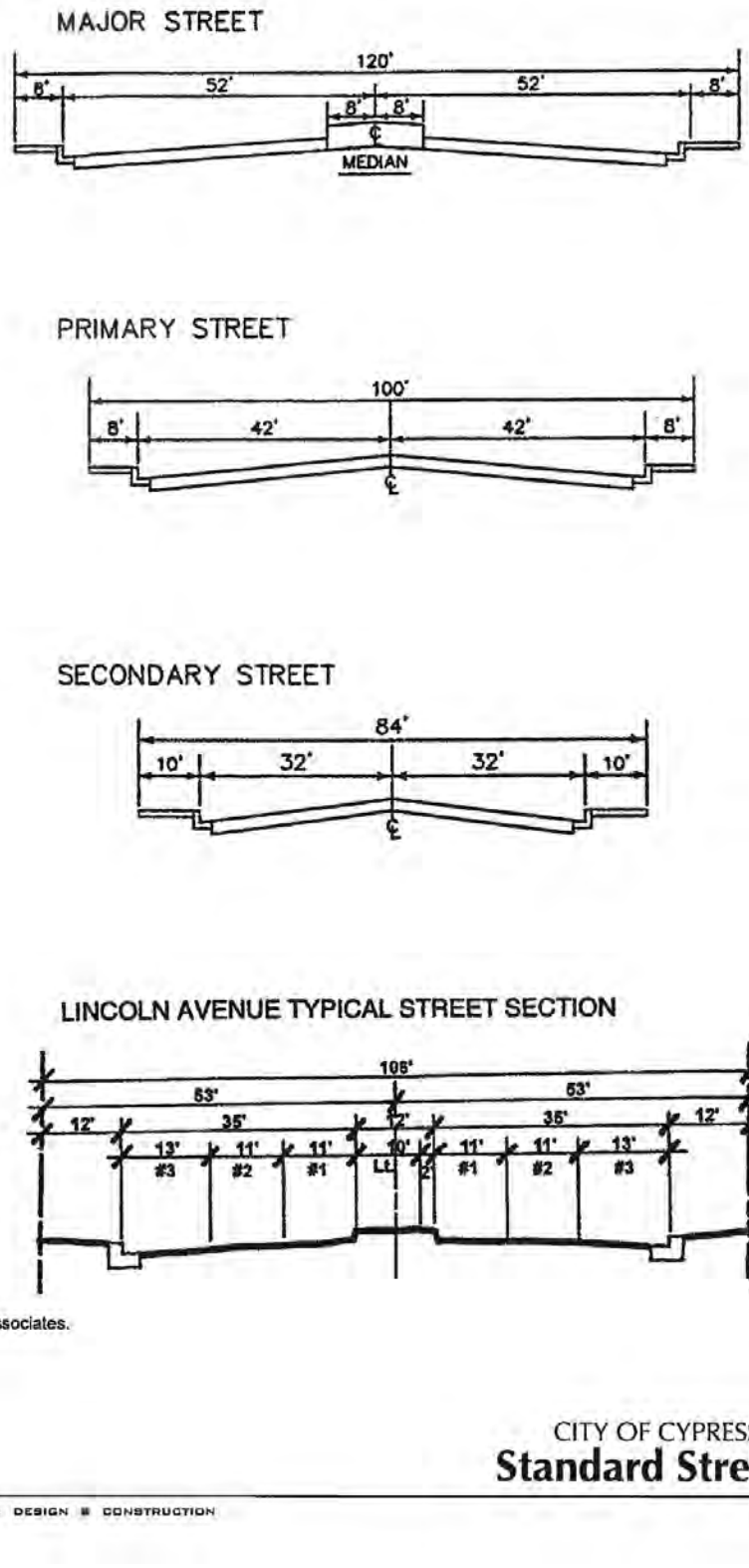
4 = Number of Lanes
D = Divided
U = Undivided
SPEED LIMIT 25 = Speed Limit (MPH)
= Traffic Signal
S = All Way Stop
= Stop Sign
= Traffic Lane

EXHIBIT 3-2: CITY OF CYPRESS GENERAL PLAN CIRCULATION ELEMENT



Source: Kimley-Horn and Associates.

EXHIBIT 3-3: CITY OF CYPRESS GENERAL PLAN ROADWAY CROSS-SECTIONS



3.3 BICYCLE & PEDESTRIAN FACILITIES

The City's bike network is shown on Exhibit 3-4. As shown on Exhibit 3-4, both Katella Avenue and Valley View Street currently accommodate off-street bike paths (there are no on-street bike lanes). Exhibit 3-5 illustrates the existing crosswalks and sidewalks throughout the study area. As shown on Exhibit 3-5, there are pedestrian facilities in place in the vicinity of the Project site along Douglas Drive, Katella Avenue, and Valley View Street. There is a 10-foot sidewalk along the west side of Douglas Drive between the proposed Project down to Katella Avenue to the south. Once completed by the adjacent development to the east, there will be a 5-foot sidewalk along the north side of Plaza Drive providing pedestrian connectivity between the proposed Project and approximately 450-feet west of Valley View Street. The signalized intersection of Douglas Drive at Katella Avenue has striped crosswalks on all approaches with push buttons. All four corners of the intersection of Douglas Drive at Katella Avenue have tactile warning strips and curb access ramps. The intersection of Valley View Street at Plaza Drive/Chip Avenue does not have a marked crosswalk across the north leg of the intersection. All other approaches include striped crosswalks with the appropriate pedestrian push buttons, tactile warning strip, and curb access ramps.

3.4 TRANSIT SERVICE

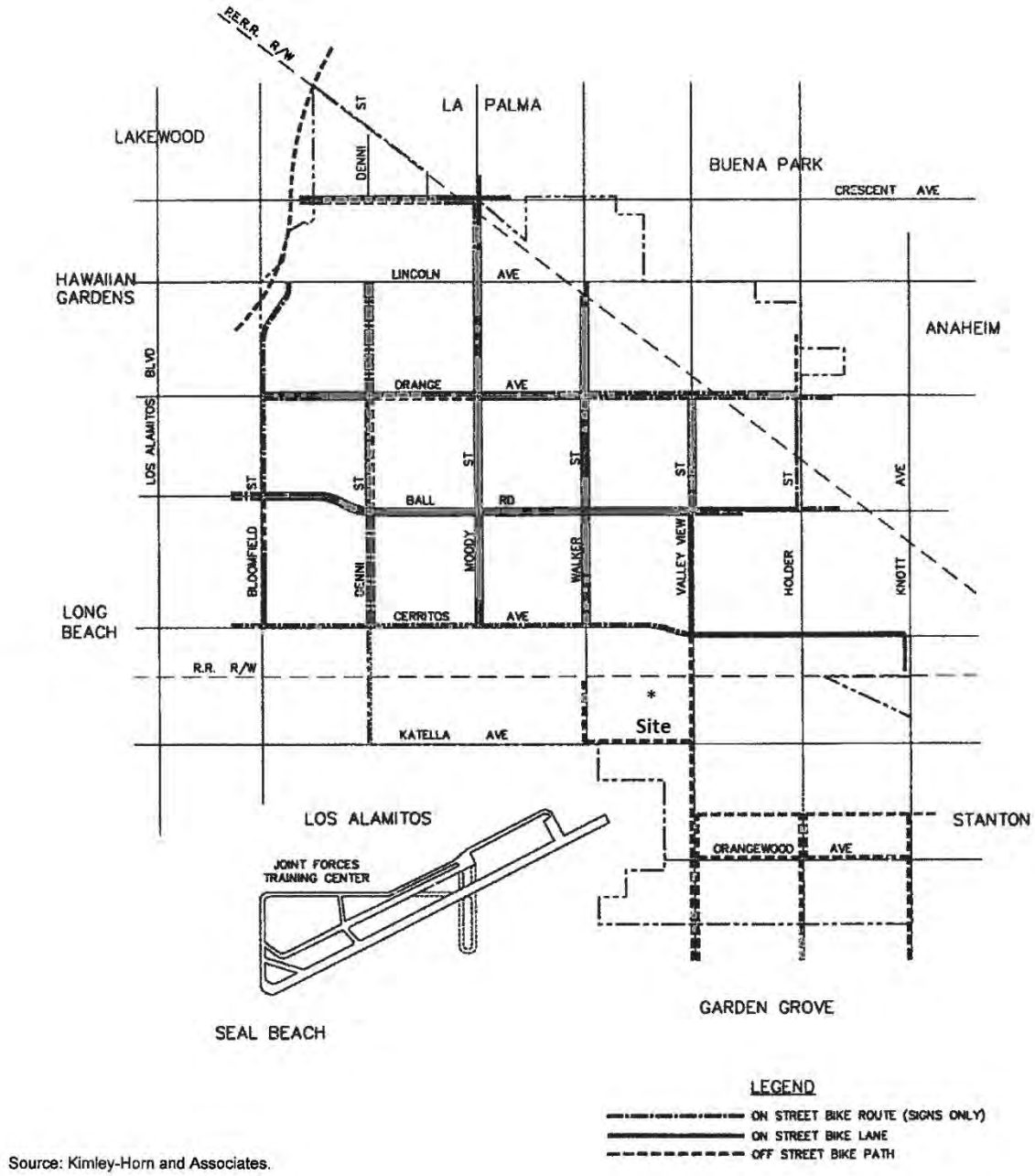
The study area is currently served by Orange County Transit Authority (OCTA) with bus service along Katella Avenue and Valley View Street. OCTA Route 50 runs along Katella Avenue and currently has existing bus stops just east of Douglas Drive and west of Valley View Street along the north side and operates seven days a week. Route 50 runs between Long Beach and Orange (including major stops at the Anaheim Regional Transportation Terminal Center and the VA Hospital in Long Beach). Buses stop approximately every 20-25 minutes during the morning and evening peak commute hours. OCTA Route 123 runs along Valley View Street and there are existing bus stops north of Plaza Drive and only operates Monday through Friday. Route 123 runs between Anaheim and Huntington Beach (including major stops at the Buena Park Metrolink Station, Fullerton Transportation Center, Anaheim Canyon Metrolink Station, and Goldenwest Transportation Center/Park and Ride). Buses stop approximately every hour (60 minutes) during the morning and evening commute hours (operational between 4:00 AM and 10:00 PM).

The existing transit stops are in close proximity to the project site and could serve the site in the future. The transit services are illustrated on Exhibit 3-6. Transit service is reviewed and updated by OCTA periodically to address ridership, budget, and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate.

3.5 TRUCK ROUTES

The City's truck routes are shown on Exhibit 3-7. Both Katella Avenue and Valley View Street adjacent to the Project are identified as City truck routes. These truck routes serve both the proposed Project and future cumulative development projects throughout the study area.

EXHIBIT 3-4: CITY OF CYPRESS GENERAL PLAN BIKE NETWORK



Source: Kimley-Horn and Associates.

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RBF CONSULTING PLANNING ■ DESIGN ■ CONSTRUCTION

CITY OF CYPRESS GENERAL PLAN
Existing Bikeways

Exhibit CIR-4

EXHIBIT 3-5: EXISTING PEDESTRIAN FACILITIES

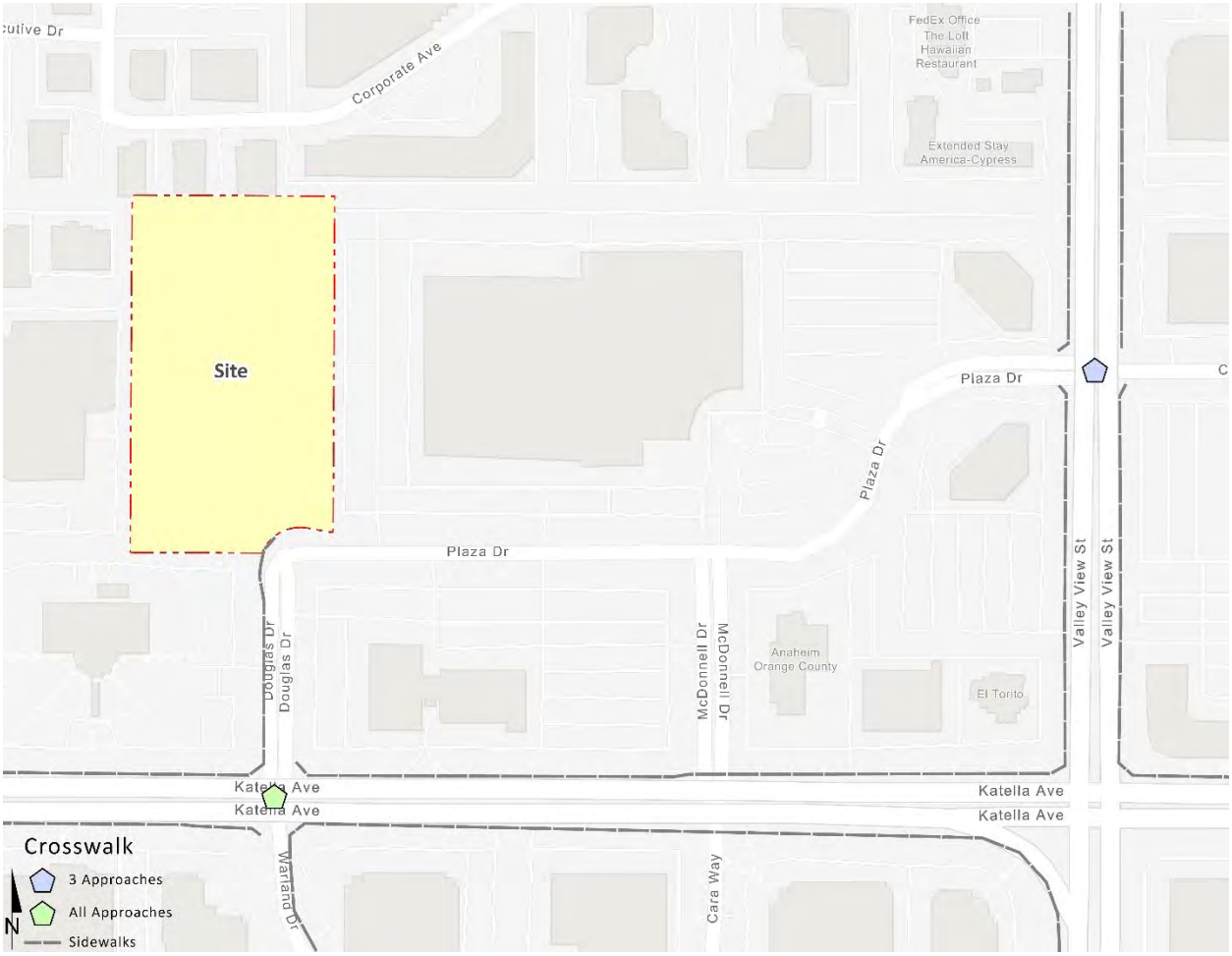


EXHIBIT 3-6: EXISTING TRANSIT ROUTES

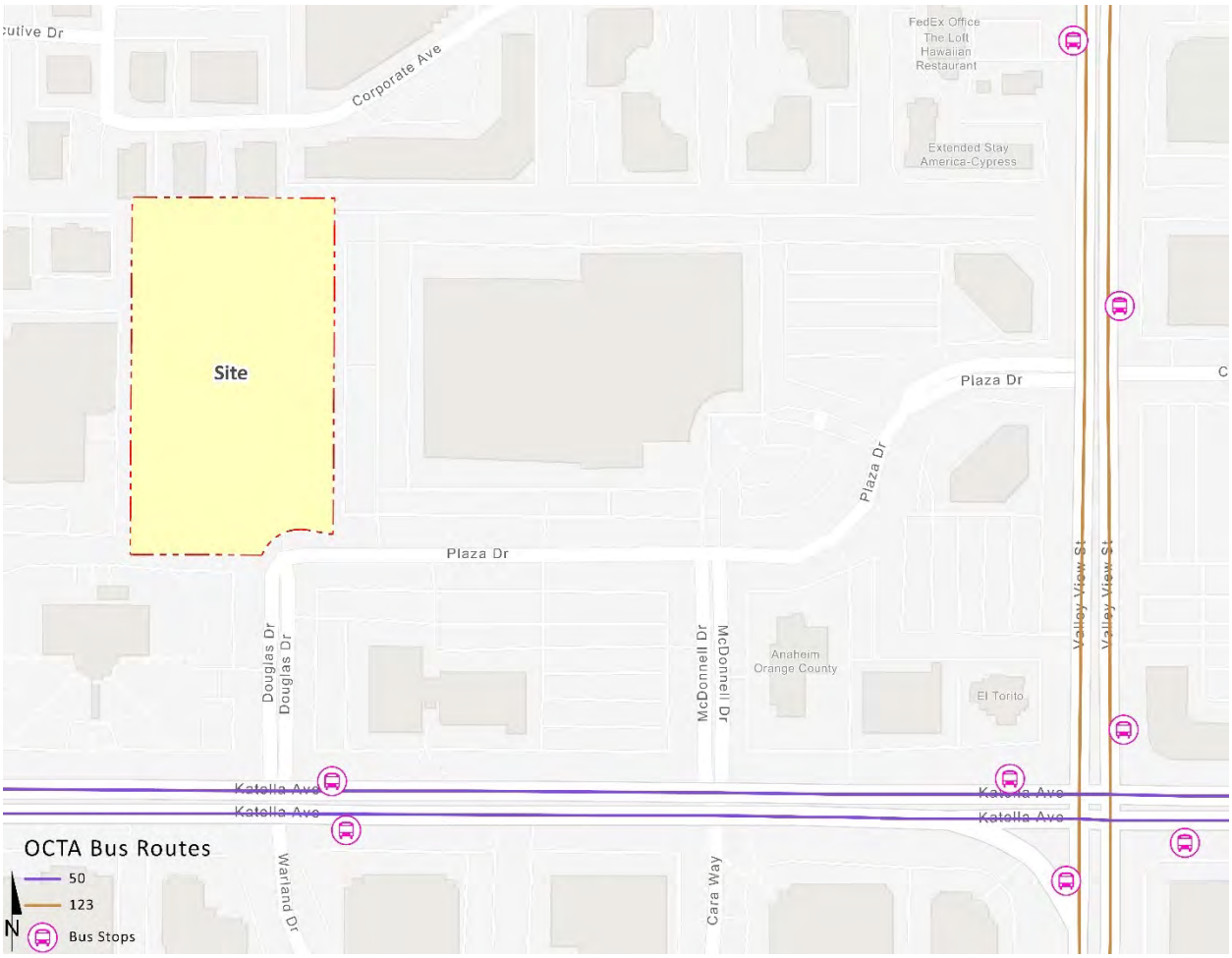
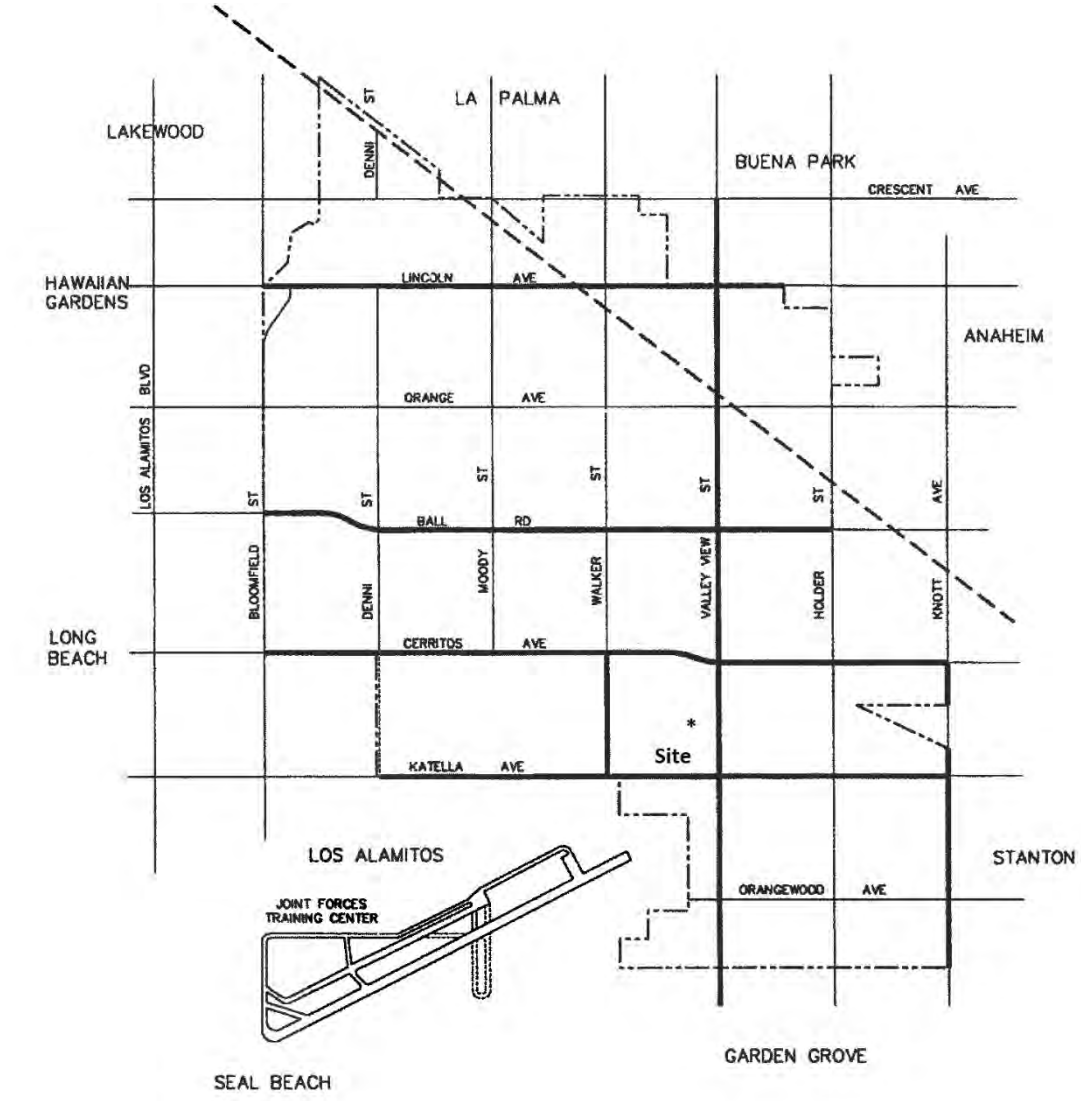


EXHIBIT 3-7: CITY OF CYPRESS TRUCK ROUTES



Source: Kimley-Horn and Associates.

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CITY OF CYPRESS GENERAL PLAN

Existing Truck Routes and Rail Lines

RBF CONSULTING — PLANNING ■ DESIGN ■ CONSTRUCTION

Exhibit CIR-5

3.6 EXISTING (2023) TRAFFIC COUNTS

The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in August 2022 when local schools were in session and operating on normal bell schedules. The following peak hours were selected for analysis:

- Weekday AM Peak Hour (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM Peak Hour (peak hour between 4:00 PM and 6:00 PM)

There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity or detour routes and near-by schools were in session and operating on normal schedules. The 2022 peak hour volumes have been adjusted to increase turning movements into low occupancy office uses in the surrounding area by 30 percent. Lastly, the volumes were then increased by an additional two percent for all movements in order to adjust the 2022 traffic counts to 2023. The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1. In addition, volume worksheets have been included identifying the adjusted 2023 volumes along with the passenger car equivalent (PCE) calculations for all analysis scenarios.

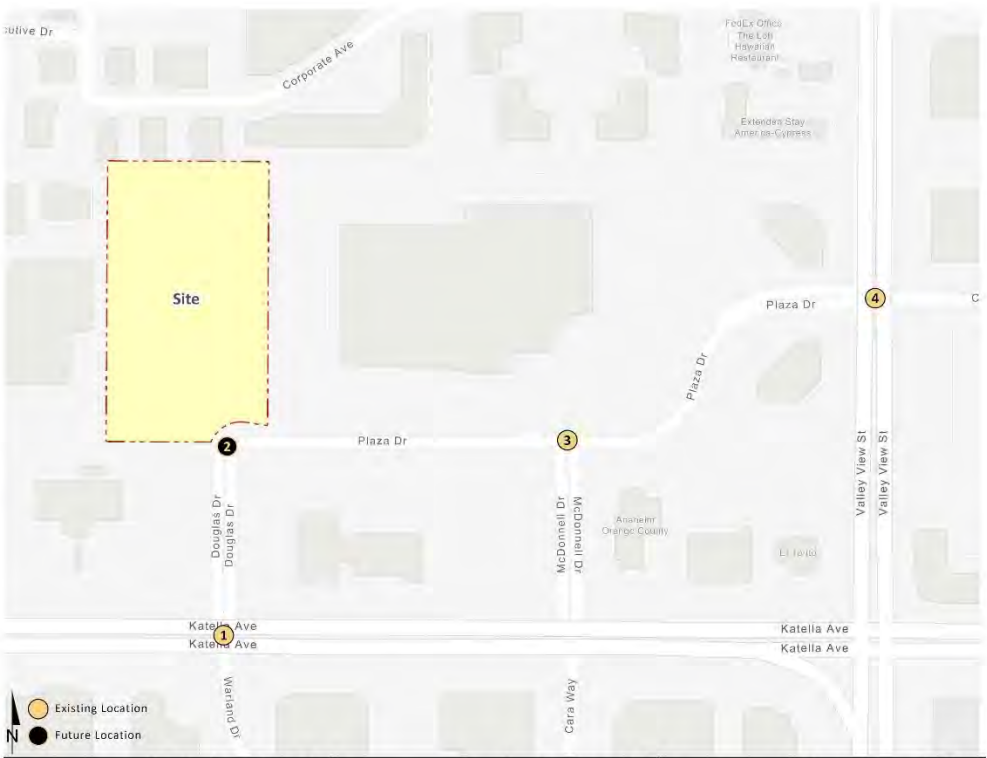
Existing weekday average daily traffic (ADT) volumes on arterial highways throughout the study area are shown on Exhibit 3-8. Existing ADT volumes were based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

Weekday PM Peak Hour (Approach Volume + Exit Volume) x 11.3 = Leg Volume

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 8.9 percent. As such, the above equation utilizing a factor of 11.3 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 8.9 percent (i.e., 1/0.089 = 11.3) and was assumed to sufficiently estimate ADT volumes for planning-level analyses. This factor is consistent with that used for other traffic studies within the study area. Existing weekday AM and weekday PM peak hour intersection volumes are shown on Exhibit 3-8.

Volumes reported on the exhibits are expressed in passenger car equivalent (PCE) volumes as the intersection operations analysis utilizes PCE volumes. Note that only the intersection turning movement volumes are expressed in PCE and ADTs are presented as actual vehicles as used in other technical studies. PCEs allow the typical "real-world" mix of vehicle types to be represented as a single, standardized unit, such as the passenger car, to be used for the purposes of capacity and level of service analyses.

EXHIBIT 3-8: EXISTING (2023) TRAFFIC VOLUMES (PCE)



1 Douglas Dr./Warland Dr. & Katella Av.

1,000 | 39,950

15(47) ↲ 1(2) ↓ 2(26) ↳
34(6) ↱
1782(1608) ←
12(9) ↰
27(11) ↳
1702(1963) →
72(32) ↲
26(83) ↰ 2(1) ↑ 5(7) ↱

42,950 | 1,450

2 Douglas Dr./Dwy. 2 & Dwy. 1/Plaza Dr.

1,350

53(100) ↰
21(24) ↱

1,350

3 McDonnell Dr. & Plaza Dr.

Nominal | 800

0(3) ↓
4(0) ↱
104(80) ←
8(11) ↰
23(86) →
0(2) ↲
19(5) ↰ 2(0) ↑ 77(9) ↱

1,900 | 350

4 Valley View St. & Plaza Dr./Chip Av.

42,050 | 6,750

154(23) ↲ 1551(1503) ↓ 254(52) ↳
39(355) ↱
0(30) ←
12(162) ↰
9(168) ↳
9(0) →
15(61) ↲
22(4) ↰ 1516(1967) ↑ 181(12) ↱

3,200 | 41,150

##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

3.7 INTERSECTION OPERATIONS ANALYSIS

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. The intersection operations analysis results are summarized in Table 3-1, which indicates that all existing study area intersections are currently operating at acceptable LOS during the peak hours. The intersection operations analysis worksheets are included in Appendix 3.2 of this TA.

TABLE 3-1: INTERSECTION ANALYSIS FOR EXISTING (2023) CONDITIONS

#	Intersection	Traffic Control[3]	Delay[1] (secs.) AM	Delay[1] (secs.) PM	Level of Service AM	Level of Service PM	ICU[2] (V/C) AM	ICU[2] (V/C) PM	Level of Service AM	Level of Service PM
1	Douglas Dr./Warland Dr. & Katella Av.	TS	5.4	8.2	A	A	0.44	0.52	A	A
2	Douglas Dr./Dwy. 2 & Dwy. 1/Plaza Dr.	AWS	7.2	7.7	A	A	--	--	--	--
3	Existing Driveway/McDonnell Dr. & Plaza Dr.	CSS	9.2	10.8	A	B	--	--	--	--
4	Valley View St. & Plaza Dr./Chip Av.	TS	15.4	35.7	B	D	0.56	0.79	A	C

1 Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown. HCM delay reported in seconds.

2 ICU reported as a volume-to-capacity ratio and for signalized intersections only. ICU not applicable to unsignalized inspections.

3 TS = Traffic Signal; AWS = All-Way Stop; CSS = Cross-Street Stop

3.8 TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for Existing traffic conditions are based on existing peak hour intersection turning volumes. There are no unsignalized study area intersections that currently warrant a traffic signal for Existing traffic conditions. Existing conditions traffic signal warrant analysis worksheets are provided in Appendix 3.3.

4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by the Project, as well as the Project's trip assignment onto the study area roadway network. The Project includes the development of a 191,394 square foot warehouse building. The TA evaluates 191,394 square feet of high-cube cold storage warehouse use. The proposed Project will replace an existing 150,626 square foot office building. The anticipated Opening Year for the proposed Project is 2025. Access to the site will be accommodated via two driveways at Plaza Drive and Douglas Drive.

4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic which is both attracted to and produced by a development.

4.1.1 EXISTING USE

The proposed Project will replace an existing 150,626 square foot office building. At the time traffic counts were conducted on August 30, 2022, the office building was 41% occupied, however, in an effort to recognize that leased tenants may have been underutilizing the office space, the building has been assumed to be 25% occupied for the purposes of the trip generation comparison. In an effort to understand the existing traffic associated with the current uses, the trip generation rates used for this analysis are based upon information collected by the ITE as provided in their Trip Generation Manual (11th Edition, 2021) for the existing general office (ITE Land Use Code 710) use (see Table 4-1).

General Office (ITE Land Use Code 710) has been used to calculate the trip generation for the existing 37,657 square feet of occupied office use (or 25% of 150,626 square feet). The trip generation summary illustrating daily, and peak hour trip generation estimates for the existing uses are also shown in Table 4-1. As shown in Table 4-1, the existing use generates a total of 408 two-way trips per day with 57 AM peak hour trips and 54 PM peak hour trips.

TABLE 4-1: EXISTING TRIP GENERATION SUMMARY

Land Use[1]	Units[2]	ITE LU Code	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
General Office (based on average rates)	TSF	710	1.34	0.18	1.52	0.24	1.20	1.44	10.84

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Eleventh Edition (2021).

[2] TSF = thousand square feet

Land Use	Quantity	Units[1]	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
General Office[2]	37.657	TSF	50	7	57	9	45	54	408

[1] TSF = Thousand Square Feet

[2] 25% of the 150,626 square foot office building was occupied in August 2022 (or 37,657 square feet).

4.1.2 PROPOSED PROJECT

The proposed Project consists of a single 191,394 square foot warehouse building. In order to develop the traffic characteristics of the proposed project, trip-generation statistics published in the ITE Trip Generation Manual (11th Edition, 2021) was used for the proposed Project. Table 4-2 summarizes the trip generation rates. For purposes of this TA, the following land use and vehicle mix has been utilized:

- ITE land use code 157 (High-Cube Cold Storage Warehouse) has been used to derive site specific trip generation estimates for up to 191,394 square feet. High-cube cold storage warehouses include warehouses characterized by the storage and/or consolidation of manufactured goods (and to a lesser extent, raw materials) prior to their distribution to retail locations or other warehouses. High-cube cold storage warehouses are facilities typified by temperature-controlled environments for frozen food or other perishable products. The High-Cube Cold Storage Warehouse vehicle mix (passenger cars versus trucks) has been obtained from the ITE's Trip Generation Manual. The truck percentages were further broken down by axle type per the following South Coast Air Quality Management District (SCAQMD) recommended truck mix: 2-Axle = 34.7%; 3-Axle = 11.0%; 4+-Axle = 54.3%.

TABLE 4-2: TRIP GENERATION RATES

Land Use[1]	Units[2]	ITE LU Code	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Actual Vehicle Trip Generation Rates									
High-Cube Cold Storage Warehouse[3]	TSF	157	0.085	0.025	0.110	0.034	0.086	0.120	2.120
Passenger Cars (AM-72.7%, PM-75.0%, Daily-64.6%)			0.076	0.004	0.080	0.019	0.071	0.090	1.370
2-Axle Trucks (AM-9.5%, PM-8.7%, Daily-12.3%)			0.003	0.007	0.010	0.005	0.005	0.010	0.260
3-Axle Trucks (AM-3.0%, PM-2.8%, Daily-3.9%)			0.001	0.002	0.003	0.002	0.001	0.003	0.083
4+-Axle Trucks (AM-14.8%, PM-13.6%, Daily-19.2%)			0.005	0.011	0.016	0.008	0.008	0.016	0.407
Passenger Car Equivalent (PCE) Trip Generation Rates									
High-Cube Cold Storage Warehouse[3]	TSF	157	0.085	0.025	0.110	0.034	0.086	0.120	2.120
Passenger Cars			0.076	0.004	0.080	0.019	0.071	0.090	1.370
2-Axle Trucks (PCE = 1.5)			0.005	0.011	0.016	0.008	0.008	0.016	0.390
3-Axle Trucks (PCE = 2.0)			0.002	0.005	0.007	0.004	0.003	0.007	0.165
4+-Axle Trucks (PCE = 3.0)			0.015	0.034	0.049	0.024	0.025	0.049	1.222

[1] Trip Generation & Vehicle Mix Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Eleventh Edition (2021).

[2] TSF = thousand square feet

[3] Truck Mix: South Coast Air Quality Management District's (SCAQMD) recommended truck mix, by axle type.
Normalized % - With Cold Storage: 34.7% 2-Axle trucks, 11.0% 3-Axle trucks, 54.3% 4-Axle trucks.

PCE factors were applied to the trip generation rates for heavy trucks (2-axles, 3-axles, and 4+-axles). PCEs allow the typical "real-world" mix of vehicle types to be represented as a single, standardized unit, such as the passenger car, to be used for the purposes of capacity and LOS analyses. The PCE factors are consistent with those used on other near-by projects.

The trip generation summary illustrating daily, and peak hour trip generation estimates for the proposed Project are summarized in Table 4-3 in actual vehicles. The proposed Project is anticipated to generate 406 two-way trips per day with 21 AM peak hour trips and 24 PM peak hour trips (actual vehicles). Intersection operations analysis for a truck-intensive project would be required to utilize the PCE trip generation consistent with the City's Guidelines. As such, the Project's trip generation in PCE is also shown in Table 4-3. The Project is anticipated to generate 604 two-way PCE trips per day with 29 PCE AM peak hour trips and 32 PCE PM peak hour trips.

TABLE 4-3: PROJECT TRIP GENERATION SUMMARY

Land Use	Quantity	Units[1]	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Actual Vehicles:									
High-Cube Cold Storage Warehouse	191.394	TSF							
Passenger Cars:			15	1	16	4	14	18	262
2-axle Trucks:			1	1	2	1	1	2	50
3-axle Trucks:			0	0	0	0	0	0	16
4+-axle Trucks:			1	2	3	2	2	4	78
Total Truck Trips (Actual Vehicles):			2	3	5	3	3	6	144
Total Trips (Actual Vehicles)[2]			**17**	**4**	**21**	**7**	**17**	**24**	**406**
Passenger Car Equivalent (PCE):									
High-Cube Cold Storage Warehouse	191.394	TSF							
Passenger Cars:			15	1	16	4	14	18	262
2-axle Trucks:			1	2	3	1	2	3	76
3-axle Trucks:			0	1	1	1	0	1	32
4+-axle Trucks:			3	6	9	5	5	10	234
Total Truck Trips (PCE):			4	9	13	7	7	14	342
Total Trips (PCE)[2]			**19**	**10**	**29**	**11**	**21**	**32**	**604**

Note: Due to rounding, some of the numbers reflected in the table to not reflect actual calculated amounts.

[1] TSF = Thousand Square Feet

[2] Total = Passenger Cars + Trucks

4.1.3 TRIP GENERATION COMPARISON

Table 4-4 shows the trip generation comparison between the existing and proposed use. It is our understanding that the existing warehouse/office building is currently vacant and generates only incidental vehicle trips, however, should the existing site be fully occupied, then it is anticipated there would be a net reduction in trips. The resulting net new trips are identified at the bottom of Table 4-4. The trip generation comparison is based on PCE as the existing and proposed uses are truck-intensive uses (any intersection operations analysis would use the PCE-based trip generation). As shown in Table 4-4, the Project is anticipated to generate a net increase of 196 two-way trips per day with a net reduction of 28 AM peak hour trips and net reduction of 22 PM peak hour trips (in PCE). For the purposes of the TA, the trip generation shown in Table 4-3 will be utilized for the intersection operations analyses (no credit for existing use).

TABLE 4-4: TRIP GENERATION COMPARISON

	AM Peak Hour			PM Peak Hour			
Land Use	In	Out	Total	In	Out	Total	Daily
Proposed Project							
Passenger Cars:	15	1	16	4	14	18	262
Total Truck Trips (PCE):	4	9	13	7	7	14	342
Total Trips (PCE)	**19**	**10**	**29**	**11**	**21**	**32**	**604**
Existing Use: General Office							
Passenger Cars:	50	7	57	9	45	54	408
Total Truck Trips (PCE):	0	0	0	0	0	0	0
Total Trips (PCE)	**50**	**7**	**57**	**9**	**45**	**54**	**408**
Variance							
Passenger Cars:	-35	-6	-41	-5	-31	-36	-146
Total Truck Trips (PCE):	4	9	13	7	7	14	342
Total Trips (PCE)	**-31**	**3**	**-28**	**2**	**-24**	**-22**	**196**

4.2 PROJECT TRIP DISTRIBUTION

The Project trip distribution represents the directional orientation of traffic to and from the Project site. Trip distribution is the process of identifying the probable destinations, directions or traffic routes that will be utilized by Project traffic. The potential interaction between the planned land uses and surrounding regional access routes are considered, to identify the route where the Project traffic would distribute. The trip distribution pattern of passenger cars is heavily influenced by the geographical location of the site, the location of surrounding land uses, and the proximity to the regional freeway system.

The trip distribution pattern for truck traffic is also influenced by the local truck routes. Both Valley View Street and Katella Avenue are truck routes within the City of Cypress. Given the differences between the vehicle types, separate trip distributions were generated for both passenger cars and truck trips. Exhibits 4-1 and 4-2 show the Project truck and passenger car trip distribution patterns, respectively. Distributions of passenger cars and trucks have been determined based on traffic count data.

EXHIBIT 4-1: PROJECT (TRUCK) TRIP DISTRIBUTION

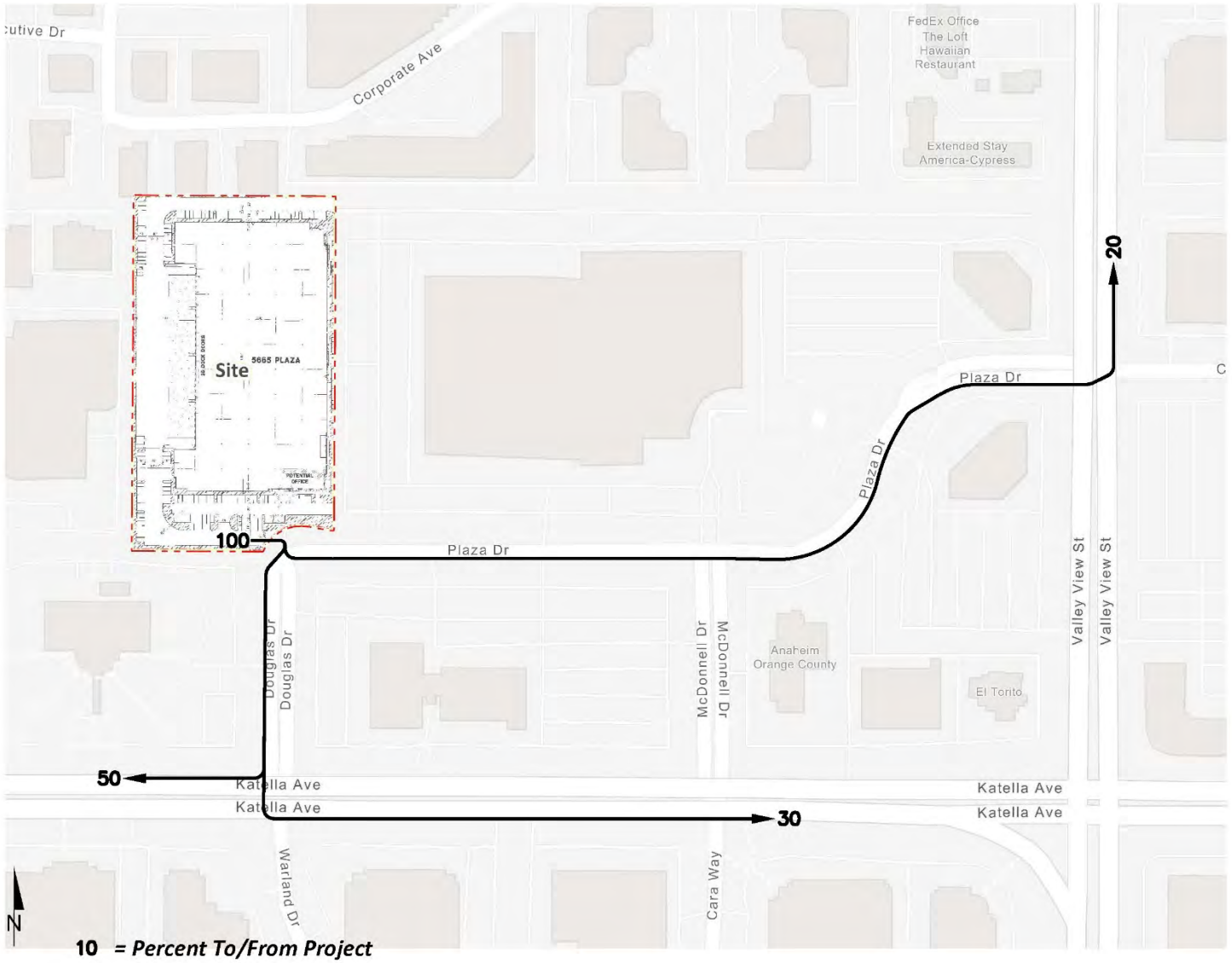
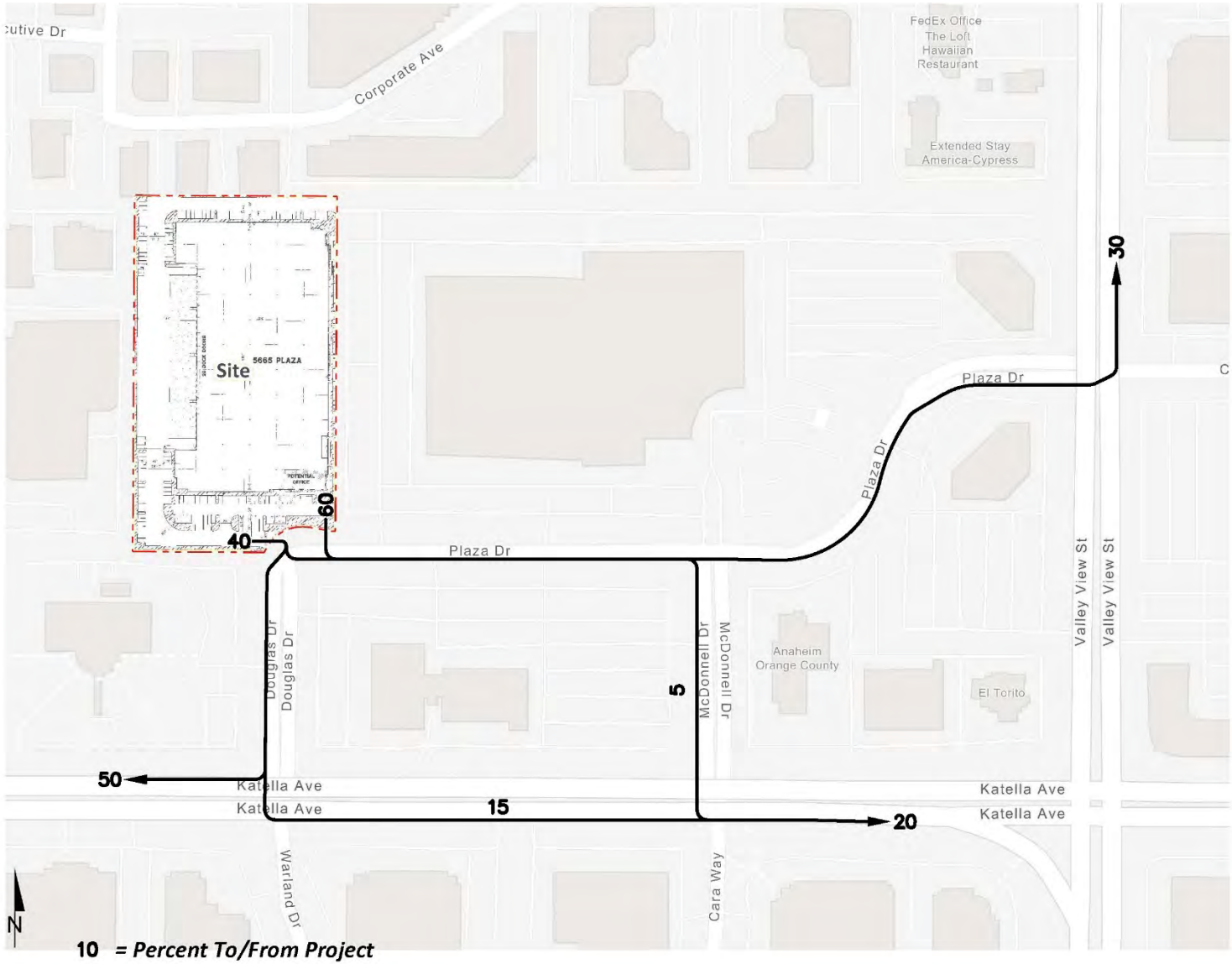


EXHIBIT 4-2: PROJECT (PASSENGER CAR) TRIP DISTRIBUTION



4.3 MODAL SPLIT

The potential for Project trips (non-truck) to be reduced by the use of public transit, walking or bicycling have not been included as part of the Project's estimated trip generation. Essentially, the Project's traffic projections are "conservative" in that these alternative travel modes would reduce the forecasted traffic volumes.

4.4 PROJECT TRIP ASSIGNMENT

The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, the Project only ADT and peak hour intersection turning movement volumes are shown on Exhibit 4-3.

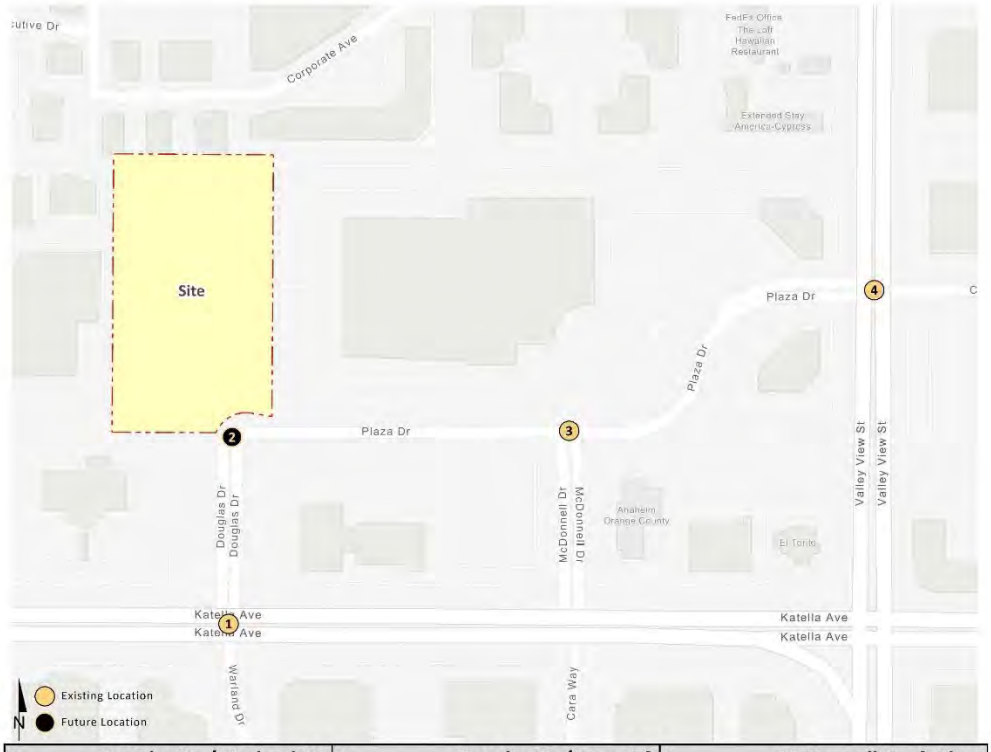
4.5 BACKGROUND TRAFFIC

Future year traffic forecasts have been based upon background (ambient) growth at 2% per year, compounded annually, for 2025 conditions. The total ambient growth is 4.04% for 2025 traffic conditions (compounded growth of 2 percent per year over 2 years or $1.02^{2\ years}$). The ambient growth factor is intended to approximate regional traffic growth. This ambient growth rate is added to existing traffic volumes to account for area-wide growth not reflected by cumulative development projects. Ambient growth has been added to daily and peak hour traffic volumes on surrounding roadways, in addition to traffic generated by the development of future projects that have been approved but not yet built and/or for which development applications have been filed and are under consideration by governing agencies.

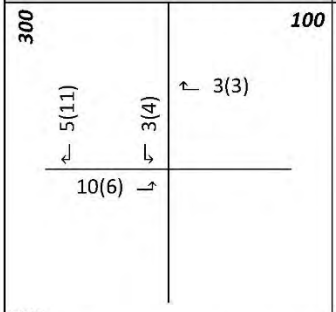
4.6 CUMULATIVE DEVELOPMENT TRAFFIC

A cumulative project list was developed for the purposes of this analysis through consultation with planning and engineering staff from the City. The cumulative project list includes known and foreseeable projects that are anticipated to contribute traffic to the study area intersections. For the purposes of this analysis, the cumulative projects that were determined to affect one or more of the study area intersections are shown on Exhibit 4-4, listed in Table 4-5, and have been considered for inclusion. Any additional traffic generated by other projects not on the cumulative projects list is likely accounted for through background ambient growth factors that have been applied to the peak hour volumes at study area intersections as discussed in Section 4.5 *Background Traffic*. Cumulative development projects are shown on Exhibit 4-4 and listed in Table 4-5. Cumulative Only ADT and peak hour intersection turning movement volumes are shown on Exhibit 4-5. Table 4-6 summarizes the trip generation for each of the cumulative development projects.

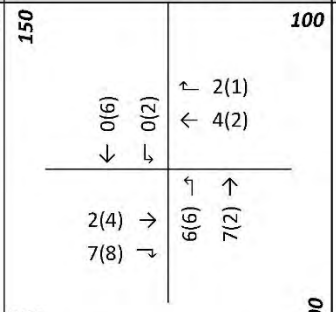
EXHIBIT 4-3: PROJECT ONLY TRAFFIC VOLUMES (PCE)



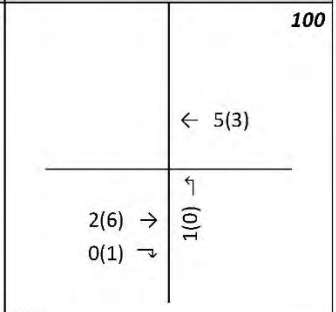
1 Douglas Dr./Warland Dr. & Katella Av.



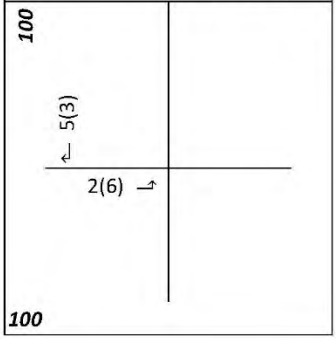
2 Douglas Dr./Dwy. 2 & Dwy. 1/Plaza Dr.



3 McDonnell Dr. & Plaza Dr.



4 Valley View St. & Plaza Dr./Chip Av.



##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

EXHIBIT 4-4: CUMULATIVE DEVELOPMENT LOCATION MAP

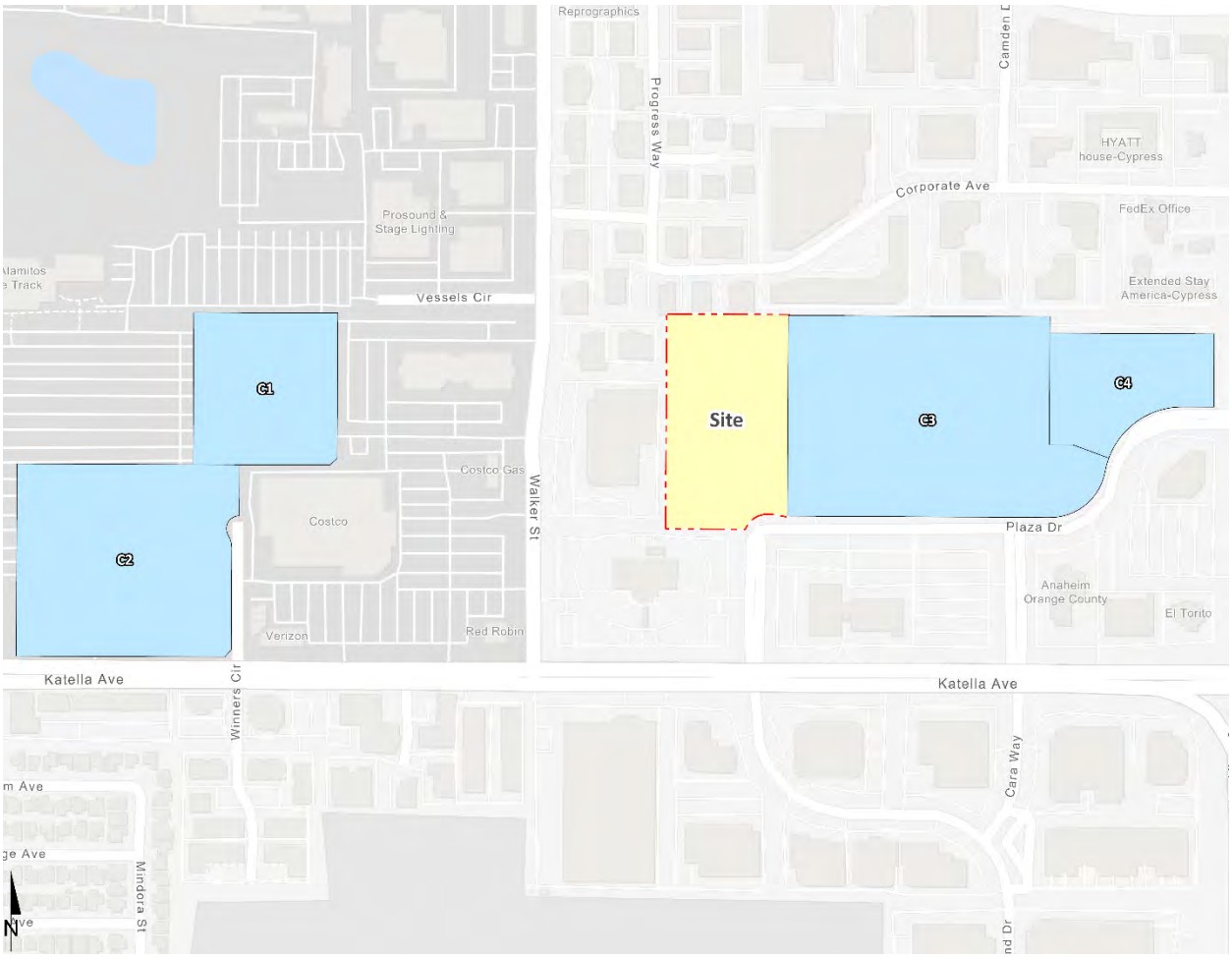
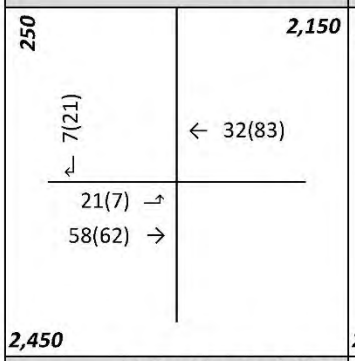
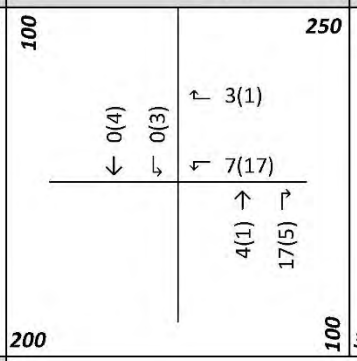


EXHIBIT 4-5: CUMULATIVE ONLY TRAFFIC VOLUMES (PCE)

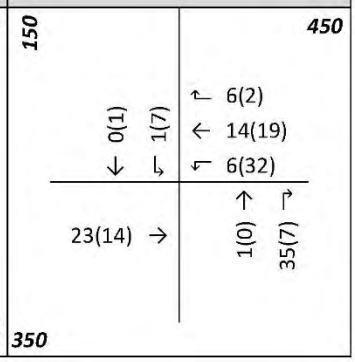
1 Douglas Dr./Warland Dr. & Katella Av.



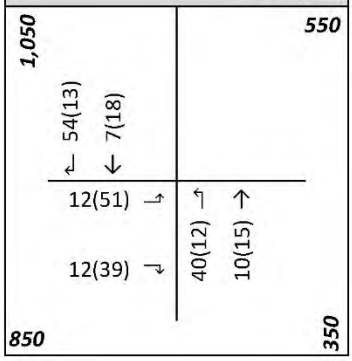
2 Douglas Dr./Dwy. 2 & Dwy. 1/Plaza Dr.



3 McDonnell Dr. & Plaza Dr.



4 Valley View St. & Plaza Dr./Chip Av.



##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

TABLE 4-5: CUMULATIVE DEVELOPMENT LAND USE SUMMARY

No.	Project Name	Land Use[1]	Quantity Units[2]
C1	Cypress Town Center 7-AC Residential	Multifamily (Low Rise) Housing	135 DU
C2	The Square	Shopping Center	20.800 TSF
		Multifamily (Mid-Rise) Housing	251 DU
		Hotel	120 Rooms
		Medical Office Building	31.585 TSF
C3	Goodman Commerce Center	High-Cube Warehousing	390.264 TSF
C4	5995 Plaza Drive	General Office	104.734 TSF

[1] TSF = Thousand Square Feet; DU = Dwelling Units

TABLE 4-6: CUMULATIVE DEVELOPMENT TRIP GENERATION SUMMARY

	AM Peak Hour			PM Peak Hour			
Land Use	In	Out	Total	In	Out	Total	Daily
C1: Cypress Town Center	14	48	62	48	28	76	988
C2: The Square	68	96	164	176	147	323	4,978
C3: Goodman Commerce Center	35	18	53	17	37	54	956
C4: 5995 Plaza Drive	140	19	159	26	125	151	1,135
Total	**257**	**181**	**438**	**267**	**337**	**604**	**8,057**

4.7 NEAR-TERM TRAFFIC CONDITIONS

The "buildup" approach combines existing traffic counts with a background ambient growth factor to forecast Future Year (2025) traffic conditions. An ambient growth factor accounts for background (area-wide) traffic increases that occur over time up to the year 2025 from the year 2023. Traffic volumes generated by the Project are then added to assess the near-term traffic conditions. The 2025 roadway network is similar to the Existing conditions roadway network, with the exception of future driveways proposed to be developed by the Project. The near-term traffic analysis includes the following traffic conditions, with the various traffic components:

- Future Year (2025) Without Project
  - Existing 2022 counts + Adjustment (30% for existing offices, and 2% overall to reflect 2023)
  - Ambient growth traffic (4.04%)
  - Cumulative Development traffic
- Future Year (2025) With Project
  - Existing 2022 counts + Adjustment (30% for existing offices, and 2% overall to reflect 2023)
  - Ambient growth traffic (4.04%)
  - Cumulative Development traffic
  - Project traffic

For the Existing volumes, the 2022 peak hour volumes have been adjusted to increase turning movements into low occupancy office uses in the surrounding area by 30 percent. Lastly, the volumes were then increased by an additional two percent for all movements in order to adjust the 2022 traffic counts to 2023.

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5 E+P TRAFFIC CONDITIONS

This section discusses the traffic forecasts for E+P conditions and the resulting intersection operations and traffic signal warrant analyses.

5.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for E+P conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for E+P conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).

5.2 E+P TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus Project traffic. The weekday ADT and weekday peak hour intersection turning movement volumes which can be expected for E+P traffic conditions are shown on Exhibit 5-1.

5.3 INTERSECTION OPERATIONS ANALYSIS

E+P peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TA. The intersection analysis results are summarized in Table 5-1 for E+P traffic conditions, which indicate that all of the study area intersections are anticipated to continue to operate at an acceptable LOS under E+P traffic conditions, consistent with Existing (2023) traffic conditions. The intersection operations analysis worksheets for E+P traffic conditions are included in Appendix 5.1 of this TA.

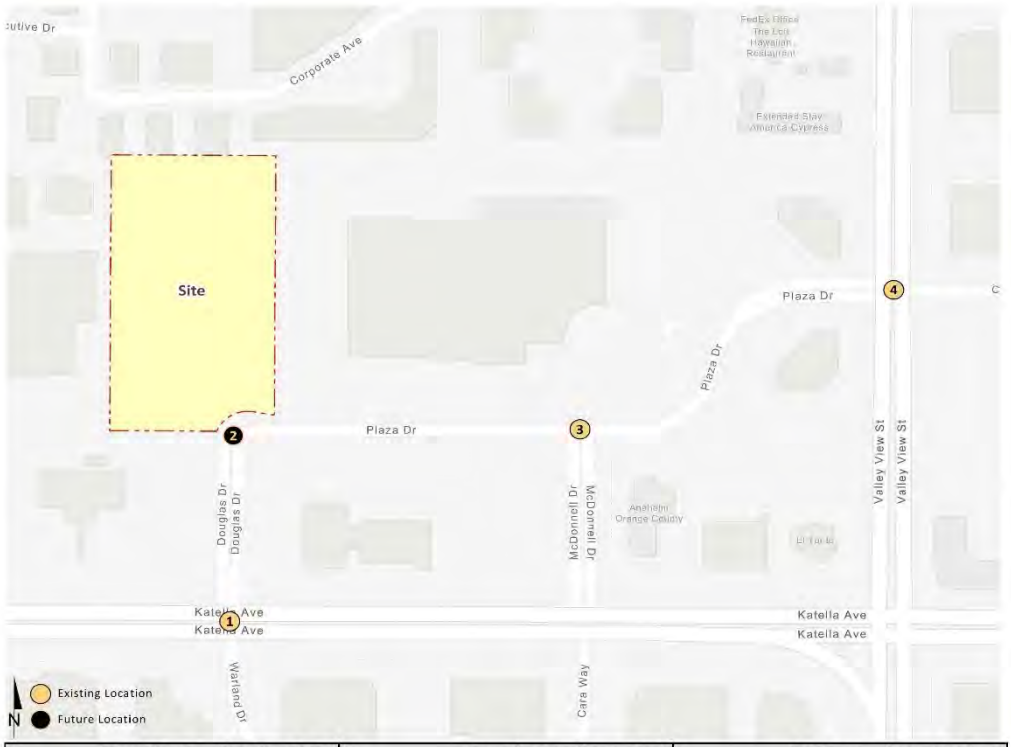
5.4 TRAFFIC SIGNAL WARRANTS ANALYSIS

The traffic signal warrant analysis for E+P traffic conditions is based on the peak hour volume-based traffic signal warrants. No study area intersections are anticipated to meet peak hour volume-based warrants with the addition of Project traffic (see Appendix 5.2).

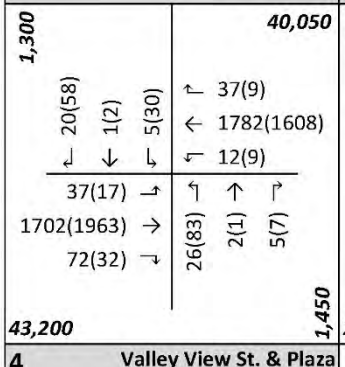
5.5 NEAR-TERM DEFICIENCIES AND IMPROVEMENTS

All study area intersections are anticipated to continue to operate at an acceptable LOS during the AM and PM peak hours under E+P traffic conditions and below the City's thresholds for change in delay and V/C (see Table 5-1). As such, no improvements, aside from those that are needed to facilitate site access, have been identified for E+P traffic conditions. However, a new southbound signal head on the northwest corner of Douglas Drive/Warland Drive at Katella Avenue for southbound approach vehicles is recommended. The new signal head will be installed on the existing pole on the northwest corner. The purpose of the new signal head is to display the signal indication should a truck in the southbound lanes obstruct the existing signal heads on the mast arm.

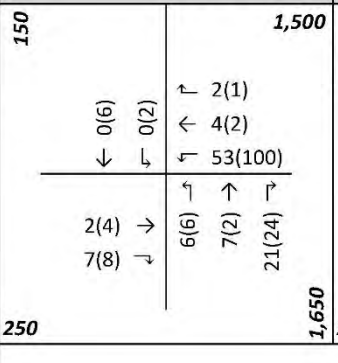
EXHIBIT 5-1: E+P TRAFFIC VOLUMES (PCE)



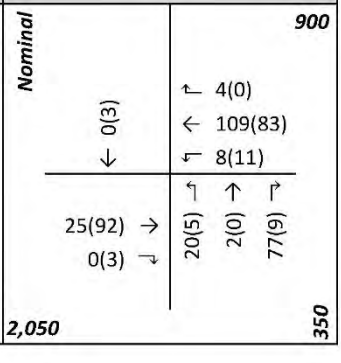
1 Douglas Dr./Warland Dr. & Katella Av.



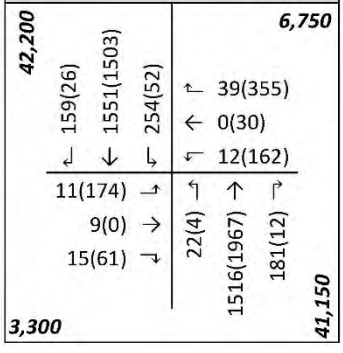
2 Douglas Dr./Dwy. 2 & Dwy. 1/Plaza Dr.



3 McDonnell Dr. & Plaza Dr.



4 Valley View St. & Plaza Dr./Chip Av.



##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

TABLE 5-1: INTERSECTION ANALYSIS FOR E+P CONDITIONS

#	Intersection	Traffic Control[3]	Existing								Existing plus Project								Net Change in Delay/ICU			
			Delay[1] (secs.)		Level of Service		ICU[2] (V/C)		Level of Service		Delay[1] (secs.)		Level of Service		ICU[2] (V/C)		Level of Service		Delay[1] (secs.)		ICU[2] (V/C)	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	Douglas Dr./Warland Dr. & Katella Av.	TS	5.4	8.2	A	A	0.439	0.517	A	A	6.0	8.7	A	A	0.448	0.523	A	A	0.6	0.5	0.009	0.006
2	Douglas Dr./Dwy. 2 & Dwy. 1/Plaza Dr.	AWS	7.2	7.7	A	A	--	--	--	--	7.2	7.7	A	A	--	--			0.0	0.0	--	--
3	Existing Driveway/McDonnell Dr. & Plaza Dr.	CSS	9.2	10.8	A	B	--	--	--	--	9.2	10.9	A	B	--	--			0.0	0.1	--	--
4	Valley View St. & Plaza Dr./Chip Av.	TS	15.4	35.7	B	D	0.560	0.794	A	C	15.5	36.1	B	D	0.562	0.797	A	C	0.1	0.4	0.002	0.003

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown. HCM delay reported in seconds.

[2] ICU reported as a volume-to-capacity ratio and for signalized intersections only. ICU not applicable to unsignalized inspections.

[3] TS = Traffic Signal; AWS = All-Way Stop; CSS = Cross-Street Stop

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6 FUTURE YEAR (2025) TRAFFIC CONDITIONS

This section discusses the traffic forecasts for Future Year (2025) conditions and the resulting intersection operations and traffic signal warrant analyses.

6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Future Year (2025) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Future Year (2025) conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Future Year (2025) conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages).

6.2 WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing (2023) traffic volumes plus an ambient growth factor of 4.04% and traffic from pending and approved cumulative development projects. The weekday ADT volumes and peak hour volumes which can be expected for Future Year (2025) Without Project traffic conditions are shown on Exhibit 6-1.

6.3 WITH PROJECT TRAFFIC VOLUME FORECASTS

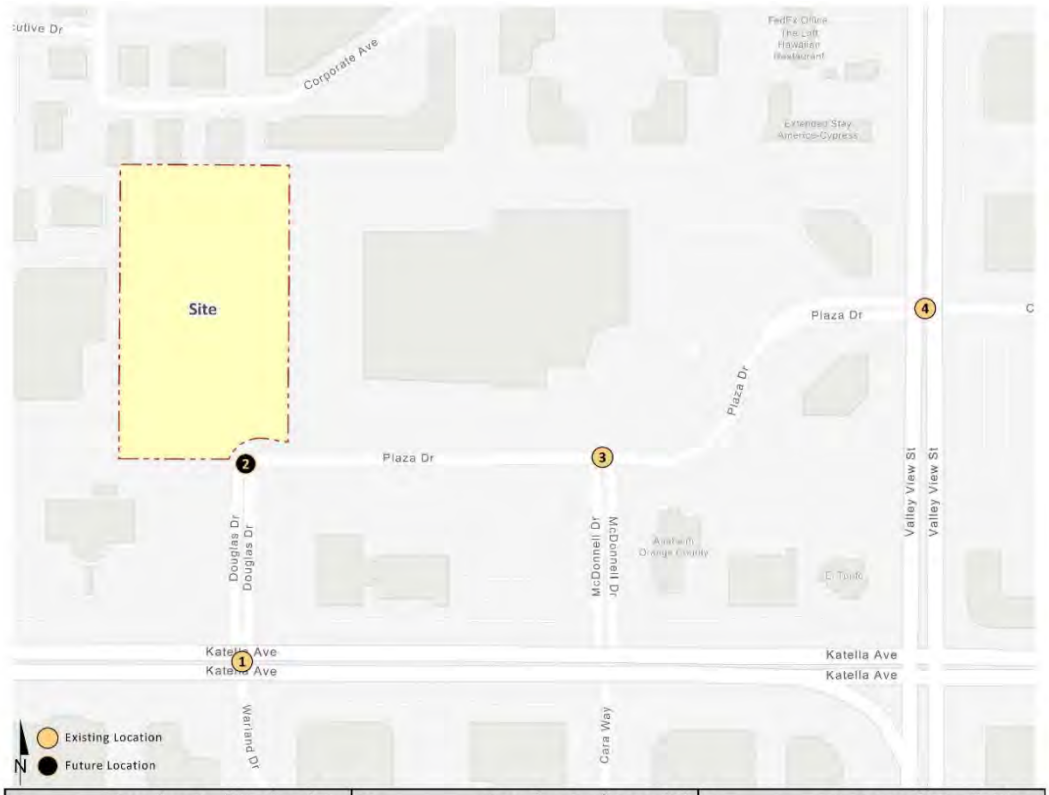
This scenario includes Existing (2023) traffic volumes plus an ambient growth factor of 4.04%, traffic from pending and approved cumulative development projects, and the addition of Project traffic. The weekday ADT volumes and peak hour volumes which can be expected for Future Year (2025) With Project traffic conditions are shown on Exhibit 6-2. Traffic volumes on the north leg of Driveway 1/Douglas Drive and Driveway 2/Plaza Drive include the traffic associated with the adjacent cumulative project.

6.4 INTERSECTION OPERATIONS ANALYSIS

Future Year (2025) peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TA. The intersection analysis results are summarized in Table 6-1 for Future Year traffic conditions, which indicate the study area intersections are anticipated to continue to operate at an acceptable LOS under Future Year (2025) Without and With Project traffic conditions. The intersection operations analysis worksheets for Future Year (2025) Without and With Project traffic conditions are included in Appendix 6.1 and Appendix 6.2 of this TA, respectively.

It is recommended that the Project install a new southbound signal head on the northwest corner of Douglas Drive/Warland Drive at Katella Avenue for southbound approach vehicles in order to display the signal indication should a truck in the southbound lanes obstruct the existing signal heads on the mast arm. The new signal head will be installed on the existing pole on the northwest corner.

EXHIBIT 6-1: FUTURE YEAR (2025) WITHOUT PROJECT TRAFFIC VOLUMES (PCE)



1 Douglas Dr./Warland Dr. & Katella Av.

1,350									43,750
	22(69)	1(2)	2(27)					35(6)	
								1886(1755)	
								12(9)	
	49(18)	→		↰	↑	↱			
	1828(2104)	→		27(86)	2(1)	5(7)			
	74(33)	↳							
47,150									1,500

2 Douglas Dr./Dwy. 2 & Dwy. 1/Plaza Dr.

100									1,650
		0(4)	0(3)					3(1)	
			↳	↰	↑	↱		62(121)	
					4(1)	39(29)			
200									1,500

3 McDonnell Dr. & Plaza Dr.

200									1,300
		0(4)	1(7)					10(2)	
								122(102)	
			↳	↰	↑	↱		14(43)	
	46(103)	→		20(5)	3(0)	115(16)			
	0(2)	↳							
2,300									350

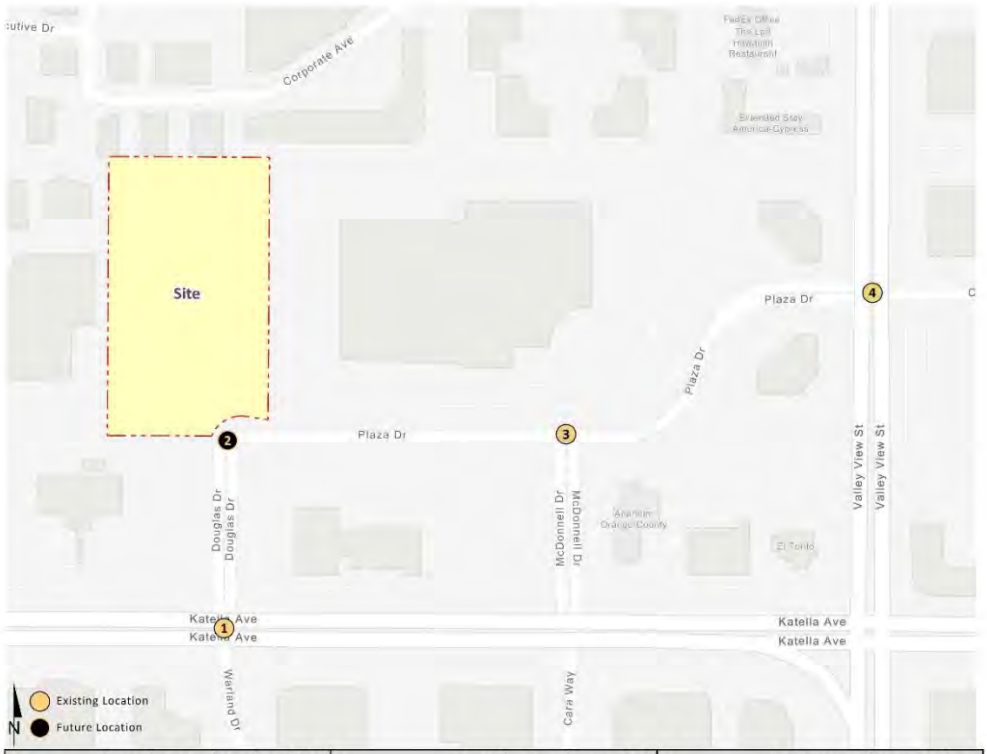
4 Valley View St. & Plaza Dr./Chip Av.

44,800									7,600
	214(37)	1620(1582)	264(54)					40(369)	
								0(31)	
			↳	↰	↑	↱		12(169)	
	21(226)	→		62(16)	1587(2061)	188(12)			
	9(0)	→							
	27(102)	↳							
4,150									43,150

##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

EXHIBIT 6-2: FUTURE YEAR (2025) WITH PROJECT TRAFFIC VOLUMES (PCE)



1 Douglas Dr./Warland Dr. & Katella Av.

1,600 | 27(80) ↲ | 1(2) ← | 5(31) ↳ | *43,850*
59(24) ↳ | 1828(2104) → | 74(33) ↲
↰ 27(86) | ↑ 2(1) | ↱ 5(7)
↱ 38(9) | ← 1886(1755) | ↰ 12(9)
47,350 | *1,500*

2 Douglas Dr./Dwy. 2 & Dwy. 1/Plaza Dr.

300 | 0(10) ↲ | 0(5) ↳ | *1,800*
2(4) → | 7(8) ↲
↰ 6(6) | ↑ 11(3) | ↱ 39(29)
↱ 5(2) | ← 4(2) | ↰ 62(121)
450 | *1,800*

3 McDonnell Dr. & Plaza Dr.

150 | 0(1) ← | 1(7) ↳ | *1,400*
48(109) → | 0(3) ↲
↰ 21(5) | ↑ 3(0) | ↱ 115(16)
↱ 6(2) | ← 127(105) | ↰ 14(43)
2,450 | *350*

4 Valley View St. & Plaza Dr./Chip Av.

44,950 | 219(40) ↲ | 1620(1582) ← | 264(54) ↳ | *7,600*
23(232) ↳ | 9(0) → | 27(102) ↲
↰ 62(16) | ↑ 1587(2061) | ↱ 188(12)
↱ 40(369) | ← 0(31) | ↰ 12(169)
4,250 | *43,150*

##(##) AM(PM) Peak Hour Intersection Volumes
Average Daily Trips

TABLE 6-1: INTERSECTION ANALYSIS FOR FUTURE YEAR (2025) CONDITIONS

			2025 Without Project								2025 With Project								Net Change in Delay/ICU			
			Delay[1] (secs.)		Level of Service		ICU[2] (V/C)		Level of Service		Delay[1] (secs.)		Level of Service		ICU[2] (V/C)		Level of Service		Delay[1] (secs.)		ICU[2] (V/C)	
#	Intersection	Traffic Control[3]	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	Douglas Dr./Warland Dr. & Katella Av.	TS	6.8	9.4	A	A	0.477	0.559	A	A	7.7	9.8	A	A	0.486	0.565	A	A	0.9	0.4	0.009	0.006
2	Douglas Dr./Dwy. 2 & Dwy. 1/Plaza Dr.	AWS	7.2	7.8	A	A	--	--	--	--	7.3	7.9	A	A	--	--	--	--	0.1	0.1	--	--
3	Existing Driveway/McDonnell Dr. & Plaza Dr.	CSS	10.9	12.0	B	B	--	--	--	--	10.9	11.9	B	B	--	--	--	--	0.0	-0.1	--	--
4	Valley View St. & Plaza Dr./Chip Av.	TS	18.6	45.7	B	D	0.582	0.856	A	D	18.7	46.8	B	D	0.582	0.860	A	D	0.1	1.1	0.000	0.004

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown. HCM delay reported in seconds.

[2] ICU reported as a volume-to-capacity ratio and for signalized intersections only. ICU not applicable to unsignalized inspections.

[3] TS = Traffic Signal; AWS = All-Way Stop; CSS = Cross-Street Stop

6.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

The traffic signal warrant analysis for Future Year (2025) traffic conditions are based on the peak hour volume-based traffic signal warrants. There are no study area intersections anticipated to meet traffic signal warrants for both Future Year (2025) Without and With Project traffic conditions (see Appendix 6.3 and Appendix 6.4, respectively).

6.6 PROJECT DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

This section provides a summary of Project deficiencies and recommended improvements. There are no study area intersections anticipated to operate at an unacceptable LOS under Future Year (2025) traffic conditions and below the City's thresholds for change in delay and V/C (see Table 6-1). However, a new southbound signal head on the northwest corner of Douglas Drive/Warland Drive at Katella Avenue for southbound approach vehicles is recommended. The new signal head will be installed on the existing pole on the northwest corner. The purpose of the new signal head is to display the signal indication should a truck in the southbound lanes obstruct the existing signal heads on the mast arm.

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7 LOCAL AND REGIONAL FUNDING MECHANISMS

Transportation improvements within the City of Cypress are funded through a combination of project mitigation, development impact fee programs and/or fair share contributions, such as the City of Cypress Development Impact Fee (DIF) program. Identification and timing of needed improvements is generally determined through local jurisdictions based upon a variety of factors.

7.1 DEVELOPMENT IMPACT FEE PROGRAM

Per the City of Cypress Master Fee Schedule Resolution No. 6118 (adopted March 8, 2010), the Project is subject to pay a City-wide Traffic Improvement Fee of $0.65 per square foot and a Regional Traffic Improvement Fee of $0.06 per square foot (for light industrial development). These Development Impact Fees (DIF) are collected from new residential, commercial, and industrial development for the purpose of funding roadway and intersection improvements necessary to accommodate City growth as identified in the City's General Plan Circulation Element. The Project's transportation impacts fee calculations are shown in Table 7-1.

TABLE 7-1: ESTIMATED FEE OBLIGATION

Fee	Land Use Category	Unit Cost	Project Units	Fee
City-Wide Traffic Improvement Fee	Light Industrial	$0.65	191,394 SF	$124,406.10
Regional Traffic Improvement Fee	Light Industrial	$0.06	191,394 SF	$11,483.64
Total				**$135,889.74**

Note: Rates adopted March 8, 2010.

The Project Applicant will be subject to the City's DIF fee program and will pay the requisite City DIF fees at the rates then in effect pursuant to the City's ordinance. The Project Applicant shall make payment of the requisite DIF at the rates then in effect, pursuant to the City DIF Program.

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8 REFERENCES

1. **City of Cypress.** *Transportation Operational Assessment (Level-Of-Service Traffic Study) Guidelines.* City of Cypress : s.n., April 2023.
2. **Institute of Transportation Engineers.** *Trip Generation Manual.* 11th Edition. 2021.
3. **Orange County Transportation Authority.** *2021 Orange county Congestion Management Program Report.* County of Orange : s.n., November 2021.
4. **Transportation Research Board.** *Highway Capacity Manual (HCM).* 6th Edition. s.l. : National Academy of Sciences, 2016.
5. **California Department of Transportation.** California Manual on Uniform Traffic Control Devices (CA MUTCD). [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CA MUTCD).* 2014, Updated March 30, 2021 (Revision 6).

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