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SAN BERNARDINO GATEWAY BUSINESS PARK

TRAFFIC ANALYSIS

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Reference Number	Agency	Date
14660-10 TA Report	City of San Bernardino	August 16, 2023

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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
DIF	Development Impact Fee
EA	Existing plus Ambient Growth
EAC	Existing plus Cumulative Projects
EAP	Existing plus Ambient Growth plus Project
EAPC	Existing plus Ambient Growth plus Cumulative plus Project
HCM	Highway Capacity Manual
ITE	Institute of Transportation Engineers
LOS	Level of Service
NCHRP	National Cooperative Highway Research Program
PCE	Passenger Car Equivalent
PHF	Peak Hour Factor
Project	San Bernardino Gateway Business Park
SBCTA	San Bernardino County Transportation Authority
SBTAM	San Bernardino Transportation Analysis Model
SCAG	Southern California Association of Governments
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 San Bernardino Gateway Business Park ("Project"), which is located on the southeast corner of Arrowhead Avenue and Rialto Avenue in the City of San Bernardino, 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 General Plan level of service goals and policies. This traffic study has been prepared in accordance with the City of San Bernardino's Traffic Impact Analysis Guidelines, the San Bernardino County Congestion Management Program (CMP) Guidelines for CMP Traffic Impact Analysis Reports (Appendix B, 2016 Update), and consultation with City staff during the traffic study scoping process. (1) (2) The City approved Project Traffic Study Scoping agreement is provided in Appendix 1.1 of this TA.

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 implement stop control for egress Project traffic at intersections at Driveways 1, 2, 3, 4 and 5 and construct the necessary ingress and egress lanes at each driveway needed to facilitate site access.
- Project to modify curb, gutter, and sidewalk along the Project's frontage on Arrowhead Avenue, Rialto Avenue, and Sierra Way to accommodate the proposed Project driveways.

Additional details and intersection lane geometrics are provided in Section 1.6 *Recommendations* of this report.

1.2 PROJECT OVERVIEW

A preliminary site plan for the proposed Project is shown on Exhibit 1-2. The Project is proposed to consist of 230,320 square feet of industrial use within three buildings. The Project will be evaluated in a single phase with an opening year of 2023. As indicated on Exhibit 1-2, vehicular access will be provided via five driveways:

- Driveway 1 on Arrowhead Avenue: full access for passenger cars and trucks
- Driveway 2 on Rialto Avenue: full access for passenger cars and trucks
- Driveway 3 on Rialto Avenue: full access for passenger cars and trucks
- Driveway 4 on Sierra Way: full access for passenger cars only
- Driveway 5 on Sierra Way: right-in/right-out only for passenger cars and trucks

Regional access to the Project site is available from the I-215 Freeway via 2nd Street, 4th Street and Mill Street interchanges. Exhibit 1-3 depicts the location of the proposed Project in relation to the existing roadway network and the study area intersections.

EXHIBIT 1-1: LOCATION MAP

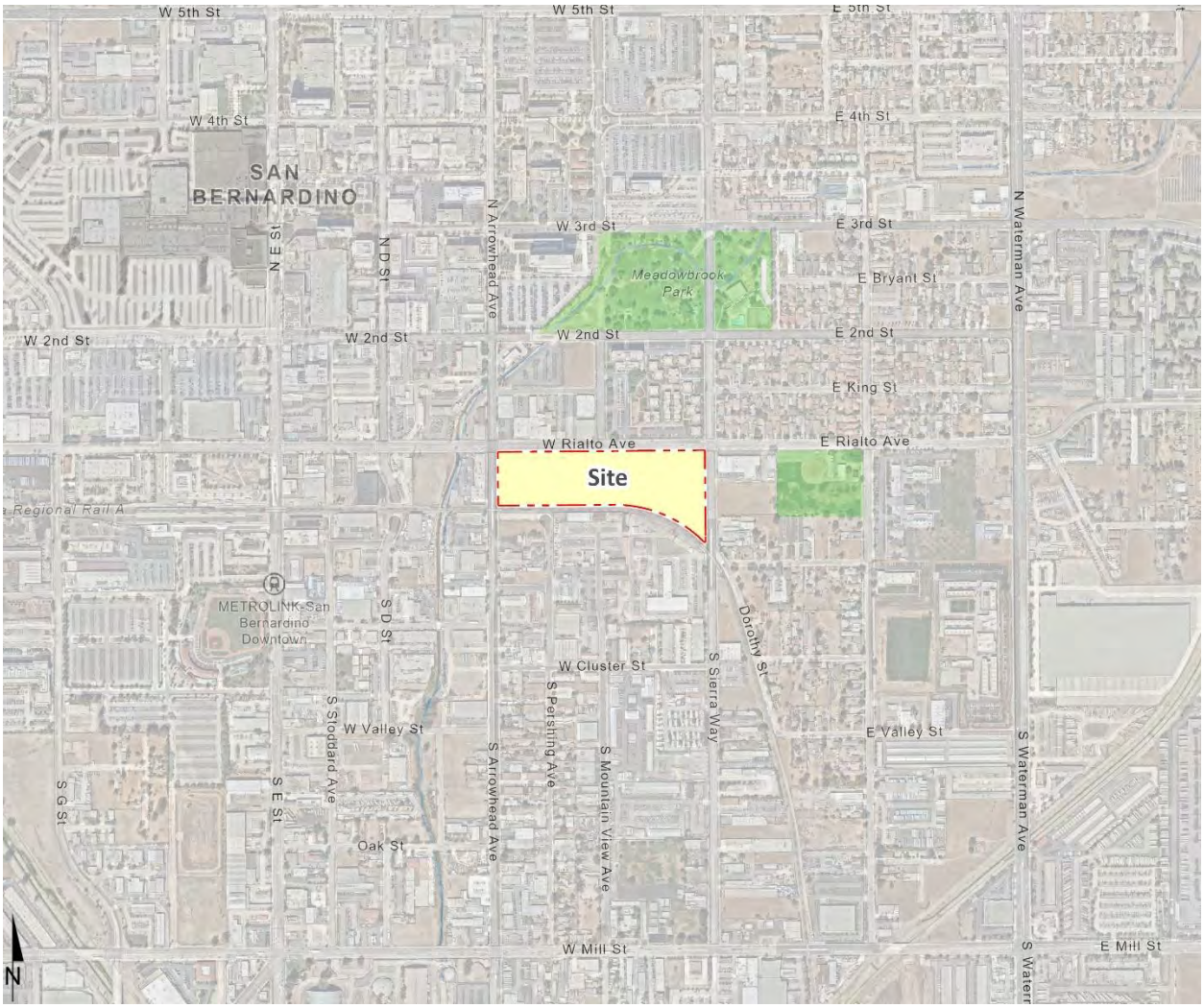


EXHIBIT 1-2: PRELIMINARY SITE PLAN

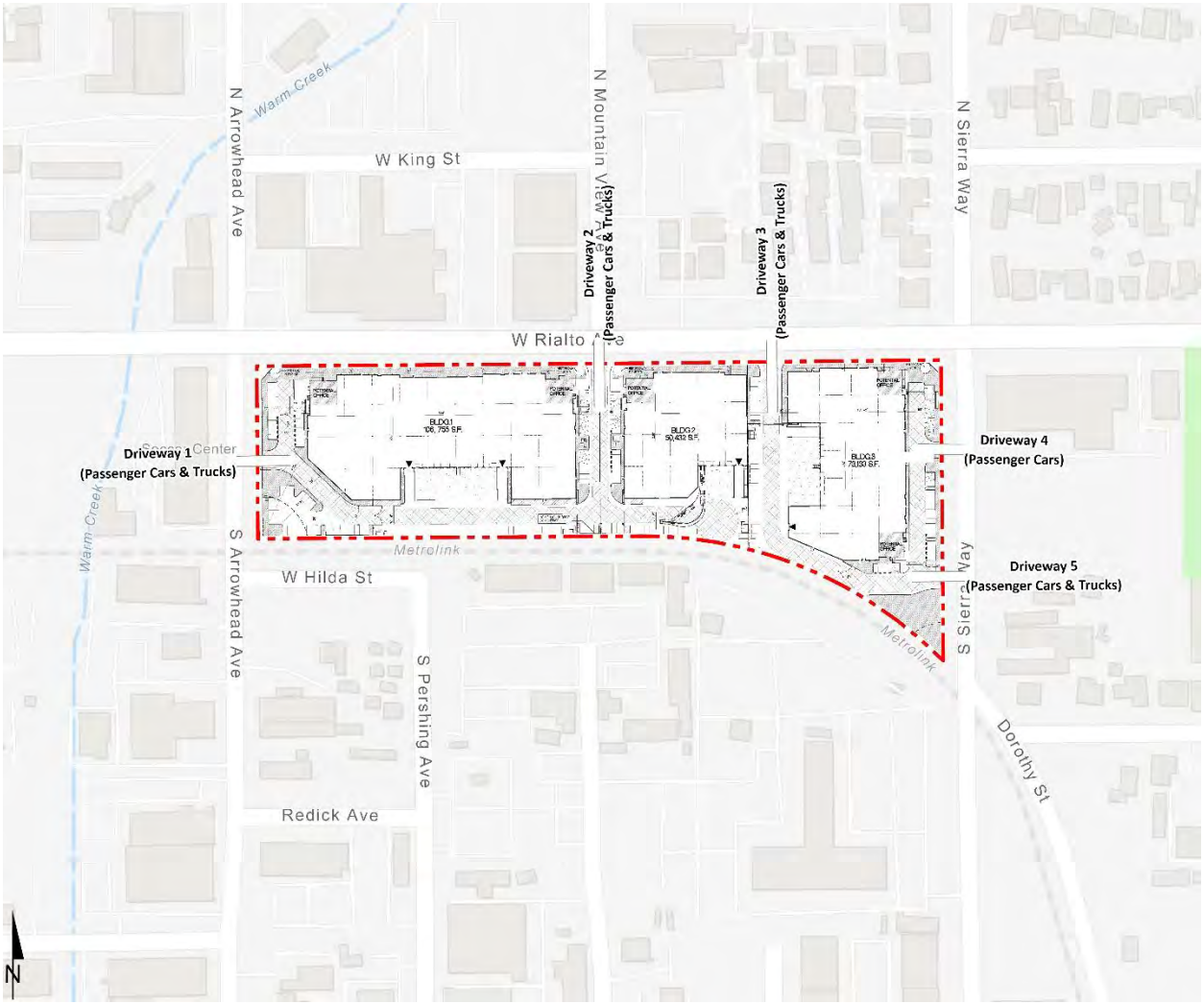


EXHIBIT 1-3: STUDY AREA

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) for the following land uses has been utilized (3):

- Industrial Park (ITE Land Use Code 130)
- Manufacturing (ITE Land Use Code 140)
- Warehousing land use (ITE Code 150)

The Project is anticipated to generate a total of 670 actual vehicle trip-ends per day with 77 AM peak hour trips and 80 PM peak hour trips. 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.

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 (2022) Conditions
- Existing plus Ambient (EA) (2023) Conditions
- Existing plus Ambient plus Project (EAP) (2023) Conditions
- Existing plus Ambient plus Cumulative (EAC) (2023) Conditions
- Existing plus Ambient plus Cumulative Plus Project (EAPC) (2023) Conditions
- Horizon Year (2040) Without Project
- Horizon Year (2040) With Project

1.3.1 EXISTING (2022) CONDITIONS

Information for Existing (2022) conditions is disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared.

1.3.2 EXISING PLUS AMBIENT (EA) AND EXISTING PLUS AMBIENT PLUS PROJECT (EAP) (2023) CONDITIONS

The EA traffic conditions analysis determines traffic deficiencies that would occur on the existing roadway system with the addition of ambient growth. To account for background traffic growth, an ambient growth factor from Existing conditions of 3.0% is included for EA (2023) traffic conditions (3 percent per year for one year). The ambient growth is consistent with the growth used by other projects in the area within the City of San Bernardino and is consistent with the City of San Bernardino traffic study guidelines. The EAP traffic conditions analysis includes the EA traffic forecasts plus the addition of Project traffic.

1.3.3 EXISING PLUS AMBIENT PLUS CUMULATIVE (EAC) AND EXISTING PLUS AMBIENT PLUS CUMULATIVE PLUS PROJECT (EAPC) (2023) CONDITIONS

The EAC traffic conditions analysis determines traffic deficiencies that would occur on the existing roadway system with the addition of ambient growth and the addition of traffic generated by other known or probably related projects. To account for background traffic growth, an ambient growth factor from Existing conditions of 3.0% is included for EAC (2023) traffic conditions (3 percent per year for one year). The ambient growth is consistent with the growth used by other projects in the area within the City of San Bernardino and is consistent with the City of San Bernardino traffic study guidelines. The related projects are at least in part already accounted for in the assumed 3.0% of ambient growth; and some of these related projects may not be implemented and operational within the 2023 Opening Year time frame assumed for the Project. The resulting traffic growth utilized in the TA (3.0% ambient growth factor plus traffic generated by related projects) would therefore tend to overstate rather than understate background cumulative traffic deficiencies under 2023 conditions. The EAPC traffic conditions analysis includes the EAC traffic forecasts plus the addition of Project traffic.

1.3.4 HORIZON YEAR (2040) CONDITIONS

Traffic projections for Horizon Year (2040) conditions were derived from the San Bernardino County Transportation Analysis Model (SBTAM) using accepted procedures for model forecast refinement and smoothing. The Horizon Year conditions analysis will be utilized to determine if improvements funded through regional transportation mitigation fee programs can accommodate the long-range cumulative traffic at the target Level of Service (LOS) identified in the City of San Bernardino (lead agency) General Plan. Each of the applicable transportation fee programs are discussed in more detail in Section 8 *Local and Regional Funding Mechanisms*.

1.4 STUDY AREA

To ensure that this TA satisfies the City of San Bernardino's traffic study requirements, Urban Crossroads, Inc. prepared a Project traffic study scoping package for review by City of San Bernardino 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 7 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 San Bernardino staff. At a minimum, the study area includes intersections where the Project is anticipated to contribute 50 or more peak hour trips per the City's traffic study guidelines. (1) The "50 peak hour trip" criterion represents a minimum number of trips at which a typical intersection would have the potential to be affected by a given development proposal. The 50 peak hour trip criterion is a traffic engineering rule of thumb that is accepted and widely used within San Bernardino County for estimating a potential area of influence (i.e., study area).

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

#	Intersection	Jurisdiction	CMP?
1	Arrowhead Av. & Rialto Av.	San Bernardino	Yes
2	Arrowhead Av. & Dwy. 1	San Bernardino	No
3	Mountain View Av./Dwy. 2 & Rialto Av.	San Bernardino	No
4	Dwy. 3 & Rialto Av.	San Bernardino	No
5	Sierra Wy. & Rialto Av.	San Bernardino	No
6	Sierra Wy. & Dwy. 4	San Bernardino	No
7	Sierra Wy. & Dwy. 5	San Bernardino	No

The intent of a CMP is to more 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 San Bernardino CMP became effective with the passage of Proposition 111 in 1990 and last updated in 2016 with an updated Nexus Study completed in 2020. (2) The intersection of Arrowhead Avenue and Rialto Avenue is identified as a San Bernardino County Transportation Authority (SBCTA) 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 and Section 5 *EA and EAP (2023) Traffic Conditions,* Section 6 *EAC and EAPC (2023) Traffic Conditions,* and Section 7 *Horizon Year (2040) Traffic Conditions* includes the detailed analysis. A summary of LOS results for all analysis scenarios is presented in Table 1-2.

1.5.1 EXISTING (2023) CONDITIONS

All of the study area intersections are currently operating at an acceptable LOS during the weekday AM and PM peak hours.

1.5.2 EA AND EAP (2023) CONDITIONS

All of the study area intersections are anticipated to continue to operate at an acceptable LOS during the weekday AM and PM peak hours under both EA and EAP traffic conditions. Project driveways have been evaluated assuming the improvements that would be implemented by the Project in order to facilitate site access.

TABLE 1-2: SUMMARY OF LOS

#	Intersection	Existing AM	Existing PM	EA (2023) AM	EA (2023) PM	EAP (2023) AM	EAP (2023) PM	EAC (2023) AM	EAC (2023) PM	EAPC (2023) AM	EAPC (2023) PM	2040 Without Project AM	2040 Without Project PM	2040 With Project AM	2040 With Project PM
1	Arrowhead Av. & Rialto Av.	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2	Arrowhead Av. & Dwy. 1	N/A	N/A	N/A	N/A	●	●	N/A	N/A	●	●	N/A	N/A	●	●
3	Mountain View Av./Dwy. 2 & Rialto Av.	●	●	●	●	●	●	●	●	●	●	●	●	●	●
4	Dwy. 3 & Rialto Av.	N/A	N/A	N/A	N/A	●	●	N/A	N/A	●	●	N/A	N/A	●	●
5	Sierra Wy. & Rialto Av.	●	●	●	●	●	●	●	●	●	●	●	●	●	●
6	Sierra Wy. & Dwy. 4	●	●	●	●	●	●	●	●	●	●	●	●	●	●
7	Sierra Wy. & Dwy. 5	N/A	N/A	N/A	N/A	●	●	N/A	N/A	●	●	N/A	N/A	●	●

● = A - D ● = E ● = F

1.5.2 EAC AND EAPC (2023) CONDITIONS

All of the study area intersections are anticipated to continue to operate at an acceptable LOS during the weekday AM and PM peak hours under both EAC and EAPC traffic conditions. Project driveways have been evaluated assuming the improvements that would be implemented by the Project in order to facilitate site access.

HORIZON YEAR (2040) CONDITIONS

All of the study area intersections are anticipated to continue to operate at an acceptable LOS during the weekday AM and PM peak hours under Horizon Year (2040) Without Project and With Project traffic conditions. Project driveways have been evaluated assuming the improvements that would be implemented by the Project in order to facilitate site access.

1.6 RECOMMENDATIONS

1.6.1 SITE ADJACENT AND SITE ACCESS 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. The site adjacent recommendations are shown on Exhibit 1-4. The site adjacent queuing analysis worksheets are provided in Appendix 1.2.

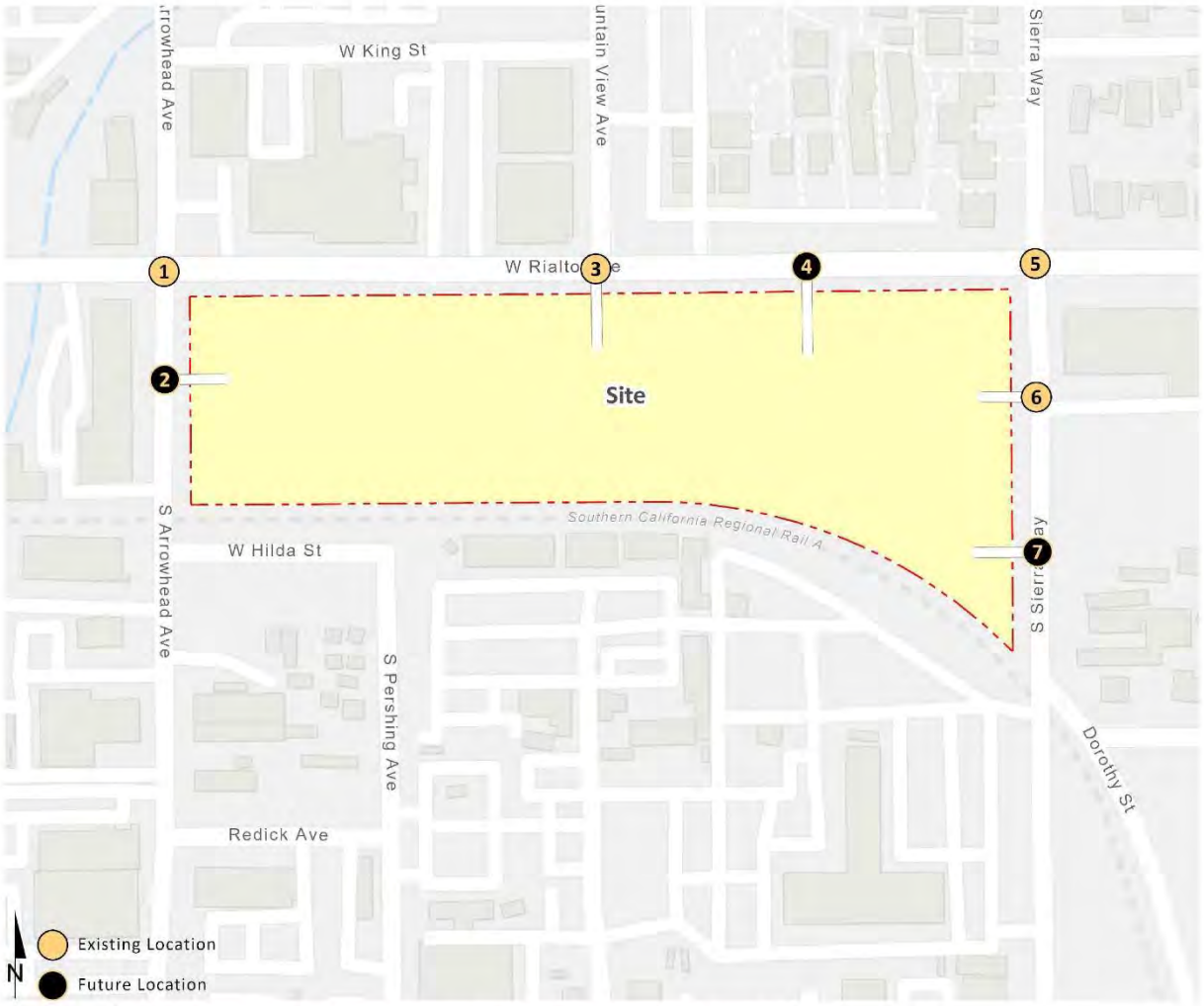
Recommendation 1 – Arrowhead Avenue & Driveway 1 (#2) – The following improvements are necessary to accommodate site access:

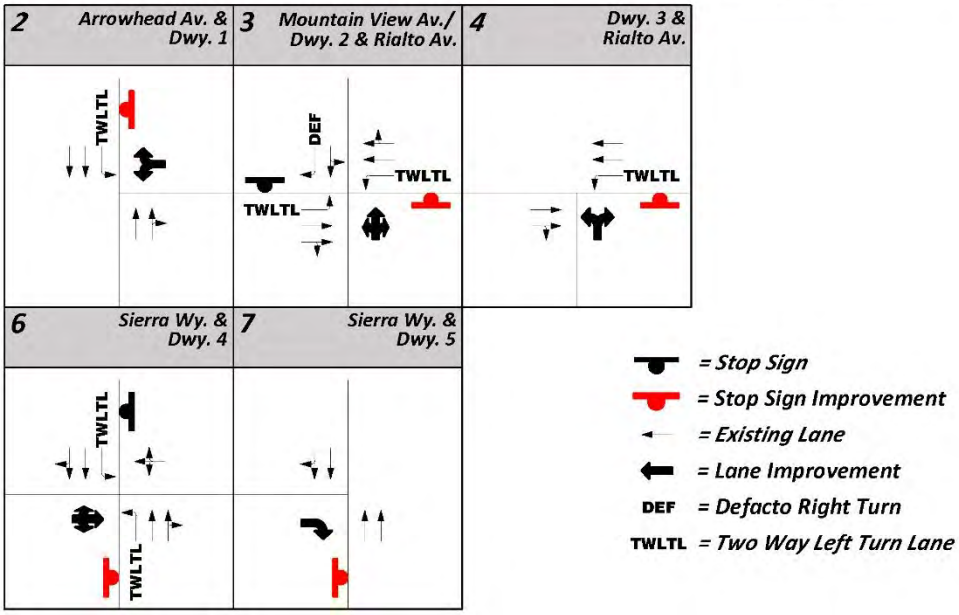
- Project to install a stop sign on the westbound approach.
- Project to construct a westbound shared left-right turn lane (Project Driveway 1).

Recommendation 2 – Mountain View Avenue/Driveway 2 & Rialto Avenue (#3) – The following improvements are necessary to accommodate site access:

- Project to install a stop sign on the northbound approach.
- Project to construct a northbound shared left-through-right turn lane (Project Driveway 2).

EXHIBIT 1-4: SITE ACCESS RECOMMENDATIONS





Recommendation 3 – Driveway 3 & Rialto Avenue (#4) – The following improvements are necessary to accommodate site access:

- Project to install a stop sign on the northbound approach.
- Project to construct a northbound shared left-right turn lane (Project Driveway 3).

Recommendation 4 – Sierra Way & Driveway 4 (#6) – The following improvements are necessary to accommodate site access:

- Project to install a stop sign on the eastbound approach.
- Project to construct an eastbound shared left-through-right turn lane (Project Driveway 4).

Recommendation 5 – Sierra Way & Driveway 5 (#7) – The following improvements are necessary to accommodate site access:

- Project to install a stop sign on the eastbound approach.
- Project to construct an eastbound right turn lane (Project Driveway 5).
- Project should install "No Left Turn" signs for the inbound and outbound directions.

Recommendation 6 – Arrowhead Avenue is a north-south oriented roadway located on the Project's western boundary. According to the City of San Bernardino General Plan, Arrowhead Avenue is currently built out to its ultimate half-section as a Major Arterial roadway (100-foot right-of-way). As such, there are no roadway improvement recommendations. However, curb, gutter, and sidewalk improvements are recommended along Arrowhead Avenue to accommodate the proposed Project driveways.

Recommendation 7 – Rialto Avenue is an east-west oriented roadway located on the Project's northern boundary. According to the City of San Bernardino General Plan, Rialto Avenue is currently built out to its ultimate half-section as a Secondary Arterial roadway (88-foot right-of-way). As such, there are no roadway improvement recommendations. However, curb, gutter, and sidewalk improvements are recommended along Rialto Avenue to accommodate the proposed Project driveways.

Recommendation 8 – Sierra Way is a north-south oriented roadway located on the Project's eastern boundary. According to the City of San Bernardino General Plan, Rialto Avenue is currently built out to its ultimate half-section as a Secondary Arterial roadway (88-foot right-of-way). As such, there are no roadway improvement recommendations. However, curb, gutter, and sidewalk improvements are recommended along Sierra Way to accommodate the proposed Project driveways.

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 construction plans for the Project site.

Sight distance at each project access point should be reviewed with respect to standard California Department of Transportation (Caltrans) and City of San Bernardino sight distance standards at the time of preparation of final grading, landscape, and street improvement plans.

1.6.2 OFF-SITE RECOMMENDATIONS

As discussed in Section 1.5 *Deficiencies* of this report, all study area intersections are currently operating and anticipated to continue to operate at an acceptable LOS during the peak hours for all analysis scenarios. As such, no off-site intersection improvements are identified.

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 each applicable Project driveway 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 (see Exhibit 1-5 for driveways). A WB-67 truck (53-foot trailer) has been utilized for the purposes of this analysis. As shown on Exhibit 1-5, the following curb radius changes are necessary in order to accommodate the ingress and egress of heavy trucks:

- Driveway 1 at Arrowhead Avenue – Modify the northeast corner to provide a 45-foot radius and the southeast corner to provide a 35-foot radius
- Driveway 2 at Rialto Avenue – Modify the southwest corner to provide a 40-foot radius.
- Driveway 3 at Rialto Avenue – Modify the southwest corner to provide a 40-foot radius.
- Driveway 5 at Sierra Way – Modify the northwest corner to provide a 40-foot radius and the southwest corner to provide a 35-foot radius.

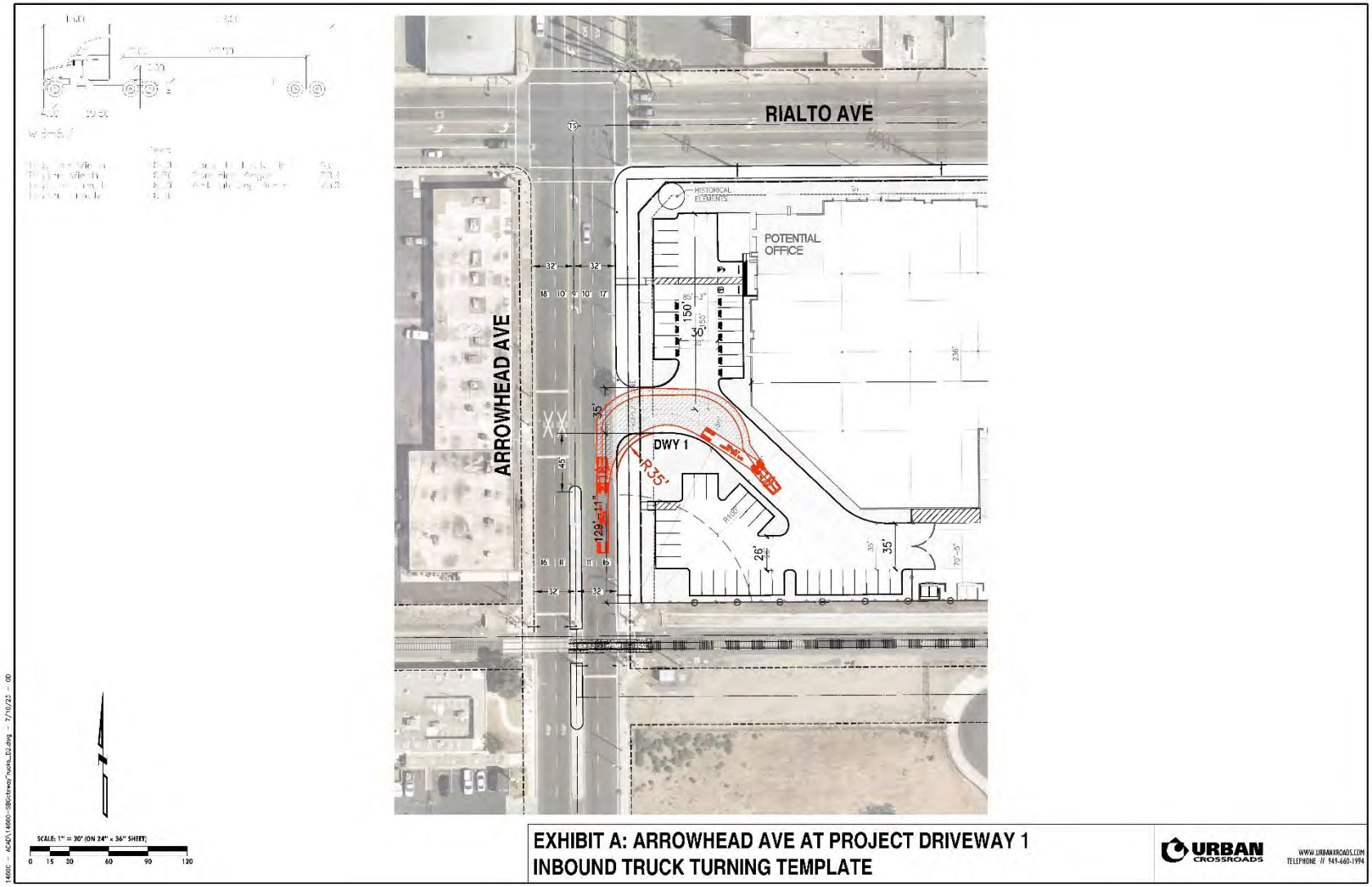
1.8 QUEUING ANALYSIS

A queuing analysis was conducted for each of the study area intersections for Horizon Year (2040) traffic conditions to determine the turn pocket lengths and lane geometric necessary to accommodate near-term 95th percentile queues and recommend storage lengths for the turning movements shown on Exhibit 1-4. The analysis was conducted for the weekday AM and weekday PM peak hours using the SimTraffic modeling software. The Horizon Year (2040) With Project Conditions queuing results are shown in Table 1-3. The queuing worksheets are provided in Appendix 1.2 of this TA.

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 (Version 11) to generate random simulations. The 95th percentile queue is not necessarily ever observed; it is simply based on statistical calculations (or Average Queue plus 1.65 standard deviations). The random simulations generated by SimTraffic have been utilized to determine the 95th percentile queue lengths observed for each turn lane. A SimTraffic simulation has been recorded 5 times, during the weekday AM and weekday PM peak hours, and has been seeded for 30-minute periods with 60-minute recording intervals.

As shown in Table 1-3, no inbound turning movement queues from the two-way left-turn are anticipated to exceed 20 feet, based on the 95th percentile queues under Horizon Year (2040) With Project traffic conditions. As such, there are no queuing issues anticipated at the Project driveways.

EXHIBIT 1-5: TRUCK ACCESS (PAGE 1 OF 7)



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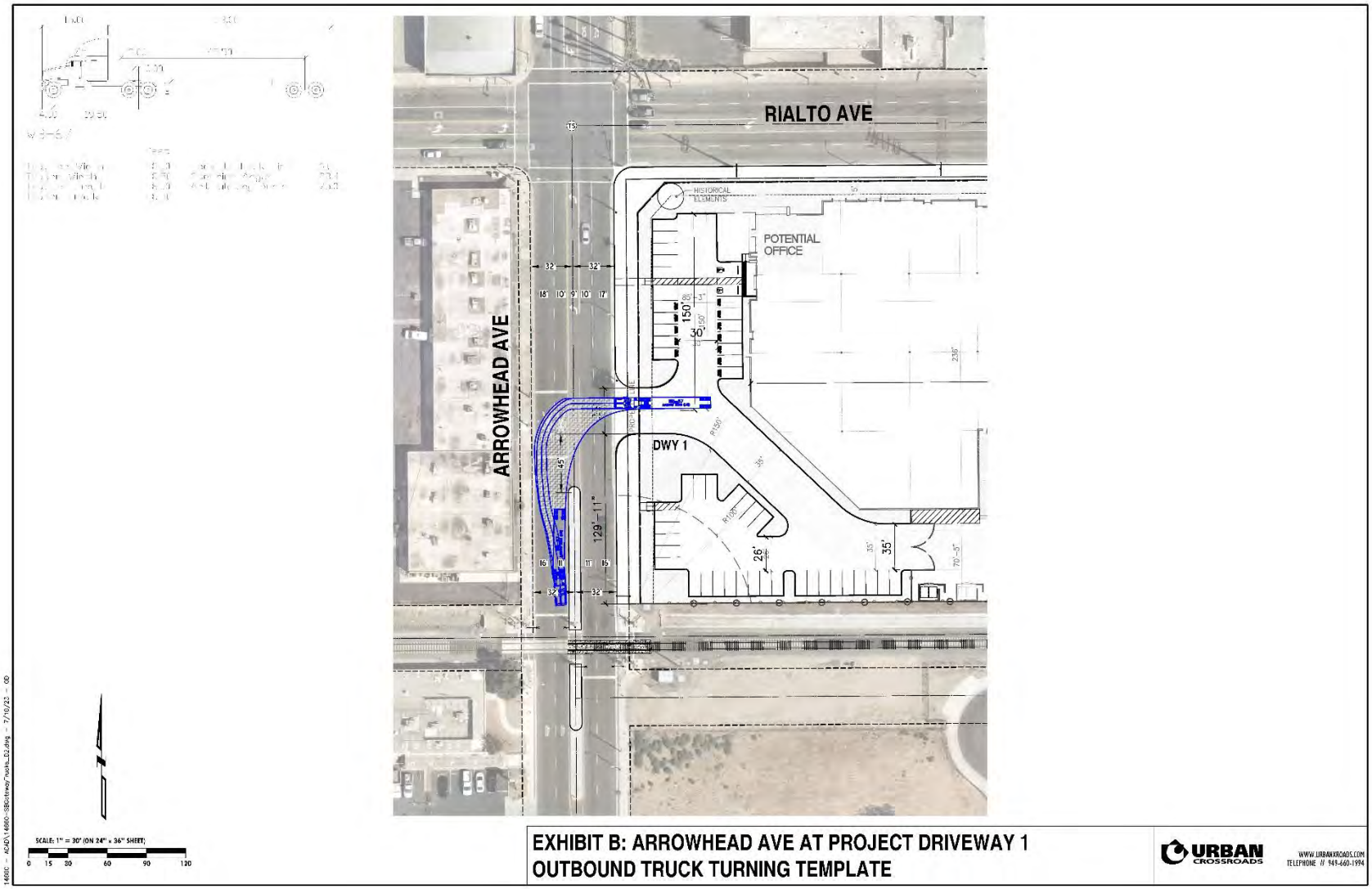

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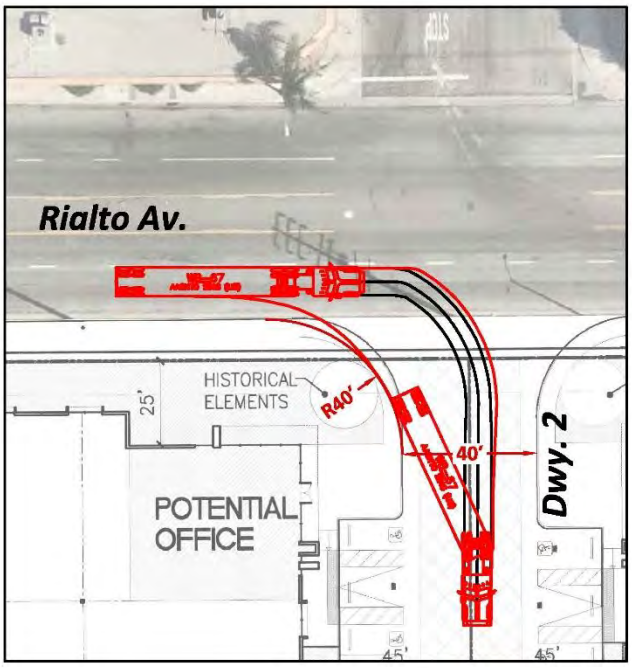

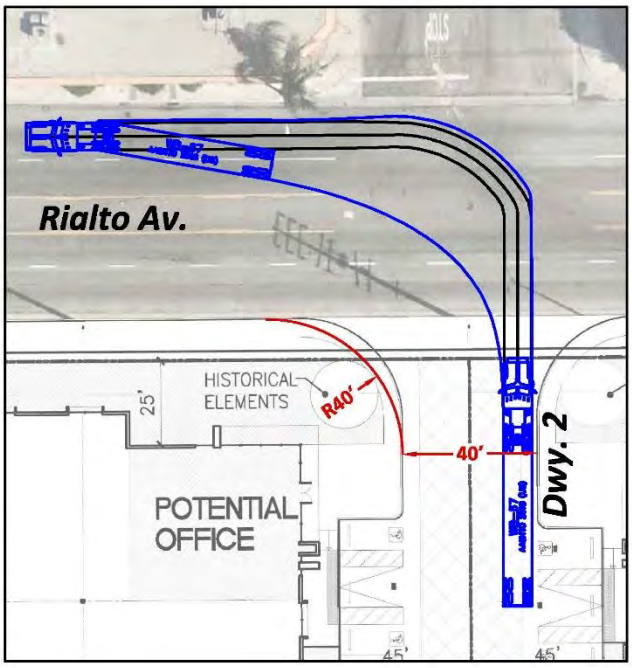

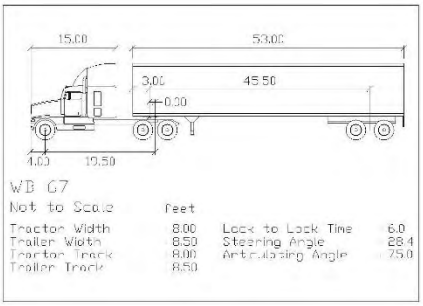

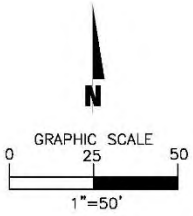

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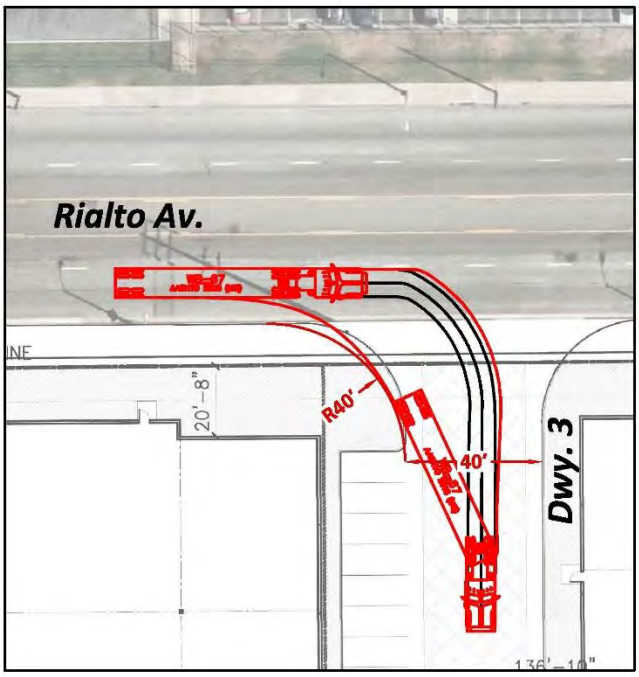

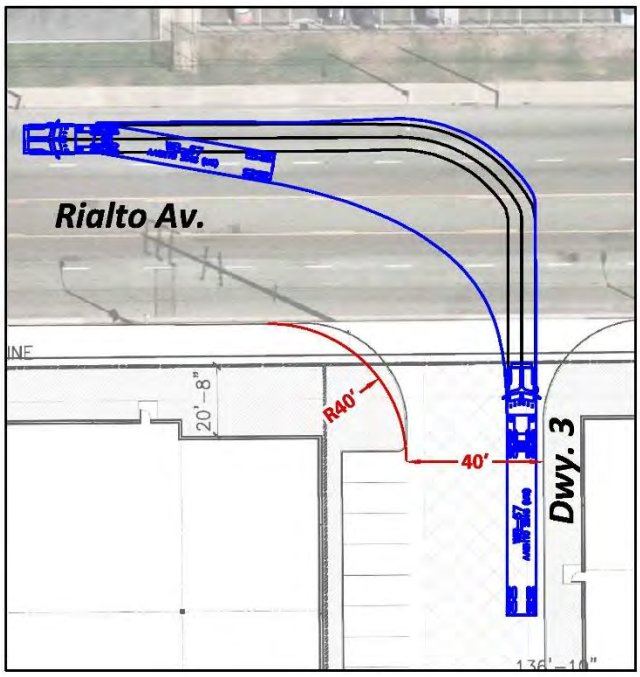

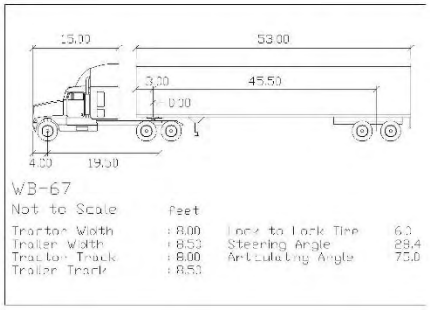

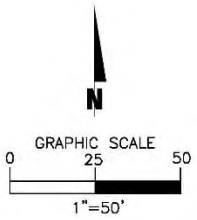

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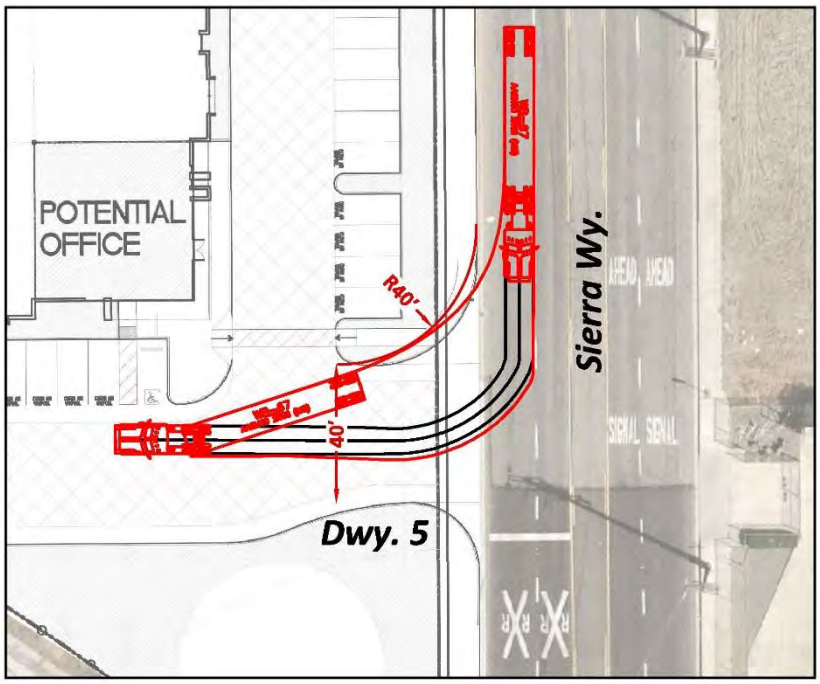

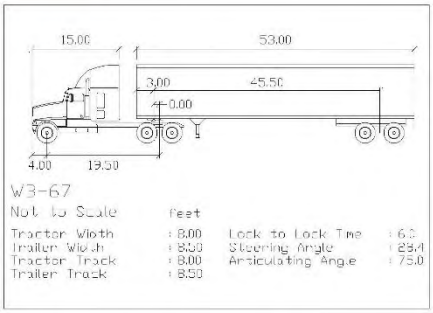

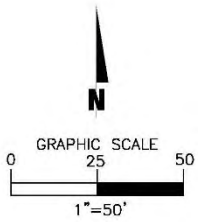

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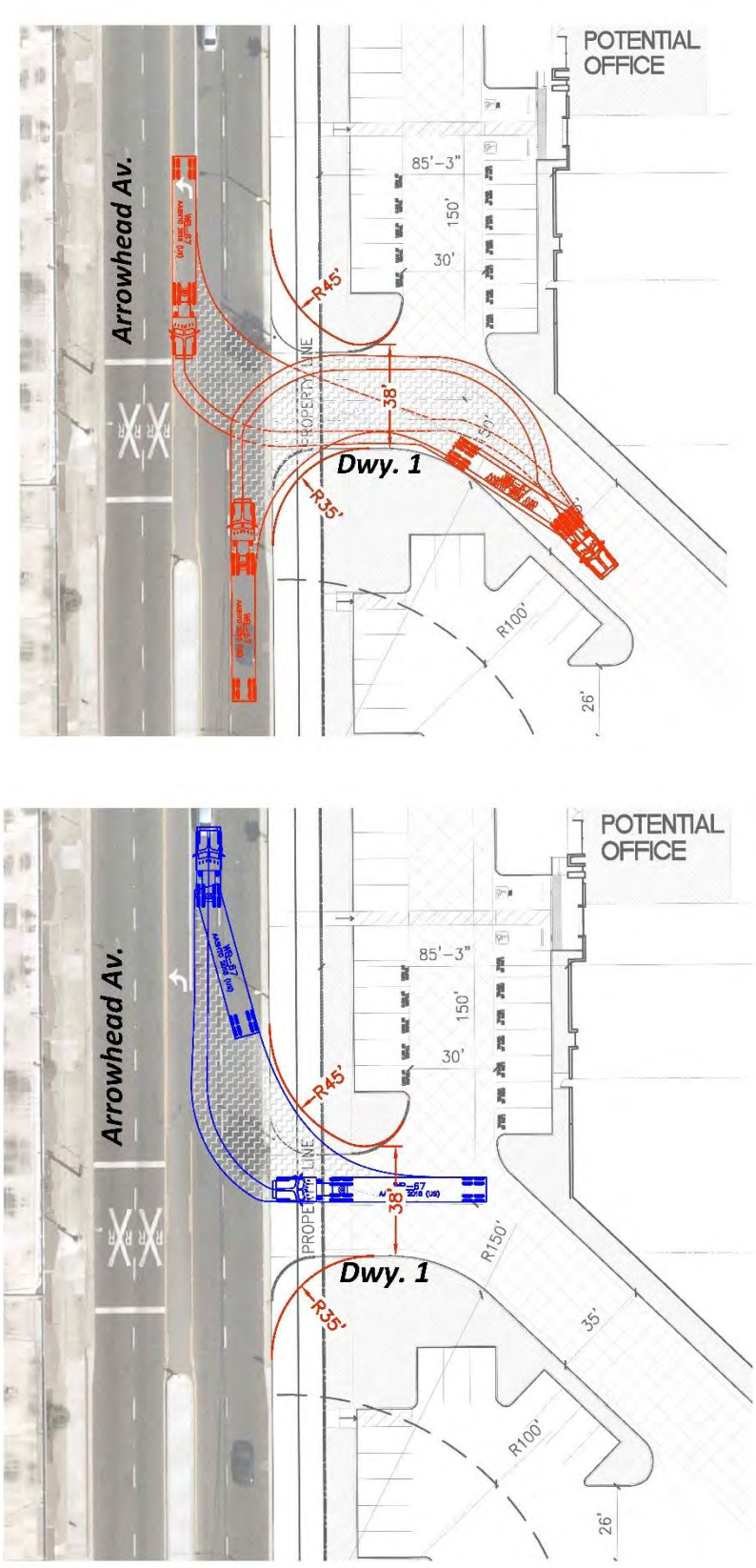

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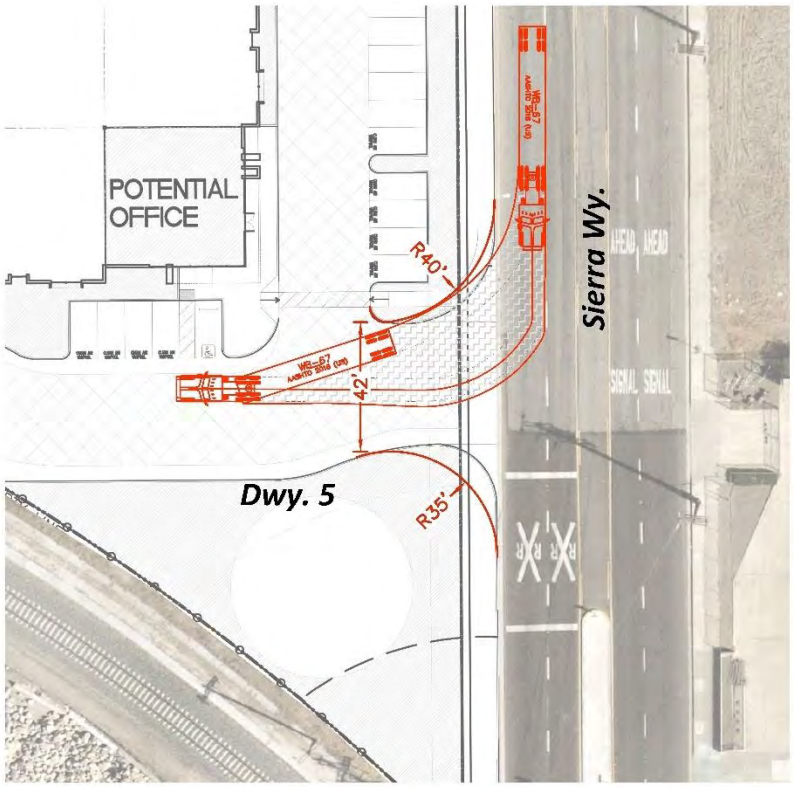


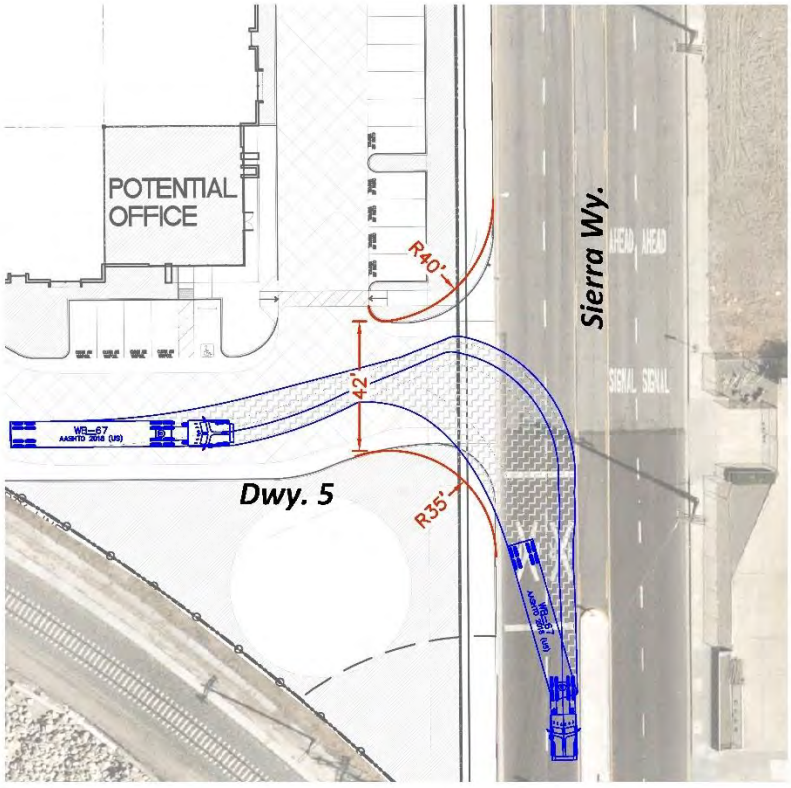


TABLE 1-3: SITE ADJACENT QUEUING SUMMARY

Intersection	Movement	Available Stacking Distance (Feet)	2040 With Project With Improvements 95th % Queue (Feet) AM Peak Hour	PM Peak Hour
Arrowhead Av. & Driveway 1	SBL	55	18	10
Mountain View Av./Dwy. 2 & Rialto Av.	WBL	220	7	0
Dwy. 3 & Rialto Av.	WBL	250	14	5
Sierra Wy. & Dwy. 4	NBL	155	12	7
Sierra Wy. & Dwy. 5	NBL	185	0	0

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 City of San Bernardino's 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

The City of San Bernardino requires signalized intersection operations analysis based on the methodology described in the HCM. (4) Intersection LOS operations are based on an intersection's average control delay. Control delay includes 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 2-1.

TABLE 2-1: 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.

Consistent with Appendix B of the San Bernardino County CMP, the following saturation flow rates, in vehicles per hour green per lane (vphgpl), will be utilized in the traffic analysis for signalized intersections:

Existing and Opening Year Cumulative Traffic Conditions:

- Exclusive through: 1800 vphgpl
- Exclusive left: 1700 vphgpl
- Exclusive right: 1800 vphgpl
- Exclusive dual left: 1600 vphgpl
- Exclusive triple left: 1500 vphgpl

Horizon Year (2040) Traffic Conditions:

- Exclusive through: 1900 vphgpl
- Exclusive left: 1800 vphgpl
- Exclusive dual left: 1700 vphgpl
- Exclusive right: 1900 vphgpl
- Exclusive dual right: 1800 vphgpl
- Exclusive triple left: 1600 vphgpl or less

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.

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 City of San Bernardino requires 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 2-2). 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 2-2: 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 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 rural 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. Urban warrants have been used as posted speed limits on the major roadways with unsignalized intersections are 40 miles per hour or below and rural warrants have been used where speeds exceed 40 miles per hour.

Future intersections that do not currently exist have been assessed regarding the potential need for new traffic signals based on future average daily traffic (ADT) volumes, using the Caltrans planning level ADT-based signal warrant analysis worksheets. Similarly, the speed limit has been used as the basis for determining the use of Urban and Rural warrants. Traffic signal warrant analyses were performed for the following study area intersection shown in Table 2-3:

TABLE 2-3: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS

#	Intersection	Jurisdiction
2	Arrowhead Av. & Dwy. 1	San Bernardino
3	Mountain View Av./Dwy. 2 & Rialto Av.	San Bernardino
4	Dwy. 3 & Rialto Av.	San Bernardino
5	Sierra Wy. & Dwy. 4	San Bernardino
6	Sierra Wy. & Dwy. 5	San Bernardino

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 *EA and EAP (2023) Traffic Conditions,* Section 6 *EAC and EAPC (2023) Traffic Conditions,* and Section 7 *Horizon Year (2040) 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)

Minimum Acceptable LOS and associated definitions of intersection deficiencies has been obtained from each of the applicable surrounding jurisdictions.

2.4.1 CITY OF SAN BERNARDINO

The definition of an intersection deficiency in the City of San Bernardino is based on the City of San Bernardino General Plan Circulation Element. The City of San Bernardino General Plan states that target LOS D be maintained at City intersections wherever possible. (1)

2.4.2 CMP

The CMP definition of deficiency is based on maintaining a level of service standard of LOS E or better, where feasible, except where an existing LOS F condition is identified in the CMP document. (2)

2.5 DEFICIENCY CRITERIA

This section outlines the methodology used in this analysis related to identifying circulation system deficiencies. The following deficiency criteria has been utilized for the City of San Bernardino. To determine whether the addition of project-related traffic at a study intersection would result in a deficiency, the following will be utilized:

The City of San Bernardino traffic study guidelines identifies a traffic deficiency at an intersection when any of the following changes in the volume-to-capacity (v/c) ratios occur between the Without Project and the With Project conditions:

LOS Without Project	V/C Difference
C	> 0.0400
D	> 0.0200
E, F	> 0.0100

Improvement recommendations for Project deficiencies would only mitigate the Project's proportional change in delay or v/c ratio to pre-Project conditions or better. Improvement recommendations will be identified for study area intersections that show a cumulative deficiency per the above changes in v/c and operate at LOS E or worse under 2023 or 2040 traffic conditions. The LOS with improvements must be improved to LOS D or better for intersections.

3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the City of San Bernardino 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 agreement with City of San Bernardino staff (Appendix 1.1), the study area includes a total of 7 existing and future intersections as shown previously on Exhibit 1-3. 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 SAN BERNARDINO GENERAL PLAN CIRCULATION ELEMENT

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

The study area roadway that is classified as a Major Arterial is identified as having a 100-foot right-of-way and 72-80-foot curb-to-curb measurement. Major Arterials include two lanes of travel in each direction and a 10-14-foot curbed and/or landscaped median. The following study area roadway within the City of San Bernardino is classified as a Major Arterial:

- Arrowhead Avenue

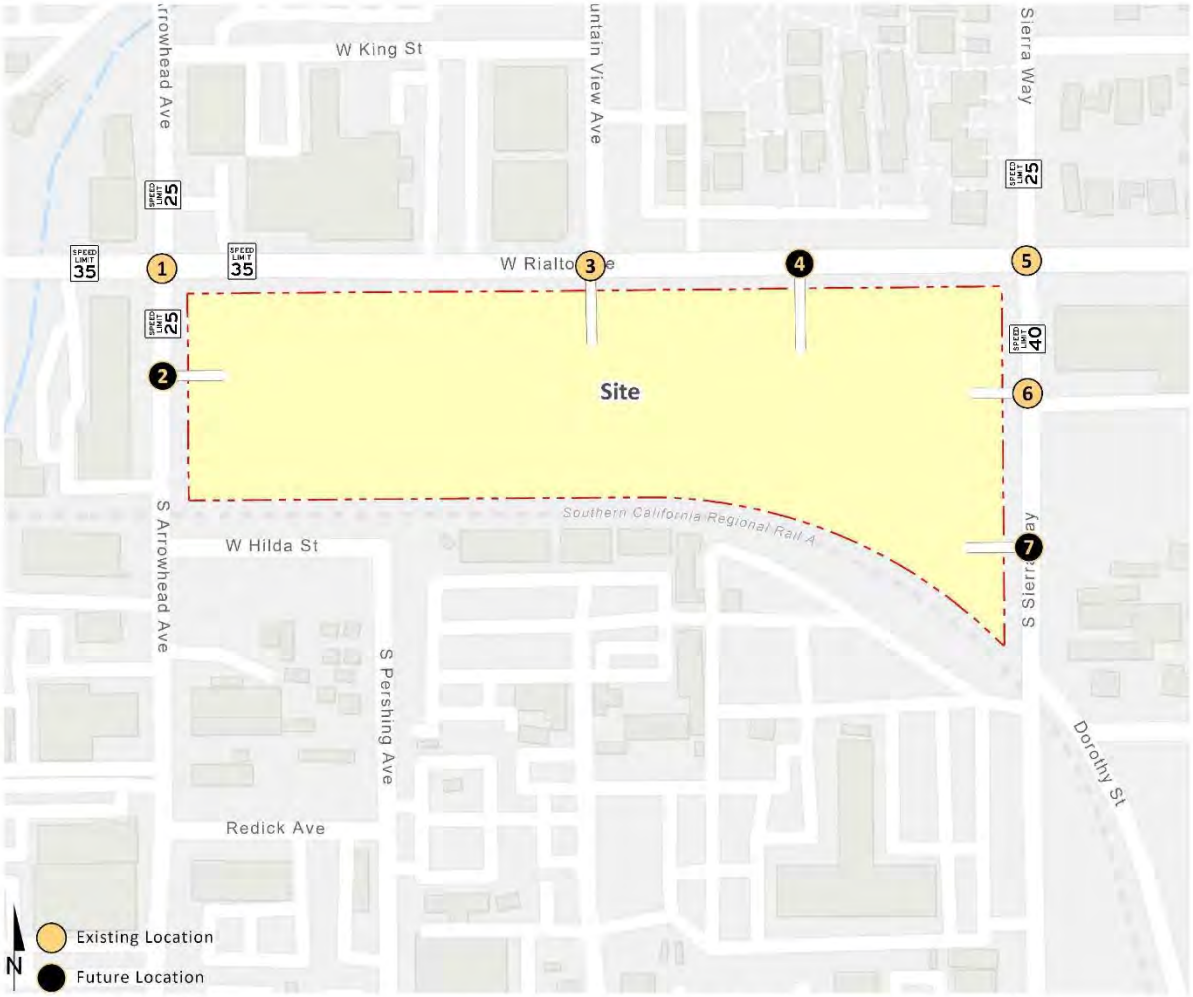
The study area roadway that is classified as a Secondary Arterial is identified as having an 88-foot right-of-way and 64-66-foot curb-to-curb measurement. Secondary Arterials include two lanes of travel in each direction and a 11-12-foot two-way turn pocket in the painted median. The following study area roadways within the City of San Bernardino are classified as a Secondary Arterial:

- Rialto Avenue
- Sierra Way

3.3 BICYCLE, EQUESTRIAN, & PEDESTRIAN FACILITIES

Exhibit 3-4 illustrates the City of San Bernardino bicycle facilities. Arrowhead Avenue is designated as a bicycle route per the City of San Bernardino General Plan. Existing pedestrian facilities within the study area are shown on Exhibit 3-5. Field observations and traffic counts conducted in February 2022 indicate light pedestrian and bicycle activity within the study area.

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



1 Arrowhead Av. & Rialto Av.	2 Arrowhead Av. & Dwy. 1	3 Mountain View Av./ Dwy. 2 & Rialto Av.	4 Dwy. 3 & Rialto Av.
4D, 4D, 4D, 4D	Future Intersection	DEF, 2U, 4D, 4D	Future Intersection
5 Sierra Wy. & Rialto Av.	**6 Sierra Wy. & Dwy. 4**	**7 Sierra Wy. & Dwy. 5**	
4D, 4D, 4D, 4D	4D, 2U, 4D	Future Intersection	

= Traffic Signal
= Stop Sign
4 = Number of Lanes
D = Divided
U = Undivided
DEF = Defacto Right Turn
= Speed Limit (MPH)

EXHIBIT 3-2: CITY OF SAN BERNARDINO GENERAL PLAN CIRCULATION ELEMENT

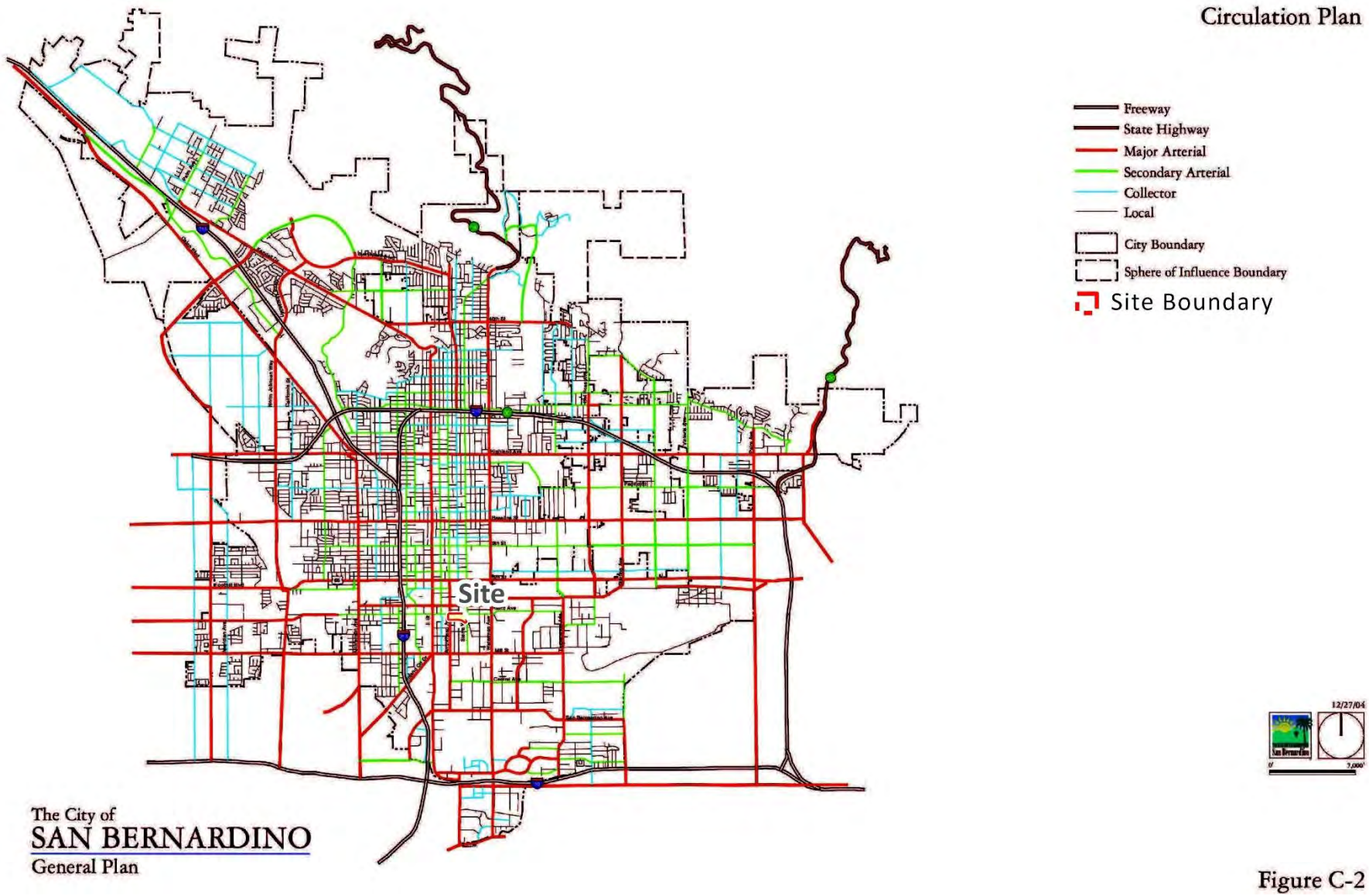


EXHIBIT 3-3: CITY OF SAN BERNARDINO GENERAL PLAN ROADWAY CROSS-SECTIONS

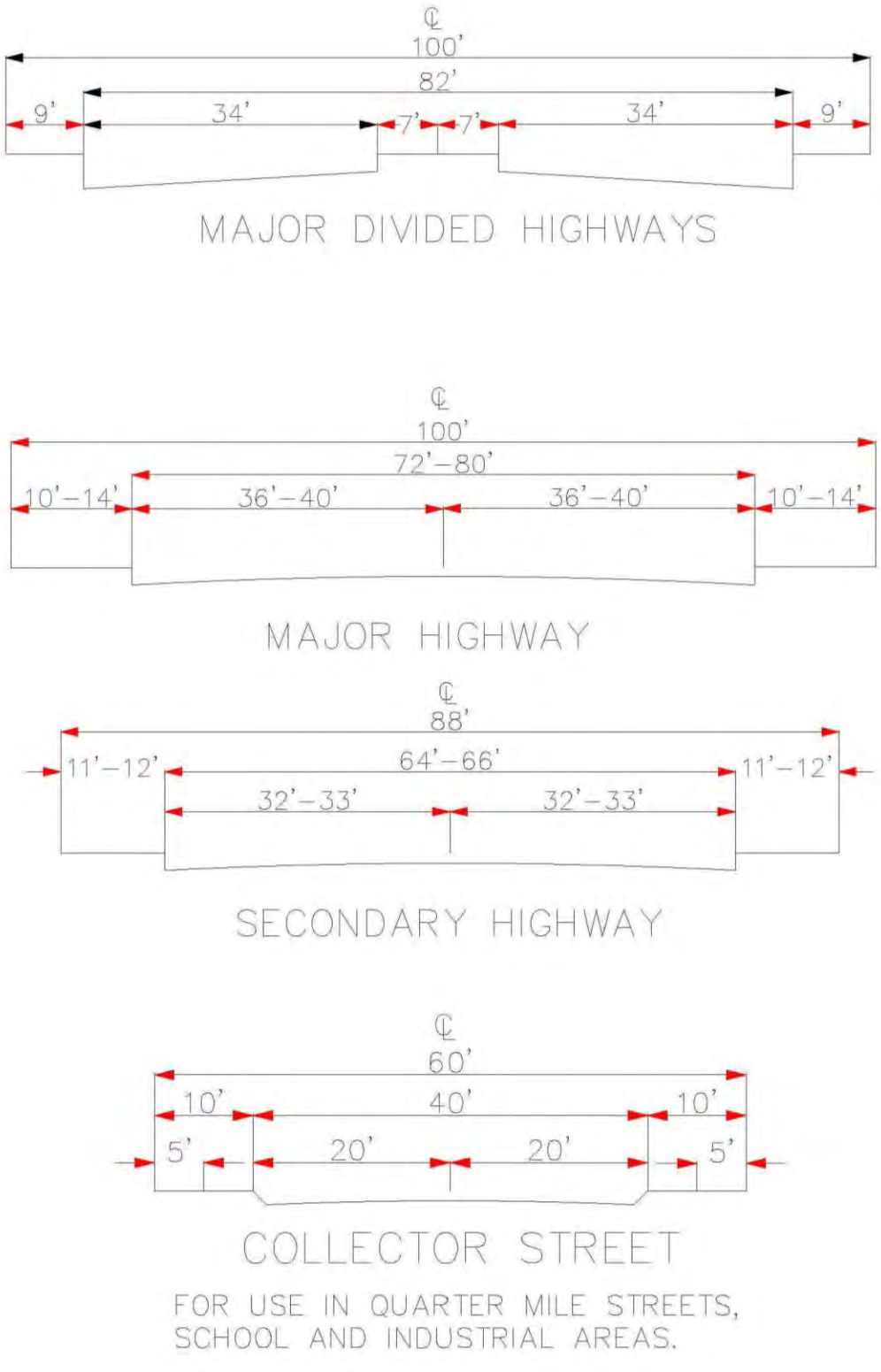
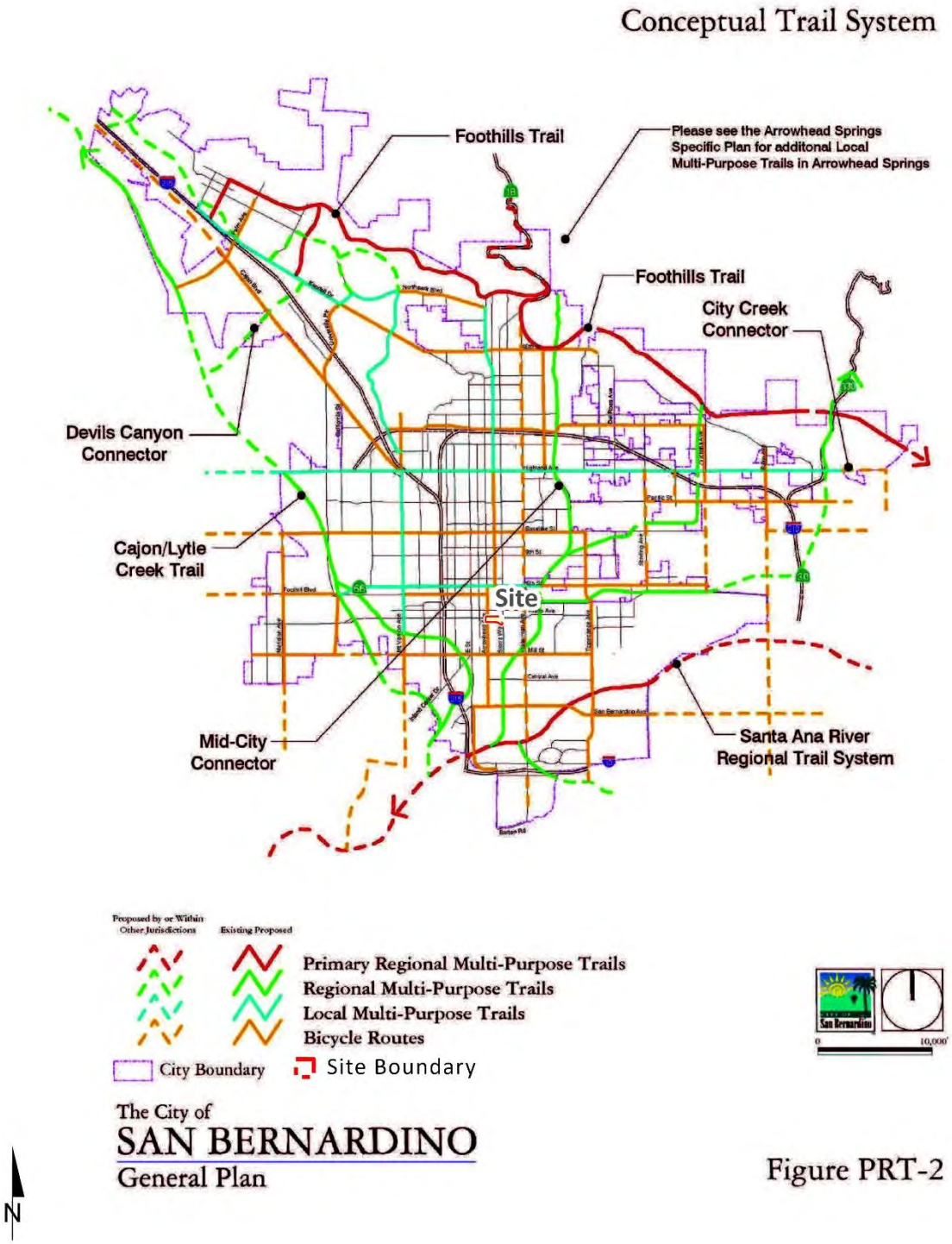


EXHIBIT 3-4: CITY OF SAN BERNARDINO BICYCLE FACILITIES



3.4 TRANSIT SERVICE

The study area within the City of San Bernardino is currently served by Omnitrans, a public transit agency serving various jurisdictions within San Bernardino County. Based on a review of the existing transit routes within the vicinity of the proposed Project, Routes 3, 4, 6, 8, and 305 currently run along Arrowhead Avenue, Rialto Avenue, and Mountain View Avenue. Transit service is reviewed and updated by Omnitrans 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. As such, it is recommended that the applicant work in conjunction with Omnitrans to potentially provide bus service to the site. Existing transit routes in the vicinity of the study area are illustrated on Exhibit 3-6.

3.5 EXISTING (2022) TRAFFIC COUNTS

The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in February 2022. 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)

The 2022 weekday AM and weekday PM peak hour count data is representative of typical weekday peak hour traffic conditions in the study area. 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. As such, no additional adjustments were made to the traffic counts to establish the baseline condition. The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1.

To represent the effect large trucks, buses, and recreational vehicles have on traffic flow, all trucks were converted into passenger car equivalent (PCE). By their size alone, these vehicles occupy the same space as two or more passenger cars. In addition, the time it takes for them to accelerate and slow-down is also much longer than for passenger cars and varies depending on the type of vehicle and number of axles. For this analysis, the following PCE factors have been used to estimate each turning movement: 2.0 for 2-axle trucks, 2.5 for 3-axle trucks, and 3.0 for 4+-axle trucks. These factors are consistent with the values recommended for use in the City's Guidelines.

Existing weekday ADT volumes are shown on Exhibit 3-7 for actual vehicles. The PCE traffic volumes utilized for the analysis are provided in Appendix 3.2. Where actual 24-hour tube count data was not available, 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 9.87 = Leg Volume

EXHIBIT 3-5: EXISTING PEDESTRIAN FACILITIES

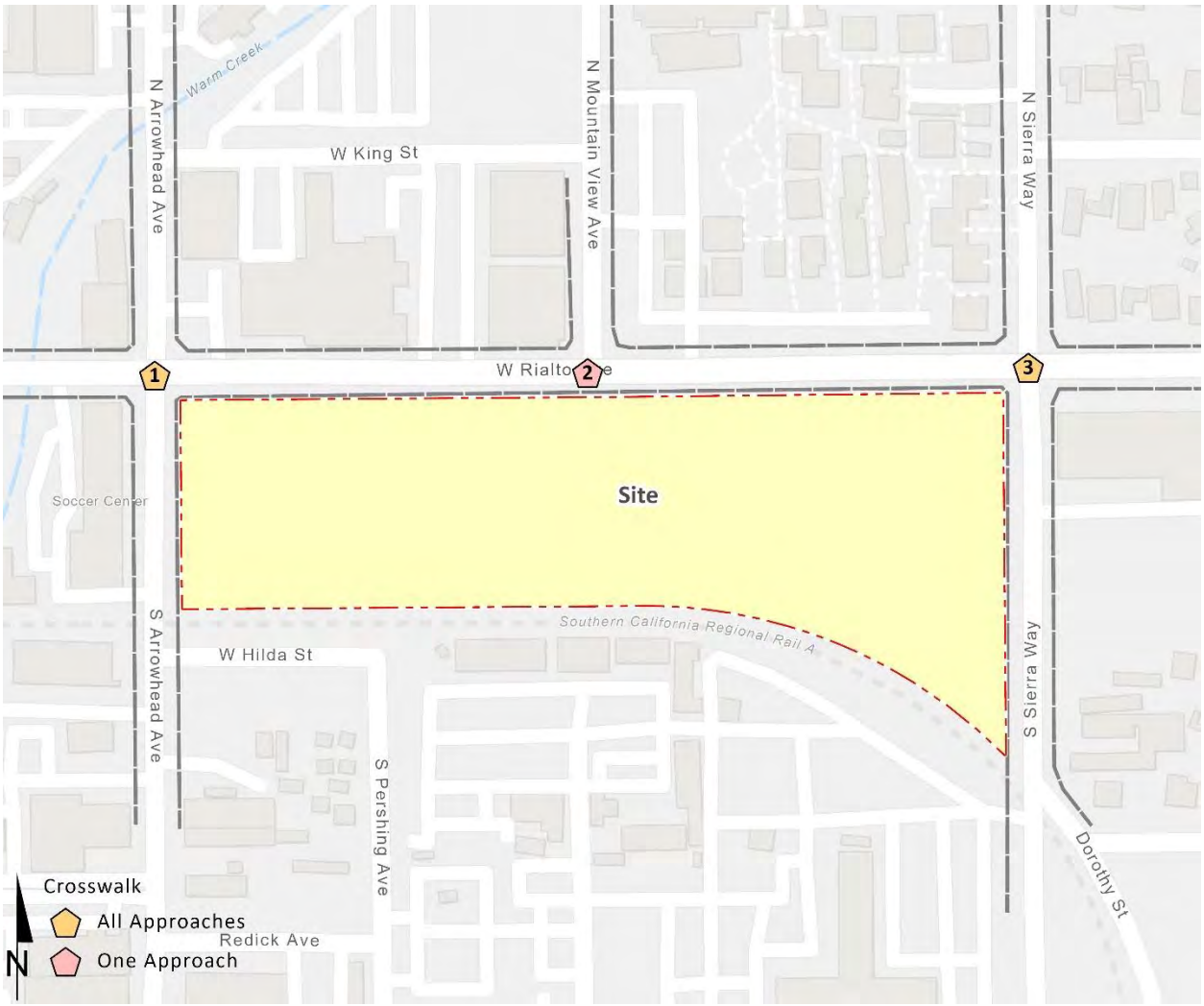
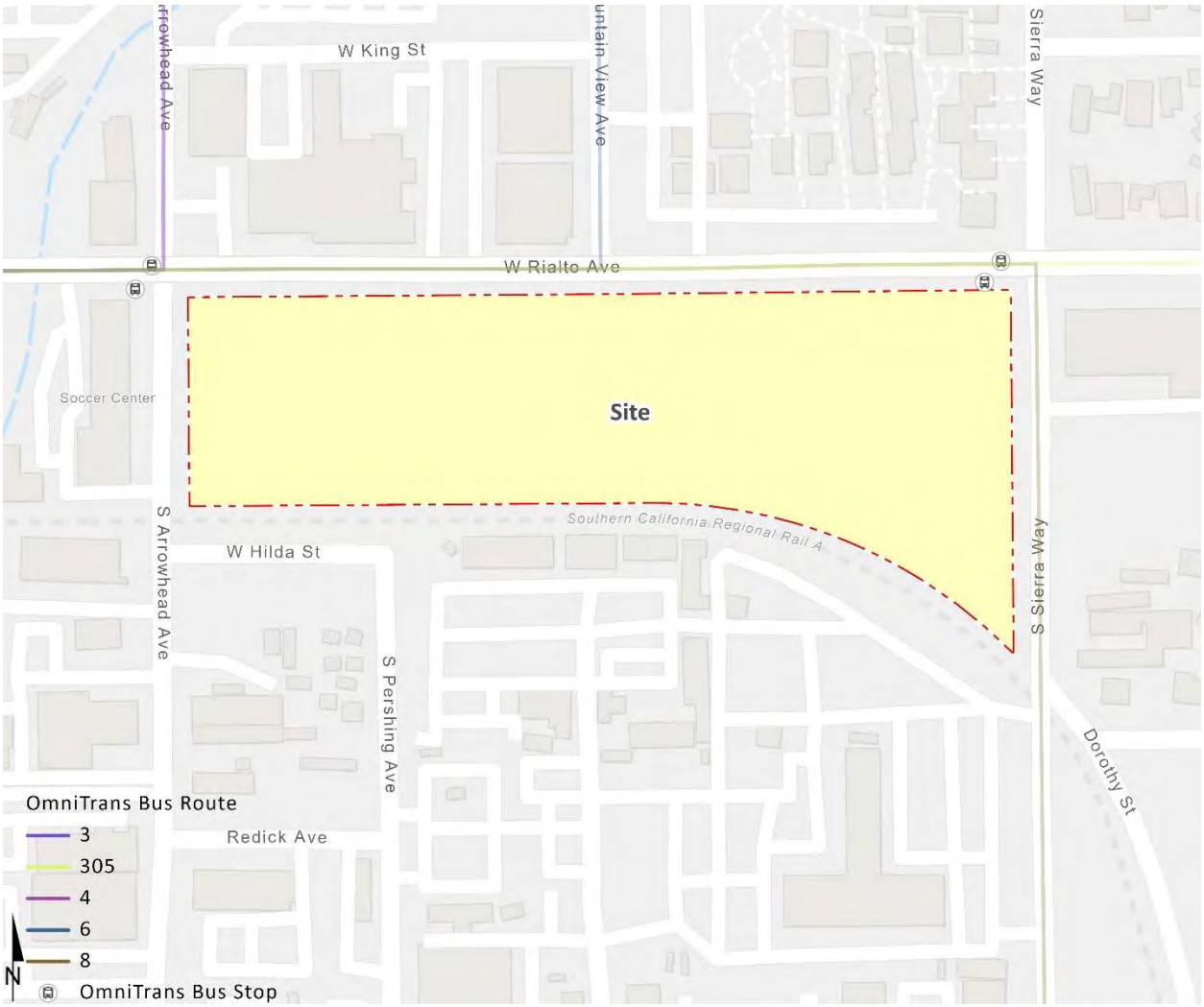


EXHIBIT 3-6: EXISTING TRANSIT ROUTES



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 10.13 percent. As such, the above equation utilizing a factor of 9.87 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 10.13 percent (i.e., 1/0.1013 = 9.87) and was assumed to sufficiently estimate average daily traffic (ADT) volumes for planning-level analyses. Existing weekday peak hour intersection volumes are also shown on Exhibit 3-7.

3.6 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 (2022) CONDITIONS

#	Intersection	Traffic Control[2]	Delay[1] (secs.) AM	Delay[1] (secs.) PM	Level of Service AM	Level of Service PM
1	Arrowhead Av. & Rialto Av.	TS	7.9	7.9	A	A
2	Arrowhead Av. & Dwy. 1		Future Intersection			
3	Mountain View Av./Dwy. 2 & Rialto Av.	CSS	13.1	13.8	B	B
4	Dwy. 3 & Rialto Av.		Future Intersection			
5	Sierra Wy. & Rialto Av.	TS	8.3	8.2	A	A
6	Sierra Wy. & Dwy. 4	CSS	9.9	8.9	A	A
7	Sierra Wy. & Dwy. 5		Future Intersection			

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 TS = Traffic Signal; CSS = Cross-street Stop

3.7 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.

EXHIBIT 3-7: EXISTING (2022) TRAFFIC VOLUMES

1 Arrowhead Av. & Rialto Av.

5,700

18(31) ↲ 159(203) ↓ 112(71) ↳

41(51) ↳

350(287) →

87(58) ↲

9,150

↱ 32(31)

← 331(404)

↰ 38(65)

↰ ↑ ↱

41(43) 129(190) 39(70)

8,650 *5,900*

2 Arrowhead Av. & Dwy. 1

Future Intersection

3 Mountain View Av./Dwy. 2 & Rialto Av.

300

11(15) ↲ 4(1) ↳

13(11) ↳

487(412) →

8,950

↱ 2(4)

← 391(489)

9,150

4 Dwy. 3 & Rialto Av.

Future Intersection

5 Sierra Wy. & Rialto Av.

4,550

72(93) ↲ 138(107) ↓ 74(23) ↳

51(96) ↳

411(300) →

28(17) ↲

7,300

↱ 30(21)

← 301(374)

↰ 14(5)

↰ ↑ ↱

18(28) 98(122) 27(18)

10,250 *2,950*

6 Sierra Wy. & Dwy. 4

2,950

176(129) ↓ 4(0) ↳

↱ 1(2)

↰ 1(0)

142(166) →

2,900

7 Sierra Wy. & Dwy. 5

Future Intersection

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

Average Daily Trips

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. A preliminary site plan for the proposed Project is shown previously on Exhibit 1-2. The Project is proposed to consist of 230,320 square feet of industrial use within three buildings. The Project will be evaluated in a single phase with an opening year of 2023. As indicated on Exhibit 1-2, vehicular access will be provided via five driveways:

- Driveway 1 on Arrowhead Avenue: full access for passenger cars and trucks
- Driveway 2 on Rialto Avenue: full access for passenger cars and trucks
- Driveway 3 on Rialto Avenue: full access for passenger cars and trucks
- Driveway 4 on Sierra Way: full access for passenger cars only
- Driveway 5 on Sierra Way: right-in/right-out only for passenger cars and trucks

Regional access to the Project site is available from the I-215 Freeway via 2nd Street, 4th Street, and Mill Street interchanges.

4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic which is both attracted to and produced by a development. Determining traffic generation for a specific project is therefore based upon forecasting the amount of traffic that is expected to be both attracted to and produced by the specific land uses being proposed for a given development.

In order to develop the traffic characteristics of the proposed project, trip-generation statistics published in the ITE Trip Generation Manual (11th Edition, 2021) for the following land use code and vehicles mixes (see also Table 4-1): (3)

- Based on the types of uses anticipated to be developed within the business park area, the trip generation rates for ITE land use code 130 (Industrial Park) have been used to derive site specific trip generation estimates for up to 57,580 square feet of the Project. The vehicle mix has been obtained from the ITE's latest Trip Generation Manual. The truck percentages were further broken down by axle type per the following SCAQMD recommended truck mix: 2-Axle = 16.7%; 3-Axle = 20.7%; 4+-Axle = 62.6%.
- ITE land use code 140 (Manufacturing) has been used to derive site specific trip generation estimates for up to 57,580 sf. The vehicle mix has been obtained from the ITE's Trip Generation Manual Supplement (dated February 2020). This study provides the following vehicle mix: AM Peak Hour: 92.0% passenger cars and 8.0% trucks; PM Peak Hour: 93.0% passenger cars and 7.0% trucks; Weekday Daily: 90.0% passenger cars and 10.0% trucks. 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 = 16.7%; 3-Axle = 20.7%; 4+-Axle = 62.6%.

- Warehousing (ITE Land Use Code 150) has been used to derive site specific trip generation estimates for up to 115,160 square feet of the proposed Project. A warehouse is primarily devoted to the storage of materials, but it may also include office and maintenance areas. The vehicle mix (passenger cars versus trucks) has been obtained from the ITE 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 = 16.7%; 3-Axle = 20.7%; 4+-Axle = 62.6%.

Trip generation for the proposed Project are summarized in Table 4-2 for actual vehicles and in Table 4-3 for PCE. As shown in Table 4-2, the proposed Project is anticipated to generate a total of 670 actual vehicle trip-ends per day with 77 AM peak hour trips and 80 PM peak hour trips. For the purposes of this traffic study, the PCE trip generation shown in Table 4-3 has been utilized for the analysis.

4.2 PROJECT TRIP DISTRIBUTION

The Project trip distribution and assignment process represents the directional orientation of traffic to and from the Project site. The trip distribution pattern is heavily influenced by the geographical location of the site, the location of surrounding uses, and the proximity to the regional freeway system. In addition, truck routes for neighboring agencies have been taken into consideration in the development of the trip distribution patterns for heavy trucks. The outbound and inbound Project passenger car trip distribution patterns are shown on Exhibits 4-1 and 4-2, respectively. The outbound and inbound Project truck trip distribution patterns are shown on Exhibits 4-3 and 4-4, respectively.

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, Project weekday ADT and weekday peak hour intersection turning movement volumes are shown on Exhibit 4-5 for actual vehicles.

TABLE 4-1: 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									
Warehousing[3]	TSF	150	0.131	0.039	0.170	0.050	0.130	0.180	1.710
Passenger Cars (AM=88.2%, PM=83.3%, Daily=64.9%)			0.116	0.034	0.150	0.042	0.108	0.150	1.110
2-Axle Trucks (AM=1.97%, PM=2.79%, Daily=5.86%)			0.002	0.001	0.003	0.003	0.002	0.005	0.100
3-Axle Trucks (AM=2.44%, PM=3.46%, Daily=7.27%)			0.002	0.002	0.004	0.003	0.003	0.006	0.124
4+-Axle Trucks (AM=7.39%, PM=10.45%, Daily=21.97%)			0.007	0.006	0.013	0.010	0.009	0.019	0.376
Manufacturing[3]	TSF	140	0.517	0.163	0.680	0.229	0.511	0.740	4.750
Passenger Cars (AM=95.6%, PM=95.9%, Daily=90.5%)			0.500	0.150	0.650	0.217	0.493	0.710	4.300
2-Axle Trucks (AM=0.74%, PM=0.69%, Daily=1.59%)			0.003	0.002	0.005	0.002	0.003	0.005	0.075
3-Axle Trucks (AM=0.91%, PM=0.85%, Daily=1.97%)			0.003	0.003	0.006	0.003	0.004	0.006	0.093
4+-Axle Trucks (AM=3.73%, PM=2.56%, Daily=5.94%)			0.011	0.008	0.019	0.008	0.011	0.019	0.282
Industrial Park[3]	TSF	130	0.275	0.065	0.340	0.075	0.265	0.340	3.370
Passenger Cars (AM=88.2%, PM=88.2%, Daily=83.09%)			0.257	0.043	0.300	0.060	0.240	0.300	2.800
2-Axle Trucks (AM=1.96%, PM=1.96%, Daily=2.82%)			0.003	0.004	0.007	0.003	0.004	0.007	0.095
3-Axle Trucks (AM=2.44%, PM=2.44%, Daily=3.50%)			0.004	0.005	0.008	0.003	0.005	0.008	0.118
4+-Axle Trucks (AM=7.36%, PM=7.36%, Daily=10.59%)			0.011	0.014	0.025	0.010	0.016	0.025	0.357

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
Passenger Car Equivalent (PCE) Trip Generation Rates[4]									
Warehousing[3]	TSF	150	0.131	0.039	0.170	0.050	0.130	0.180	1.710
Passenger Cars			0.116	0.034	0.150	0.042	0.108	0.150	1.110
2-Axle Trucks (PCE = 2.0)			0.004	0.003	0.007	0.006	0.004	0.010	0.200
3-Axle Trucks (PCE = 2.5)			0.005	0.005	0.010	0.008	0.008	0.016	0.311
4+-Axle Trucks (PCE = 3.0)			0.021	0.017	0.038	0.030	0.026	0.056	1.127
Manufacturing[3]	TSF	140	0.517	0.163	0.680	0.229	0.511	0.740	4.750
Passenger Cars			0.500	0.150	0.650	0.217	0.493	0.710	4.300
2-Axle Trucks (PCE = 2.0)			0.006	0.004	0.010	0.004	0.006	0.010	0.150
3-Axle Trucks (PCE = 2.5)			0.008	0.008	0.016	0.006	0.009	0.016	0.233
4+-Axle Trucks (PCE = 3.0)			0.033	0.023	0.056	0.023	0.033	0.056	0.845
Industrial Park[3]	TSF	130	0.275	0.065	0.340	0.075	0.265	0.340	3.370
Passenger Cars			0.257	0.043	0.300	0.060	0.240	0.300	2.800
2-Axle Trucks (PCE = 2.0)			0.006	0.007	0.013	0.005	0.008	0.013	0.190
3-Axle Trucks (PCE = 2.5)			0.009	0.011	0.021	0.008	0.013	0.021	0.295
4+-Axle Trucks (PCE = 3.0)			0.034	0.041	0.075	0.029	0.047	0.075	1.070

[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 % - Without Cold Storage: 16.7% 2-Axle trucks, 20.7% 3-Axle trucks, 62.6% 4-Axle trucks.

[4] PCE factors: 2-axle = 2.0; 3-axle = 2.5; 4+-axle = 3.0.

TABLE 4-2: TRIP GENERATION SUMMARY (ACTUAL VEHICLES)

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:									
Warehousing (50%)	115.160	TSF							
Passenger Cars:			13	4	17	5	12	17	128
2-axle Trucks:			0	0	0	0	0	0	12
3-axle Trucks:			0	0	0	0	0	0	14
4+-axle Trucks:			1	1	2	1	1	2	44
Total Truck Trips (Actual Vehicles):			1	1	2	1	1	2	70
Total Warehousing Trips (Actual Vehicles):			**14**	**5**	**19**	**6**	**13**	**19**	**198**
Manufacturing (25%)	57.580	TSF							
Passenger Cars:			29	9	38	13	28	41	248
2-axle Trucks:			0	0	0	0	0	0	4
3-axle Trucks:			0	0	0	0	0	0	6
4+-axle Trucks:			1	0	1	0	1	1	16
Total Truck Trips (Actual Vehicles):			1	0	1	0	1	1	26
Total Manufacturing Trips (Actual Vehicles):			**30**	**9**	**39**	**13**	**29**	**42**	**274**
Business Park (25%)	57.580	TSF							
Passenger Cars:			15	2	17	3	14	17	162
2-axle Trucks:			0	0	0	0	0	0	6
3-axle Trucks:			0	0	0	0	0	0	8
4+-axle Trucks:			1	1	2	1	1	2	22
Total Truck Trips (Actual Vehicles):			1	1	2	1	1	2	36
Total Business Park Trips (Actual Vehicles):			**16**	**3**	**19**	**4**	**15**	**19**	**198**
Total Passenger Car Trips:			57	15	72	21	54	75	538
Total Truck Trips (Actual Vehicles):			3	2	5	2	3	5	132
Total Trips (Actual Vehicles)[2]			**60**	**17**	**77**	**23**	**57**	**80**	**670**

[1] TSF = thousand square feet

[2] Total Trips = Passenger Cars + Truck Trips.

TABLE 4-2: TRIP GENERATION SUMMARY (PCE)

Passenger Car Equivalent (PCE):								
Warehousing (50%)	115.160 TSF							
Passenger Cars:		13	4	17	5	12	17	128
2-axle Trucks:		0	0	0	1	0	1	24
3-axle Trucks:		1	1	2	1	1	2	36
4+-axle Trucks:		2	2	4	3	3	6	130
Total Truck Trips (PCE):		3	3	6	5	4	9	190
Total Warehousing Trips (PCE):		**16**	**7**	**23**	**10**	**16**	**26**	**318**
Manufacturing (25%)	57.580 TSF							
Passenger Cars:		29	9	38	13	28	41	248
2-axle Trucks:		0	0	0	0	0	0	10
3-axle Trucks:		0	0	0	0	1	1	14
4+-axle Trucks:		2	1	3	1	2	3	50
Total Truck Trips (PCE):		2	1	3	1	3	4	74
Total Manufacturing Trips (PCE):		**31**	**10**	**41**	**14**	**31**	**45**	**322**
Business Park (25%)	57.580 TSF							
Passenger Cars:		15	2	17	3	14	17	162
2-axle Trucks:		0	0	0	0	0	0	12
3-axle Trucks:		1	1	2	0	1	1	18
4+-axle Trucks:		2	2	4	2	3	5	62
Total Truck Trips (PCE):		3	3	6	2	4	6	92
Total Business Park Trips (PCE):		**18**	**5**	**23**	**5**	**18**	**23**	**254**
Total Passenger Car Trips:		57	15	72	21	54	75	538
Total Truck Trips (PCE):		8	7	15	8	11	19	356
Total Trips (PCE)[2]		**65**	**22**	**87**	**29**	**65**	**94**	**894**

[1] TSF = thousand square feet

[2] Total Trips = Passenger Cars + Truck Trips.

EXHIBIT 4-1: PROJECT (PASSENGER CAR OUTBOUND) TRIP DISTRIBUTION

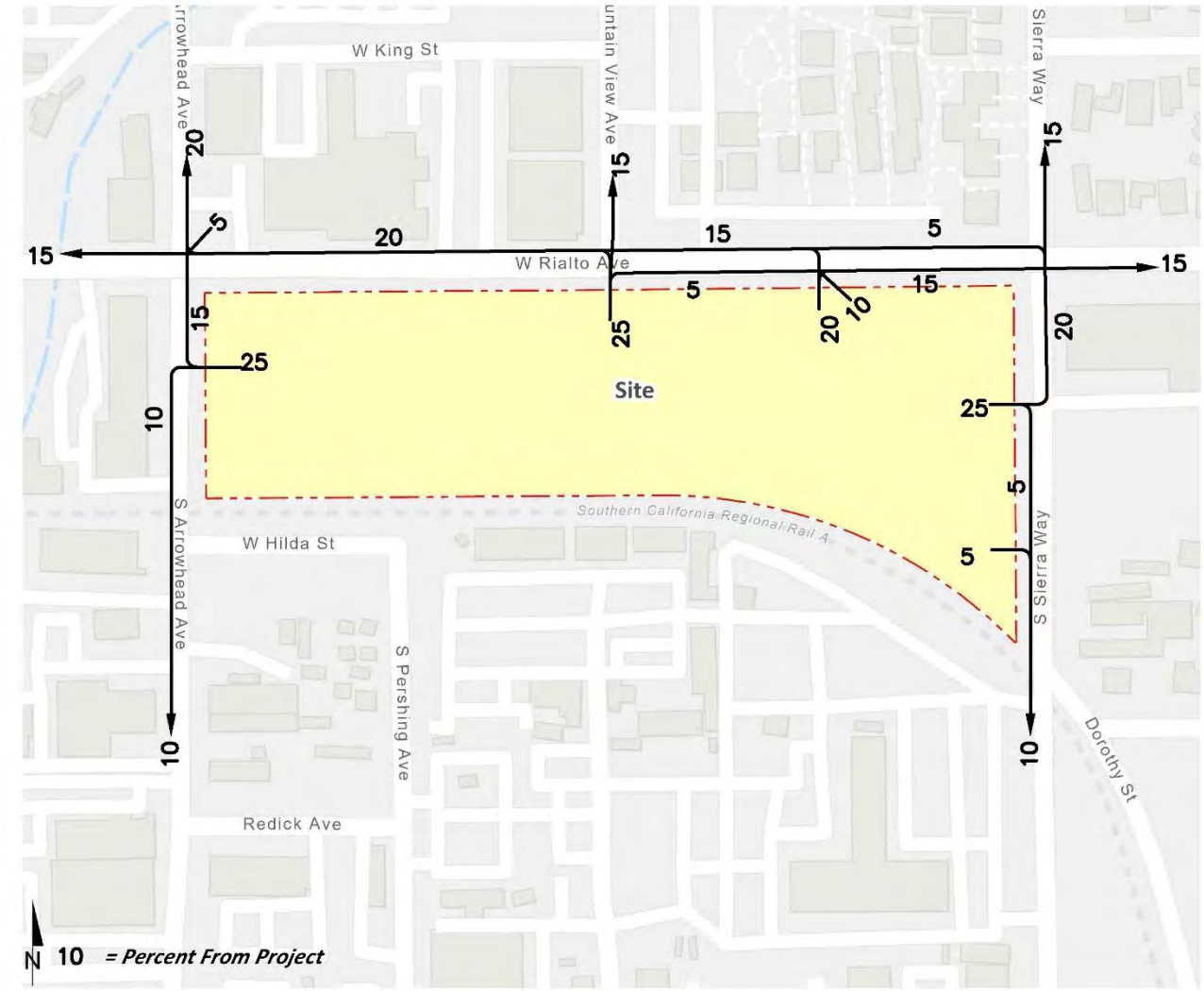


EXHIBIT 4-2: PROJECT (PASSENGER CAR INBOUND) TRIP DISTRIBUTION

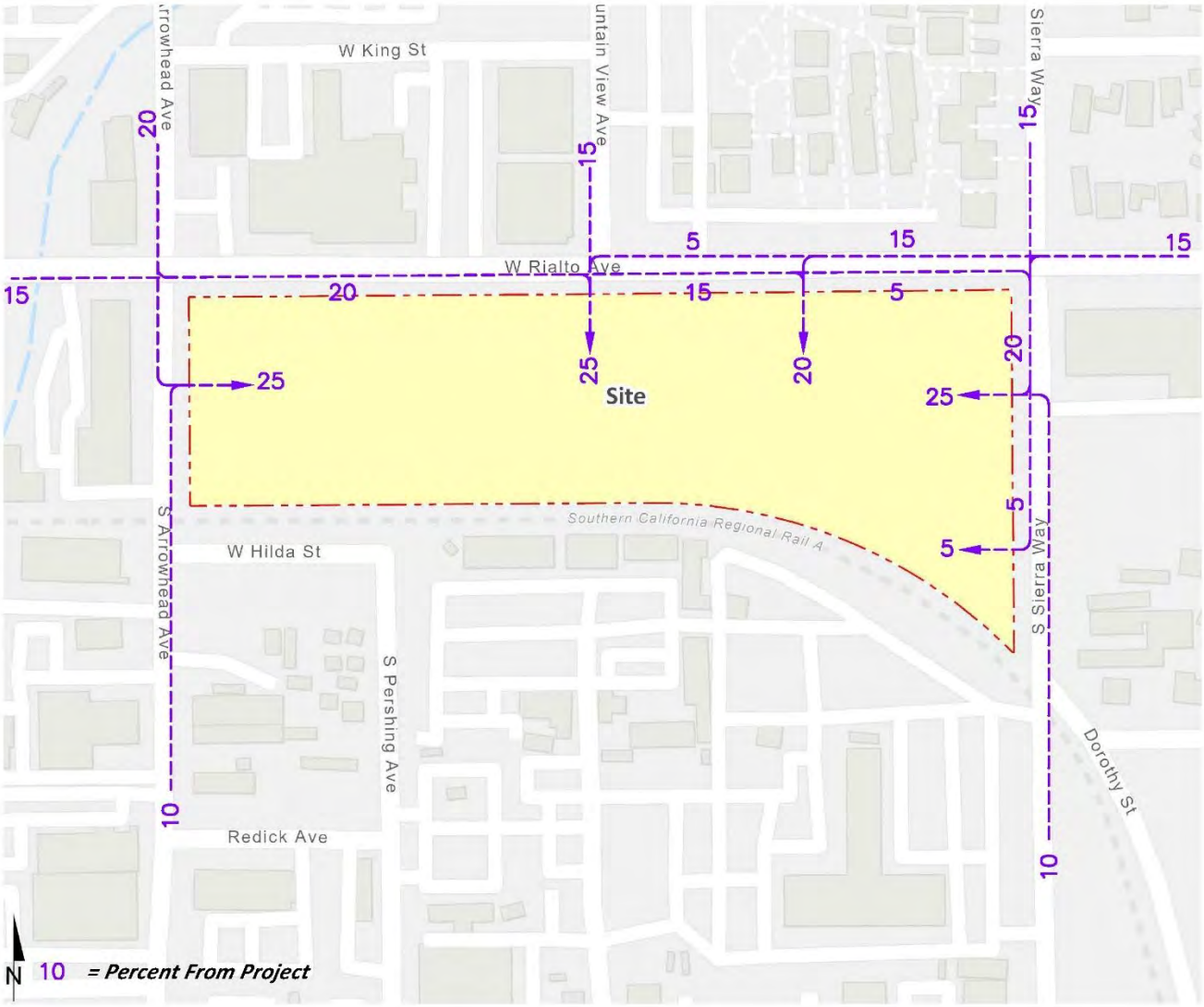


EXHIBIT 4-3: PROJECT (TRUCK OUTBOUND) TRIP DISTRIBUTION

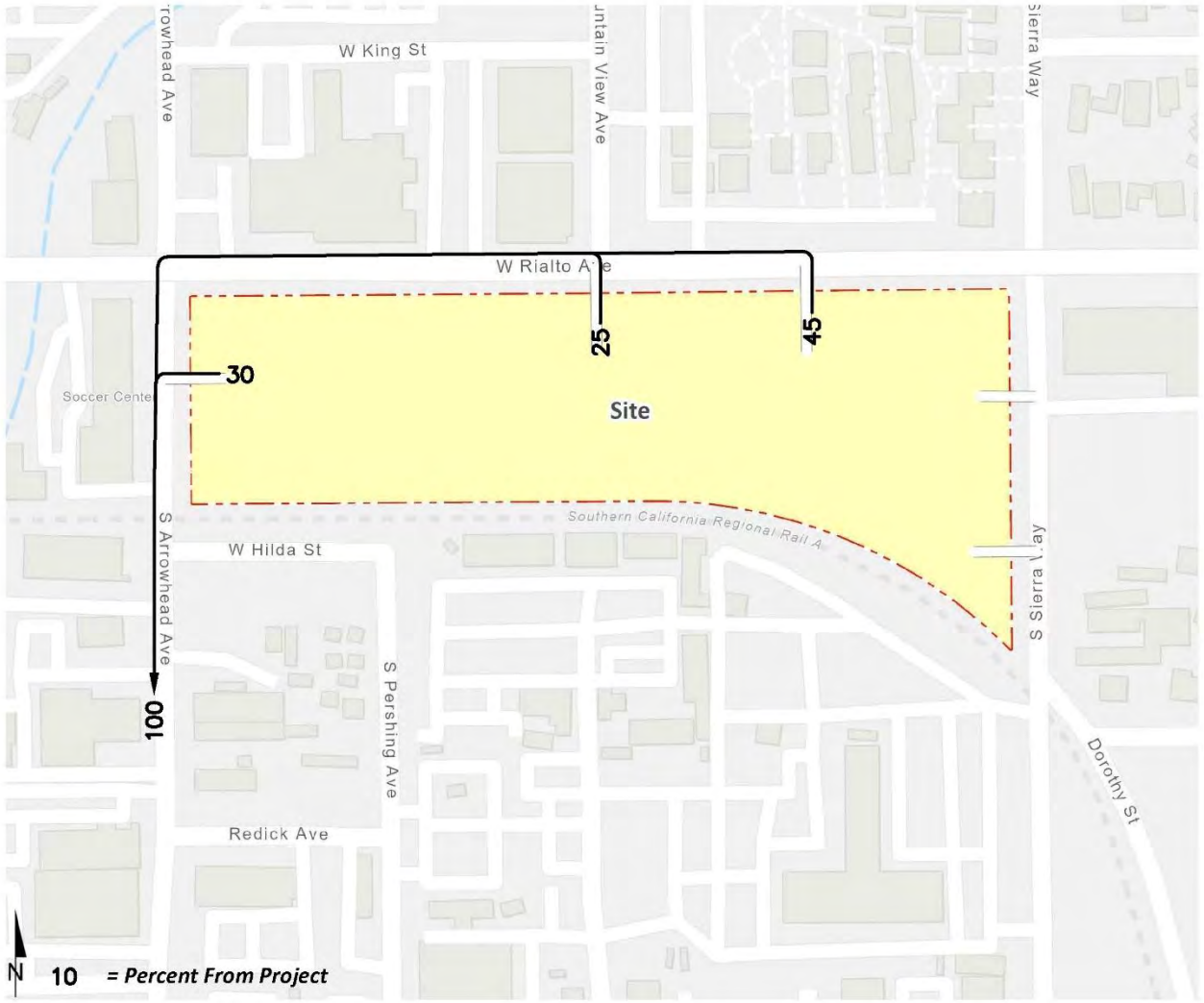


EXHIBIT 4-4: PROJECT (TRUCK INBOUND) TRIP DISTRIBUTION

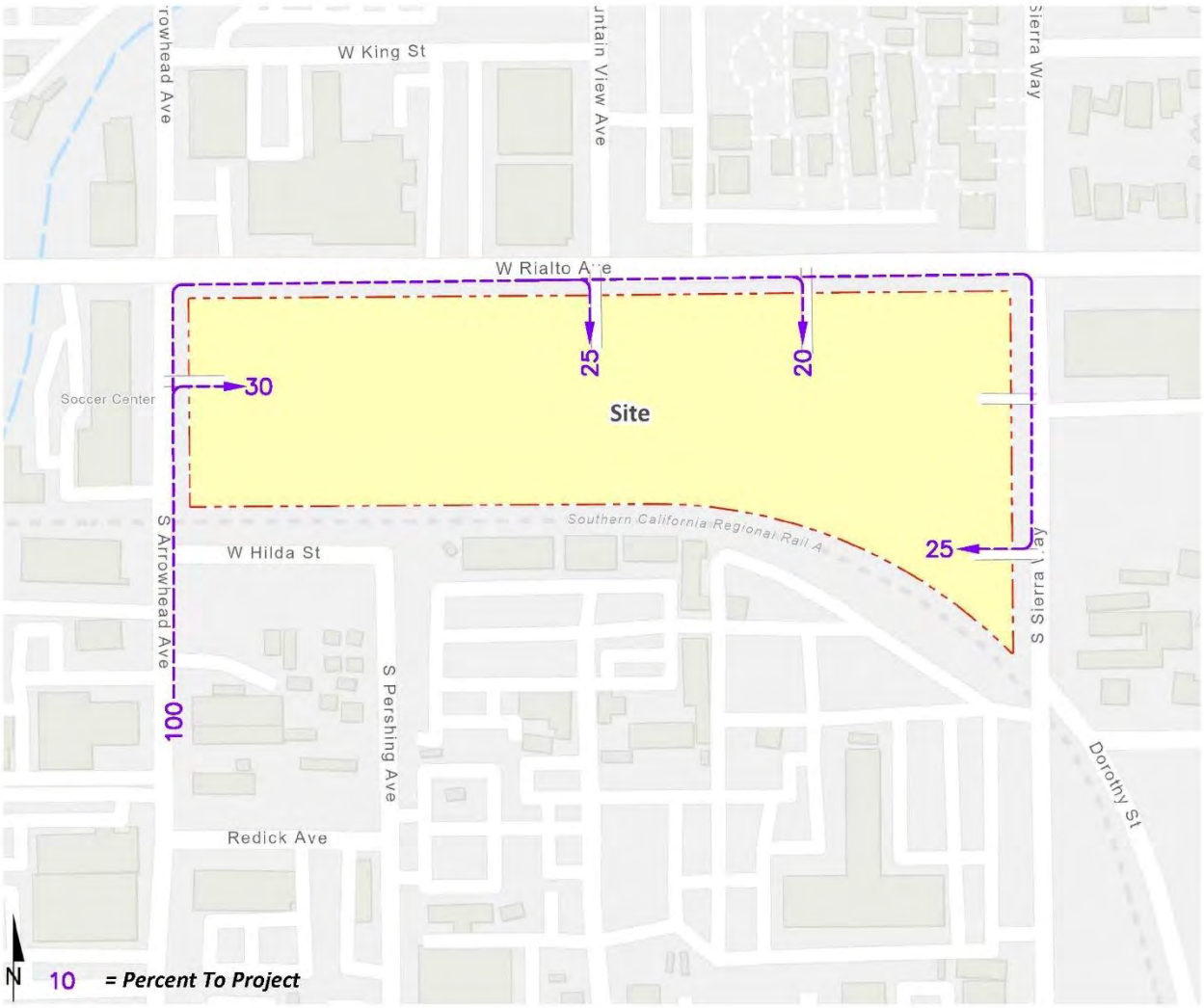
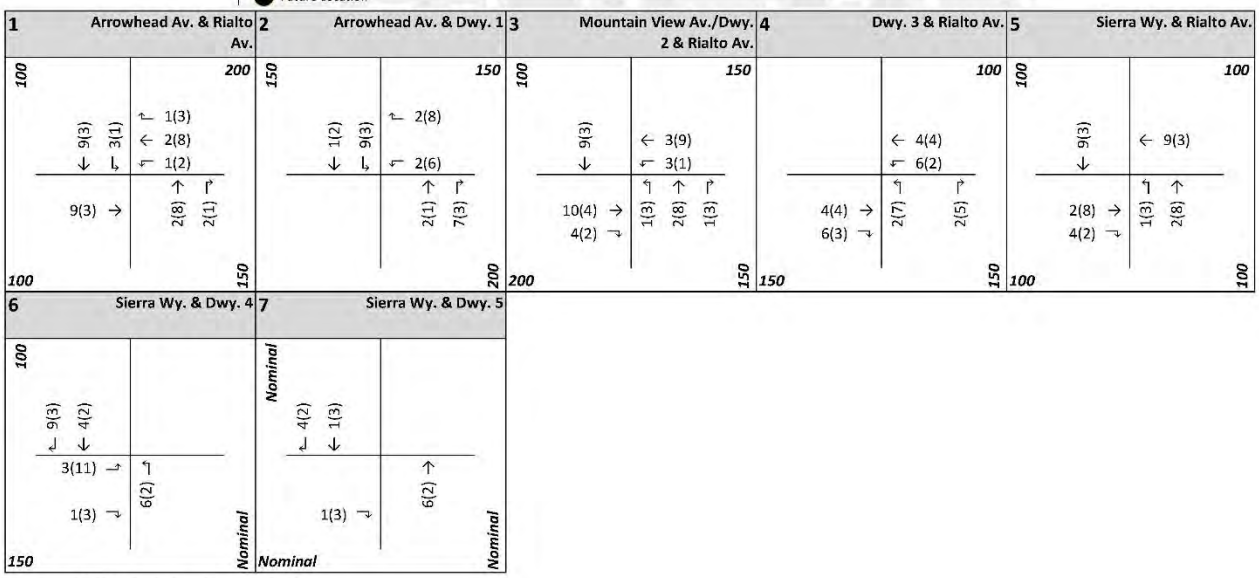


EXHIBIT 4-5: PROJECT ONLY TRAFFIC VOLUMES



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

Average Daily Trips

4.5 BACKGROUND TRAFFIC

4.5.1 OPENING YEAR CUMULATIVE CONDITIONS

Future year traffic forecasts have been based upon background (ambient) growth at 3% per year for 2023 traffic conditions. The total ambient growth is 3.0% for 2023 traffic conditions. 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 conjunction with 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. EA and EAC (2023) traffic volumes are provided in Section 5 and Section 6 of this report. The traffic generated by the proposed Project was then manually added to the base volume to determine EAP and EAPC forecasts.

4.5.2 HORIZON YEAR (2040) CONDITIONS

The adopted Southern California Association of Governments (SCAG) Connect SoCal: Demographics and Growth Forecast (adopted September 3, 2020) growth forecasts for the City of San Bernardino identifies projected growth in population of 216,300 in 2016 to 230,500 in 2045, or a 6.56% increase over the 29-year period. (6) The change in population equates to roughly a 0.22% growth rate, compounded annually. Similarly, growth over the same 29-year period in households is projected to increase by 15.2%, or a 0.49% annual growth rate. Finally, growth in employment over the same 29-year period is projected to increase by 24.0%, or a 0.74% annual growth rate.

Based on a comparison of Existing (2022) traffic volumes to the Horizon Year (2040) forecasts, the average growth rate is greater than 0.7%, compounded annually between Existing (2022) and 2040 traffic conditions. Therefore, the annual growth rate utilized for the purposes of this analysis would appear to conservatively approximate the anticipated regional growth in traffic volumes in the City of San Bernardino for EA, EAC, and Horizon Year (2040) traffic conditions, especially when considered along with the addition of project-related traffic, which would tend to overstate as opposed to understate the potential impacts to traffic and circulation.

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 of San Bernardino. The cumulative projects listed are those that would generate traffic and would contribute traffic to study area intersections. Exhibit 4-6 illustrates the cumulative development location map. A summary of cumulative development projects and their proposed land uses are shown in Table 4-4. If applicable, the traffic generated by individual cumulative projects was manually added to the EA and EAP forecasts to ensure that traffic generated by the listed cumulative development projects in Table 4-2 are reflected as part of the background traffic. In an effort to conduct a conservative analysis, the cumulative projects are added in conjunction with the ambient growth identified in Section 4.5.1 *Background Traffic: Opening Year Cumulative Conditions*. Cumulative ADT and peak hour intersection turning movement volumes are shown on Exhibit 4-7. Cumulative development trip generation has been provided in Appendix 4.1.

EXHIBIT 4-6: CUMULATIVE DEVELOPMENT LOCATION MAP

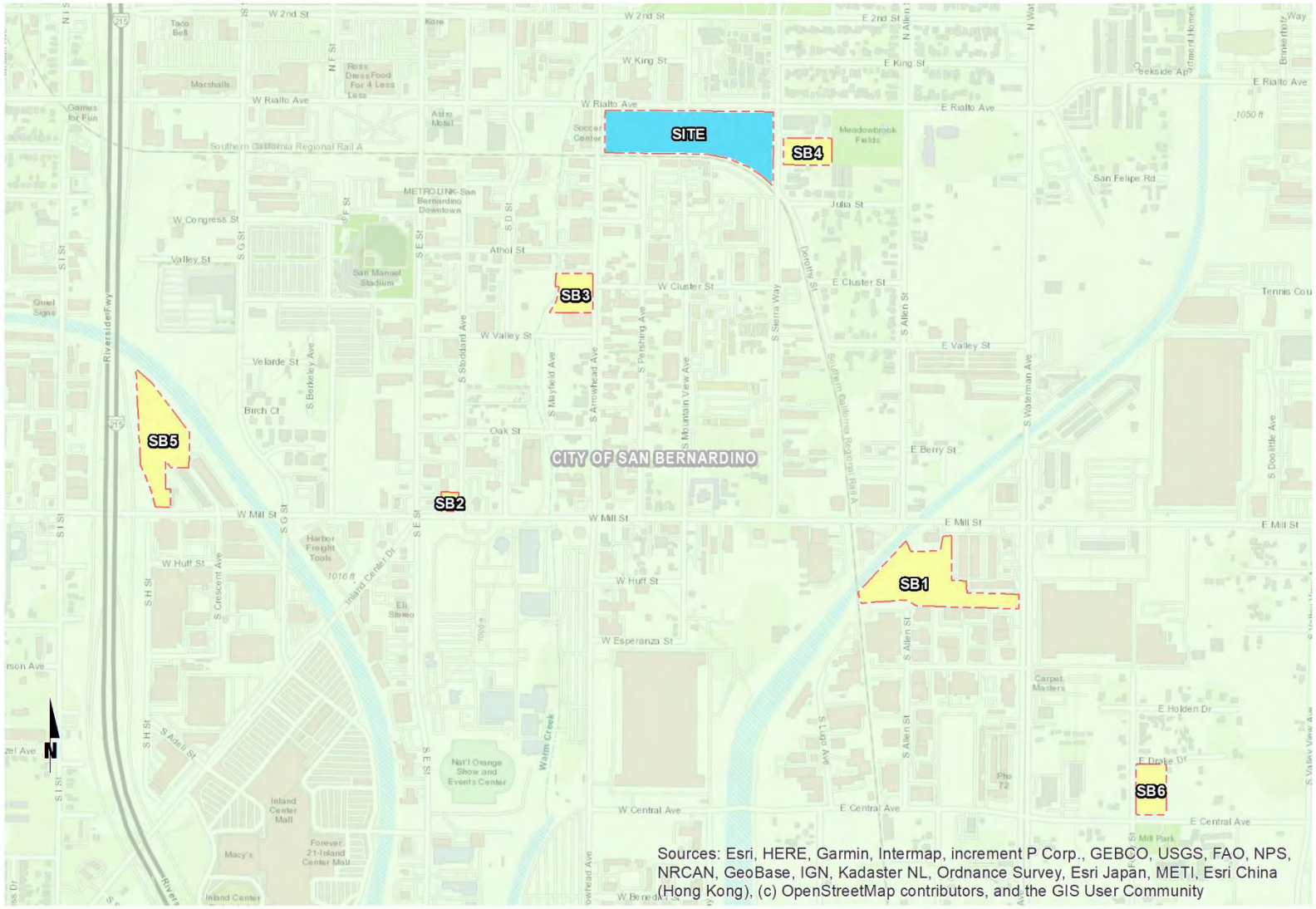


EXHIBIT 4-7: CUMULATIVE ONLY TRAFFIC VOLUMES

1 Arrowhead Av. & Rialto Av.	2 Arrowhead Av. & Dwy. 1	3 Mountain View Av./Dwy. 2 & Rialto Av.	4 Dwy. 3 & Rialto Av.	5 Sierra Wy. & Rialto Av.
250 / 250 ← 4(4) 8(10) → ← 2(15) 5(7) → 250 / 250	Future Intersection	250 ← 2(15) 8(10) → 250	Future Intersection	200 / 250 ← 22(4) 2(8) → 6(1) ↴ ← 1(10) ↰ 6(1) ↰ 1(6) ↑ 4(20) ↱ 1(6) 250 / 300

6 Sierra Wy. & Dwy. 4	7 Sierra Wy. & Dwy. 5
300 ← 34(7) 5(31) → 300	Future Intersection

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

TABLE 4-4: CUMULATIVE DEVELOPMENT LAND USE SUMMARY

No.	Project Name/Case Number	Address/Location	Land Use[1]	Quantity	Units[2]
SB1	CUP 18-17	South side of E. Mill St., west of S. Waterman Av.	Truck Trailer Yard	8.0	Acres
SB2	CUP 20-15	488 W. Mill St.	Automated Car Wash	1	TUN
SB3	DP-D 18-09	S. Arrowhead Av., at Cluster St.	Truck Trailer Yard	1.9	Acres
SB4	DP-D 20-07	East of S. Sierra Wy., south of Rialto Av.	General Office Building	30.805	TSF
SB5	DP-D 21-06	766 W. Mill St.	Truck Trailer Yard and	7	Acres
SB6	SUB 20-08; DP-D 20-15	NEC of E. Central Av. & Foisy St.	Warehousing	104.850	TSF

[1] TSF = Thousand Square Feet; TUN = Tunnels

4.7 HORIZON YEAR (2040) VOLUME DEVELOPMENT

Traffic projections for Horizon Year (2040) without Project conditions were derived from the San Bernardino Transportation Analysis Model (SBTAM) using accepted procedures for model forecast refinement and smoothing for study area intersections located within the County of San Bernardino. The traffic forecasts reflect the area-wide growth anticipated between Existing (2022) conditions and Horizon Year (2040) traffic conditions. In most instances the traffic model zone structure is not designed to provide accurate turning movements along arterial roadways unless refinement and reasonableness checking is performed. Therefore, the Horizon Year (2040) peak hour forecasts were refined using the model derived long range forecasts, base (validation) year model forecasts, along with existing peak hour traffic count data collected at each analysis location in February 2022. The SBTAM has a base (validation) year of 2016 and a horizon (future forecast) year of 2040. The difference in model volumes (2040-2016) defines the growth in traffic over the 24-year period.

The refined future peak hour approach and departure volumes obtained from the model output data are then entered into a spreadsheet program consistent with the National Cooperative Highway Research Program (NCHRP Report 765), along with initial estimates of turning movement proportions. A linear programming algorithm is used to calculate individual turning movements which match the known directional roadway segment forecast volumes computed in the previous step. This program computes a likely set of intersection turning movements from intersection approach counts and the initial turning proportions from each approach leg.

The SBTAM uses an AM peak period-to-peak hour factor of 0.35 and a PM peak period-to-peak hour factor of 0.27. These factors represent the relationship of the highest single AM peak hour to the modeled 3-hour AM peak period (an even distribution would result in a factor of 0.33) and the highest single PM peak hour to the modeled 4-hour PM peak period (an even distribution would result in a factor of 0.25).

Typically, the model growth is prorated and is subsequently added to the existing (base validation) traffic volumes to represent Horizon Year traffic conditions. In an effort to conduct a conservative analysis, reductions to traffic forecasts from either Existing or EA/EAC conditions were not assumed as part of this analysis. As such, in conjunction with the addition of cumulative projects that are not consistent with the General Plan, additional growth has also been applied on a movement-by-movement basis, where applicable, to estimate reasonable Horizon Year (2040) forecasts. Horizon Year (2040) turning volumes were compared to EA and EAC (2023) volumes in order to ensure a minimum growth as a part of the refinement process. The minimum growth includes any additional

growth between EA and EAC (2023) and Horizon Year (2040) traffic conditions that is not accounted for by the traffic generated by cumulative development projects and ambient growth rates assumed between Existing (2022) and EA and EAC (2023) conditions. Future estimated peak hour traffic data was used for new intersections and intersections with an anticipated change in travel patterns to further refine the Horizon Year (2040) peak hour forecasts.

The future Horizon Year (2040) Without Project peak hour turning movements were then reviewed by Urban Crossroads, Inc. for reasonableness, and in some cases, were adjusted to achieve flow conservation, reasonable growth, and reasonable diversion between parallel routes. Flow conservation checks ensure that traffic flow between two closely spaced intersections, such as two adjacent driveway locations, is verified in order to make certain that vehicles leaving one intersection are entering the adjacent intersection and that there is no unexplained loss of vehicles. The result of this traffic forecasting procedure is a series of traffic volumes which are suitable for traffic operations analysis. Post processing has been performed for the weekday AM and PM peak hours only as these are the only time periods where traffic model data was readily available (worksheets provided in Appendix 4.2 of this TA). Project traffic was then added for all With Project traffic conditions.

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5 EA AND EAP (2023) TRAFFIC CONDITIONS

This section discusses the traffic forecasts for EA and EAP (2023) 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 EA and EAP 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 EAP conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).

5.2 EA GROWTH TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus an ambient growth factor of 3.0%. The weekday ADT and weekday peak hour intersection turning movement volumes which can be expected for EA (2023) traffic conditions are shown on Exhibit 5-1 for actual vehicles. The PCE volumes utilized for the analysis are provided in Appendix 5.1.

5.3 EAP TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus an ambient growth factor of 3.0% and the addition of Project traffic. The weekday ADT and weekday peak hour intersection turning movement volumes which can be expected for EAP (2023) traffic conditions are shown on Exhibit 5-2 for actual vehicles. The PCE volumes utilized for the analysis are provided in Appendix 5.2.

5.4 INTERSECTION OPERATIONS ANALYSIS

EA and EAP (2023) 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 EA and EAP (2023) traffic conditions, which indicate that the study area intersections are anticipated to continue to operate at an acceptable LOS under EA and EAP (2023) traffic conditions. The intersection operations analysis worksheets for EA and EAP (2023) traffic conditions are included in Appendices 5.1 and 5.2 of this TA, respectively.

TABLE 5-1: INTERSECTION ANALYSIS FOR EA AND EAP (2023) CONDITIONS

#	Intersection	Traffic Control[2]	EA (2023) Delay[1] (secs.) AM	EA (2023) Delay[1] (secs.) PM	EA (2023) Volume-to-Capacity (V/C) AM	EA (2023) Volume-to-Capacity (V/C) PM	EA (2023) Level of Service AM	EA (2023) Level of Service PM	EAP (2023) Delay[1] (secs.) AM	EAP (2023) Delay[1] (secs.) PM	EAP (2023) Volume-to-Capacity (V/C) AM	EAP (2023) Volume-to-Capacity (V/C) PM	EAP (2023) Level of Service AM	EAP (2023) Level of Service PM
1	Arrowhead Av. & Rialto Av.	TS	8.0	7.9	0.36	0.36	A	A	8.0	8.0	0.37	0.38	A	A
2	Arrowhead Av. & Dwy. 1	**CSS**	Future Intersection						10.8	11.6	--	--	B	B
3	Mountain View Av./Dwy. 2 & Rialto Av.	CSS	13.3	14.0	--	--	B	B	14.3	14.8	--	--	B	B
4	Dwy. 3 & Rialto Av.	**CSS**	Future Intersection						13.5	13.0	--	--	B	B
5	Sierra Wy. & Rialto Av.	TS	8.3	8.2	0.31	0.34	A	A	8.4	8.3	0.31	0.34	A	A
6	Sierra Wy. & Dwy. 4	CSS	9.9	8.9	--	--	A	A	9.6	8.8	--	--	A	A
7	Sierra Wy. & Dwy. 5	**CSS**	Future Intersection						0.0	0.0	--	--	A	A

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 TS = Traffic Signal; CSS = Cross-street Stop; **CSS** = Improvement

5.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

The traffic signal warrant analysis for EA and EAP (2023) traffic conditions are based on the peak hour volumes or planning level ADT volume-based traffic signal warrants. No study area intersections are anticipated to meet either peak hour volume or ADT volume-based warrants with the addition of Project traffic (see Appendices 5.3 and 5.4, respectively).

5.6 PROJECT DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

All study area intersections are anticipated to operate at an acceptable LOS during the peak hours under EA and EAP (2023) traffic conditions. As such, no intersection improvements have been identified.

EXHIBIT 5-1: EA (2023) TRAFFIC VOLUMES

1 Arrowhead Av. & Rialto Av.

5,850

19(32) ↲ 164(209) ← 115(73) ↳

42(53) ↰ 361(296) → 90(60) ↱

9,450

↰ 33(32) ← 341(416) ↱ 39(67)

↰ 42(44) → 133(196) ↱ 40(72)

8,900 *6,050*

2 Arrowhead Av. & Dwy. 1

Future Intersection

3 Mountain View Av./Dwy. 2 & Rialto Av.

300

11(15) ↲ 4(1) ↳

13(11) ↰ 502(424) →

9,200

↱ 2(4) ← 403(504)

9,450

4 Dwy. 3 & Rialto Av.

Future Intersection

5 Sierra Wy. & Rialto Av.

4,700

74(96) ↲ 142(110) ← 76(24) ↳

53(99) ↰ 423(309) → 29(18) ↱

7,550

↱ 31(22) ← 310(385) ↱ 14(5)

↰ 19(29) → 101(126) ↱ 28(19)

10,550 *3,000*

6 Sierra Wy. & Dwy. 4

3,000

181(133) ← 4(0) ↳

↱ 1(2) ↰ 1(0)

146(171) →

3,000

7 Sierra Wy. & Dwy. 5

Future Intersection

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

Average Daily Trips

EXHIBIT 5-2: EAP (2023) TRAFFIC VOLUMES

1 Arrowhead Av. & Rialto Av.

5,950 | 9,650
19(32) ↲ 173(212) ← 118(74) ↳
42(53) ↳ ← 34(35)
370(299) → ← 343(424)
90(60) ↲ ← 40(69)
42(44) ↰ 135(204) ↑ 42(73) ↱
8,950 | 6,250

2 Arrowhead Av. & Dwy. 1

6,550 | 150
294(338) ← 9(3) ↳
← 2(8)
← 2(6)
217(313) ↑ 7(3) ↱
6,600

3 Mountain View Av./Dwy. 2 & Rialto Av.

400 | 9,400
11(15) ↲ 9(3) ← 4(1) ↳
13(11) ↳ ← 2(4)
512(428) → ← 406(513)
4(2) ↲ ← 3(1)
1(3) ↰ 2(8) ↑ 1(3) ↱
9,650 | 150

4 Dwy. 3 & Rialto Av.

9,350
← 407(514)
← 6(2)
509(429) → ↰ 2(7) ↱ 2(5)
6(3) ↲
9,400 | 150

5 Sierra Wy. & Rialto Av.

4,800 | 7,600
74(96) ↲ 151(113) ← 76(24) ↳
53(99) ↳ ← 31(22)
425(317) → ← 319(388)
33(20) ↲ ← 14(5)
20(32) ↰ 103(134) ↑ 28(19) ↱
10,700 | 3,150

6 Sierra Wy. & Dwy. 4

3,150
9(3) ↲ 185(135) ← 4(0) ↳
← 1(2)
← 1(0)
3(11) ↳
1(3) ↲
6(2) ↰ 146(171) ↑
150 | 3,050

7 Sierra Wy. & Dwy. 5

3,050
4(2) ↲ 183(136) ←
1(3) ↲
152(173) ↑
Nominal | 3,050

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

6 EAC AND EAPC (2023) TRAFFIC CONDITIONS

This section discusses the traffic forecasts for EAC and EAPC (2023) 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 EAC and EAPC 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 EAPC 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 EAC and EAPC (2023) conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages).

6.2 EAC TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus an ambient growth factor of 3.0% and the addition of traffic generated by cumulative development projects. The weekday ADT and weekday peak hour intersection turning movement volumes which can be expected for EAC (2023) traffic conditions are shown on Exhibit 6-1 for actual vehicles. The PCE volumes utilized for the analysis are provided in Appendix 6.1.

6.3 EAPC TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus an ambient growth factor of 3.0%, the addition of traffic generated by cumulative development projects, and the addition of Project traffic. The weekday ADT and weekday peak hour intersection turning movement volumes which can be expected for EAPC (2023) traffic conditions are shown on Exhibit 6-2 for actual vehicles. The PCE volumes utilized for the analysis are provided in Appendix 6.2.

6.4 INTERSECTION OPERATIONS ANALYSIS

EAC and EAPC (2023) 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 EAC and EAPC (2023) traffic conditions, which indicates that the study area intersections are anticipated to continue to operate at an acceptable LOS under EAC and EAPC (2023) traffic conditions. The intersection operations analysis worksheets for EAC and EAPC (2023) traffic conditions are included in Appendices 6.1 and 6.2 of this TA, respectively.

TABLE 6-1: INTERSECTION ANALYSIS FOR EAC AND EAPC (2023) CONDITIONS

#	Intersection	Traffic Control[2]	EAC (2023) Delay[1] (secs.) AM	EAC (2023) Delay[1] (secs.) PM	EAC (2023) Volume-to-Capacity (V/C) AM	EAC (2023) Volume-to-Capacity (V/C) PM	EAC (2023) Level of Service AM	EAC (2023) Level of Service PM	EAPC (2023) Delay[1] (secs.) AM	EAPC (2023) Delay[1] (secs.) PM	EAPC (2023) Volume-to-Capacity (V/C) AM	EAPC (2023) Volume-to-Capacity (V/C) PM	EAPC (2023) Level of Service AM	EAPC (2023) Level of Service PM
1	Arrowhead Av. & Rialto Av.	TS	8.0	8.0	0.36	0.36	A	A	8.0	8.0	0.37	0.38	A	A
2	Arrowhead Av. & Dwy. 1	**CSS**	Future Intersection						9.7	10.2	--	--	A	B
3	Mountain View Av./Dwy. 2 & Rialto Av.	CSS	13.3	14.2	--	--	B	B	15.7	15.8	--	--	C	C
4	Dwy. 3 & Rialto Av.	**CSS**	Future Intersection						12.8	12.2	--	--	B	B
5	Sierra Wy. & Rialto Av.	TS	8.4	8.3	0.31	0.34	A	A	8.4	8.3	0.31	0.34	A	A
6	Sierra Wy. & Dwy. 4	CSS	10.1	9.0	--	--	B	A	10.4	10.1	--	--	B	B
7	Sierra Wy. & Dwy. 5	**CSS**	Future Intersection						8.9	8.8	--	--	A	B

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 TS = Traffic Signal; CSS = Cross-street Stop; **CSS** = Improvement

6.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

The traffic signal warrant analysis for EAC and EAPC (2023) traffic conditions are based on the peak hour volumes or planning level ADT volume-based traffic signal warrants. No study area intersections are anticipated to meet either peak hour volume or ADT volume-based warrants with the addition of Project traffic (see Appendices 6.3 and 6.4, respectively).

6.6 PROJECT DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

All study area intersections are anticipated to operate at an acceptable LOS during the peak hours under EAC and EAPC (2023) traffic conditions. As such, no intersection improvements have been identified.

EXHIBIT 6-1: EAC (2023) TRAFFIC VOLUMES

1 Arrowhead Av. & Rialto Av.

6,100 | 9,650
- 19(32) ↲ 33(32) ↰
- 168(213) ↓ 343(431) ←
- 115(73) ↳ 39(67) ↱
- 42(53) → 42(44) ↱ 138(203) ↑ 40(72) ↱
- 369(306) → 138(203) ↑
- 90(60) ↴ 40(72) ↱

9,100 | 6,300

2 Arrowhead Av. & Dwy. 1

Future Intersection

3 Mountain View Av./Dwy. 2 & Rialto Av.

300 | 9,450
- 11(15) ↲ 2(4) ↰
- 4(1) ↳ 405(519) ←
- 13(11) → 13(11) →
- 510(434) → 510(434) →

9,650

4 Dwy. 3 & Rialto Av.

Future Intersection

5 Sierra Wy. & Rialto Av.

4,900 | 7,750
- 74(96) ↲ 31(22) ↰
- 164(114) ↓ 311(395) ←
- 76(24) ↳ 20(6) ↱
- 53(99) → 20(35) ↱ 105(146) ↑ 29(25) ↱
- 425(317) → 105(146) ↑
- 35(19) ↴ 29(25) ↱

10,800 | 3,300

6 Sierra Wy. & Dwy. 4

3,300
- 215(140) ↓ 1(2) ↰
- 4(0) ↳ 1(0) ↱
- 151(202) ↑

3,300

7 Sierra Wy. & Dwy. 5

Future Intersection

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

EXHIBIT 6-2: EAPC (2023) TRAFFIC VOLUMES

1 Arrowhead Av. & Rialto Av.

6,200 | 19(32) ↲ | 177(216) ← | 118(74) ↳ | 9,850
↰ 34(35)
← 345(439)
↰ 40(69)
42(53) ↳ | ↰ 42(44) | → 140(211) | ↱ 42(73)
378(309) →
90(60) ↲
9,200 | 6,500

2 Arrowhead Av. & Dwy. 1

6,800 | 298(342) ← | 9(3) ↳ | 150
↱ 2(8)
↰ 2(6)
→ 222(320) | ↱ 7(3)
6,850

3 Mountain View Av./Dwy. 2 & Rialto Av.

400 | 11(15) ↲ | 9(3) ← | 4(1) ↳ | 9,600
↱ 2(4)
← 408(528)
↰ 3(1)
13(11) ↳
520(438) →
4(2) ↲
↰ 1(3) | → 2(8) | ↱ 1(3)
9,850 | 150

4 Dwy. 3 & Rialto Av.

9,600
← 409(529)
↰ 6(2)
517(439) →
6(3) ↲
↰ 2(7) | ↱ 2(5)
9,650 | 150

5 Sierra Wy. & Rialto Av.

4,950 | 74(96) ↲ | 173(117) ← | 76(24) ↳ | 7,850
↱ 31(22)
← 320(398)
↰ 20(6)
53(99) ↳
427(325) →
39(21) ↲
↰ 21(38) | → 107(154) | ↱ 29(25)
10,900 | 3,450

6 Sierra Wy. & Dwy. 4

3,450 | 9(3) ↲ | 219(142) ← | 4(0) ↳
↱ 1(2)
↰ 1(0)
3(11) ↳
1(3) ↲
↰ 6(2) | → 151(202)
150 | 3,350

7 Sierra Wy. & Dwy. 5

3,150 | 4(2) ↲ | 186(144) ←
1(3) ↲
→ 161(176)
Nominal | 3,150

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

7 HORIZON YEAR (2040) TRAFFIC CONDITIONS

This section discusses the methods used to develop Horizon Year (2040) Without and With Project traffic forecasts, and the resulting intersection operations and traffic signal warrant analyses.

7.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Horizon Year (2040) 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 Horizon Year conditions only (e.g., intersection and roadway improvements along the Project's frontage and driveways).
- If applicable, driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Horizon Year conditions only.
- Other parallel facilities, that although not evaluated for the purposes of this analysis, are anticipated to be in place for Horizon Year traffic conditions and would affect the travel patterns within the study area.

7.2 HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes the refined post-process volumes obtained from the SBTAM (see Section 4.7 *Horizon Year (2040) Volume Development* of this TA for a detailed discussion on the post-processing methodology). The weekday ADT and weekday peak hour volumes which can be expected for Horizon Year (2040) Without Project traffic conditions are shown on Exhibit 7-1 for actual vehicles. The PCE volumes utilized for the analysis are provided in Appendix 7.1.

7.3 HORIZON YEAR (2040) WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes the refined post-process volumes obtained from the SBTAM, plus the traffic generated by the proposed Project. The weekday ADT and weekday peak hour volumes which can be expected for Horizon Year (2040) With Project traffic conditions are shown on Exhibit 7-2 for actual vehicles. The PCE volumes utilized for the analysis are provided in Appendix 7.2.

EXHIBIT 7-1: HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC VOLUMES

1 Arrowhead Av. & Rialto Av.

6,700 | *10,650*

20(32) ↲ | 216(227) ↓ | 121(80) ↳ | ↱ 36(35) | ← 383(483) | ↰ 78(86)

46(58) ↳ | 427(368) → | 141(98) ↲

48(114) ↰ | 152(274) ↑ | 59(141) ↱

10,050 | *7,350*

2 Arrowhead Av. & Dwy. 1

Future Intersection

3 Mountain View Av./Dwy. 2 & Rialto Av.

850 | *10,400*

14(18) ↲ | 6(2) ↳ | ↰ 4(7) | ← 486(572)

26(23) ↳

584(548) →

10,650

4 Dwy. 3 & Rialto Av.

Future Intersection

5 Sierra Wy. & Rialto Av.

5,350 | *8,550*

75(105) ↲ | 181(125) ↓ | 88(32) ↳ | ↰ 37(29) | ← 386(469) | ↰ 22(8)

53(108) ↳ | 510(427) → | 38(19) ↴

21(38) ↰ | 115(160) ↑ | 32(27) ↱

11,850 | *3,650*

6 Sierra Wy. & Dwy. 4

3,650

237(154) ↓ | 5(0) ↳ | ↱ 1(2) | ↰ 1(0)

166(222) ↑

3,600

7 Sierra Wy. & Dwy. 5

Future Intersection

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

Average Daily Trips

EXHIBIT 7-2: HORIZON YEAR (2040) WITH PROJECT TRAFFIC VOLUMES

1 Arrowhead Av. & Rialto Av.

6,850			10,850
20(32) ↲	225(230) ←	124(81) ↳	↱ 37(38)
			← 385(491)
			↰ 79(88)
46(58) ↳			
436(371) →			
141(98) ↴			
	48(114) ↰	154(282) ↑	61(142) ↱
10,100			7,550

2 Arrowhead Av. & Dwy. 1

7,500			150
	327(376) ←	9(3) ↳	↱ 2(8)
			↰ 2(6)
		244(352) →	7(3) ↱
			7,500

3 Mountain View Av./Dwy. 2 & Rialto Av.

900			10,550
14(18) ↲	9(3) ←	6(2) ↳	↱ 4(7)
			← 489(581)
			↰ 3(1)
26(23) ↳			
594(552) →			
4(2) ↴			
	1(3) ↰	2(8) ↑	1(3) ↱
10,850			150

4 Dwy. 3 & Rialto Av.

			10,550
			← 449(581)
			↰ 6(2)
568(483) →			
6(3) ↴			
	2(7) ↰		2(5) ↱
10,600			150

5 Sierra Wy. & Rialto Av.

5,450			8,650
75(105) ↲	190(128) ←	88(32) ↳	↱ 37(29)
			← 395(472)
			↰ 22(8)
53(108) ↳			
512(435) →			
42(21) ↴			
	22(41) ↰	117(168) ↑	32(27) ↱
12,000			3,750

6 Sierra Wy. & Dwy. 4

3,750			
9(3) ↲	241(156) ←	5(0) ↳	↱ 1(2)
			↰ 1(0)
3(11) ↳			
1(3) ↴			
	6(2) ↰	166(222) ↑	
150			3,700

7 Sierra Wy. & Dwy. 5

3,450			
4(2) ↲	205(158) ←		
1(3) ↴			
		177(193) ↑	
Nominal			3,450

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

7.4 INTERSECTION OPERATIONS ANALYSIS

LOS calculations were conducted for the study intersections to evaluate their operations under Horizon Year (2040) Without Project conditions with roadway and intersection geometrics consistent with Section 7.1 *Roadway Improvements*. As shown in Table 7-1, the study area intersections are anticipated to continue to operate at an acceptable LOS during the peak hours under Horizon Year (2040) Without Project and With Project traffic conditions. The intersection operations analysis worksheets for Horizon Year (2040) Without Project and With Project traffic conditions are included in Appendices 7.1 and 7.2, respectively.

TABLE 7-1: INTERSECTION ANALYSIS FOR HORIZON YEAR (2040) CONDITIONS

			2040 Without Project						2040 With Project					
			Delay[1] (secs.)		Volume-to-Capacity (V/C)		Level of Service		Delay[1] (secs.)		Volume-to-Capacity (V/C)		Level of Service	
#	Intersection	Traffic Control[2]	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	Arrowhead Av. & Rialto Av.	TS	8.1	7.8	0.42	0.42	A	A	8.1	8.6	0.43	0.44	A	A
2	Arrowhead Av. & Dwy. 1	**CSS**	Future Intersection						9.9	10.4	--	--	A	B
3	Mountain View Av./Dwy. 2 & Rialto Av.	CSS	14.2	13.4	--	--	B	B	17.3	17.5	--	--	C	C
4	Dwy. 3 & Rialto Av.	**CSS**	Future Intersection						13.3	12.7	--	--	B	B
5	Sierra Wy. & Rialto Av.	TS	8.3	8.1	0.35	0.38	A	A	8.3	8.4	0.35	0.38	A	A
6	Sierra Wy. & Dwy. 4	CSS	9.6	8.8	--	--	A	A	10.6	10.2	--	--	B	B
7	Sierra Wy. & Dwy. 5	**CSS**	Future Intersection						8.9	8.8	--	--	A	A

[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] TS = Traffic Signal; CSS = Cross-street Stop; **CSS** = Improvement

7.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

The traffic signal warrant analysis for Horizon Year (2040) traffic conditions are based on the peak hour volumes or planning level ADT volume-based traffic signal warrants. No study area intersections are anticipated to meet either peak hour volume or ADT volume-based warrants for Horizon Year (2040) Without and With Project traffic conditions (see Appendices 7.3 and7.4, respectively).

7.6 LONG-TERM DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

All study area intersections are anticipated to operate at an acceptable LOS during the peak hours under Horizon Year (2040) Without Project and With Project traffic conditions. As such, no intersection improvements have been identified.

8 LOCAL AND REGIONAL FUNDING MECHANISMS

Transportation improvements within the City of San Bernardino are funded through a combination of improvements constructed by the Project, development impact fee programs or fair share contributions. Fee programs applicable to the Project are described below.

8.1 CITY OF SAN BERNARDINO DEVELOPMENT IMPACT FEE (DIF) PROGRAM

The City of San Bernardino has created its own local Development Impact Fee (DIF) program to impose and collect fees from new residential, commercial, and industrial development for the purpose of funding roadways and intersections necessary to accommodate City growth as identified in the City's General Plan Circulation Element. The City's DIF includes a Regional Circulation System Fee to comply with Measure "I" and a Local Circulation System Fee to address transportation improvements which are locally significant. The fee schedule was recently updated in June 2014 and is adjusted annually based upon changes in the construction cost index. Under the City's DIF program, the City may grant to developers a credit against specific components of fees when those developers construct certain facilities and landscaped medians identified in the list of improvements funded by the DIF program. The City may grant to developers a credit against specific components of fees when those developers construct certain facilities and landscaped medians identified in the list of improvements funded by the DIF program.

The timing to use the DIF fees is established through periodic capital improvement programs which are overseen by the City's Public Works Department. Periodic traffic counts, review of traffic accidents, and a review of traffic trends throughout the City are also periodically performed by City staff and consultants. The City uses this data to determine the timing of implementing the improvements listed in its facilities list. The City also uses this data to ensure that the improvements listed on the facilities list are constructed before the LOS falls below the LOS performance standards adopted by the City. In this way, the improvements are constructed before the LOS falls below the City's LOS performance thresholds.

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. The Project Applicant's payment of the requisite DIF fees at the rates then in effect pursuant to the DIF Program will mitigate its impacts to DIF-funded facilities. After the City's DIF fees are collected, they are placed in a separate interest-bearing account pursuant to the requirements of Government Code § 66000 et seq. The timing to use the DIF fees is established through periodic capital improvement programs which are overseen by the City's Public Works Department.

8.2 MEASURE "I"

In 2004, the voters of San Bernardino County approved the 30-year extension of Measure "I", a one-half of one percent sales tax on retail transactions, through the year 2040, for transportation projects including, but not limited to, infrastructure improvements, commuter rail, public transit, and other identified improvements. The Measure "I" extension requires that a regional traffic impact fee be created to ensure development is paying its fair share. A regional Nexus study was prepared by the SBCTA and concluded that each jurisdiction should include a regional fee component in their local programs in order to meet the Measure "I" requirement. The regional component assigns specific facilities and cost sharing formulas to each jurisdiction and was most recently updated in March 2019. (6) Revenues collected through these programs are used in tandem with the City's DIF funds to deliver projects identified in the Nexus Study. While Measure "I" is a self-executing sales tax administered by SBCTA, it bears discussion here because the funds raised through Measure "I" have funded in the past and will continue to fund new transportation facilities in San Bernardino County**.**

9 REFERENCES

1. **Fehr & Peers for City of San Bernardino.** *Traffic Impact Analysis Guidelines.* City of San Bernardino : s.n., August 2020.
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3. **Institute of Transportation Engineers.** *Trip Generation Manual.* 11th Edition. 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).
6. **Southern California Association of Governments.** *Demographics and Gorwth Forecast Technical Report.* SCAG : s.n., Adopted on September 3, 2020.

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