

LAKE CREEK LOGISTICS CENTER

TRAFFIC ANALYSIS

PREPARED BY: Charlene So, PE | cso@urbanxroads.com
Jared Brawner | jbrawner@urbanxroads.com
Aric Evatt | aevatt@urbanxroads.com

TABLE OF CONTENTS

Table of Contents	ii
Appendices.....	iv
List of Exhibits.....	vi
List of Tables	vii
List of Abbreviated Terms	viii
1 Introduction.....	1
1.1 Summary of Findings	1
1.2 Project Overview	1
1.3 Analysis Scenarios.....	4
1.4 Study Area	5
1.5 Deficiencies	8
1.6 Recommendations.....	11
2 Methodologies.....	19
2.1 Level of Service.....	19
2.2 Intersection Capacity Analysis.....	19
2.3 Traffic Signal Warrant Analysis Methodology	21
2.4 Off-Ramp Queuing Analysis	22
2.5 Minimum Acceptable Levels of Service (LOS).....	22
2.6 Deficiency Criteria	22
2.7 Project Fair Share Calculation Methodology	23
3 Area Conditions	25
3.1 Existing Circulation Network	25
3.2 Town of Apple Valley General Plan Circulation Element.....	25
3.3 Bicycle and Pedestrian Facilities.....	28
3.4 Transit Service.....	28
3.5 Truck Routes.....	28
3.6 Existing (2024) Traffic Counts.....	32
3.7 Intersection Operations Analysis.....	32
3.8 Traffic Signal Warrant Analysis	32
3.9 Queuing Analysis	36
4 Projected Future Traffic.....	37
4.1 Project Trip Generation	37
4.2 Project Trip Distribution	40
4.3 Modal Split.....	43
4.4 Project Trip Assignment.....	43
4.5 Background Traffic.....	43
4.6 Cumulative Development Traffic.....	46
4.7 Horizon Year (2050) Traffic Forecasts	50
5 Opening Year Cumulative (2029) Traffic Conditions.....	51

- 5.1 Roadway Improvements 51
- 5.2 Without Project Traffic Volume Forecasts 51
- 5.3 With Project Traffic Volume Forecasts 51
- 5.4 Intersection Operations Analysis 56
- 5.5 Traffic Signal Warrant Analysis 58
- 5.6 Off-Ramp Queuing Analysis 58
- 5.7 Project Deficiencies and Recommended Improvements..... 59
- 6 Horizon Year (2050) Traffic Conditions..... 63
 - 6.1 Roadway Improvements 63
 - 6.2 Without Project Traffic Volume Forecasts 63
 - 6.3 With Project Traffic Volume Forecasts 63
 - 6.4 Intersection Operations Analysis 68
 - 6.5 Traffic Signal Warrant Analysis 70
 - 6.6 Off-Ramp Queuing Analysis 70
 - 6.7 Project Deficiencies and Recommended Improvements..... 71
- 7 Local and Regional Funding Mechanisms 75
 - 7.1 Town of Apple Valley Development Impact Fee (DIF) Program 75
 - 7.2 Measure “I” Funds 75
 - 7.3 Fair Share Contribution..... 75
- 8 References..... 79

APPENDICES

Appendix 1.1: Traffic Study Scoping Agreement

Appendix 1.2: Site Adjacent Queues

Appendix 3.1: Traffic Counts

Appendix 3.2: Existing (2024) Conditions Intersection Operations Analysis Worksheets

Appendix 3.3: Existing (2024) Conditions Traffic Signal Warrant Analysis Worksheets

Appendix 3.4: Existing (2024) Conditions Queuing Analysis Worksheets

Appendix 4.1: Post Processing Worksheets

Appendix 5.1: Opening Year Cumulative (2029) Without Project Conditions Intersection Operations Analysis Worksheets

Appendix 5.2: Opening Year Cumulative (2029) With Project Conditions Intersection Operations Analysis Worksheets

Appendix 5.3: Opening Year Cumulative (2029) Without Project Conditions Traffic Signal Warrant Analysis Worksheets

Appendix 5.4: Opening Year Cumulative (2029) With Project Conditions Traffic Signal Warrant Analysis Worksheets

Appendix 5.5: Opening Year Cumulative (2029) Without Project Conditions Off-Ramp Queuing Analysis Worksheets

Appendix 5.6: Opening Year Cumulative (2029) With Project Conditions Off-Ramp Queuing Analysis Worksheets

Appendix 5.7: Opening Year Cumulative (2029) With Project Conditions Intersection Operations Analysis Worksheets With Improvements

Appendix 5.8: Opening Year Cumulative (2029) With Project Conditions Off-Ramp Queuing Analysis Worksheets With Improvements

Appendix 6.1: Horizon Year (2050) Without Project Conditions Intersection Operations Analysis Worksheets

Appendix 6.2: Horizon Year (2050) With Project Conditions Intersection Operations Analysis Worksheets

Appendix 6.3: Horizon Year (2050) Without Project Conditions Traffic Signal Warrant Analysis Worksheets

Appendix 6.4: Horizon Year (2050) With Project Conditions Traffic Signal Warrant Analysis
Worksheets

Appendix 6.5: Horizon Year (2050) Without Project Conditions Off-Ramp Queuing Analysis
Worksheets

Appendix 6.6: Horizon Year (2050) With Project Conditions Off-Ramp Queuing Analysis Worksheets

Appendix 6.7: Horizon Year (2050) With Project Conditions Intersection Operations Analysis
Worksheets With Improvements

Appendix 6.8: Horizon Year (2050) With Project Conditions Off-Ramp Queuing Analysis Worksheets
With Improvements

List of Exhibits

Exhibit 1-1: Location Map..... 2

Exhibit 1-2: Preliminary Site Plan 3

Exhibit 1-3: Study Area..... 7

Exhibit 1-4: Site Access Recommendations 12

Exhibit 3-1: Existing Number of Through Lanes and Intersection Controls.....26

Exhibit 3-2: Town of Apple Valley General Plan Circulation Element27

Exhibit 3-3: Town of Apple Valley Existing and Planned Bicycle Facilities29

Exhibit 3-4: Existing Transit Routes..... 30

Exhibit 3-5: Town of Apple Valley Truck Routes 31

Exhibit 3-6: Existing (2024) Peak Hour Intersection Volumes..... 33

Exhibit 3-7: Existing (2024) Average Daily Traffic (ADT)..... 34

Exhibit 4-1: Project (Trucks) Trip Distribution..... 41

Exhibit 4-2: Project (Passenger Car) Trip Distribution 42

Exhibit 4-3: Project Only Peak Hour Intersection Volumes..... 44

Exhibit 4-4: Project Only Average Daily Traffic (ADT)..... 45

Exhibit 4-5: Cumulative Development Location Map 47

Exhibit 4-6: Cumulative Only Peak Hour Intersection Volumes 48

Exhibit 4-7: Cumulative Only Average Daily Traffic (ADT) 49

Exhibit 5-1: Opening Year Cumulative (2029) Without Project Peak Hour Intersection Volumes.....52

Exhibit 5-2: Opening Year Cumulative (2029) Without Project Average Daily Traffic (ADT)53

Exhibit 5-3: Opening Year Cumulative (2029) With Project Peak Hour Intersection Volumes.....54

Exhibit 5-4: Opening Year Cumulative (2029) With Project Average Daily Traffic (ADT).....55

Exhibit 6-1: Horizon Year (2050) Without Project Peak Hour Intersection Volumes..... 64

Exhibit 6-2: Horizon Year (2050) Without Project Average Daily Traffic (ADT)65

Exhibit 6-3: Horizon Year (2050) With Project Peak Hour Intersection Volumes..... 66

Exhibit 6-4: Horizon Year (2050) With Project Average Daily Traffic (ADT) 67

LIST OF TABLES

Table 1-1: Intersection Analysis Locations	6
Table 1-2: Summary of LOS.....	8
Table 1-3: Summary of Improvements (Page 1 of 2).....	16
Table 1-3: Summary of Improvements (Page 2 of 2).....	17
Table 2-1: Signalized Intersection LOS Thresholds.....	20
Table 2-2: Unsignalized Intersection LOS Thresholds	21
Table 3-1: Intersection Analysis for Existing (2024) Conditions	35
Table 3-2: Peak Hour Queuing Summary for Existing (2024) Conditions	36
Table 4-1: Project Trip Generation Summary	38
Table 4-2: Project Trip Generation Summary (Actual Vehicles).....	39
Table 4-3: Trip Generation Summary (PCE)	40
Table 4-4: Cumulative Development Land Use Summary	46
Table 5-1: Intersection Analysis for Opening year Cumulative (2029) Conditions	57
Table 5-2: Peak Hour Queuing Summary for Opening Year Cumulative (2029) Conditions.....	59
Table 5-3: Intersection Analysis for Opening Year Cumulative (2029) Conditions With Improvements	60
Table 5-4: Peak Hour Queuing Summary for Opening Year Cumulative (2029) Conditions With improvements	61
Table 6-1: Intersection Analysis for Horizon Year (2050) Conditions	69
Table 6-2: Peak Hour Queuing Summary for Horizon Year (2050) Conditions.....	71
Table 6-3: Intersection Analysis for Horizon Year (2050) Conditions With Improvements	72
Table 6-4: Peak Hour Queuing Summary for Horizon Year (2050) Conditions With improvements	73
Table 7-1: Opening Year Cumulative (2029) Project Fair Share Calculations.....	76
Table 7-2: Horizon Year (2050) Project Fair Share Calculations	77

LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
CA MUTCD	California Manual on Uniform Traffic Control Devices
Caltrans	California Department of Transportation
CMP	Congestion Management Program
DIF	Development Impact Fee
HCM	Highway Capacity Manual
HDM	Highway Design Manual
ITE	Institute of Transportation Engineers
LOS	Level of Service
PHF	Peak Hour Factor
Project	Lake Creek Logistics Center
SBCTA	San Bernardino County Transportation Authority
TA	Traffic Analysis
v/c	Volume to Capacity
vphgpl	Vehicles per Hour Green per Lane
VVTA	Victor Valley Transit Authority

This page intentionally left blank

1 INTRODUCTION

This report presents the results of the Traffic Analysis (TA) for Lake Creek Logistics Center development ("Project"), which is bounded by Gustine Road to the north, Central Road to the east, Corwin Road to the south, and Apple Valley Airport to the west in the Town of Apple Valley, 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 San Bernardino County [Transportation Impact Study Guideline](#) (July 9, 2019) as the Town of Apple Valley utilizes the County [Guidelines](#), and consultation with Town staff during the traffic study scoping process. (1) (2) The Town approved Project Traffic Study Scoping Agreement is provided in Appendix 1.1 of this TA.

1.1 SUMMARY OF FINDINGS

Under cumulative conditions without the addition of Project traffic, 12 study area intersections are anticipated to operate at an unacceptable level of service (LOS) based on the Highway Capacity Manual (HCM) methodology. The Project will be responsible for contributing fair share costs towards these deficient intersection locations for the recommended improvements detailed in this TA. With the addition of Project traffic, one additional intersection (Central Road and Gustine Road, Intersection #13) is anticipated to operate at an unacceptable LOS. The Project will be responsible to construct the improvements detailed in this TA at this intersection. The Project is also subject to the Town's Development Impact Fee (DIF) and County of San Bernardino fee programs.

The Project plans to construct the following improvements in conjunction with development to facilitate site access:

- Project to construct six driveways (Driveways 1-6) on Gustine Road. All driveways will be stop-controlled and allow for full turning movements.
- Project to construct one driveway (Driveway 7) on Central Road. Driveway 7 will be stop-controlled and allow for full turning movements.
- Project to construct six driveways (Driveways 8-13) on Corwin Road. All driveways will be stop-controlled and allow for full turning movements.
- Project to construct Gustine Road, Central Road, and Corwin Road along the Project's frontages at their ultimate half-section width according to the Town of Apple Valley General Plan and consistent with the Town's standards. Additionally, the Project will provide an additional 12 feet of pavement width along Gustine Road and Corwin Road to accommodate one lane on the opposite side of the street.

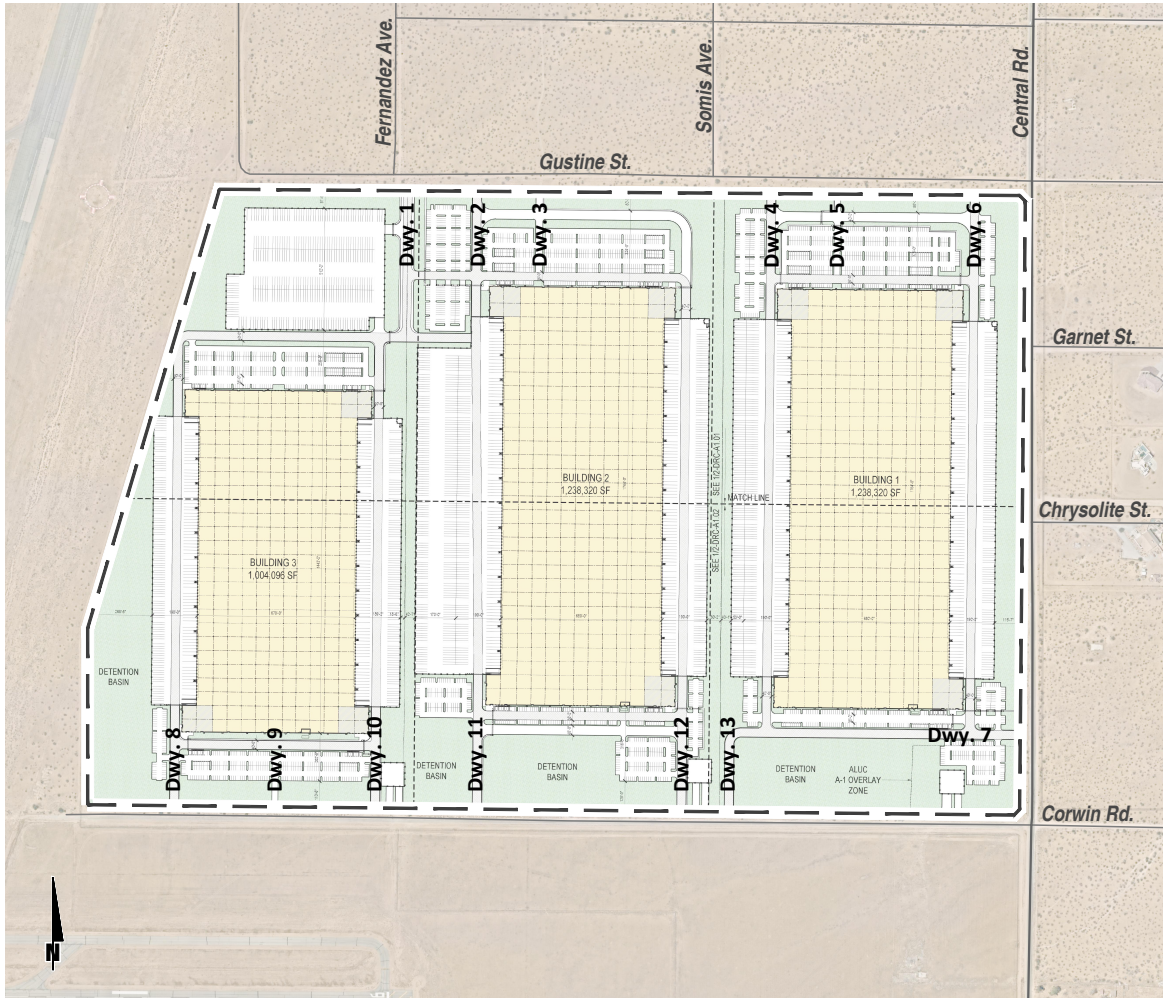
1.2 PROJECT OVERVIEW

A preliminary site plan for the proposed Project is shown on Exhibit 1-2. The proposed Project consists of the development of three industrial warehouse and distribution buildings totaling 3,480,736 square feet. For the purposes of the traffic study, the Project mix assumes 10% general light industrial, 10% high-cube cold storage warehouse use, and 80% high-cube fulfillment center warehousing use. Access to the Project site will be accommodated via six driveways along Gustine Road, a single driveway proposed on Central Road, and six driveways along Corwin Road. All driveways are assumed to allow for full access (no turn restrictions). The Project is anticipated to have an Opening Year of 2029. Regional access to the Project site is accommodated from the I-15 Freeway.

EXHIBIT 1-1 : LOCATION MAP



EXHIBIT 1-2 : PRELIMINARY SITE PLAN



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) were used to estimate the trip generation. (3) The Project is anticipated to generate a total of 8,370 two-way vehicle trip-ends per day with 635 AM peak hour trips and 727 PM peak hour trips (actual vehicles). The Project is anticipated to generate a total of 10,518 Passenger Car Equivalent (PCE) trip-ends per day with 740 AM PCE peak vehicle hour trips and 834 PM PCE peak hour vehicle 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 (2024) Conditions
- Opening Year Cumulative (2029) Without Project Conditions
- Opening Year Cumulative (2029) With Project Conditions
- Horizon Year (2050) Without Project Conditions
- Horizon Year (2050) With Project Conditions

1.3.1 EXISTING (2024) CONDITIONS

Information for Existing (2024) conditions is disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared. Local schools were in session with in-person instruction at the time of the traffic counts. Traffic counts were conducted in January 2024.

1.3.2 OPENING YEAR CUMULATIVE (2029) CONDITIONS

The Opening Year Cumulative (2029) traffic conditions analysis determines the potential near-term cumulative circulation system deficiencies. To account for growth in traffic between Existing (2024) traffic conditions and the Project Opening Year Cumulative (2029), a growth rate of 2 percent was assumed (2.0% per year compounded over 2 years or $1.02^{5 \text{ years}}$ for a total of 10.41%). The roadway network is similar to Existing conditions except for new connections to be constructed by the Project. Conservatively, this TA estimates the area ambient traffic growth and then adds traffic generated by other known or probable related projects. These related projects are at least in part already accounted for in the assumed ambient growth rates; and some of these related projects may not be implemented and operational within the 2029 Opening Year timeframe assumed for the Project. The resulting traffic growth utilized in the TA (traffic generated by related projects) would therefore tend to overstate rather than understate background cumulative traffic deficiencies under 2029 traffic conditions.

1.3.3 HORIZON YEAR (2050) CONDITIONS

Traffic projections for Horizon Year (2050) 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 Town of Apple Valley (lead agency) General Plan. Each of the applicable transportation fee programs are discussed in more detail in Section 7 *Local and Regional Funding Mechanisms*.

1.4 STUDY AREA

To ensure that this TA satisfies the Town of Apple Valley's traffic study requirements, a Project traffic study scoping package was prepared for review by Town of Apple Valley 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 scoping agreement is included in Appendix 1.1 of this TA.

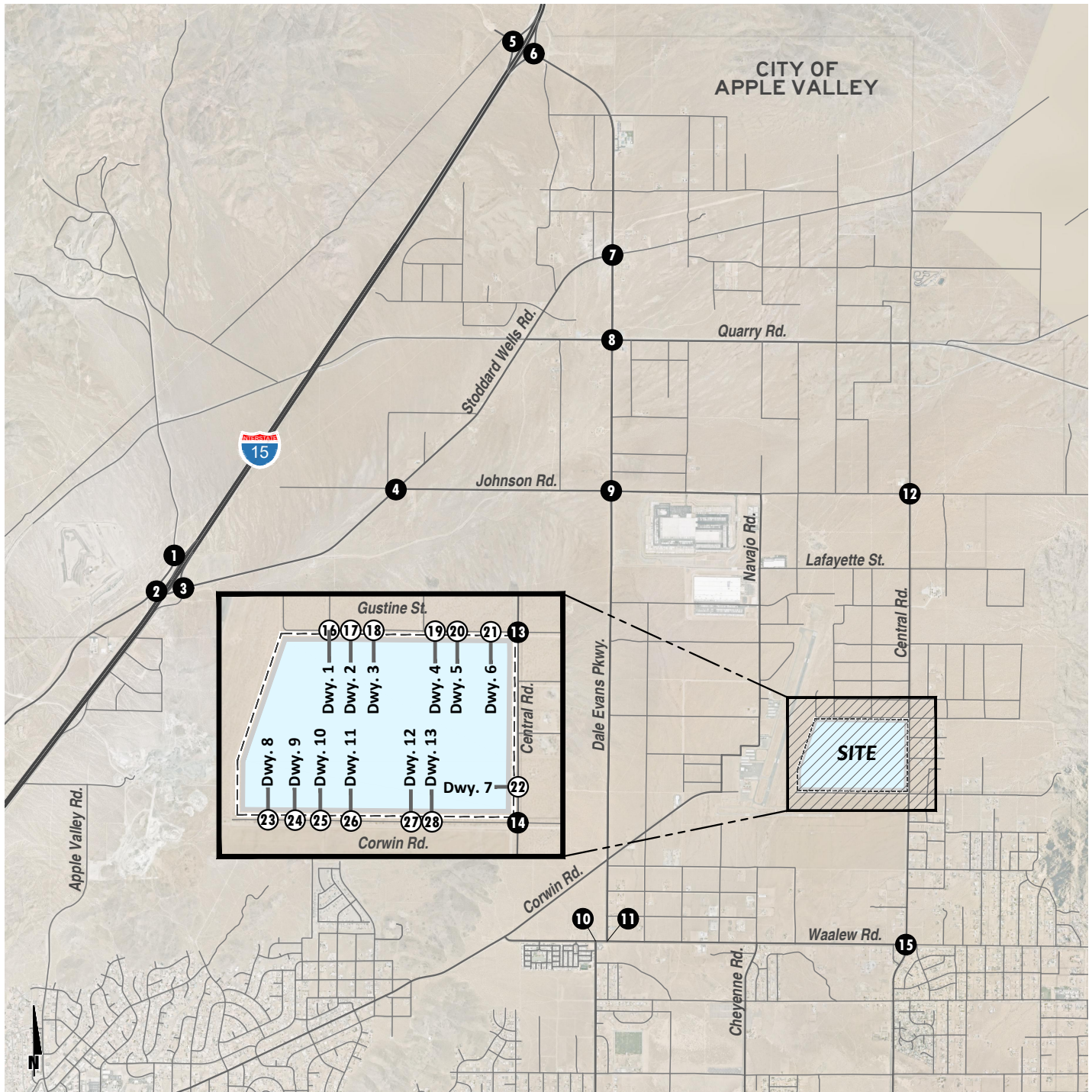
The 28 study area intersections shown on Exhibit 1-3 and listed in Table 1-1 were selected for evaluation in this TA based on consultation with Town of Apple Valley staff. At a minimum, the study area includes intersections where the Project is anticipated to contribute 50 or more peak hour trips per the County's Guidelines. 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 (including the Town of Apple Valley) for estimating a potential area of influence (i.e., study area).

The intent of the Congestion Management Program (CMP) is to directly link land use, transportation, and air quality, thereby prompting reasonable growth management programs that will effectively utilize new transportation funds, alleviate traffic congestion and related deficiencies, and improve air quality. Counties within California have developed CMPs with varying methods and strategies to meet the intent of the CMP legislation. There are no study area intersections identified as a County of San Bernardino CMP location.

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

#	Intersection	Jurisdiction	CMP?
1	Quarry Rd. & I-15 SB Ramps	County, Caltrans	No
2	Quarry Rd. & Stoddard Wells Rd.	County	No
3	I-15 NB Ramps & Stoddard Wells Rd.	Town of Apple Valley, Caltrans	No
4	Stoddard Wells Rd. & Johnson Rd.	Town of Apple Valley, County	No
5	I-15 SB Ramps & Dale Evans Pkwy.	County, Caltrans	No
6	I-15 NB Ramps & Dale Evans Pkwy.	Town of Apple Valley, Caltrans	No
7	Dale Evans Pkwy. & Stoddard Wells Rd.	Town of Apple Valley, County	No
8	Dale Evans Pkwy. & Quarry Rd.	Town of Apple Valley, County	No
9	Dale Evans Pkwy. & Johnson Rd.	Town of Apple Valley, County	No
10	Dale Evans Pkwy. (West) & Waalew Rd.	Town of Apple Valley	No
11	Dale Evans Pkwy. (East) & Waalew Rd.	Town of Apple Valley	No
12	Central Rd. & Johnson Rd.	Town of Apple Valley, County	No
13	Central Rd. & Gustine Rd.	Town of Apple Valley, County	No
14	Central Rd. & Corwin Rd.	Town of Apple Valley, County	No
15	Central Rd. & Waalew Rd.	Town of Apple Valley	No
16	Driveway 1 & Gustine Rd.	Town of Apple Valley	No
17	Driveway 2 & Gustine Rd.	Town of Apple Valley	No
18	Driveway 3 & Gustine Rd.	Town of Apple Valley	No
19	Driveway 4 & Gustine Rd.	Town of Apple Valley	No
20	Driveway 5 & Gustine Rd.	Town of Apple Valley	No
21	Driveway 6 & Gustine Rd.	Town of Apple Valley	No
22	Central Rd. & Driveway 7	Town of Apple Valley, County	No
23	Driveway 8 & Corwin Rd.	Town of Apple Valley	No
24	Driveway 9 & Corwin Rd.	Town of Apple Valley	No
25	Driveway 10 & Corwin Rd.	Town of Apple Valley	No
26	Driveway 11 & Corwin Rd.	Town of Apple Valley	No
27	Driveway 12 & Corwin Rd.	Town of Apple Valley	No
28	Driveway 13 & Corwin Rd.	Town of Apple Valley	No

EXHIBIT 1-3 : STUDY AREA



LEGEND:

- ①** = Existing Intersection Analysis Location
- = Future Intersection Analysis Location

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 3 *Area Conditions*, Section 5 *Opening Year Cumulative (2029) Traffic Conditions*, and Section 6 *Horizon Year (2050) Traffic Conditions* includes the detailed analysis. A summary of LOS results for all analysis scenarios is presented in Table 1-2.

TABLE 1-2: SUMMARY OF LOS

	Existing 2024		2029 Without Project		2029 With Project		2050 Without Project		2050 With Project	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1 Quarry Rd. & I-15 SB Ramps	●	●	●	●	●	●	●	●	●	●
2 Quarry Rd. & Stoddard Wells Rd.	●	●	●	●	●	●	●	●	●	●
3 I-15 NB Ramps & Stoddard Wells Rd.	●	●	●	●	●	●	●	●	●	●
4 Stoddard Wells Rd. & Johnson Rd.	●	●	●	●	●	●	●	●	●	●
5 I-15 SB Ramps & Dale Evans Pkwy.	●	●	●	●	●	●	●	●	●	●
6 I-15 NB Ramps & Dale Evans Pkwy.	●	●	●	●	●	●	●	●	●	●
7 Dale Evans Pkwy. & Stoddard Wells Rd.	●	●	●	●	●	●	●	●	●	●
8 Dale Evans Pkwy. & Quarry Rd.	●	●	●	●	●	●	●	●	●	●
9 Dale Evans Pkwy. & Johnson Rd.	●	●	●	●	●	●	●	●	●	●
10 Dale Evans Pkwy. (West) & Waalew Rd.	●	●	●	●	●	●	●	●	●	●
11 Dale Evans Pkwy. (East) & Waalew Rd.	●	●	●	●	●	●	●	●	●	●
12 Central Rd. & Johnson Rd.	●	●	●	●	●	●	●	●	●	●
13 Central Rd. & Gustine Rd.	●	●	●	●	●	●	●	●	●	●
14 Central Rd. & Corwin Rd.	●	●	●	●	●	●	●	●	●	●
15 Central Rd. & Waalew Rd.	●	●	●	●	●	●	●	●	●	●
16 Driveway 1 & Gustine Rd.	N/A	N/A	N/A	N/A	●	●	N/A	N/A	●	●
17 Driveway 2 & Gustine Rd.	N/A	N/A	N/A	N/A	●	●	N/A	N/A	●	●
18 Driveway 3 & Gustine Rd.	N/A	N/A	N/A	N/A	●	●	N/A	N/A	●	●
19 Driveway 4 & Gustine Rd.	N/A	N/A	N/A	N/A	●	●	N/A	N/A	●	●
20 Driveway 5 & Gustine Rd.	N/A	N/A	N/A	N/A	●	●	N/A	N/A	●	●
21 Driveway 6 & Gustine Rd.	N/A	N/A	N/A	N/A	●	●	N/A	N/A	●	●
22 Central Rd. & Driveway 7	N/A	N/A	N/A	N/A	●	●	N/A	N/A	●	●
23 Driveway 8 & Corwin Rd.	N/A	N/A	N/A	N/A	●	●	N/A	N/A	●	●
24 Driveway 9 & Corwin Rd.	N/A	N/A	N/A	N/A	●	●	N/A	N/A	●	●
25 Driveway 10 & Corwin Rd.	N/A	N/A	N/A	N/A	●	●	N/A	N/A	●	●
26 Driveway 11 & Corwin Rd.	N/A	N/A	N/A	N/A	●	●	N/A	N/A	●	●
27 Driveway 12 & Corwin Rd.	N/A	N/A	N/A	N/A	●	●	N/A	N/A	●	●
28 Driveway 13 & Corwin Rd.	N/A	N/A	N/A	N/A	●	●	N/A	N/A	●	●

LEGEND:

- = A-D
- = E
- = F

1.5.1 EXISTING (2024) CONDITIONS

Intersections

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

Off-Ramp Queues

There are no movements that currently experience off-ramp queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows for Existing (2024) traffic conditions.

1.5.2 OPENING YEAR CUMULATIVE (2029) CONDITIONS

Intersections

The following study area intersections are anticipated to operate at an unacceptable LOS under Opening Year Cumulative (2029) Without Project traffic conditions:

- Quarry Road & I-15 Southbound Ramps (#1) – LOS F PM peak hour only
- Quarry Road & Stoddard Wells Road (#2) – LOS F PM peak hour only
- I-15 Northbound Ramps & Stoddard Wells Road (#3) – LOS F AM and PM peak hours
- Stoddard Wells Road & Johnson Road (#4) – LOS F AM and PM peak hours
- I-15 Southbound Ramps & Dale Evans Parkway (#5) – LOS F AM and PM peak hours
- Dale Evans Parkway & Stoddard Wells Road (#7) – LOS F AM and PM peak hours
- Dale Evans Parkway & Quarry Road (#8) – LOS F AM and PM peak hours
- Dale Evans Parkway & Johnson Road (#9) – LOS F AM and PM peak hours
- Dale Evans Parkway (West) & Waalew Road (#10) – LOS F PM peak hour only
- Dale Evans Parkway (East) & Waalew Road (#11) – LOS F PM peak hour only
- Central Road & Johnson Road (#12) – LOS F AM and PM peak hours
- Central Road & Waalew Road (#15) – LOS E PM peak hour only

With the addition of Project traffic, the following additional study area intersections are anticipated to operate at an unacceptable LOS with the addition of Project traffic under Opening Year Cumulative (2029) With Project traffic conditions:

- Central Road & Gustine Road (#13) – LOS E AM peak hour; LOS F PM peak hour
- Central Road & Waalew Road (#15) – LOS E AM peak hour

Off-Ramp Queues

The following movements are anticipated to experience off-ramp queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows under Opening Year Cumulative (2029) Without Project traffic conditions:

- I-15 Northbound Ramps & Stoddard Wells Road (#3) – Southbound shared left-through-right – AM and PM peak hours
- I-15 Northbound Ramps & Dale Evans Parkway (#6) – Southbound shared left-through-right – AM peak hour only

The addition of Project traffic is not anticipated to result in any additional off-ramp queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows under Opening Year Cumulative (2029) With Project traffic conditions.

1.5.3 HORIZON YEAR (2050) CONDITIONS

Intersections

The following study area intersections are anticipated to operate at an unacceptable LOS under Horizon Year (2050) Without Project traffic conditions:

- I-15 Northbound Ramps & Stoddard Wells Road (#3) – LOS F AM and PM peak hours
- Stoddard Wells Road & Johnson Road (#4) – LOS F AM and PM peak hours
- I-15 Southbound Ramps & Dale Evans Parkway (#5) – LOS F AM and PM peak hours
- Dale Evans Parkway & Stoddard Wells Road (#7) – LOS F AM and PM peak hours
- Dale Evans Parkway & Quarry Road (#8) – LOS F AM and PM peak hours
- Dale Evans Parkway & Johnson Road (#9) – LOS F AM and PM peak hours
- Dale Evans Parkway (West) & Waalew Road (#10) – LOS F PM peak hour only
- Dale Evans Parkway (East) & Waalew Road (#11) – LOS F AM and PM peak hours
- Central Road & Johnson Road (#12) – LOS F AM and PM peak hours
- Central Road & Waalew Road (#15) – LOS F PM peak hour only

With the addition of Project traffic, the following additional study area intersections are anticipated to operate at an unacceptable LOS with the addition of Project traffic under Horizon Year (2050) With Project traffic conditions:

- Central Road & Gustine Road (#13) – LOS F AM and PM peak hours
- Central Road & Waalew Road (#15) – LOS F AM peak hour

Off-Ramp Queues

The following movements are anticipated to experience off-ramp queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows under Horizon Year (2050) Without Project traffic conditions:

- I-15 Northbound Ramps & Stoddard Wells Road (#3) Southbound shared left-through-right – AM and PM peak hours

With the addition of Project traffic, the following movement is anticipated to experience queuing issues during the weekday AM peak 95th percentile traffic flows under Horizon Year (2050) With Project traffic conditions:

- I-15 Southbound Ramps & Dale Evans Parkway (#5) Southbound shared left-through-right – AM peak hour only

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 at Exhibit 1-4.

Recommendation 1 – Driveway 1 & Gustine Road (#16) – The following improvement is necessary to accommodate site access:

- Project to install a stop control on the northbound approach and construct a shared left-right turn lane (Project driveway).
- Project to construct an eastbound shared through-right turn lane.
- Project to construct a westbound shared left-through lane.

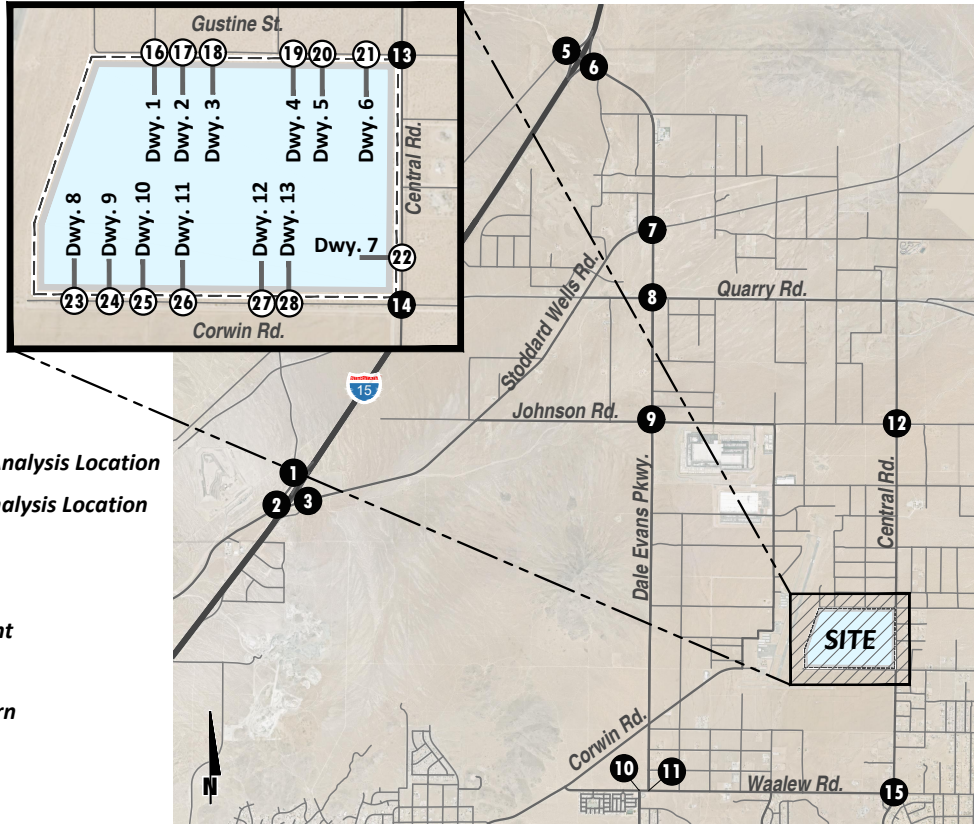
Recommendation 2 – Driveway 2 & Gustine Road (#17) – The following improvement is necessary to accommodate site access:

- Project to install a stop control on the northbound approach and construct a shared left-right turn lane (Project driveway).
- Project to construct an eastbound shared through-right turn lane.
- Project to construct a westbound shared left-through lane.

Recommendation 3 – Driveway 3 & Gustine Road (#18) – The following improvement is necessary to accommodate site access:

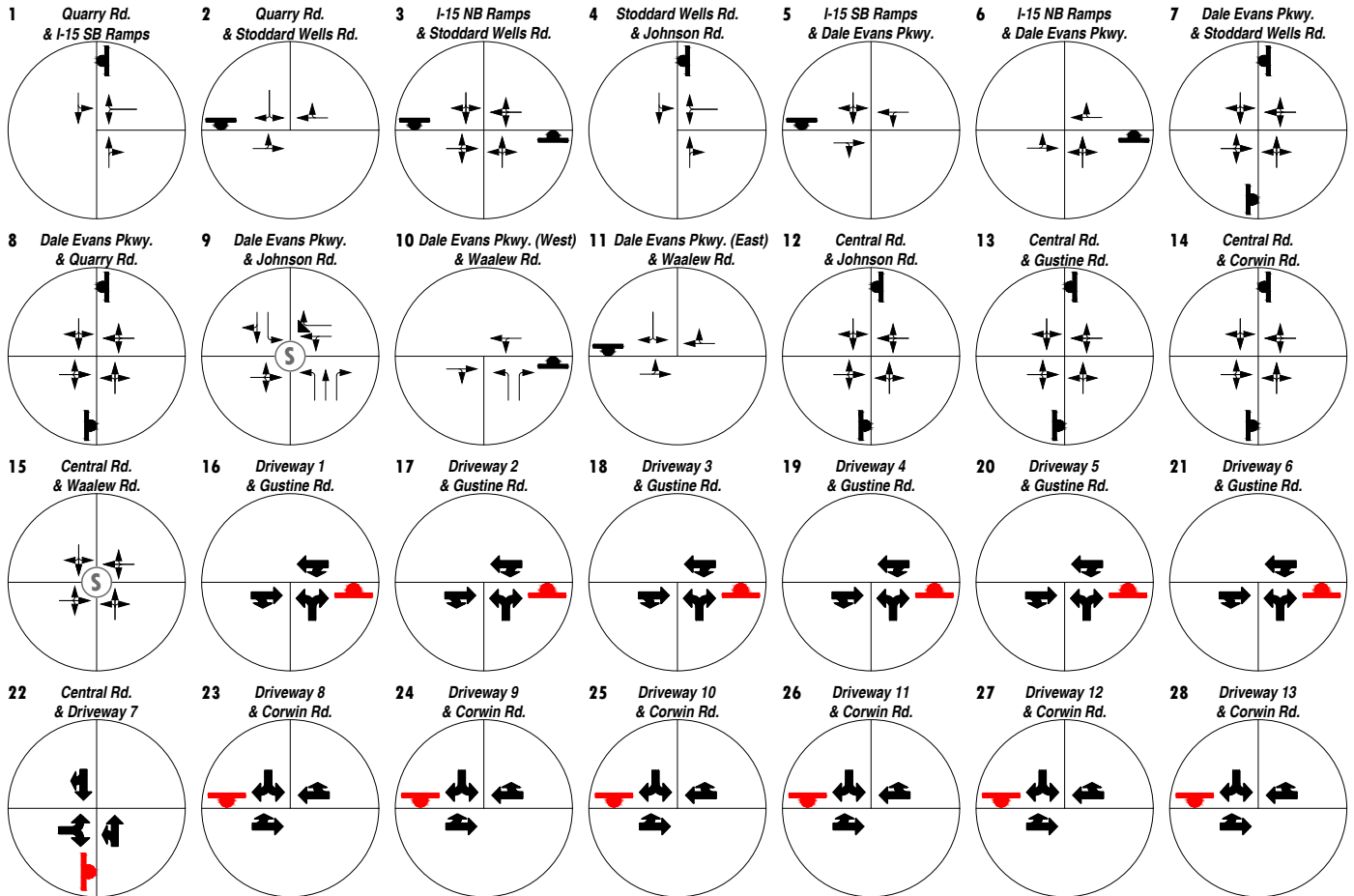
- Project to install a stop control on the northbound approach and construct a shared left-right turn lane (Project driveway).
- Project to construct an eastbound shared through-right turn lane.
- Project to construct a westbound shared left-through lane.

EXHIBIT 1-4 : SITE ACCESS RECOMMENDATIONS



LEGEND:

- 0** = Existing Intersection Analysis Location
- = Future Intersection Analysis Location
- S** = Existing All Way Stop
- = Existing Stop Sign
- = Stop Sign Improvement
- = Existing Lane
- = Existing Free Right Turn
- = Lane Improvement



Recommendation 4 – Driveway 4 & Gustine Road (#19) – The following improvement is necessary to accommodate site access:

- Project to install a stop control on the northbound approach and construct a shared left-right turn lane (Project driveway).
- Project to construct an eastbound shared through-right turn lane.
- Project to construct a westbound shared left-through lane.

Recommendation 5 – Driveway 5 & Gustine Road (#20) – The following improvement is necessary to accommodate site access:

- Project to install a stop control on the northbound approach and construct a shared left-right turn lane (Project driveway).
- Project to construct an eastbound shared through-right turn lane.
- Project to construct a westbound shared left-through lane.

Recommendation 6 – Driveway 6 & Gustine Road (#21) – The following improvement is necessary to accommodate site access:

- Project to install a stop control on the northbound approach and construct a shared left-right turn lane (Project driveway).
- Project to construct an eastbound shared through-right turn lane.
- Project to construct a westbound shared left-through lane.

Recommendation 7 – Central Road & Driveway 7 (#22) – The following improvement is necessary to accommodate site access:

- Project to install a stop control on the eastbound approach and construct a shared left-right turn lane (Project driveway).
- Project to construct a southbound shared through-right turn lane.
- Project to construct a northbound shared left-through lane.

Recommendation 8 – Driveway 8 & Corwin Road (#23) – The following improvement is necessary to accommodate site access:

- Project to install a stop control on the southbound approach and construct a shared left-right turn lane (Project driveway).
- Project to construct a westbound shared through-right turn lane.
- Project to construct an eastbound shared left-through lane.

Recommendation 9 – Driveway 9 & Corwin Road (#24) – The following improvement is necessary to accommodate site access:

- Project to install a stop control on the southbound approach and construct a shared left-right turn lane (Project driveway).
- Project to construct a westbound shared through-right turn lane.
- Project to construct an eastbound shared left-through lane.

Recommendation 10 – Driveway 10 & Corwin Road (#25) – The following improvement is necessary to accommodate site access:

- Project to install a stop control on the southbound approach and construct a shared left-right turn lane (Project driveway).
- Project to construct a westbound shared through-right turn lane.
- Project to construct an eastbound shared left-through lane.

Recommendation 11 – Driveway 11 & Corwin Road (#26) – The following improvement is necessary to accommodate site access:

- Project to install a stop control on the southbound approach and construct a shared left-right turn lane (Project driveway).
- Project to construct a westbound shared through-right turn lane.
- Project to construct an eastbound shared left-through lane.

Recommendation 12 – Driveway 12 & Corwin Road (#27) – The following improvement is necessary to accommodate site access:

- Project to install a stop control on the southbound approach and construct a shared left-right turn lane (Project driveway).
- Project to construct a westbound shared through-right turn lane.
- Project to construct an eastbound shared left-through lane.

Recommendation 13 – Driveway 13 & Corwin Road (#28) – The following improvement is necessary to accommodate site access:

- Project to install a stop control on the southbound approach and construct a shared left-right turn lane (Project driveway).
- Project to construct a westbound shared through-right turn lane.
- Project to construct an eastbound shared left-through lane.

Recommendation 14 – Gustine Road is an east-west oriented roadway located along the Project's northern boundary. Project to construct Gustine Road from the Project's western boundary to Central Road at its ultimate half-section width as a Modified Collector (ultimate 66-foot right-of-way), consistent with the Town's standards. The Project will also provide an additional 12 feet of pavement width to accommodate one westbound lane from the Project's western boundary to Central Road to facilitate site access.

Recommendation 15 – Corwin Road is an east-west oriented roadway located along the Project's southern boundary. Project to construct Corwin Road from the Project's western boundary to Central Road at its ultimate half-section width as a Modified Collector (ultimate 66-foot right-of-way), consistent with the Town's standards. The Project will also provide an additional 12 feet of pavement width to accommodate one eastbound lane from the Project's western boundary to Central Road to facilitate site access.

Recommendation 16 – Central Road is a north-south oriented roadway located on the Project's eastern boundary. Project to construct Central Road at its ultimate half-section width as a Major Divided Arterial (128-foot right-of-way) along the Project's frontage from Gustine Road to Corwin Road, consistent with the Town's standards. As part of the Project's frontage improvements along Central Road, a 2nd and 3rd southbound through lane could be accommodated in the future with the construction of receiving lanes to the south of the Project's southern boundary. Until widening to the south occurs, the pavement along the Project's frontage on Central Road can be cross-hatched.

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 Town of Apple Valley sight distance standards at the time of preparation of final grading, landscape, and street improvement plans.

1.6.2 OFF-SITE RECOMMENDATIONS

The recommended improvements needed to address the cumulative deficiencies are summarized in Table 1-3. For those improvements listed in Table 1-3 and not constructed as part of the Project, the Project Applicant's responsibility for the Project's contributions towards deficient intersections is fulfilled through payment of fees or fair share that would be assigned to construction of the identified recommended improvements.

1.6.3 QUEUING ANALYSIS AT THE PROJECT DRIVEWAYS

A queuing analysis was conducted at the study area intersections for Horizon Year (2050) With Project traffic conditions to determine the turn pocket lengths necessary to accommodate 95th percentile queues. The analysis was conducted for the weekday AM and weekday PM peak hours. The results have been provided in Appendix 1.2.

SimTraffic is designed to model networks of signalized and unsignalized intersections, with the primary purpose of checking and fine-tuning signal operations. SimTraffic uses the input parameters from Synchro to generate random simulations. The 95th percentile queue is derived from the average queue plus 1.65 standard deviations. The 95th percentile queue is not necessarily ever observed; it is simply based on statistical calculations (or Average Queue plus 1.65 standard deviations). Many agencies utilize the 95th percentile queues for design purposes. A vehicle is considered queued whenever it is traveling at less than 10 feet/second. The random simulations generated by SimTraffic have been utilized to determine the 95th percentile queue lengths observed for each turn movement. A SimTraffic simulation has been recorded five (5) times, during the weekday AM and weekday PM peak hours, and has been seeded for 30-minute periods with 60-minute recording intervals.

TABLE 1-3: SUMMARY OF IMPROVEMENTS (PAGE 1 OF 2)

# Intersection Location	Opening Year Cumulative (2029)		Horizon Year (2050)		Improvements included in Fee Program? ¹	Project Responsibility ²	Applicable Jurisdiction	Fair Share % ^{3,4}
	Without Project	With Project	Without Project	With Project				
1 Quarry Rd. & I-15 SB Ramps	Add NB right turn lane	Same	Not Applicable	Not Applicable	No	Fair Share	County	20.9%
2 Quarry Rd. & Stoddard Wells Rd.	Add WB right turn lane	Same	Not Applicable	Not Applicable	No	Fair Share	County	20.8%
3 I-15 NB Ramps & Stoddard Wells Rd.	Install a traffic signal	Same	Same	Same	No	Fair Share	Apple Valley, Caltrans	18.9%
	Add SB left turn lane	Same	Same	Same	No	Fair Share	Caltrans	
	Add 2nd WB through lane	Same	Same	Same	No	Fair Share	Apple Valley	
	Add EB left turn lane	Same	Same	Same	No	Fair Share	Apple Valley	
	Add WB left turn lane	Same	Same	Same	No	Fair Share	Apple Valley	
4 Stoddard Wells Rd. & Johnson Rd.	Install a traffic signal	Same	Same	Same	No	Fair Share	Apple Valley	22.6%
	Add NB right turn lane	Same	Same	Same	No	Fair Share	Apple Valley	
	Add WB left turn lane	Same	Same	Same	No	Fair Share	Apple Valley	
5 I-15 SB Ramps & Dale Evans Pkwy.	Install a traffic signal	Same	Same	Same	No	Fair Share	County, Caltrans	11.6%
7 Dale Evans Pkwy. & Stoddard Wells Rd.	Install a traffic signal	Same	Same	Same	No	Fair Share	Apple Valley, County	11.5%
8 Dale Evans Pkwy. & Quarry Rd.	Install a traffic signal	Same	Same	Same	No	Fair Share	Apple Valley, County	11.5%
	Add NB left turn lane	Same	Same	Same	No	Fair Share	Apple Valley	
	Add SB left turn lane	Same	Same	Same	No	Fair Share	County	
9 Dale Evans Pkwy. & Johnson Rd.	Install a traffic signal	Same	Same	Same	No	Fair Share	Apple Valley, County	20.8%
	Add 2nd NB through lane	Same	Same	Same	No	Fair Share	Apple Valley	
	Add 2nd SB through lane	Same	Same	Same	No	Fair Share	County	
	Add 2nd EB through lane	Same	Same	Same	No	Fair Share	Apple Valley	
	Add 2nd WB through lane	Same	Same	Same	No	Fair Share	Apple Valley	
	Add EB left turn lane	Same	Same	Same	No	Fair Share	Apple Valley	
	Add WB left turn lane	Same	Same	Same	No	Fair Share	Apple Valley	
				Add 2nd SB left turn lane	Same	No	Fair Share	

TABLE 1-3: SUMMARY OF IMPROVEMENTS (PAGE 2 OF 2)

# Intersection Location	Opening Year Cumulative (2029)		Horizon Year (2050)		Improvements included in Fee Program? ¹	Project Responsibility ²	Applicable Jurisdiction	Fair Share % ^{3,4}
	Without Project	With Project	Without Project	With Project				
10 Dale Evans Pkwy. (West) & Waalew Rd.	Install a traffic signal	Same	Same	Same	No	Fair Share	Apple Valley	17.8%
11 Dale Evans Pkwy. (East) & Waalew Rd.	Install a traffic signal	Same	Same	Same	No	Fair Share	Apple Valley	15.9%
12 Central Rd. & Johnson Rd.	Install a traffic signal	Same	Same	Same	No	Fair Share	Apple Valley	37.5%
	Add NB left turn lane	Same	Same	Same	No	Fair Share	Apple Valley	
	Add SB left turn lane	Same	Same	Same	No	Fair Share	Apple Valley	
	Add EB left turn lane	Same	Same	Same	No	Fair Share	Apple Valley	
	Add WB left turn lane	Same	Same	Same	No	Fair Share	Apple Valley	
	Add 2nd NB left turn lane	Same	Same	Same	No	Fair Share	Apple Valley	
	Add SB right turn lane	Same	Same	Same	No	Fair Share	Apple Valley	
13 Central Rd. & Gustine Rd.	None	Install a traffic signal	Same	Same	No	Construct	Apple Valley, County	--
15 Central Rd. & Waalew Rd.	Install a traffic signal	Same	Same	Same	No	Fair Share	Apple Valley	24.6%

¹ Improvements included in the Town of Apple Valley DIF program.

² Identifies the Project's responsibility to construct an improvement or contribute fair share or fee payment towards the implementation of the improvements shown.

³ Program improvements constructed may be eligible for fee credit, at discretion of the Town. See Table 7-1 for Fair Share Calculations.

⁴ Fair share percentages are based on Opening Year Cumulative (2029) volumes for Opening Year Cumulative improvements, and Horizon Year (2050) volumes for Horizon Year improvements.

This Page Intentionally Left Blank

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 Town of Apple Valley'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 a 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 7th 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 Town of Apple Valley 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. The saturation flow rates utilized are consistent with the rates identified in the San Bernardino County CMP.

The traffic modeling and signal timing optimization software package Synchro (Version 12) is utilized to analyze signalized intersections within the study area. Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), $V/C \leq 1.0$	Level of Service, $V/C \leq 1.0$ 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, 7th Edition

¹ if V/C is greater than 1.0 then LOS is F per HCM

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., $PHF = [Hourly Volume] / [4 \times Peak 15\text{-minute Flow Rate}]$). 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)

Consistent with the County Guidelines, a PHF of 0.95 is assumed for the Horizon Year (2050) traffic conditions.

2.2.2 UNSIGNALIZED INTERSECTIONS

The Town of Apple Valley requires the operations of unsignalized intersections to 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), $V/C \leq 1.0$	Level of Service, $V/C \leq 1.0$ 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 intersections capacity exceeded.	>50.00	F

Source: HCM, 7th 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 ascertain 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 California Department of Transportation (Caltrans) California Manual on Uniform Traffic Control Devices (CA MUTCD) for all study area intersections. (6)

The signal warrant criteria for Existing conditions 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. (6) Specifically, this TA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing study area intersections for all analysis scenarios. Warrant 3 is appropriate to use for this TA because it provides specialized warrant criteria for intersections with urban characteristics (e.g., adjacent major streets operating at or below 40 miles per hour) or rural characteristics (e.g., adjacent major streets operating above 40 miles per hour). 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.

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.

The traffic signal warrant analysis for Existing (2024) conditions are presented in Section 3 *Area Conditions*. The traffic signal warrant analyses for future conditions are presented in Section 5 *Opening Year Cumulative (2029) Traffic Conditions* and Section 6 *Horizon Year (2050) Traffic Conditions*.

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 OFF-RAMP QUEUING ANALYSIS

Consistent with Caltrans requirements, the 95th percentile queuing of vehicles has been assessed at the off-ramps to determine potential queuing deficiencies at the freeway ramp intersections at the I-15 Freeway at the Quarry Road, Stoddard Wells Road, and Dale Evans Parkway interchanges. Specifically, the off-ramp queuing analysis is utilized to identify any potential queuing and “spill back” onto the I-15 Freeway mainline from the off-ramps.

The traffic progression analysis tool and HCM intersection analysis program, Synchro, has been used to assess the potential deficiencies/needs of the intersections with traffic added from the proposed Project. Storage (turn-pocket) length recommendations at the ramps have been based upon the 95th percentile queue resulting from the Synchro progression analysis. The footnote from the Synchro output sheets indicates if the 95th percentile cycle exceeds capacity. Traffic is simulated for two complete cycles of the 95th percentile traffic in Synchro in order to account for the effects of spillover between cycles. In practice, the 95th percentile queue shown will rarely be exceeded and the queues shown with the footnote are acceptable for the design of storage bays. The 95th percentile queue is derived from the average queue plus 1.65 standard deviations. The 95th percentile queue is not necessarily ever observed, it is simply based on statistical calculations.

2.5 MINIMUM ACCEPTABLE LEVELS OF SERVICE (LOS)

According to the Town of Apple Valley's General Plan, LOS C or better is preferable, but LOS D is the minimum acceptable condition that should be maintained during the peak commute hours, where feasible. Therefore, for the purposes of this traffic analysis, LOS D has also been considered the acceptable threshold for all study area intersections.

2.6 DEFICIENCY CRITERIA

This section outlines the methodology used in this analysis related to identifying circulation system deficiencies. Per the Town's Traffic Study Guidelines: In accordance with the Town's General Plan Circulation Element, at intersections where the LOS falls below, or is expected to fall below an acceptable threshold with or without the addition of the project, feasible measures shall be identified to mitigate the project's impacts for all project scenario conditions. The TA calculates the project's fair share towards each improvement required to serve cumulative conditions with or without the Project.

2.7 PROJECT FAIR SHARE CALCULATION METHODOLOGY

In cases where this TA identifies that the Project would contribute additional traffic volumes to traffic deficiencies, Project fair share costs of improvements necessary to address deficiencies have been identified. The Project's fair share cost of improvements is determined based on the following equation, which is the ratio of Project traffic to new future traffic, and new future traffic is Project traffic plus future development traffic:

$$\text{Project Fair Share \%} = \frac{\text{Project AM/PM Traffic}}{(\text{2050 With Project AM/PM Total Traffic} - \text{Existing AM/PM Traffic})}$$

The Project fair share percentage has been calculated for both the AM peak hour and PM peak hour and the higher of the two has been selected. The Project fair share contribution calculations are presented in Section 6 *Local and Regional Funding Mechanisms* of this TA.

This Page Intentionally Left Blank

3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the Town of Apple Valley General Plan Circulation Network, and a review of existing peak hour intersection operations, traffic signal warrant, and freeway off-ramp queuing analyses.

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the agreement with Town of Apple Valley staff (Appendix 1.1), the study area includes a total of 28 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 TOWN OF APPLE VALLEY GENERAL PLAN CIRCULATION ELEMENT

The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on the Town of Apple Valley General Plan Circulation Element, are described subsequently. Exhibit 3-2 shows the Town of Apple Valley General Plan Circulation Element.

Major Divided Parkways are designed to accommodate six travel lanes with a 20-foot center median and 15-foot parkways on each side of the roadway, within a 142-foot right-of-way. The following study area roadway within the Town of Apple Valley is classified as a Major Divided Parkway:

- Dale Evans Parkway

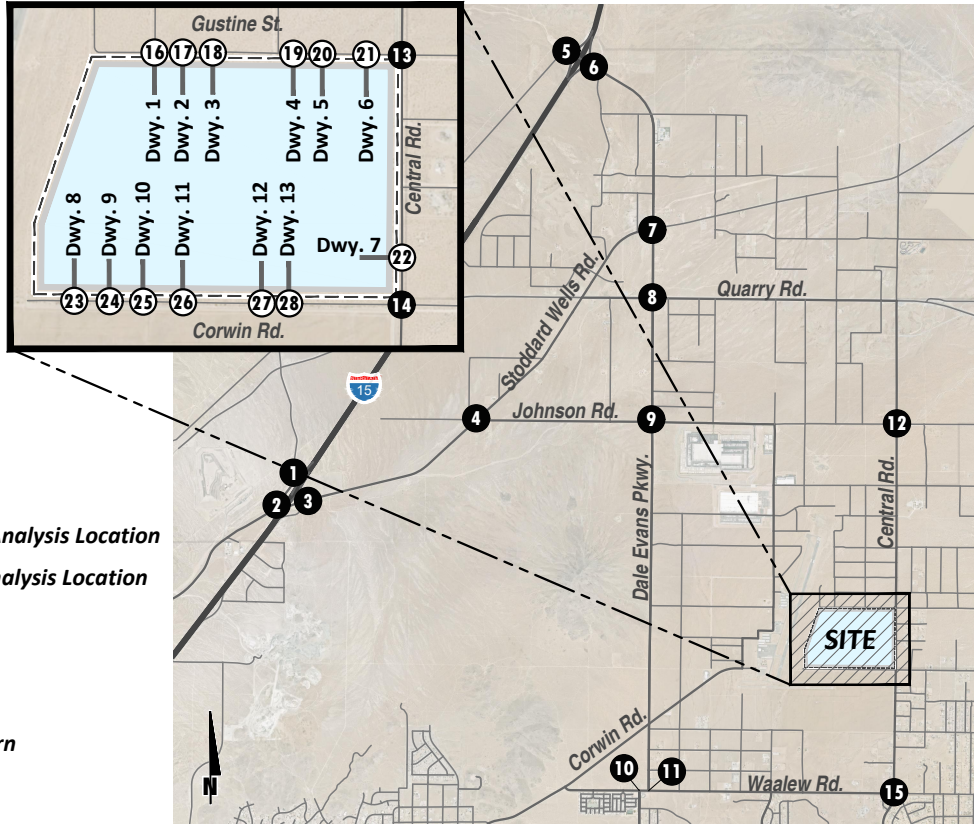
Major Divided Arterials are designed to accommodate six travel lanes with a center turn lane or median and 10-foot bike or parking lanes on each side of the roadway, within a 128-foot right-of-way. The following study area roadways within the Town of Apple Valley are classified as Major Divided Arterials:

- Quarry Road, west of Stoddard Wells Road
- Stoddard Wells Road, south of Johnson Road
- Central Road, between Johnson Road and Waalew Road

Major Roads are designed to accommodate four travel lanes with a bike or parking lane, within a 104-foot right-of-way. The following study area roadways within the Town of Apple Valley are classified as Major Roads:

- Stoddard Wells Road, north of Johnson Road
- Central Road, north of Johnson Road
- Quarry Road, between Stoddard Wells Road and Dale Evans Parkway
- Johnson Road
- Waalew Road

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



LEGEND:

- 0** = Existing Intersection Analysis Location
- = Future Intersection Analysis Location
- S** = Existing All Way Stop
- ⏹** = Existing Stop Sign
- ←** = Existing Lane
- ↗** = Existing Free Right Turn

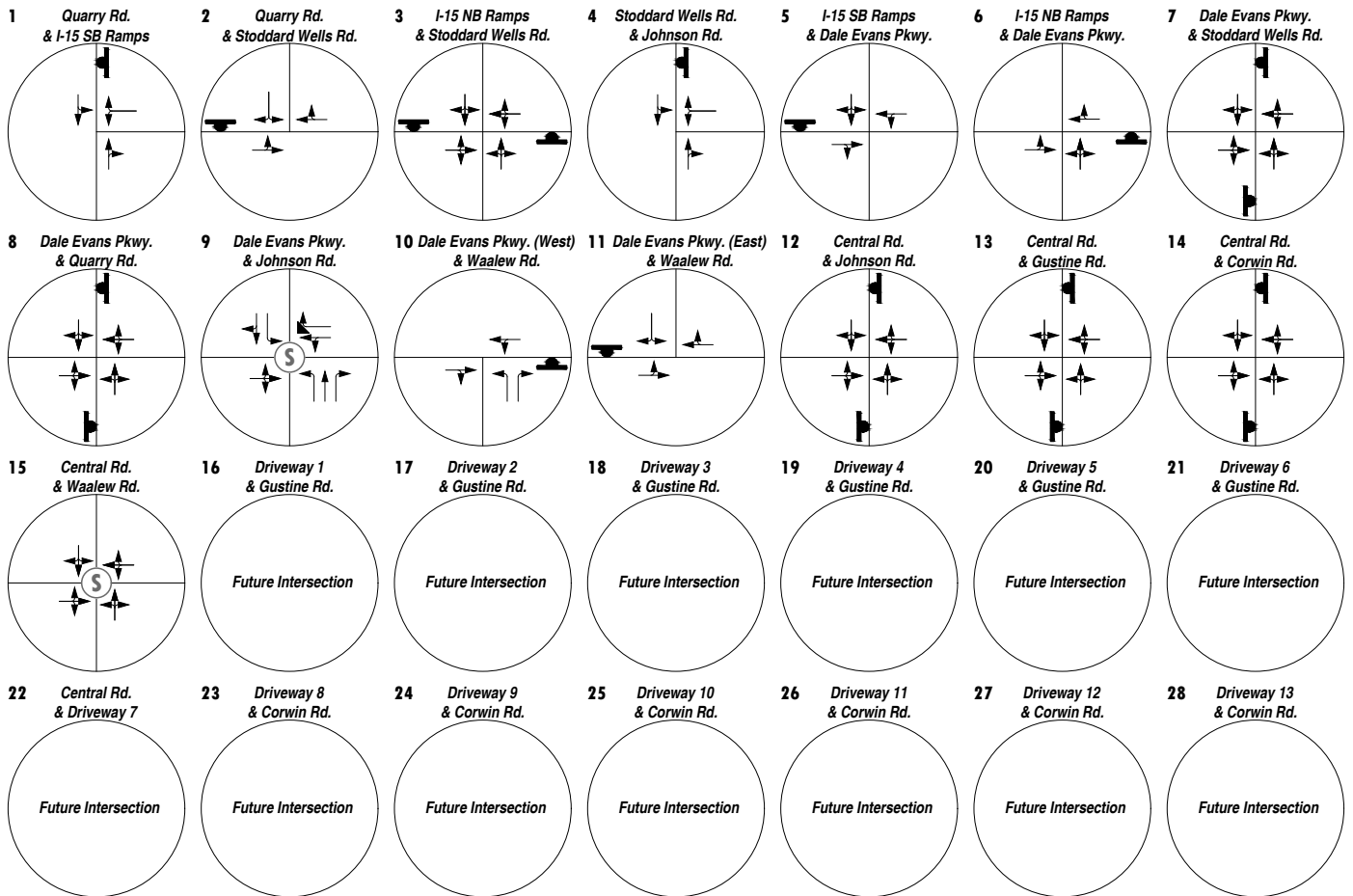
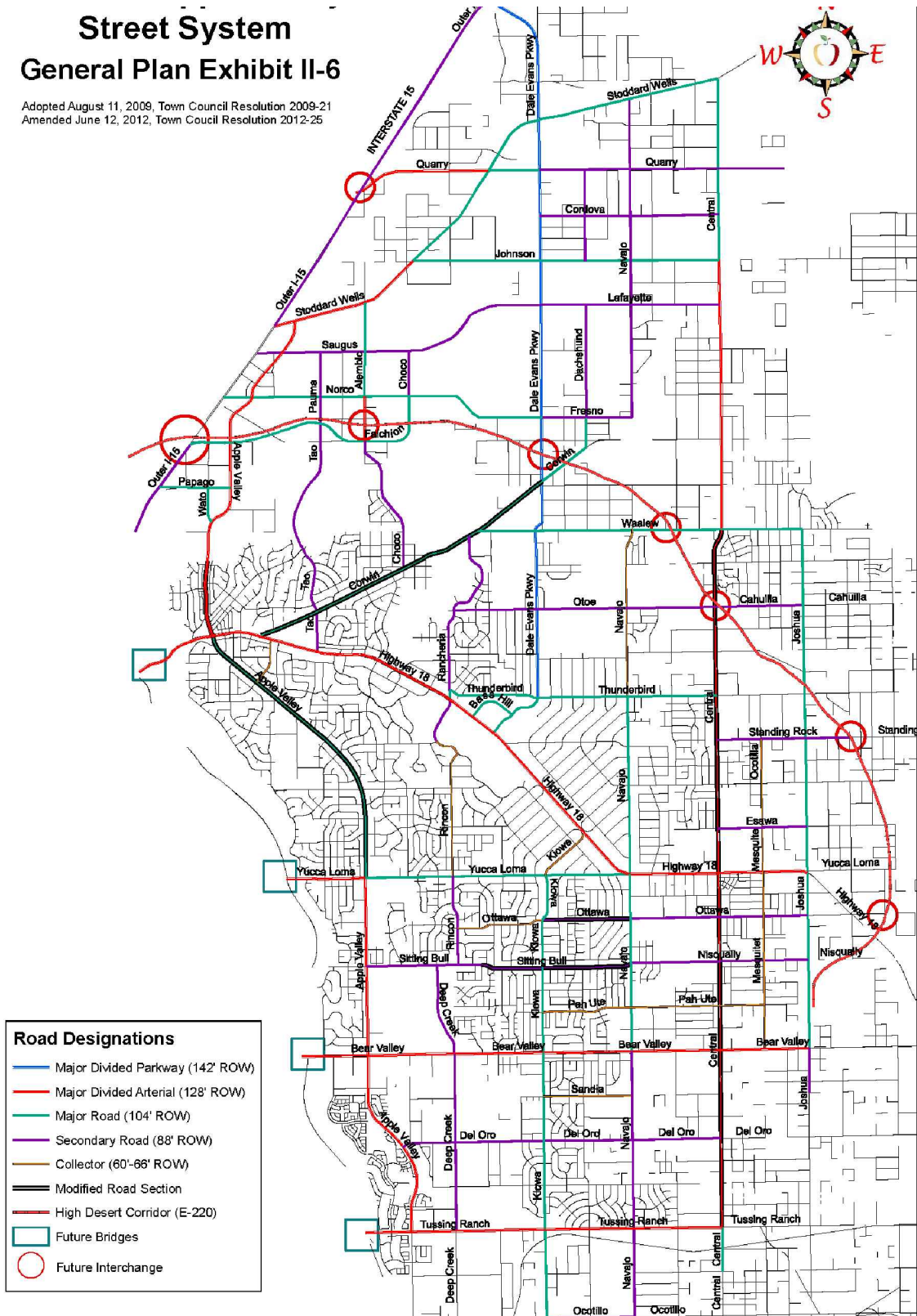


EXHIBIT 3-2 : TOWN OF APPLE VALLEY GENERAL PLAN STREET SYSTEM

Street System

General Plan Exhibit II-6

Adopted August 11, 2009, Town Council Resolution 2009-21
 Amended June 12, 2012, Town Council Resolution 2012-25



Secondary Roads are designed to accommodate four travel lanes with a bike or parking lane, within a 88-foot right-of-way. The following study area roadway within the Town of Apple Valley is classified as a Secondary Road:

- Quarry Road, east of Dale Evans Parkway

3.3 BICYCLE AND PEDESTRIAN FACILITIES

Exhibit 3-3 illustrates the Town of Apple Valley bike paths. As shown at Exhibit 3-3, there are proposed Class II bike lanes on Central Road, and Class I bike paths along Stoddard Wells Road, Dale Evans Parkway, and Waalew Road. There are no pedestrian facilities in close proximity to the Project. Field observations indicate nominal pedestrian and bicycle activity within the study area.

3.4 TRANSIT SERVICE

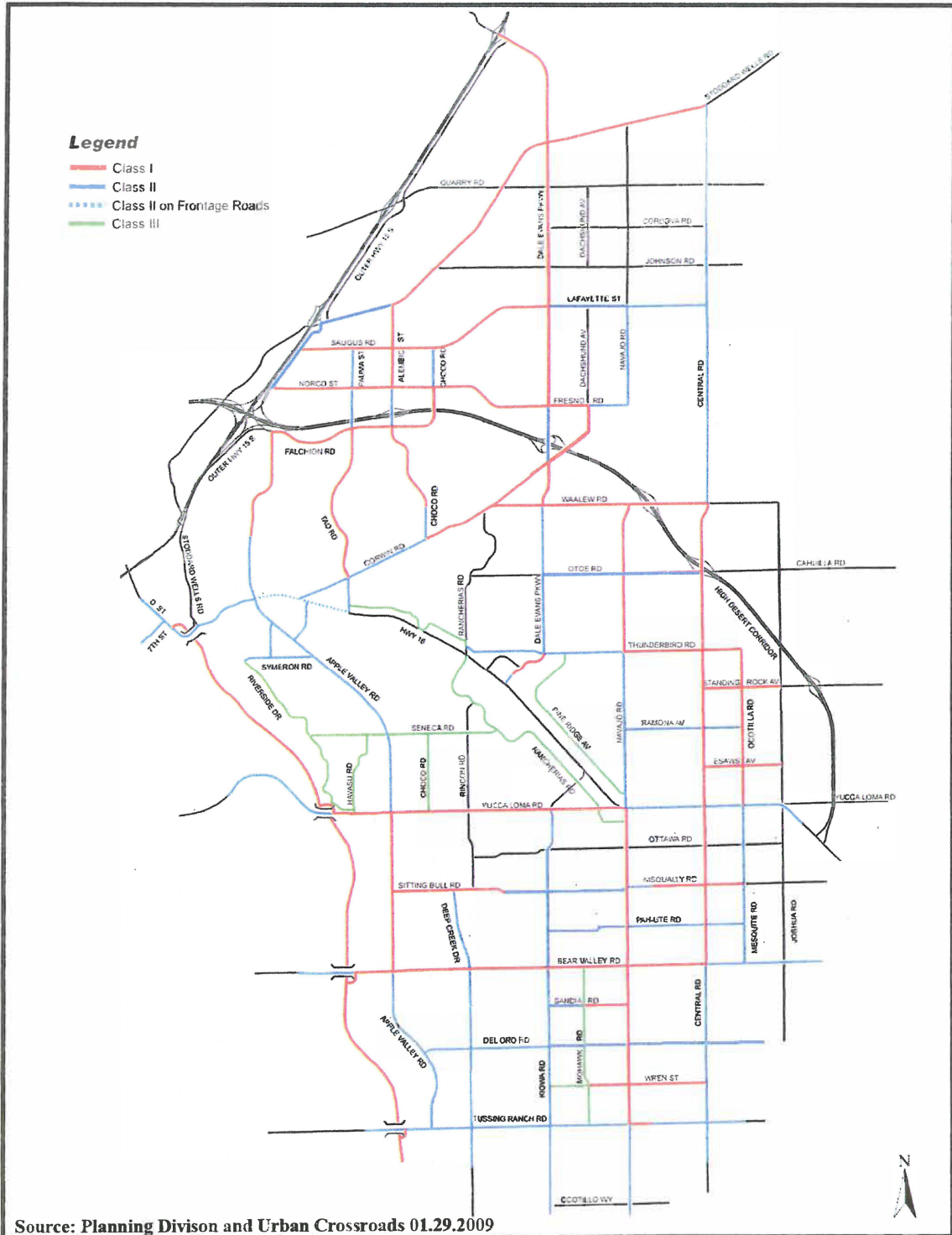
The study area is currently served by Victor Valley Transit Authority (VTA), a public transit agency serving various jurisdictions within San Bernardino County. The existing transit routes within the study area are shown on Exhibit 3-4. Route 42 currently runs along Dale Evans Parkway, Johnson Road, and Corwin Road.

Transit service is reviewed and updated by VTA 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 VTA to potentially provide bus service to the site.

3.5 TRUCK ROUTES

The Town of Apple Valley truck routes are shown on Exhibit 3-5. Through truck routes are included on Central Road, Waalew Road, Dale Evans Parkway and Johnson Road between Dale Evans Parkway and Central Road, in the study area. Local Truck Routes are also shown on Stoddard Wells Road and Johnson Road west of Dale Evans Parkway. These designated truck routes have been utilized for both the proposed Project and future cumulative development projects for the purposes of this TA.

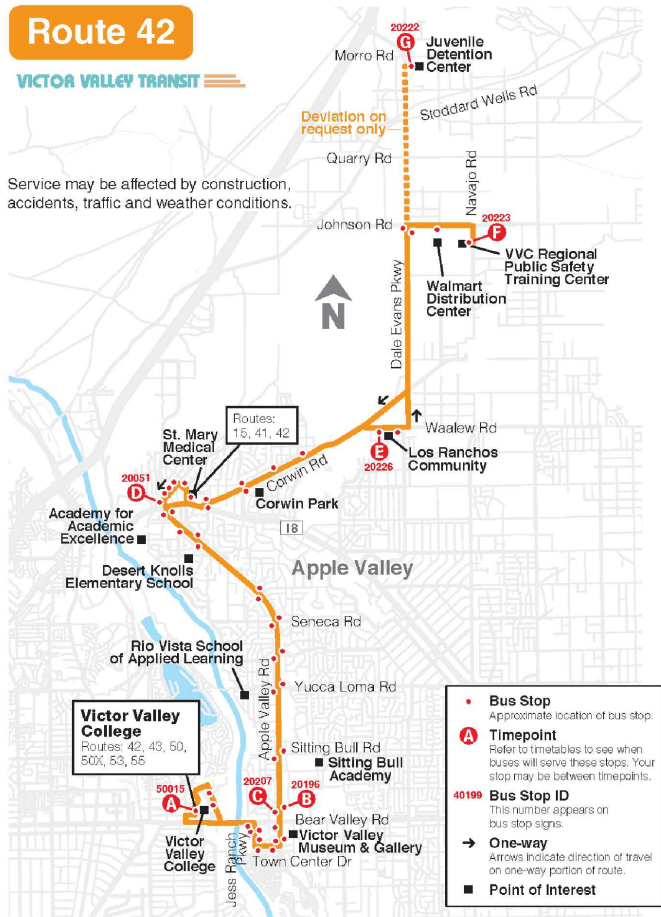
EXHIBIT 3-3 : TOWN OF APPLE VALLEY BIKE PATHS



Apple Valley General Plan
 Town of Apple Valley Bike Paths
 Apple Valley, California

Exhibit
 II-10

EXHIBIT 3-4 : TRANSIT ROUTES



Monday-Friday

Northbound

	Victor Valley College A	Apple Valley Rd & Pimlico Rd B	Apple Valley Rd & Hwy 18 D	Waalew Rd & Los Ranchos E	Navajo Rd & Johnson Rd F
AM	8:30	8:38	8:54	9:04	9:13
	7:30	7:38	7:54	8:04	8:13
	8:30	8:39	8:54	9:04	9:12
	9:30	9:39	9:55	10:05	10:14
	10:30	10:39	10:55	11:05	11:14
	11:30	11:39	11:55	12:06	12:14
PM	12:30	12:39	12:55	13:06	13:14
	1:30	1:39	1:55	2:06	2:14
	2:30	2:39	2:55	3:06	3:13
	3:30	3:39	3:55	4:05	4:12
	4:30	4:39	4:55	5:05	5:12
	5:30	5:39	5:55	6:05	6:12
	6:30	6:39	6:55	7:05	7:13
	7:30	7:38	7:51	8:01	8:09
	8:30	8:39	8:52	9:02	-

Southbound

	Navajo Rd & Johnson Rd F	Juvenile Detention Center G	Waalew Rd & Los Ranchos E	A/Rc
AM	6:30 *	6:39 *	6:44	
	7:30 *	7:38 *	7:44	
	8:30 *	8:39 *	8:44	
	9:30 *	9:39 *	9:44	
	10:30 *	10:39 *	10:44	
	11:30 *	11:39 *	11:44	
PM	12:30 *	12:39 *	12:44	
	1:30 *	1:39 *	1:44	
	2:30 *	2:39 *	2:44	
	3:30 *	3:37 *	3:46	
	4:30 *	4:37 *	4:46	
	5:30 *	5:37 *	5:46	
	6:30 *	6:37 *	6:46	
	7:30 *	7:38 *	7:46	
	8:30 *	8:38 *	8:46	

* Juvenile Detention Center (G) if not servicing the Juvenile Detention Center (F) Navajo & Johnson (F)

Saturday

Northbound

	Victor Valley College A	Apple Valley Rd & Pimlico Rd B	Apple Valley Rd & Hwy 18 D	Waalew Rd & Los Ranchos E	Navajo Rd & Johnson Rd F
AM	7:40	7:48	8:05	8:15	8:20
	8:33	8:41	8:58	9:06	9:13
	9:26	9:34	9:51	9:59	10:06
	10:19	10:27	10:44	10:52	10:59
	11:12	11:20	11:37	11:45	11:52
PM	12:05	12:13	12:30	12:38	12:45
	12:58	1:06	1:23	1:31	1:38
	1:51	1:59	2:16	2:24	2:31
	2:44	2:52	3:09	3:17	3:24
	3:37	3:45	4:02	4:10	4:17
	4:30	4:38	4:55	5:03	5:10
	5:23	5:31	5:48	5:56	6:03
	6:16	6:24	6:41	6:49	6:56
	7:09	7:17	7:34	7:42	7:49
	8:02	8:10	8:27	8:35	-

Southbound

	Navajo Rd & Johnson Rd F	Juvenile Detention Center G	Waalew Rd & Los Ranchos E	A/Rc
AM	7:30 *	7:39 *	7:45	
	8:23 *	8:29 *	8:38	
	9:16 *	9:22 *	9:31	
	10:09 *	10:15 *	10:24	
	11:02 *	11:08 *	11:17	
PM	11:55 *	12:01 *	12:10	
	12:48 *	12:54 *	1:03	
	1:41 *	1:47 *	1:56	
	2:34 *	2:40 *	2:49	
	3:27 *	3:33 *	3:42	
	4:20 *	4:26 *	4:35	
	5:13 *	5:19 *	5:28	
	6:06 *	6:12 *	6:21	
	6:59 *	7:05 *	7:14	

* Juvenile Detention Center (G) if not servicing the Juvenile Detention Center (F) Navajo & Johnson (F)

Sunday

Northbound

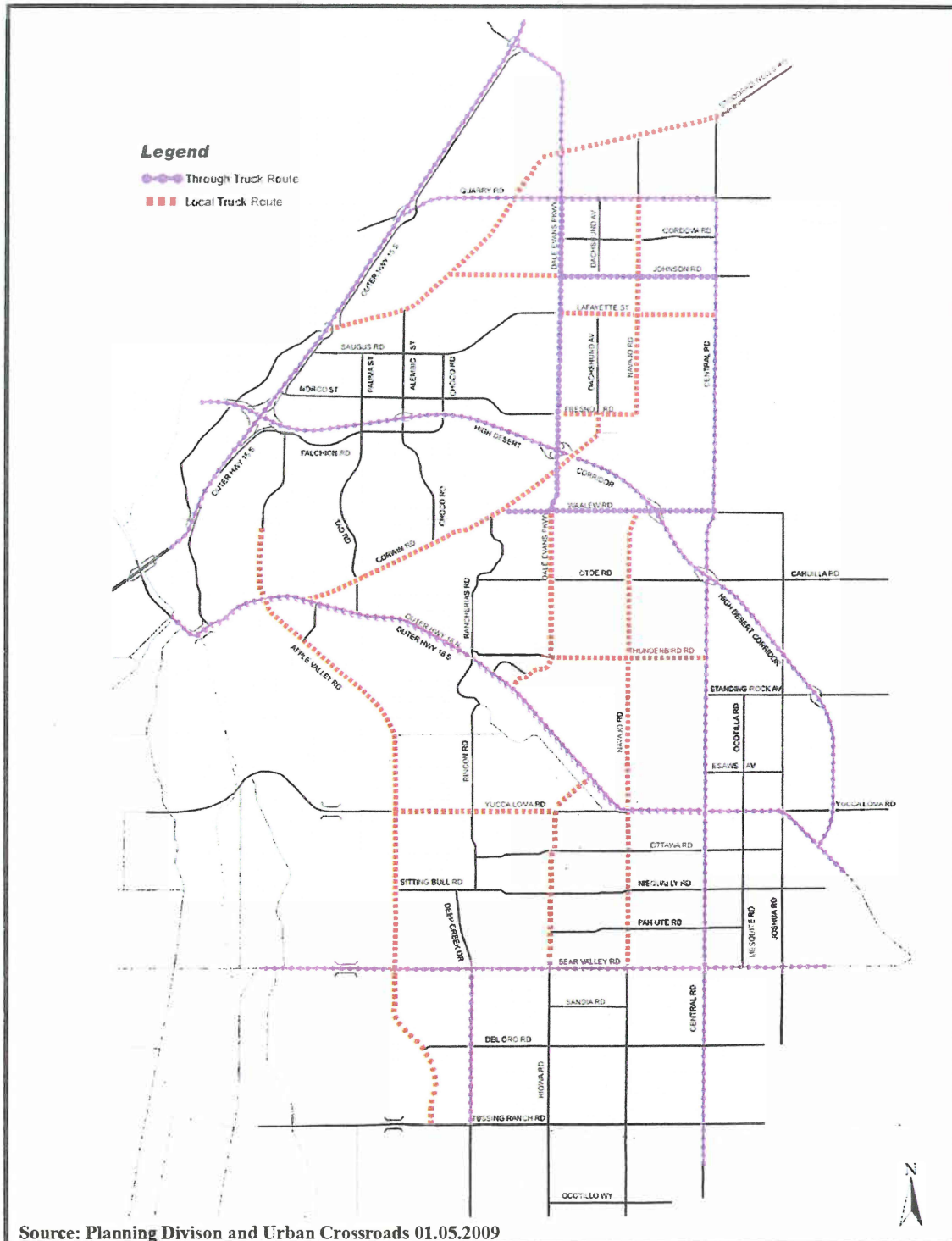
	Victor Valley College A	Apple Valley Rd & Pimlico Rd B	Apple Valley Rd & Hwy 18 D	Waalew Rd & Los Ranchos E	Navajo Rd & Johnson Rd F
AM	8:33	8:40	8:54	9:04	9:12
	9:26	9:33	9:47	9:57	10:05
	10:19	10:26	10:40	10:50	10:58
PM	11:12	11:19	11:33	11:43	11:51
	12:05	12:12	12:26	12:36	12:44
	12:58	1:05	1:19	1:29	1:37
	1:51	1:58	2:12	2:22	2:30
	2:44	2:51	3:05	3:15	3:23
	3:37	3:44	3:58	4:08	4:16
	4:30	4:37	4:51	5:01	5:09
	5:23	5:30	5:44	5:54	-

Southbound

	Navajo Rd & Johnson Rd F	Juvenile Detention Center G	Waalew Rd & Los Ranchos E	A/Rc
AM	8:23 *	8:29 *	8:38	
	9:16 *	9:22 *	9:32	
	10:09 *	10:15 *	10:25	
PM	11:02 *	11:08 *	11:18	
	11:55 *	12:01 *	12:11	
	12:48 *	12:54 *	1:04	
	1:41 *	1:47 *	1:57	
	2:34 *	2:40 *	2:50	
	3:27 *	3:33 *	3:43	
	4:20 *	4:26 *	4:36	
	5:13 *	5:19 *	5:29	

* Juvenile Detention Center (G) if not servicing the Juvenile Detention Center (F) Navajo & Johnson (F)

EXHIBIT 3-5 : TOWN OF APPLE VALLEY TRUCK ROUTES



Source: Planning Division and Urban Crossroads 01.05.2009



Apple Valley General Plan
 Town of Apple Valley Truck Routes at Build Out
 Apple Valley, California

Exhibit
II-8

3.6 EXISTING (2024) TRAFFIC COUNTS

The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in January 2024. 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 2024 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. The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1. Existing weekday AM and weekday PM peak hour intersection volumes are also shown on Exhibit 3-6. Existing weekday ADT volumes are shown on Exhibit 3-7. 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:

$$\text{Weekday PM Peak Hour (Approach Volume + Exit Volume)} \times 8.69 = \text{Leg Volume}$$

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicate that the peak-to-daily relationship is approximately 11.51 percent. As such, the above equation utilizing a factor of 8.69 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 11.51 percent (i.e., $1/0.1151 = 8.69$) and was assumed to sufficiently estimate ADT volumes for planning-level analyses.

3.7 INTERSECTION OPERATIONS ANALYSIS

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

3.8 TRAFFIC SIGNAL WARRANT ANALYSIS

Traffic signal warrants for Existing traffic conditions are based on existing peak hour intersection turning volumes. The following unsignalized study area intersections currently warrant a traffic signal for Existing traffic conditions:

- Dale Evans Parkway & Johnson Road (#9)
- Dale Evans Parkway (East) & Waalew Road (#11)

Existing conditions traffic signal warrant analysis worksheets are provided in Appendix 3.3.

EXHIBIT 3-6 : EXISTING (2024) PEAK HOUR INTERSECTION VOLUMES

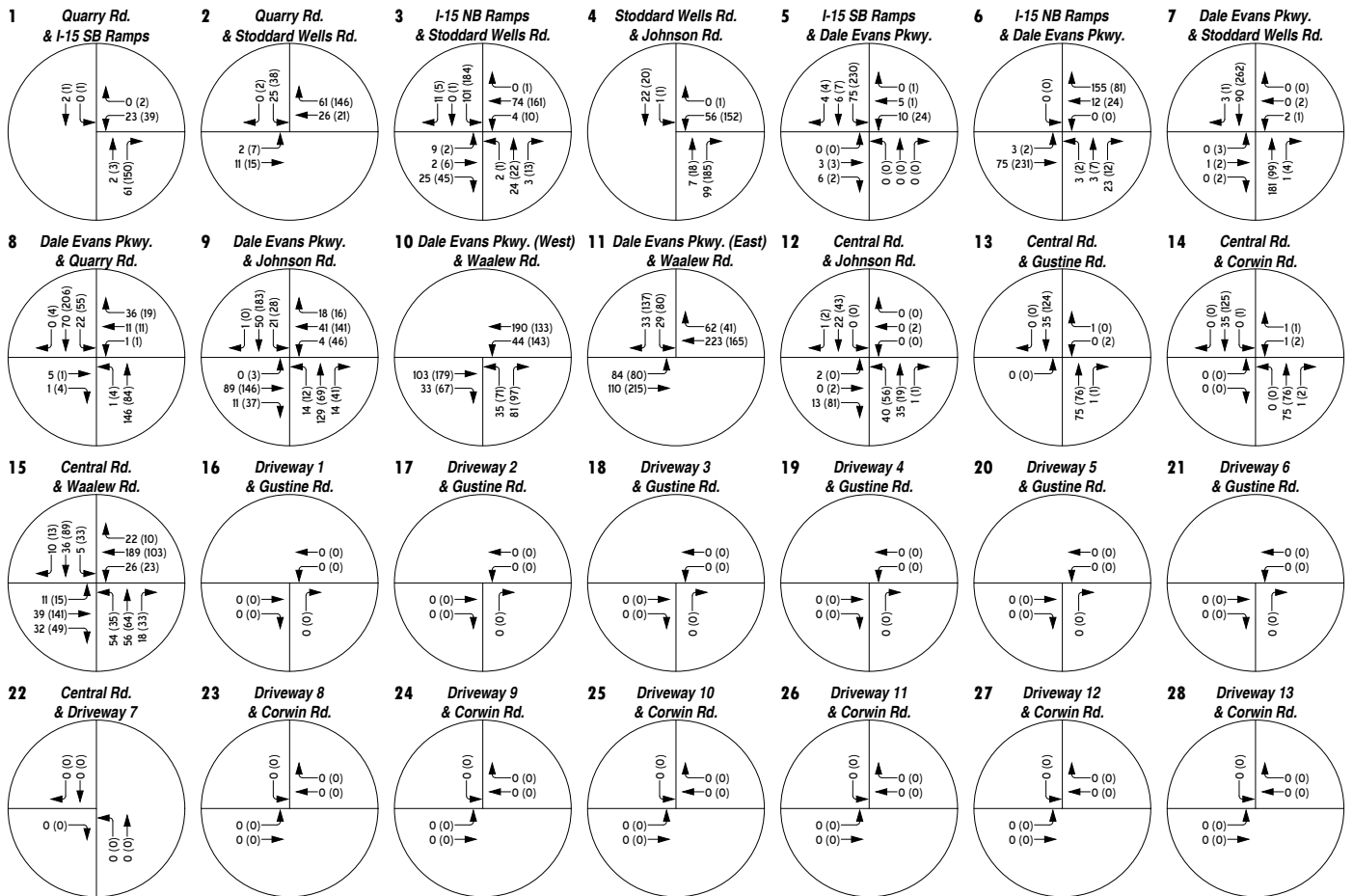
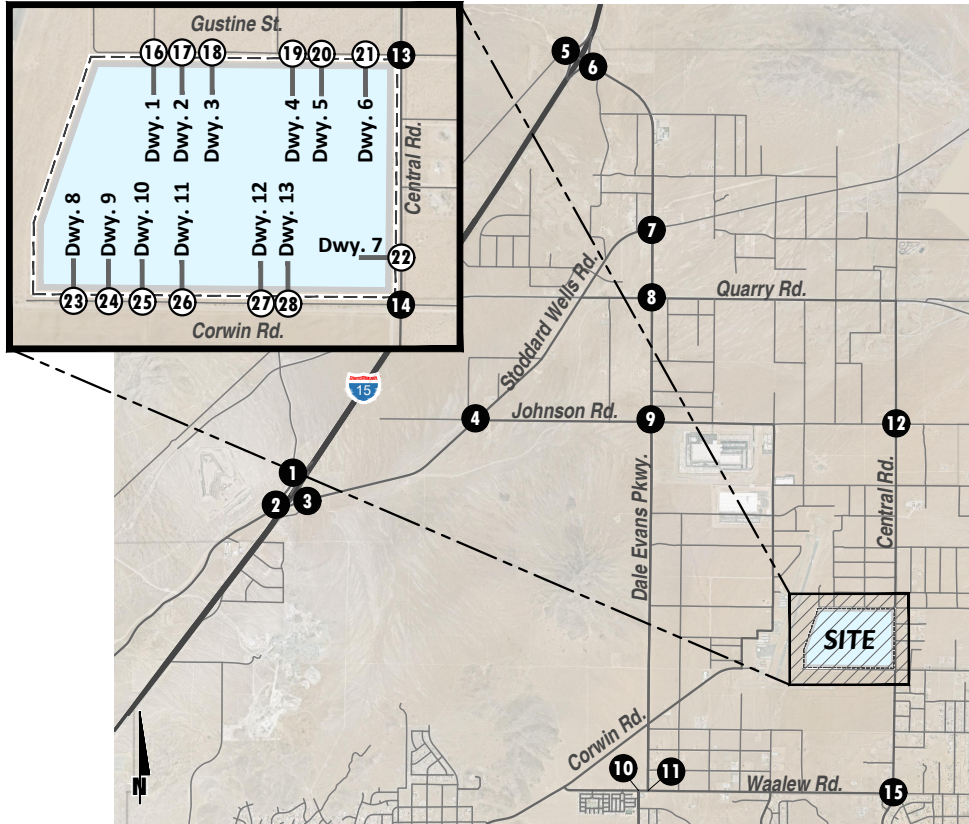
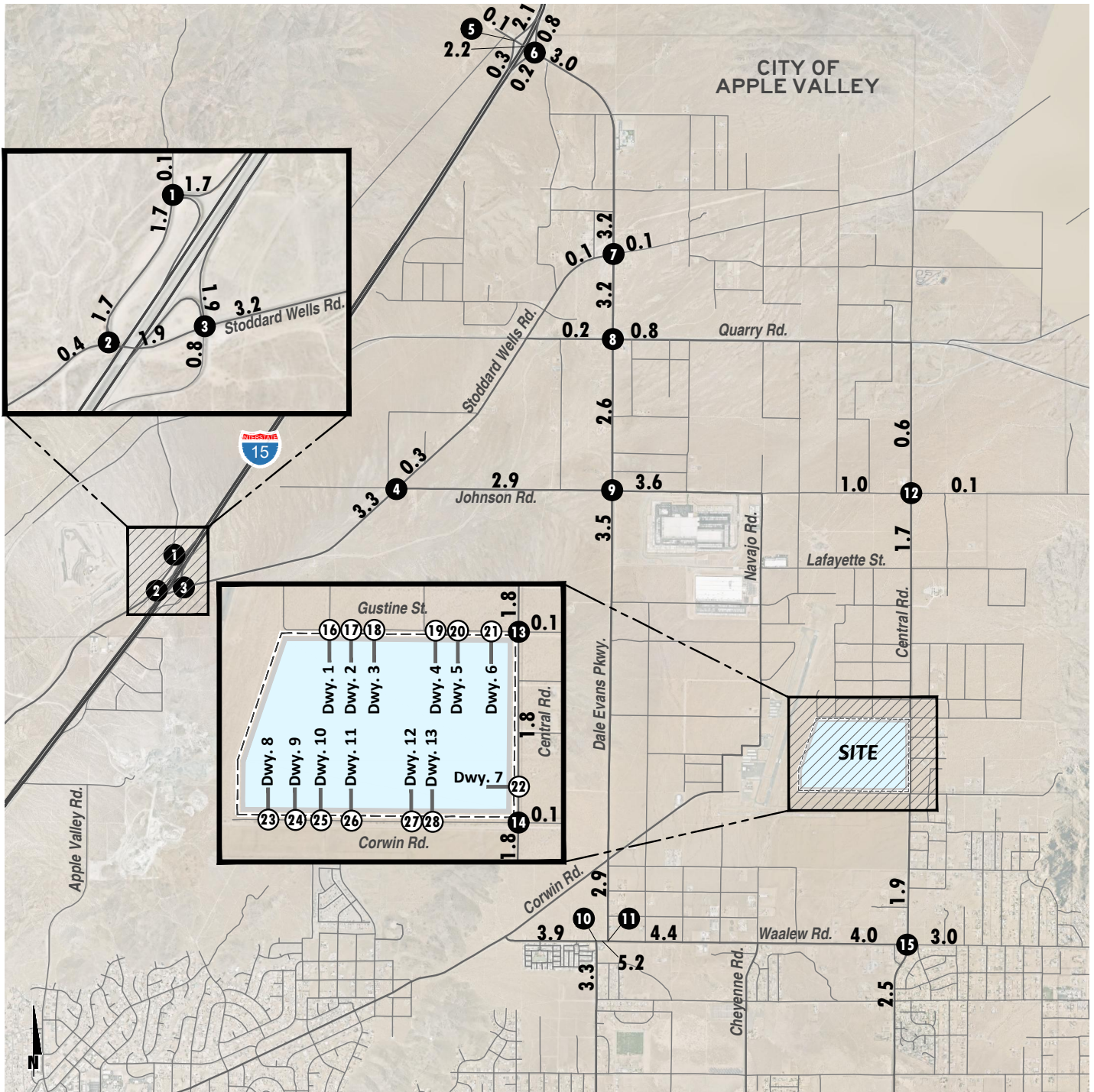


EXHIBIT 3-7 : EXISTING (2024) AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

- = Existing Intersection Analysis Location
- = Future Intersection Analysis Location
- 10** = Average Daily Trips (1000's)

TABLE 3-1: INTERSECTION ANALYSIS FOR EXISTING (2024) CONDITIONS

#	Intersection	Traffic Control ¹	Delay ² (secs.)		Level of Service	
			AM	PM	AM	PM
1	Quarry Rd. & I-15 SB Ramps	CSS	9.0	10.0	A	A
2	Quarry Rd. & Stoddard Wells Rd.	CSS	9.2	10.5	A	B
3	I-15 NB Ramps & Stoddard Wells Rd.	CSS	11.6	11.4	B	B
4	Stoddard Wells Rd. & Johnson Rd.	CSS	10.1	13.6	B	B
5	I-15 SB Ramps & Dale Evans Pkwy.	CSS	9.7	11.3	A	B
6	I-15 NB Ramps & Dale Evans Pkwy.	CSS	9.2	10.2	A	B
7	Dale Evans Pkwy. & Stoddard Wells Rd.	CSS	11.7	12.4	B	B
8	Dale Evans Pkwy. & Quarry Rd.	CSS	11.6	11.2	B	B
9	Dale Evans Pkwy. & Johnson Rd.	AWS	10.1	18.8	B	C
10	Dale Evans Pkwy. (West) & Waalew Rd.	CSS	11.9	18.2	B	C
11	Dale Evans Pkwy. (East) & Waalew Rd.	CSS	12.1	15.3	B	C
12	Central Rd. & Johnson Rd.	CSS	8.7	10.5	A	B
13	Central Rd. & Gustine Rd.	CSS	8.7	10.1	A	B
14	Central Rd. & Corwin Rd.	CSS	9.0	9.5	A	A
15	Central Rd. & Waalew Rd.	AWS	9.6	9.8	A	A
16	Driveway 1 & Gustine Rd.		Future Intersection			
17	Driveway 2 & Gustine Rd.		Future Intersection			
18	Driveway 3 & Gustine Rd.		Future Intersection			
19	Driveway 4 & Gustine Rd.		Future Intersection			
20	Driveway 5 & Gustine Rd.		Future Intersection			
21	Driveway 6 & Gustine Rd.		Future Intersection			
22	Central Rd. & Driveway 7		Future Intersection			
23	Driveway 8 & Corwin Rd.		Future Intersection			
24	Driveway 9 & Corwin Rd.		Future Intersection			
25	Driveway 10 & Corwin Rd.		Future Intersection			
26	Driveway 11 & Corwin Rd.		Future Intersection			
27	Driveway 12 & Corwin Rd.		Future Intersection			
28	Driveway 13 & Corwin Rd.		Future Intersection			

* **BOLD** = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

¹ AWS = All-Way Stop; CSS = Cross-Street Stop

² Per the Highway Capacity Manual (7th 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.

3.9 QUEUING ANALYSIS

Queuing analysis findings are presented in Table 3-2. As shown in Table 3-2, there are currently no study area off-ramps experiencing queuing issues during the peak hours under Existing (2024) traffic conditions. Worksheets for Existing traffic conditions queuing analysis are provided in Appendix 3.4.

TABLE 3-2: PEAK HOUR QUEUING SUMMARY FOR EXISTING (2024) CONDITIONS

Intersection	Movement	Available Stacking Distance (Feet)	95th Percentile Queue (Feet)		Acceptable? ¹	
			AM Peak Hour	PM Peak Hour	AM	PM
Quarry Rd. & I-15 SB Ramps	WBL/R	1,000	3	8	Yes	Yes
I-15 NB Ramps & Stoddard Wells Rd.	SBL/T/R	1,000	25	180	Yes	Yes
I-15 SB Ramps & Dale Evans Pkwy.	SBL/T/R	1,410	15	43	Yes	Yes
I-15 NB Ramps & Dale Evans Pkwy.	NBL/T/R	1,280	5	5	Yes	Yes

¹ Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided.

4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by the Project, as well as the Project's trip assignment onto the study area roadway network. The Project is proposing to develop three industrial warehouse and distribution buildings totaling 3,480,736 square feet. For the purposes of the traffic study, the Project mix assumes 10% general light industrial, 10% high-cube cold storage warehouse use, and 80% high-cube fulfillment center warehousing use. Access to the Project site will be accommodated via six driveways along Gustine Road, a single driveway proposed on Central Road, and six driveways along Corwin Road. All driveways are assumed to allow for full access (no turn restrictions). Regional access to the Project site will be provided by the I-15 Freeway. The Project is anticipated to have an Opening Year of 2029.

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 Project, trip-generation statistics published in the ITE Trip Generation Manual (11th Edition, 2021) were used. The following ITE land use codes and vehicle mixes will be utilized for the proposed Project (Table 4-1 presents the trip generation rates):

- ITE Land Use Code 110 (General Light Industrial) has been used to derive site-specific trip generation estimates for up to 348,074 square feet of the proposed Project (10% of the total square footage). A light industrial facility is a free-standing facility devoted to a single use that has an emphasis on activities other than manufacturing. Typically, there is minimum office space. The vehicle mix has been obtained from the ITE's Trip Generation Manual. The truck percentages were further broken down by axle type per the following South Coast Air Quality Management District (SCAQMD) recommended truck mix: 2-Axle = 16.7%; 3-Axle = 20.7%; 4+-Axle = 62.6%.
- ITE Land Use Code 157 (High-Cube Cold Storage Warehouse) has been used to derive site-specific trip generation estimates for up to 384,074 square feet (10% of the total square footage). High-cube cold storage warehouses include warehouses characterized by the storage and/or consolidation of manufactured goods (and to a lesser extent, raw materials) prior to their distribution to retail locations or other warehouses. High-cube cold storage warehouses are facilities typified by temperature-controlled environments for frozen food or other perishable products. The High-Cube Cold Storage Warehouse vehicle mix (passenger cars versus trucks) has been obtained from the ITE's Trip Generation Manual. The truck percentages were further broken down by axle type per the following SCAQMD recommended truck mix: 2-Axle = 34.7%; 3-Axle = 11.0%; 4+-Axle = 54.3%.

- High-Cube Fulfillment Center Warehouse has been used to derive site-specific trip generation estimates for up to 2,784,588 square feet of the proposed Project (80% of the total square footage). The ITE Trip Generation Manual has trip generation rates for high-cube fulfillment center use for both non-sort and sort facilities (ITE Land Use Code 155). While there is sufficient data to support use of the trip generation rates for non-sort facilities, the sort facility rate is unreliable (by ITE's standards) because the rates are based on limited data (i.e., one to two surveyed sites whereas ITE recommends a minimum of 3 sites but preferably 5). The proposed Project is speculative and whether a non-sort or sort facility end-user would occupy the buildings is not known at this time. Lastly, the ITE Trip Generation Manual recommends the use of local data sources where available. As such, the best available source for high-cube fulfillment center use would be the trip-generation and vehicle mix statistics published in the High-Cube Warehouse Trip Generation Study (WSP, January 29, 2019) which was commissioned by the Western Riverside Council of Governments (WRCOG) in support of the Transportation Uniform Mitigation Fee (TUMF) update in the County of Riverside. The WSP trip generation rates were published in January 2019 and are based on data collected at 11 local high-cube fulfillment center sites located throughout Southern California (specifically within Riverside County and San Bernardino County). However, the WSP study does not include a split for inbound and outbound vehicles; as such, the inbound and outbound splits per the ITE Trip Generation Manual for Land Use Code 154 have been utilized.

TABLE 4-1: PROJECT TRIP GENERATION SUMMARY

Land Use ¹	Units ²	ITE LU Code	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Actual Vehicle Trip Generation Rates									
General Light Industrial ³	TSF	110	0.651	0.089	0.740	0.091	0.559	0.650	4.870
Passenger Cars (AM=98.6%, PM=98.5%, Daily=94.9%)			0.645	0.085	0.730	0.086	0.554	0.640	4.620
2-Axle Trucks (AM=0.23%, PM=0.25%, Daily=0.85%)			0.001	0.001	0.002	0.001	0.001	0.002	0.042
3-Axle Trucks (AM=0.29%, PM=0.31%, Daily=1.05%)			0.001	0.001	0.002	0.001	0.001	0.002	0.052
4+-Axle Trucks (AM=0.88%, PM=0.94%, Daily=3.20%)			0.004	0.002	0.006	0.003	0.003	0.006	0.157
High-Cube Fulfillment Center Warehouse ⁴	TSF	--	0.089	0.033	0.122	0.050	0.115	0.165	2.129
Passenger Cars (AM-84.4%, PM-87.3%, Daily-82.2%)			0.079	0.024	0.103	0.040	0.104	0.144	1.750
2-4 Axle Trucks (AM-6.6%, PM-6.7%, Daily-7.6%)			0.004	0.004	0.008	0.005	0.006	0.011	0.162
5+-Axle Trucks (AM-9.0%, PM-6.0%, Daily-10.2%)			0.005	0.006	0.011	0.005	0.005	0.010	0.217
High-Cube Cold Storage Warehouse ³	TSF	157	0.085	0.025	0.110	0.034	0.086	0.120	2.120
Passenger Cars (AM-72.7%, PM-75.0%, Daily-64.6%)			0.076	0.004	0.080	0.019	0.071	0.090	1.370
2-Axle Trucks (AM-9.5%, PM-8.7%, Daily-12.3%)			0.003	0.007	0.010	0.005	0.005	0.010	0.260
3-Axle Trucks (AM-3.0%, PM-2.8%, Daily-3.9%)			0.001	0.002	0.003	0.002	0.001	0.003	0.083
4+-Axle Trucks (AM-14.8%, PM-13.6%, Daily-19.2%)			0.005	0.011	0.016	0.008	0.008	0.016	0.407

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.

 Normalized % - With Cold Storage: 34.7% 2-Axle trucks, 11.0% 3-Axle trucks, 54.3% 4-Axle trucks.

⁴ Vehicle Mix Source: High Cube Warehouse Trip Generation Study, WSP, January 29, 2019.

 Inbound and outbound split source: ITE Trip Generation Manual, Eleventh Edition (2021) for ITE Land Use Code 154.

Based on the trip generation rates shown in Table 4-1, the Project trip generation has been calculated in Table 4-2. As shown in Table 4-2, the proposed Project is anticipated to generate 8,370 two-way vehicle trip-ends per day with 635 AM peak hour trips and 727 PM peak hour trips (actual vehicles).

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

Land Use	Quantity Units ¹	AM Peak Hour			PM Peak Hour			Daily
		In	Out	Total	In	Out	Total	
Actual Vehicles:								
General Light Industrial (10%)	348.074 TSF							
Passenger Cars:		225	30	255	30	193	223	1,608
2-axle Trucks:		0	0	0	0	0	0	16
3-axle Trucks:		0	0	0	0	0	0	18
4+-axle Trucks:		1	1	2	1	1	2	56
Total Truck Trips (Actual Vehicles):		1	1	2	1	1	2	90
Total Trips (Actual Vehicles) ²		226	31	257	31	194	225	1,698
High-Cube Cold Storage (10%)	348.074 TSF							
Passenger Cars:		26	1	27	7	25	32	478
2-axle Trucks:		1	3	4	2	2	4	92
3-axle Trucks:		0	1	1	1	0	1	30
4+-axle Trucks:		2	4	6	3	3	6	142
Total Truck Trips (Actual Vehicles):		3	8	11	6	5	11	264
Total Trips (Actual Vehicles) ²		29	9	38	13	30	43	742
High-Cube Fulfillment (80%)	2,784.588 TSF							
Passenger Cars:		221	66	287	112	289	401	4,874
2-4axle Trucks:		11	11	22	14	16	30	452
5+-axle Trucks:		15	16	31	13	15	28	604
Total Truck Trips (Actual Vehicles):		26	27	53	27	31	58	1,056
Total Trips (Actual Vehicles) ²		247	93	340	139	320	459	5,930
Passenger Cars		472	97	569	149	507	656	6,960
Trucks		30	36	66	34	37	71	1,410
Total Trips (Actual Vehicles)²		502	133	635	183	544	727	8,370

¹ TSF = thousand square feet

² Total Trips = Passenger Cars + Truck Trips.

PCE factors were applied to the trip generation rates for heavy trucks (large 2-axles, 3-axles, 4+-axles). PCEs allow the typical “real-world” mix of vehicle types to be represented as a single, standardized unit, such as the passenger car, to be used for the purposes of capacity and level of service analyses. The PCE factors are consistent with the recommended PCE factors in the County’s Guidelines.

Table 4-3 shows the resulting Project trip generation summary in PCE, which shows the Project is anticipated to generate a net total of 10,518 two-way PCE vehicle trip-ends per day with 740 PCE AM peak hour trips and 834 PCE PM peak hour trips. Consistent with the County requirements, the peak hour intersection operations analysis has been conducted using the PCE volumes shown in Table 4-3.

TABLE 4-3: TRIP GENERATION SUMMARY (PCE)

Land Use	Quantity Units ¹	AM Peak Hour			PM Peak Hour			Daily
		In	Out	Total	In	Out	Total	
Passenger Car Equivalent (PCE):								
General Light Industrial (10%)	348,074 TSF							
Passenger Cars:		225	30	254	30	193	223	1,608
2-axle Trucks:		1	0	1	1	0	1	22
3-axle Trucks:		1	1	1	1	1	1	36
4+-axle Trucks:		4	2	7	3	3	7	164
Total Truck Trips (PCE):		6	3	9	5	4	9	222
Total Trips (PCE) ²		231	33	263	35	197	232	1,830
High-Cube Cold Storage (10%)								
Passenger Cars:	348,074 TSF	26	1	27	7	25	32	478
2-axle Trucks:		2	4	6	3	3	6	136
3-axle Trucks:		1	2	3	1	1	2	58
4+-axle Trucks:		5	12	17	8	9	17	426
Total Truck Trips (PCE):		8	18	26	12	13	25	620
Total Trips (PCE) ²		34	19	53	19	38	57	1,098
High-Cube Fulfillment (80%)								
Passenger Cars:	2,784,588 TSF	221	66	287	112	289	401	4,874
2-4axle Trucks:		22	23	45	29	32	61	902
5+-axle Trucks:		45	47	92	39	44	83	1,814
Total Truck Trips (PCE):		67	70	137	68	76	144	2,716
Total Trips (PCE) ²		288	136	424	180	365	545	7,590
Passenger Cars		472	97	568	149	507	656	6,960
Trucks		81	91	172	85	93	178	3,558
Total Trips (PCE)²		553	188	740	234	600	834	10,518

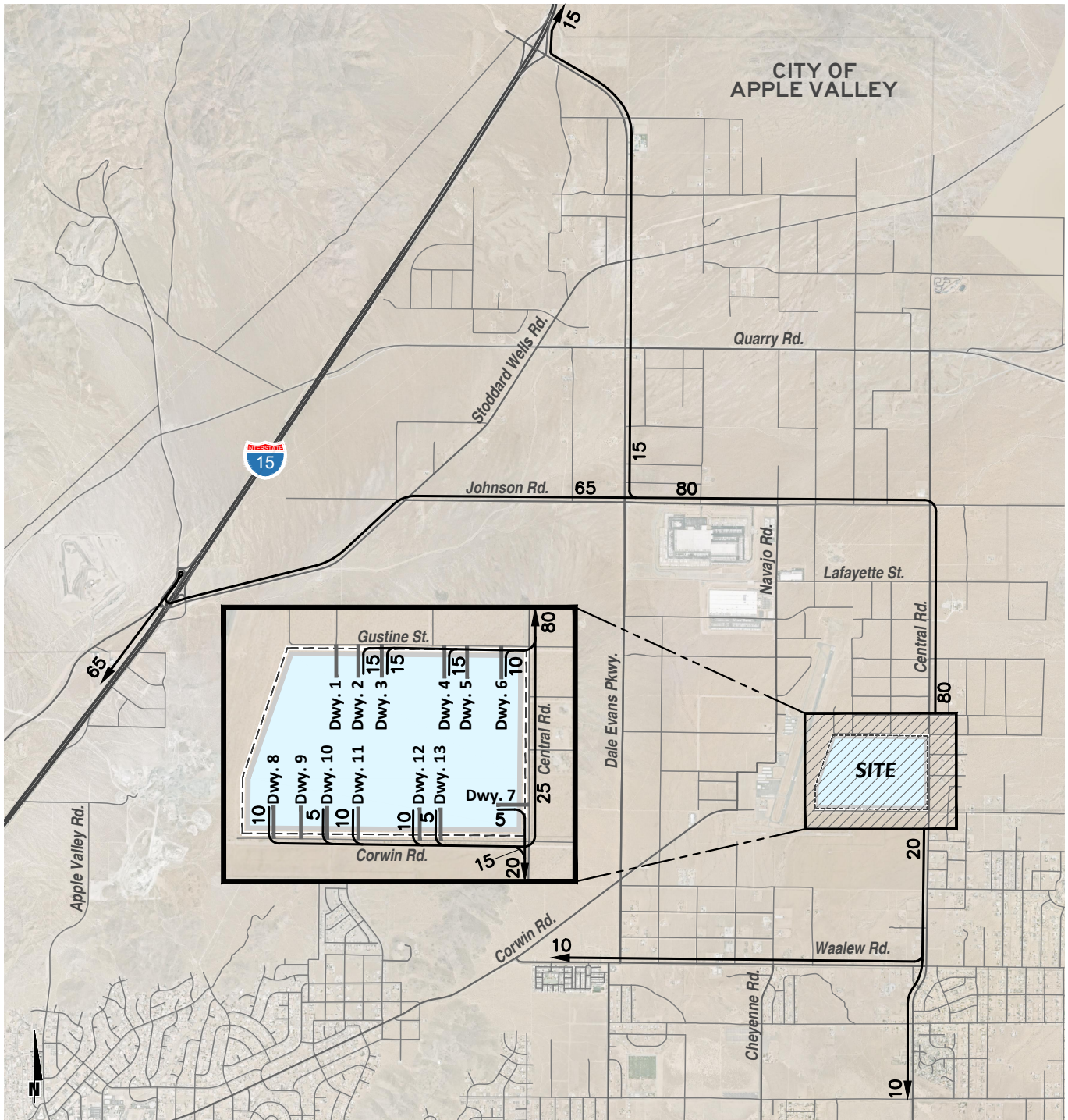
¹ TSF = thousand square feet

² Total Trips = Passenger Cars + Truck Trips.

4.2 PROJECT TRIP DISTRIBUTION

The Project trip distribution represents the directional orientation of traffic to and from the Project site. Trip distribution is the process of identifying the probable destinations, directions or traffic routes that will be utilized by Project traffic. The potential interaction between the planned land uses and surrounding regional access routes are considered, to identify the route where the Project traffic would distribute. The Project trip distribution represents the directional orientation of traffic to and from the Project site. The Project trip distributions are shown on Exhibit 4-1 for trucks and Exhibit 4-2 for passenger cars. The Project truck trip distribution patterns adhere to the Town’s approved truck routes and were part of the TA scoping process (see Appendix 1.1)

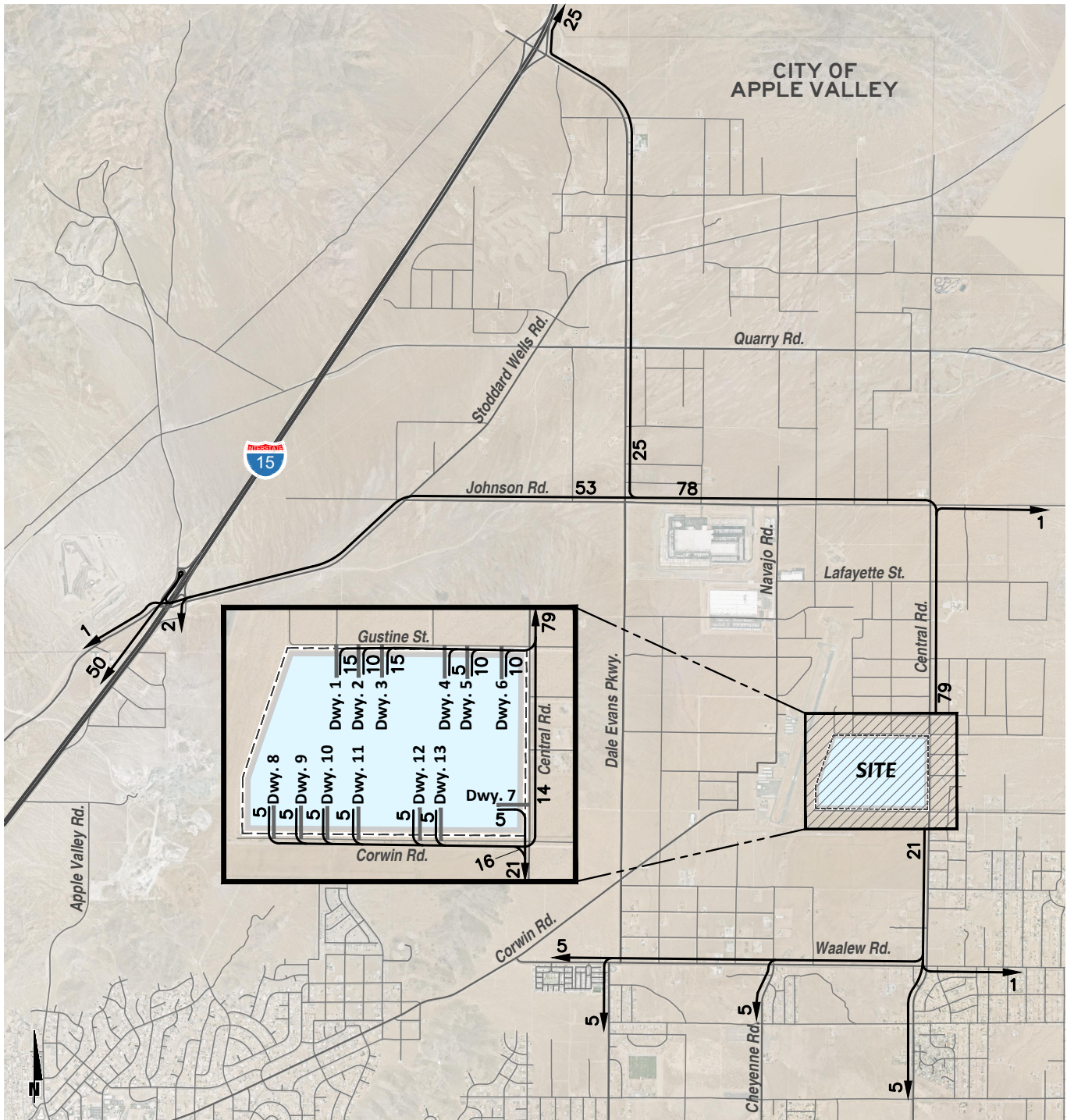
EXHIBIT 4-1 : PROJECT (TRUCK) TRIP DISTRIBUTION



LEGEND:

- 10 = Truck Percent To/From Project
- = Trip Distribution

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



LEGEND:

- 10 = Passenger Car Percent To/From Project
- = Trip Distribution

4.3 MODAL SPLIT

The potential for Project trips 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 peak hour intersection turn movement volumes and ADT are shown on Exhibits 4-3 and 4-4, respectively.

4.5 BACKGROUND TRAFFIC

Future year traffic forecasts have been based upon background (ambient) growth at 2.0% per year, compounded annually. The total ambient growth is 10.41% for 2029 traffic. The ambient growth factor is intended to approximate regional traffic growth. This ambient growth rate is added to existing traffic volumes to account for area-wide growth not reflected by cumulative development projects. Ambient growth has been added to daily and peak hour traffic volumes on surrounding roadways, in addition to traffic generated by the development of future projects that have been approved but not yet built and/or for which development applications have been filed and are under consideration by governing agencies. The traffic generated by the proposed Project is manually added to the base volume to determine Opening Year Cumulative forecasts.

The traffic analysis includes the following traffic conditions, with the various traffic components:

- Opening Year Cumulative (2029) Without Project
 - Existing 2024 volumes
 - Ambient growth traffic (10.41%)
 - Cumulative Development traffic
- Opening Year Cumulative (2029) With Project
 - Existing 2024 volumes
 - Ambient growth traffic (10.41%)
 - Cumulative Development traffic
 - Project Traffic

EXHIBIT 4-3 : PROJECT ONLY PEAK HOUR INTERSECTION VOLUMES

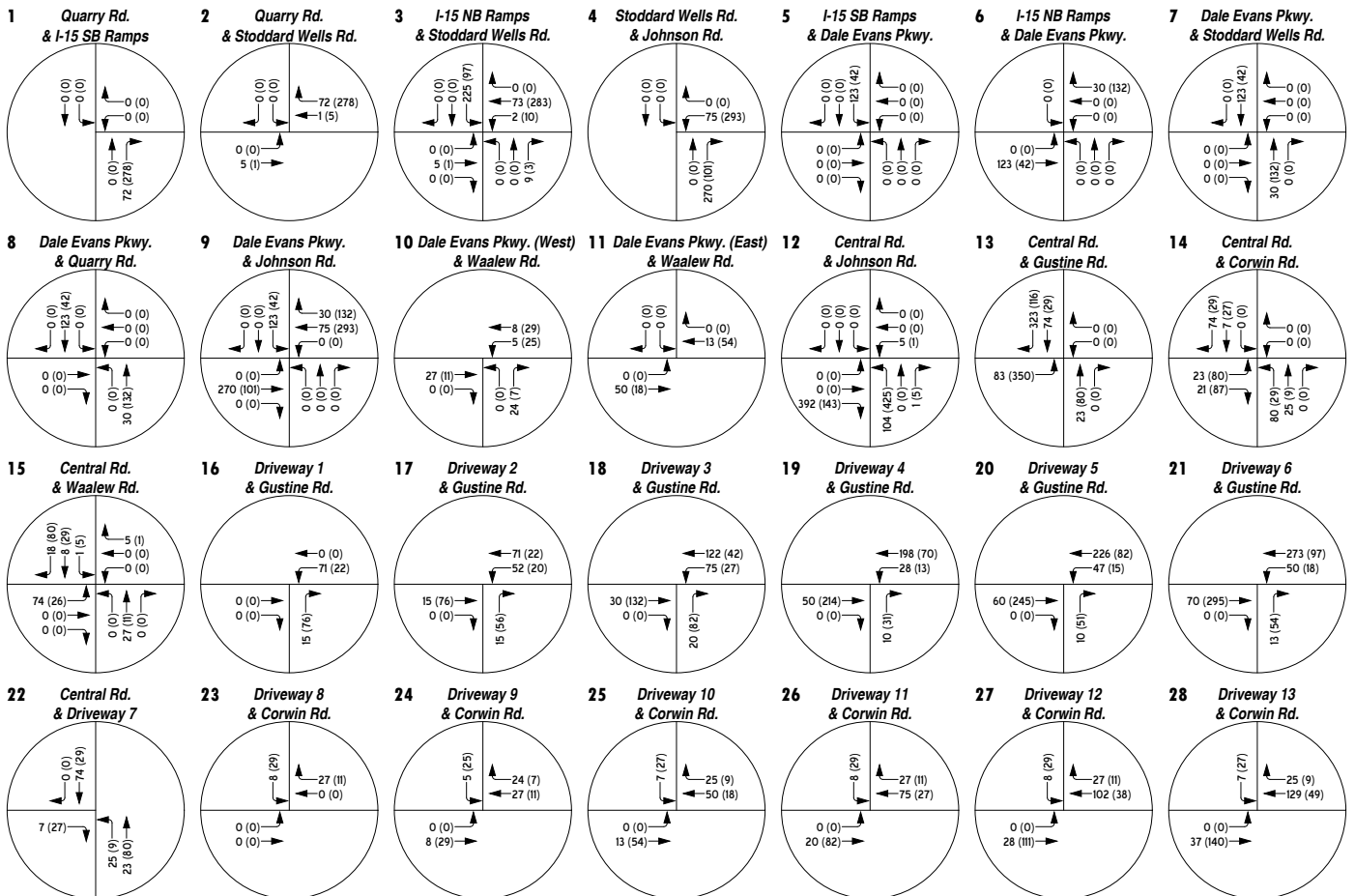
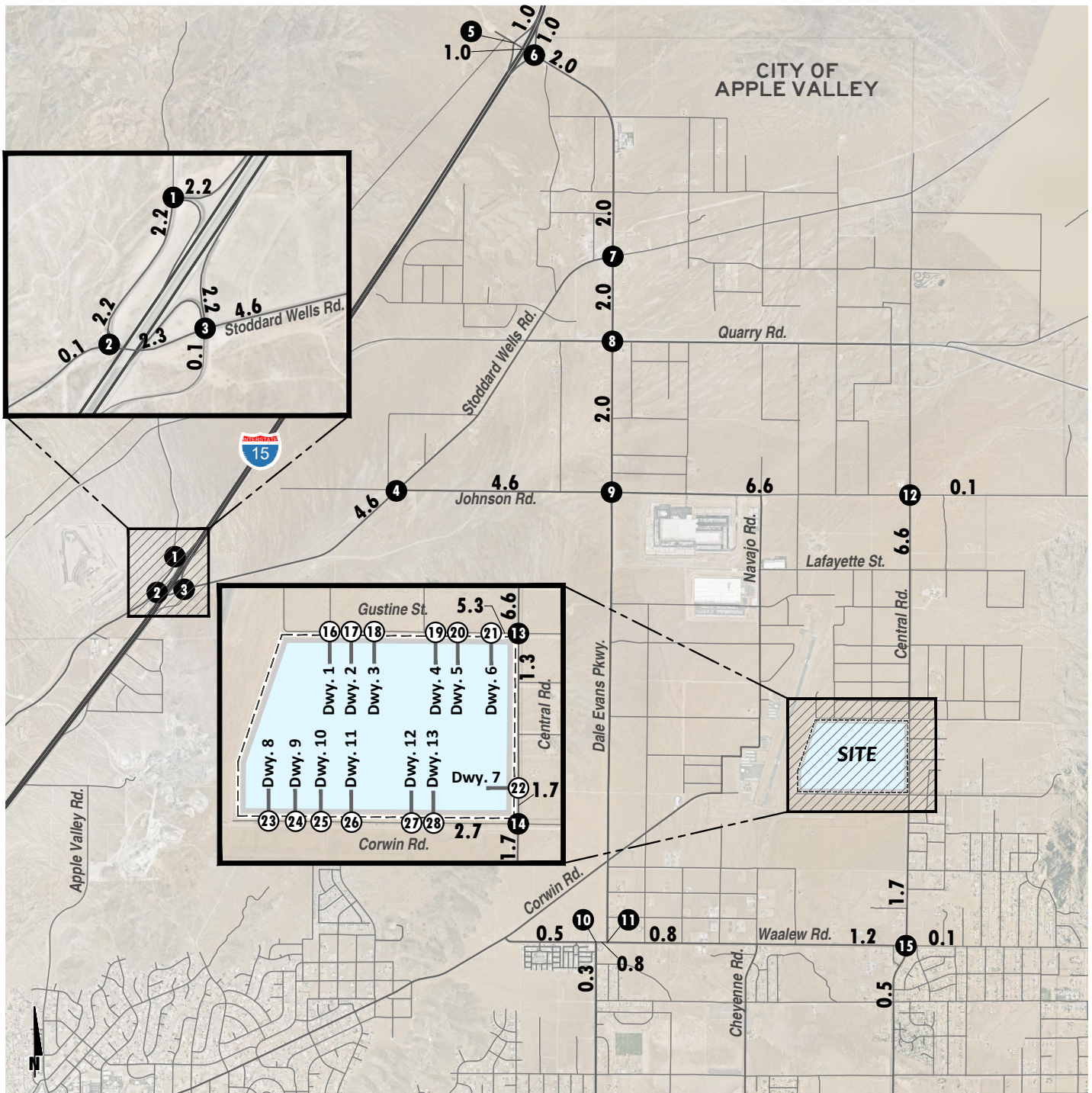


EXHIBIT 4-4 : PROJECT ONLY AVERAGE DAILY TRAFFIC (ADT)



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 Town of Apple Valley. The cumulative projects listed are those that would generate traffic and would contribute traffic to study area intersections. Exhibit 4-5 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 Opening Year Cumulative (2029) forecasts to ensure that traffic generated by the listed cumulative development projects in Table 4-3 is 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 *Background Traffic*. Cumulative peak hour intersection turning movement volumes and ADT are shown on Exhibits 4-6 and 4-7, respectively.

TABLE 4-4: CUMULATIVE DEVELOPMENT LAND USE SUMMARY

ID	Project Name	Land Use	Quantity	Units ¹
1	Apple Valley 143 (Covington)	High-Cube Fulfillment Center	2,518.500	TSF
2	Lafayette Street Logistics Facility (Redwood Industrial)	High-Cube Fulfillment Center	1,026.412	TSF
		High-Cube Cold Storage	181.132	TSF
3	Love's Travel Center	Travel Center	25	VFP
		Recreational Vehicle Stop	80	Spaces
4	Inland Empire Logistics Center	High-Cube Fulfillment Center	2,600.000	TSF
5	Quarry Pawnee Complex	High-Cube Fulfillment Center	1,460.000	TSF
6	Cordova Complex	High-Cube Fulfillment Center	1,560.000	TSF
7	Green Trucking Solutions Cold Storage	High-Cube Cold Storage	385.004	TSF
8	TTM No. 20306	Single Family Detached Residential	160	DU
9	1M Warehouse	High-Cube Fulfillment Center	1,080.000	TSF
10	Watson High Desert Logistics - East	High-Cube Fulfillment (Non-Sort)	2,800.000	TSF
11	Watson High Desert Logistics - West	High-Cube Fulfillment (Non-Sort)	900.000	TSF
12	Cordova Road Logistics Facility (Redwood West Cordova)	High-Cube Fulfillment Center	1,144.330	TSF
		High-Cube Cold Storage	201.940	TSF
13	Central Business Center (AV 3PL Site 1)	Warehousing	2,134.000	TSF
14	AV 3PL Site 2	Warehousing	2,134.000	TSF
15	North Apple Valley Industrial Park	Warehousing	5,821.709	TSF

¹ DU = Dwelling Units; TSF = Thousand Square Feet; VFP = Vehicle Fueling Positions

EXHIBIT 4-5 : CUMULATIVE DEVELOPMENT LOCATION MAP

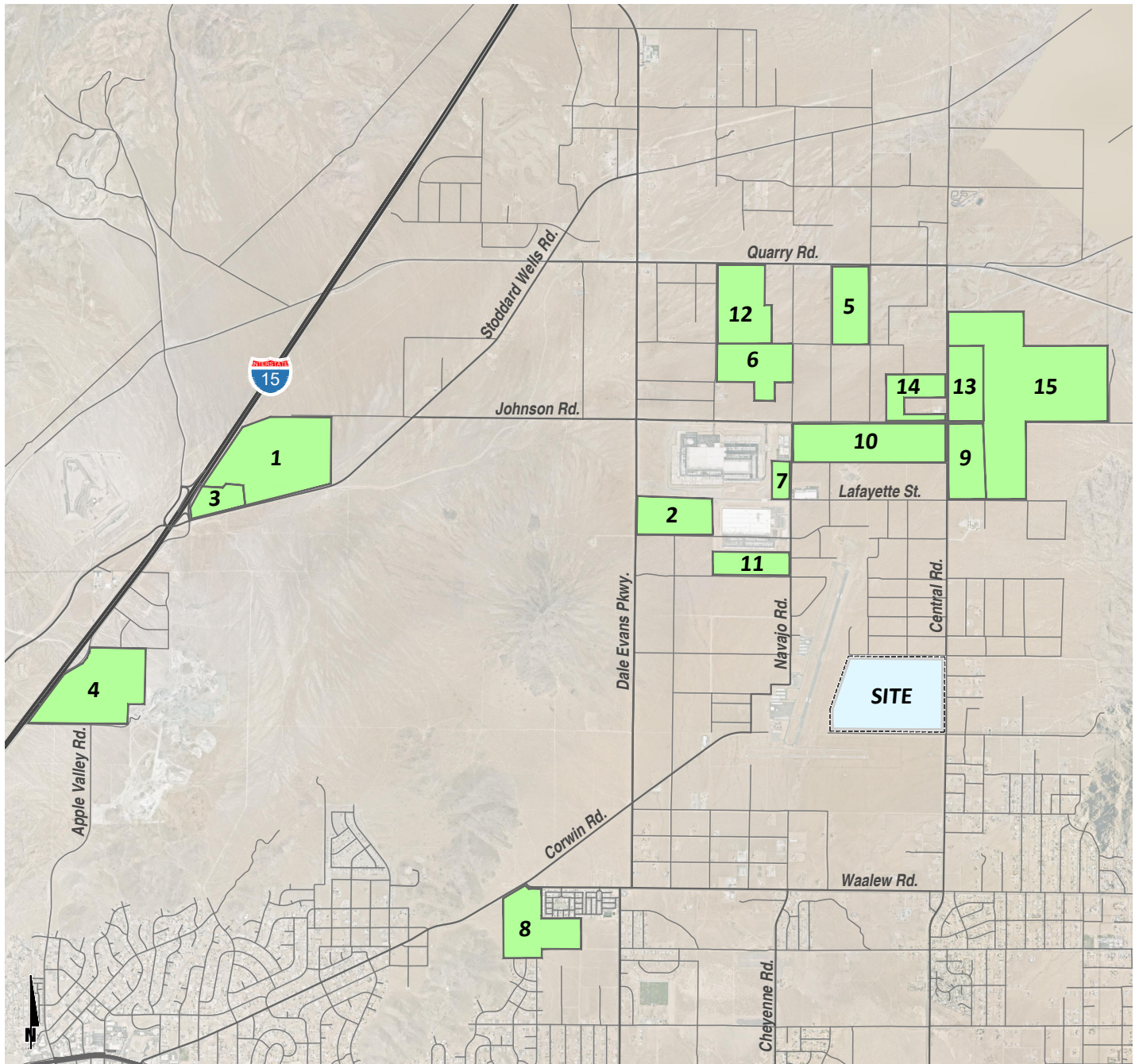
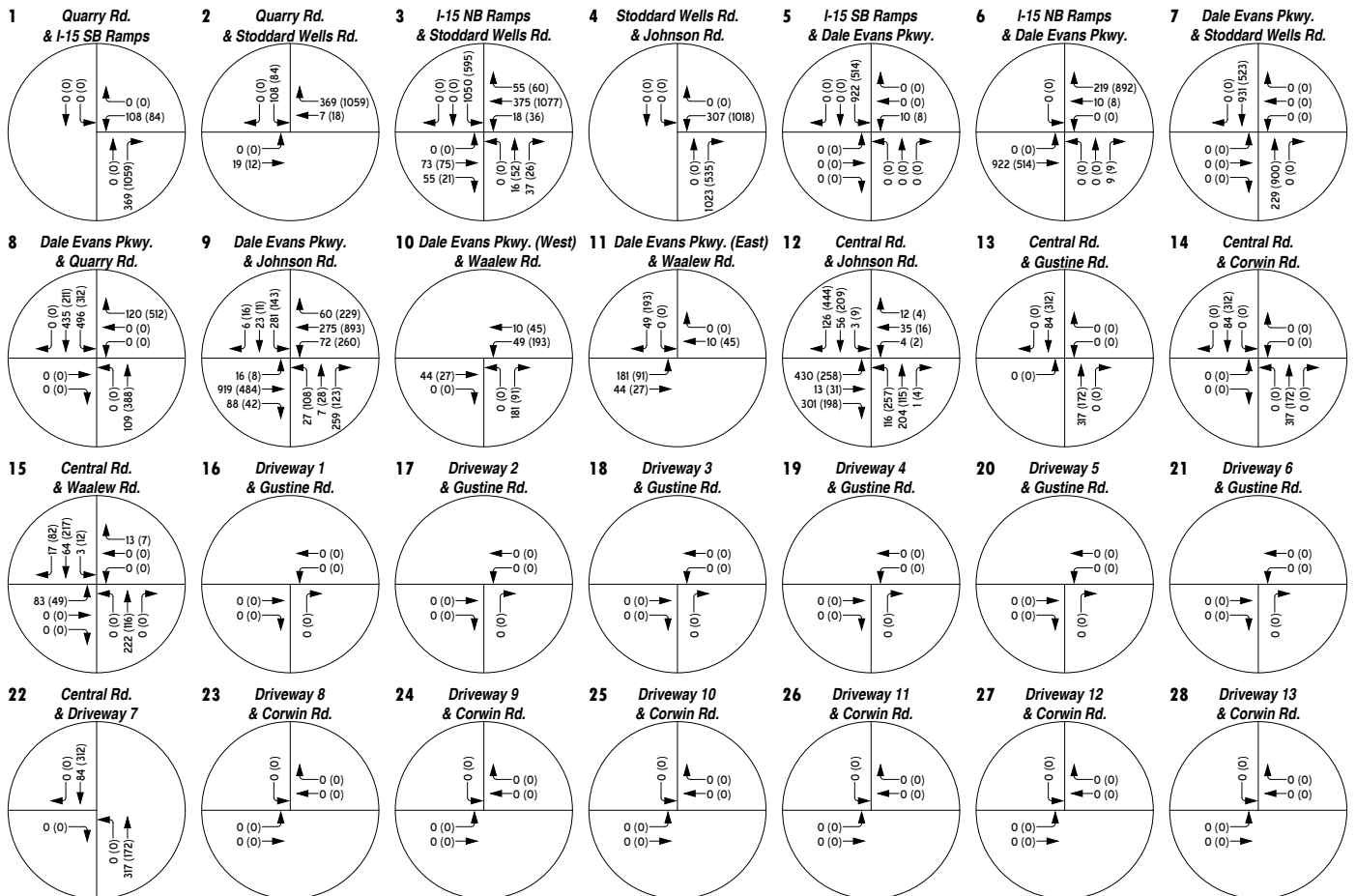
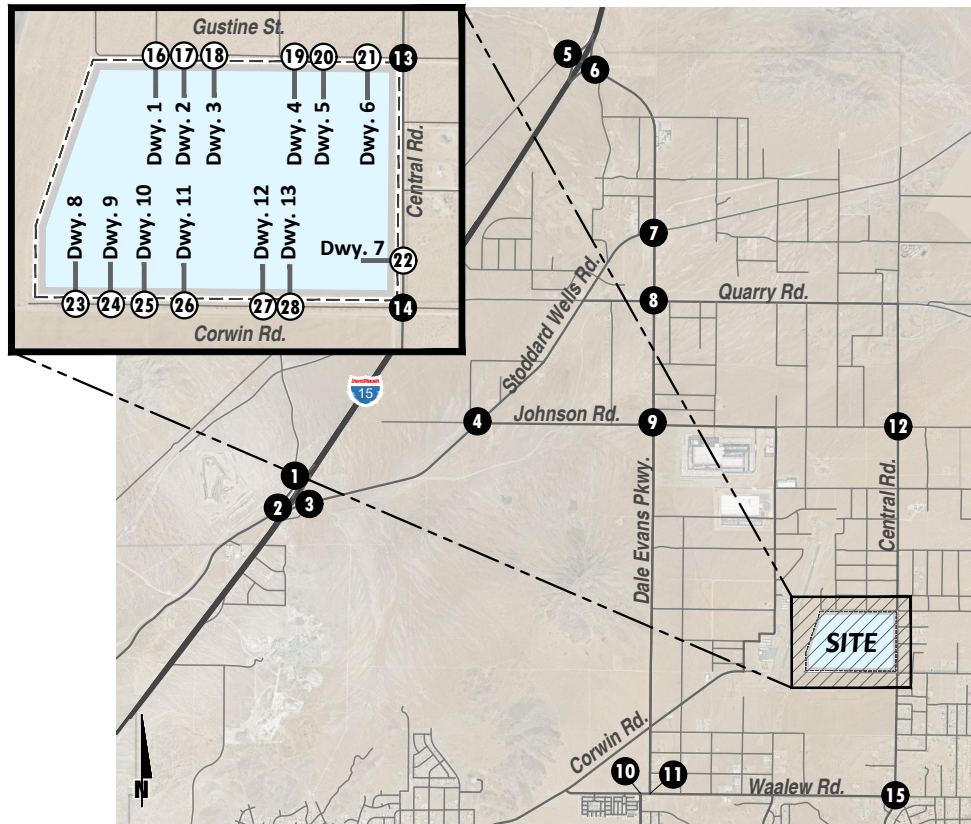


EXHIBIT 4-6 : CUMULATIVE ONLY TRAFFIC VOLUMES



4.7 HORIZON YEAR (2050) TRAFFIC FORECASTS

Traffic projections for Horizon Year (2050) Without Project conditions were derived from the 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 (2024) conditions and Horizon Year (2050) 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 (2050) 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 2024. The SBTAM has a base (validation) year of 2019 and a horizon (future forecast) year of 2050. The difference in model volumes (2050-2019) defines the growth in traffic over the 31-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 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).

The future Horizon Year Without Project peak hour turning movements were then reviewed by Urban Crossroads 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 freeway ramp locations, is verified in order to make sure certain 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 worksheets are provided in Appendix 4.1.

5 OPENING YEAR CUMULATIVE (2029) TRAFFIC CONDITIONS

This section discusses the methods used to develop Opening Year Cumulative (2029) Without and With Project traffic forecasts, and the resulting intersection operations, traffic signal warrant, and freeway off-ramp queuing analyses.

5.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Opening Year Cumulative (2029) 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 Opening Year Cumulative 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 Opening Year Cumulative conditions only.

5.2 WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes, plus an ambient growth rate of 10.41%, plus traffic from pending and approved but not yet constructed known development projects in the area. The weekday AM and PM peak hour volumes which can be expected for Opening Year Cumulative (2029) Without Project traffic conditions are shown on Exhibit 5-1. The weekday ADT which can be expected for Opening Year Cumulative (2029) Without Project traffic conditions are shown on Exhibit 5-2.

5.3 WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Opening Year Cumulative (2029) Without Project traffic in conjunction with the addition of Project traffic. The weekday AM and PM peak hour volumes which can be expected for Opening Year Cumulative (2029) With Project traffic conditions are shown on Exhibit 5-3. The weekday ADT which can be expected for Opening Year Cumulative (2029) With Project traffic conditions are shown on Exhibit 5-4.

EXHIBIT 5-1 : OPENING YEAR CUMULATIVE (2029) WITHOUT PROJECT PEAK HOUR INTERSECTION VOLUMES

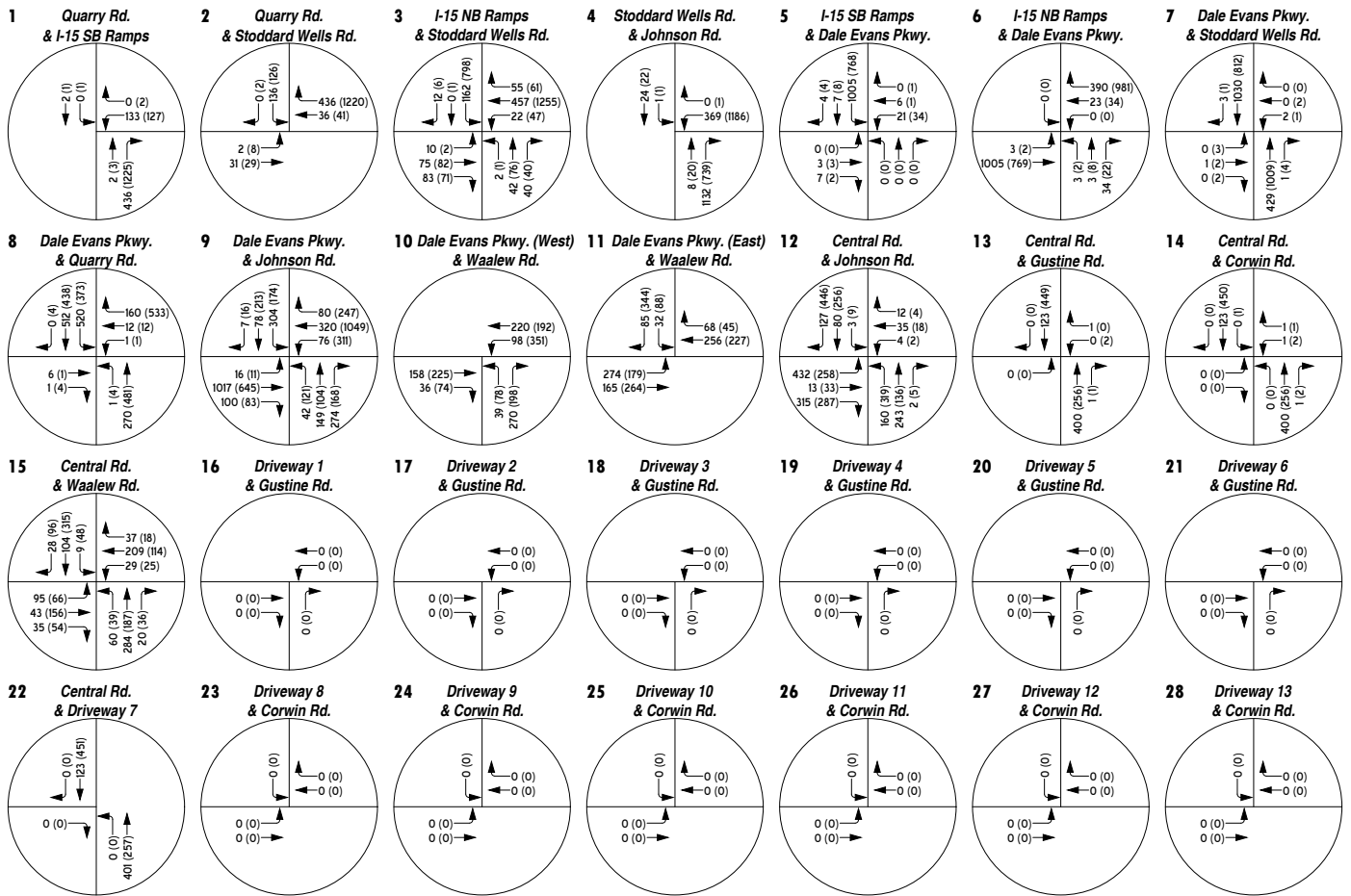
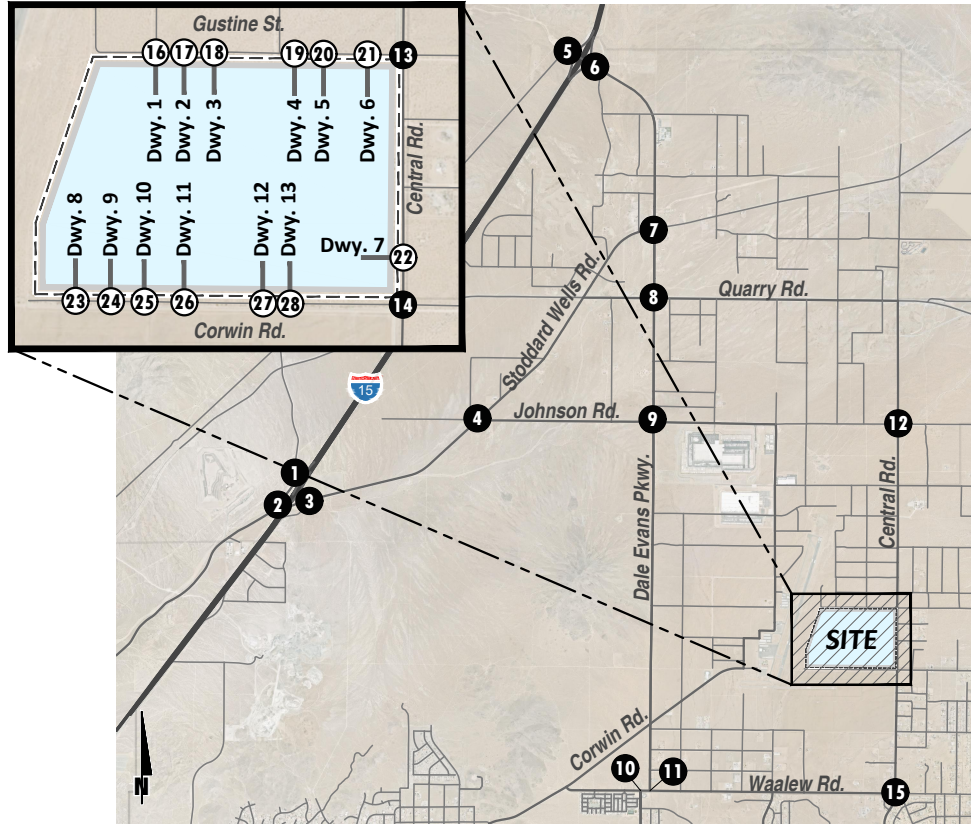
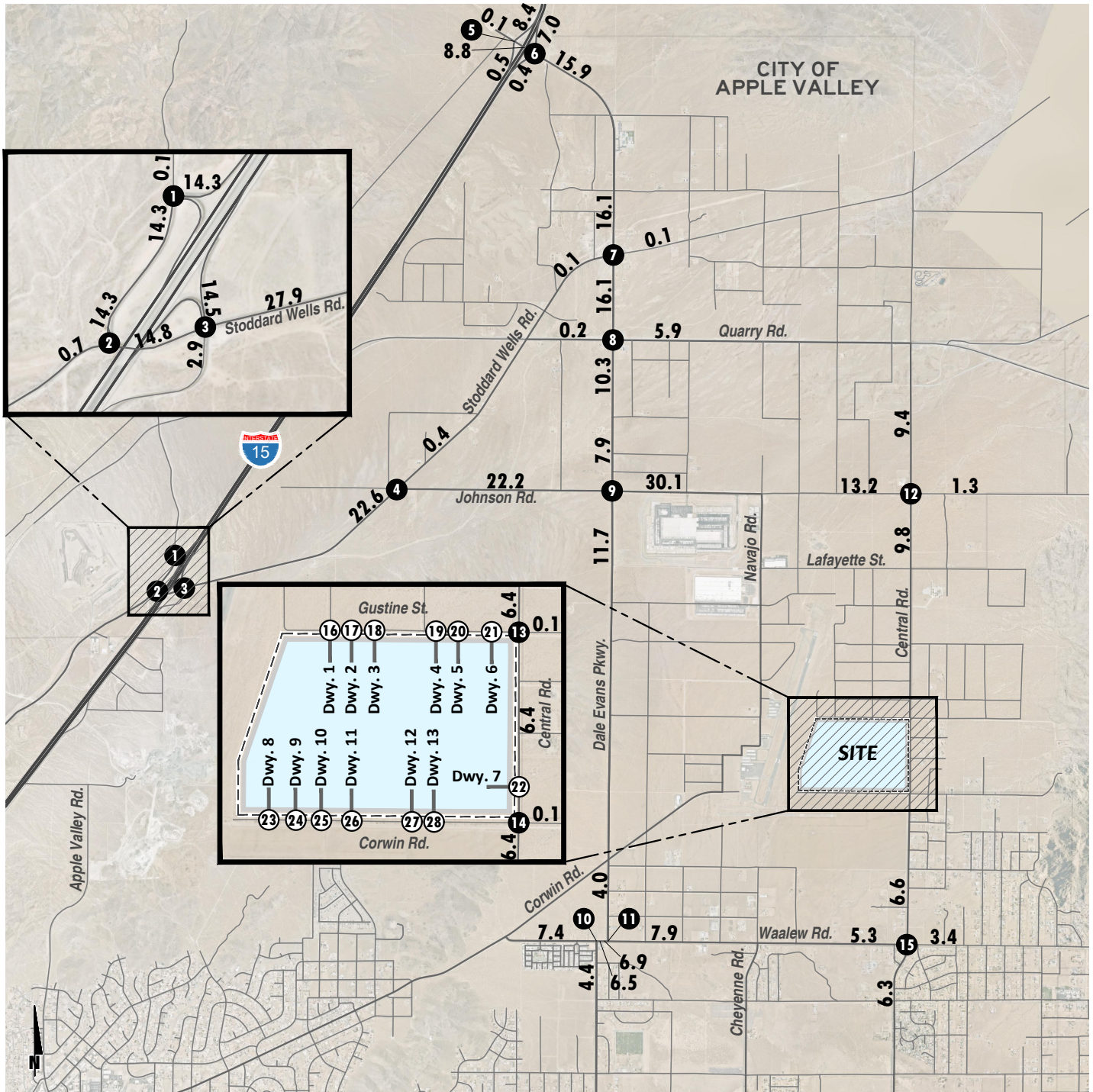


EXHIBIT 5-2 : OPENING YEAR CUMULATIVE (2029) WITHOUT PROJECT AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

- = Existing Intersection Analysis Location
- = Future Intersection Analysis Location
- 10 = Average Daily Trips (1000's)

EXHIBIT 5-3 : OPENING YEAR CUMULATIVE (2029) WITH PROJECT PEAK HOUR INTERSECTION VOLUMES

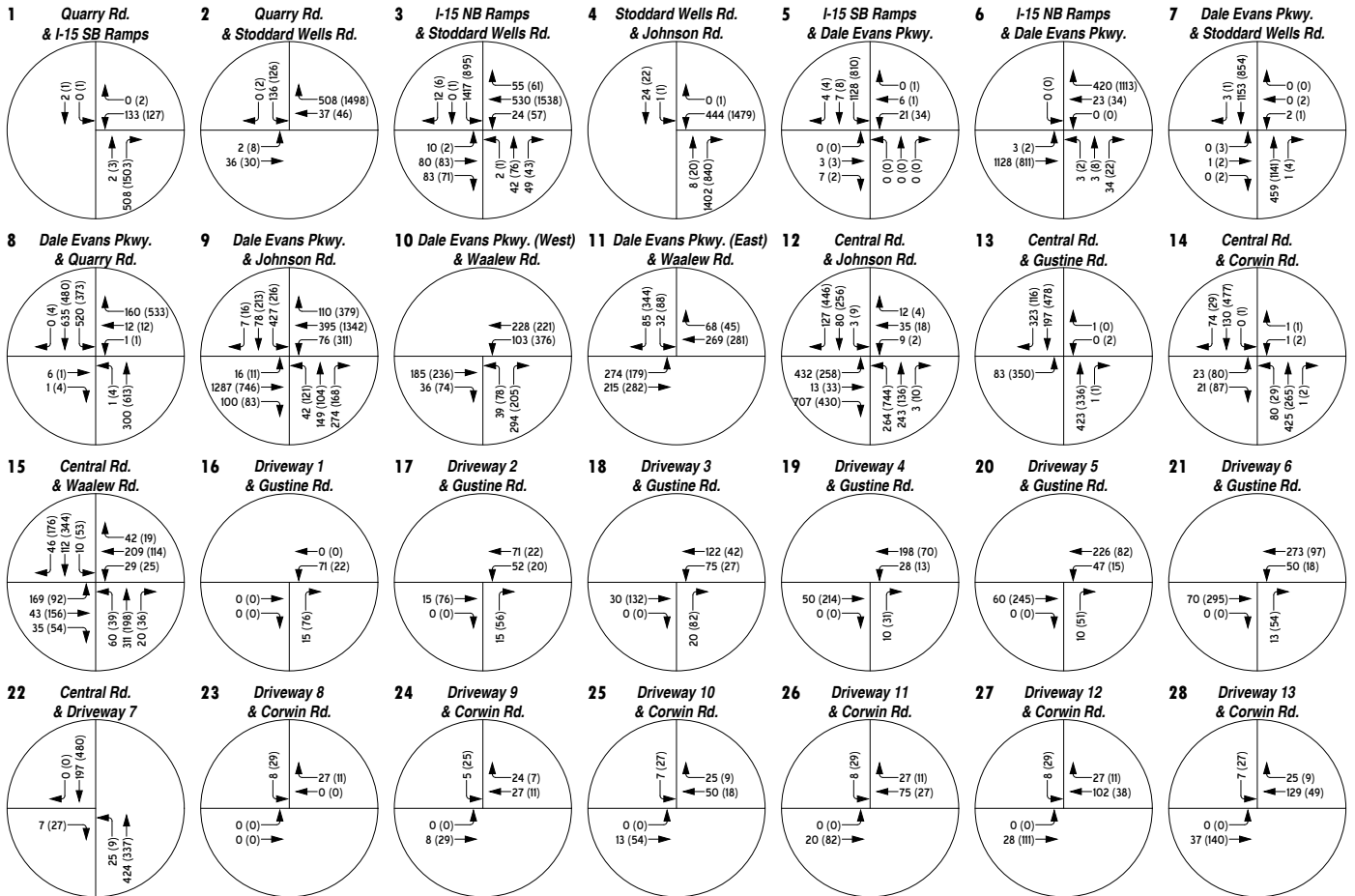
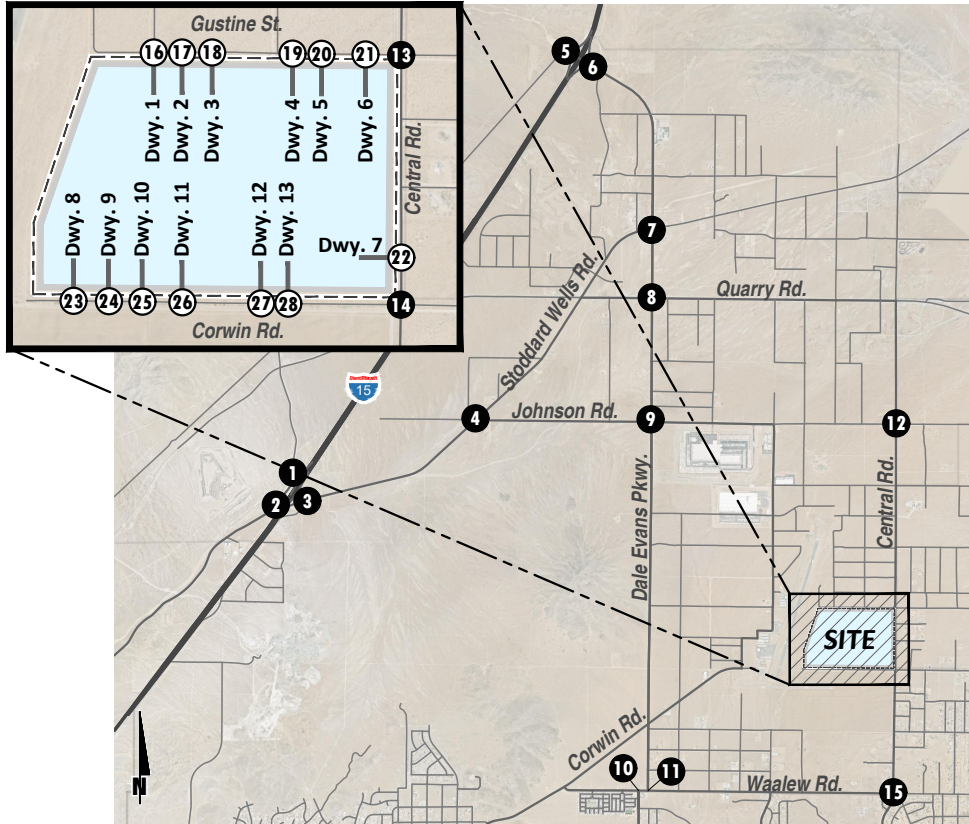
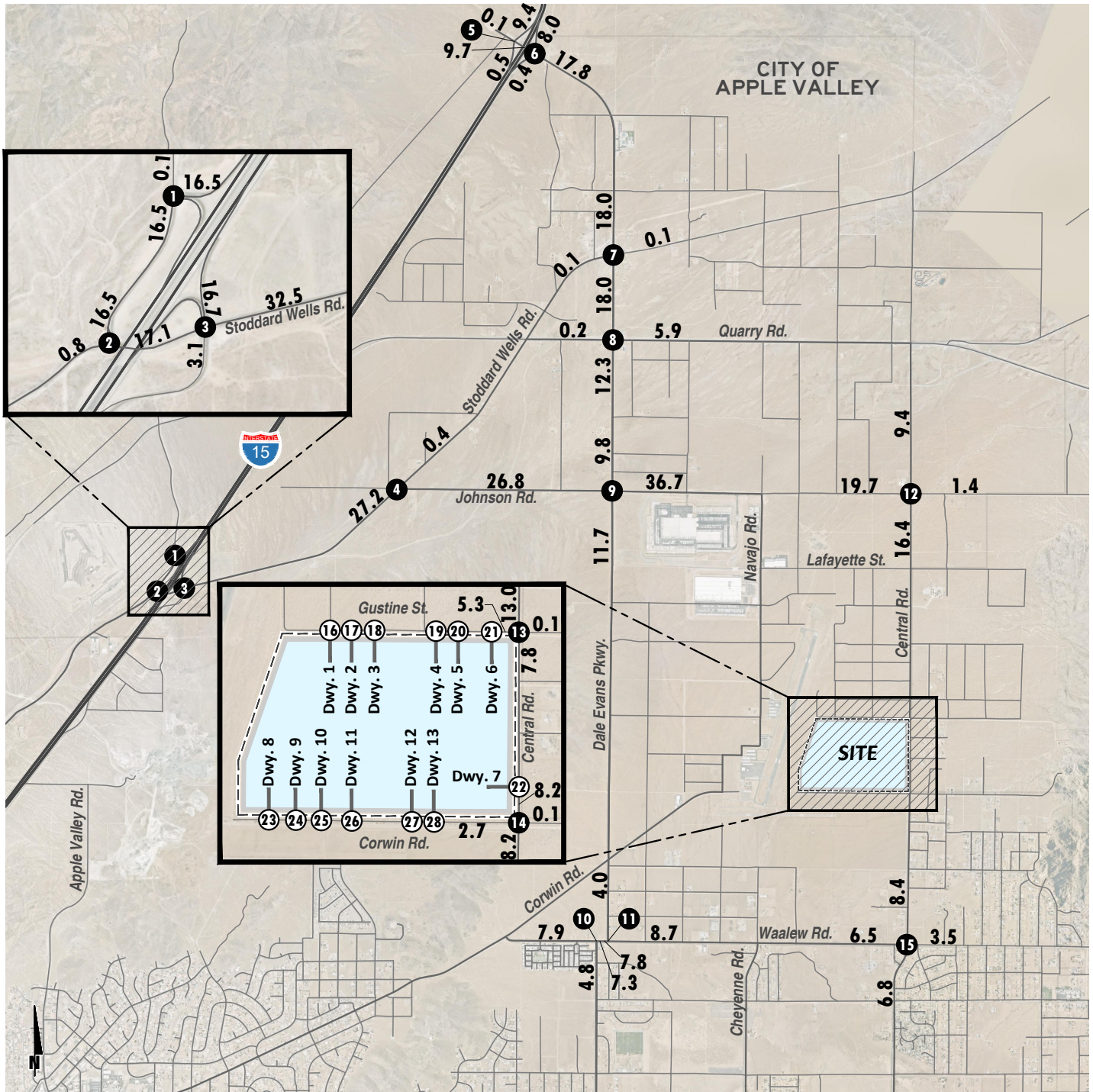


EXHIBIT 5-4 : OPENING YEAR CUMULATIVE (2029) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

- = Existing Intersection Analysis Location
- = Future Intersection Analysis Location
- 10 = Average Daily Trips (1000's)

5.4 INTERSECTION OPERATIONS ANALYSIS

5.4.1 OPENING YEAR CUMULATIVE (2029) WITHOUT PROJECT TRAFFIC CONDITIONS

LOS calculations were conducted for the study intersections to evaluate their operations under Opening Year Cumulative (2029) Without Project conditions with roadway and intersection geometrics consistent with Section 5.1 *Roadway Improvements*. As shown in Table 5-1, the following study area intersections are anticipated to operate at an unacceptable LOS under Opening Year Cumulative (2029) Without Project traffic conditions:

- Quarry Road & I-15 Southbound Ramps (#1) – LOS F PM peak hour only
- Quarry Road & Stoddard Wells Road (#2) – LOS F PM peak hour only
- I-15 Northbound Ramps & Stoddard Wells Road (#3) – LOS F AM and PM peak hours
- Stoddard Wells Road & Johnson Road (#4) – LOS F AM and PM peak hours
- I-15 Southbound Ramps & Dale Evans Parkway (#5) – LOS F AM and PM peak hours
- Dale Evans Parkway & Stoddard Wells Road (#7) – LOS F AM and PM peak hours
- Dale Evans Parkway & Quarry Road (#8) – LOS F AM and PM peak hours
- Dale Evans Parkway & Johnson Road (#9) – LOS F AM and PM peak hours
- Dale Evans Parkway (West) & Waalew Road (#10) – LOS F PM peak hour only
- Dale Evans Parkway (East) & Waalew Road (#11) – LOS F PM peak hour only
- Central Road & Johnson Road (#12) – LOS F AM and PM peak hours
- Central Road & Waalew Road (#15) – LOS E PM peak hour only

The intersection operations analysis worksheets for Opening Year Cumulative (2029) Without Project traffic conditions are included in Appendix 5.1 of this TA.

5.4.2 OPENING YEAR CUMULATIVE (2029) WITH PROJECT TRAFFIC CONDITIONS

As shown in Table 5-1, the following additional study area intersections are anticipated to operate at an unacceptable LOS with the addition of Project traffic under Opening Year Cumulative (2029) With Project traffic conditions:

- Central Road & Gustine Road (#13) – LOS E AM peak hour; LOS F PM peak hour
- Central Road & Waalew Road (#15) – LOS E AM peak hour

The intersection operations analysis worksheets for Opening Year Cumulative (2029) With Project traffic conditions are included in Appendix 5.2 of this TA.

TABLE 5-1: INTERSECTION ANALYSIS FOR OPENING YEAR CUMULATIVE (2029) CONDITIONS

# Intersection	Traffic Control ¹	2029 Without Project				2029 With Project			
		Delay ² (secs.)		Level of Service		Delay ² (secs.)		Level of Service	
		AM	PM	AM	PM	AM	PM	AM	PM
1 Quarry Rd. & I-15 SB Ramps	CSS	12.1	>100.0	B	F	12.9	>100.0	B	F
2 Quarry Rd. & Stoddard Wells Rd.	CSS	12.7	>100.0	B	F	13.7	>100.0	B	F
3 I-15 NB Ramps & Stoddard Wells Rd.	CSS	>100.0	>100.0	F	F	>100.0	>100.0	F	F
4 Stoddard Wells Rd. & Johnson Rd.	CSS	>100.0	>100.0	F	F	>100.0	>100.0	F	F
5 I-15 SB Ramps & Dale Evans Pkwy.	CSS	>100.0	>100.0	F	F	>100.0	>100.0	F	F
6 I-15 NB Ramps & Dale Evans Pkwy.	CSS	32.3	20.1	D	C	34.5	21.7	D	C
7 Dale Evans Pkwy. & Stoddard Wells Rd.	CSS	73.2	>100.0	F	F	86.6	50.9	F	F
8 Dale Evans Pkwy. & Quarry Rd.	CSS	>100.0	>100.0	F	F	>100.0	>100.0	F	F
9 Dale Evans Pkwy. & Johnson Rd.	AWS	>100.0	>100.0	F	F	>100.0	>100.0	F	F
10 Dale Evans Pkwy. (West) & Waalew Rd.	CSS	13.8	93.0	B	F	14.7	>100.0	B	F
11 Dale Evans Pkwy. (East) & Waalew Rd.	CSS	24.5	67.2	C	F	28.4	>100.0	D	F
12 Central Rd. & Johnson Rd.	CSS	>100.0	>100.0	F	F	>100.0	>100.0	F	F
13 Central Rd. & Gustine Rd.	CSS	11.1	18.2	B	C	37.5	>100.0	E	F
14 Central Rd. & Corwin Rd.	CSS	12.7	15.0	B	C	19.1	33.5	C	D
15 Central Rd. & Waalew Rd.	AWS	21.9	41.7	C	E	45.7	98.0	E	F
16 Driveway 1 & Gustine Rd.	<u>CSS</u>	Future Intersection				8.4	8.6	A	A
17 Driveway 2 & Gustine Rd.	<u>CSS</u>	Future Intersection				8.4	8.9	A	A
18 Driveway 3 & Gustine Rd.	<u>CSS</u>	Future Intersection				8.6	9.5	A	A
19 Driveway 4 & Gustine Rd.	<u>CSS</u>	Future Intersection				8.7	9.8	A	A
20 Driveway 5 & Gustine Rd.	<u>CSS</u>	Future Intersection				8.8	10.2	A	B
21 Driveway 6 & Gustine Rd.	<u>CSS</u>	Future Intersection				8.9	10.7	A	B
22 Central Rd. & Driveway 7	<u>CSS</u>	Future Intersection				9.6	12.1	A	B
23 Driveway 8 & Corwin Rd.	<u>CSS</u>	Future Intersection				8.6	8.7	A	A
24 Driveway 9 & Corwin Rd.	<u>CSS</u>	Future Intersection				8.8	8.9	A	A
25 Driveway 10 & Corwin Rd.	<u>CSS</u>	Future Intersection				9.0	9.1	A	A
26 Driveway 11 & Corwin Rd.	<u>CSS</u>	Future Intersection				9.3	9.4	A	A
27 Driveway 12 & Corwin Rd.	<u>CSS</u>	Future Intersection				9.6	9.8	A	A
28 Driveway 13 & Corwin Rd.	<u>CSS</u>	Future Intersection				9.8	10.1	A	A

* **BOLD** = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

¹ AWS = All-Way Stop; CSS = Cross-Street Stop; CSS = Improvement

² Per the Highway Capacity Manual (7th 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.

5.5 TRAFFIC SIGNAL WARRANT ANALYSIS

Traffic signal warrants have been performed for Opening Year Cumulative (2029) traffic conditions based on peak hour intersection turning movements volumes or planning level (ADT) volumes. The following study area intersections are anticipated to meet a traffic signal warrant under Opening Year Cumulative (2029) Without Project traffic conditions:

- I-15 Northbound Ramps & Stoddard Wells Road (#3)
- Stoddard Wells Road & Johnson Road (#4)
- I-15 Northbound Ramps & Dale Evans Parkway (#6)
- Dale Evans Parkway & Quarry Road (#8)
- Dale Evans Parkway (West) & Waalew Road (#10)
- Central Road & Johnson Road (#12)
- Central Road & Waalew Road (#15)

With the addition of Project traffic, the following additional study area intersections are anticipated to meet a traffic signal warrant under Opening Year Cumulative (2029) With Project traffic conditions:

- Central Road & Gustine Road (#13)
- Central Road & Corwin Road (#14)

The Opening Year Cumulative (2029) Without Project and With Project traffic conditions traffic signal warrant analysis worksheets are provided in Appendices 5.3 and 5.4, respectively.

5.6 OFF-RAMP QUEUING ANALYSIS

Queuing analysis findings for Opening Year Cumulative (2029) Without Project are presented in Table 5-2. As shown in Table 5-2, the following movements are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows under Opening Year Cumulative (2029) Without Project traffic conditions:

- I-15 Northbound Ramps & Stoddard Wells Road (#3) Southbound shared left-through-right – AM and PM peak hours
- I-15 Southbound Ramps & Dale Evans Parkway (#6) – Southbound shared left-through-right – AM peak hour only

No additional movements are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows with the addition of Project traffic under Opening Year Cumulative (2029) With Project traffic conditions. Worksheets for Opening Year Cumulative (2029) Without Project and With Project traffic conditions queuing analysis are provided in Appendices 5.5 and 5.6, respectively.

TABLE 5-2: PEAK HOUR QUEUING SUMMARY FOR OPENING YEAR CUMULATIVE (2029) CONDITIONS

Intersection	Movement	Available Stacking Distance (Feet)	2029 Without Project				2029 With Project			
			95th Percentile Queue (Feet)		Acceptable? ¹		95th Percentile Queue (Feet)		Acceptable? ¹	
			AM Peak	PM Peak	AM	PM	AM Peak	PM Peak	AM	PM
Quarry Rd. & I-15 SB Ramps	WBL/R	1,000	23	398	Yes	Yes	28	560	Yes	Yes
I-15 NB Ramps & Stoddard Wells Rd.	SBL/T/R	1,000	3,985	4,700	No	No	5,188	5,425	No	No
I-15 SB Ramps & Dale Evans Pkwy.	SBL/T/R	1,410	1,728	880	No	Yes	2,198	1,040	No	Yes
I-15 NB Ramps & Dale Evans Pkwy.	NBL/T/R	1,280	48	25	Yes	Yes	50	28	Yes	Yes

BOLD = 95th percentile queue exceeds the available storage.

¹ Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided.

5.7 PROJECT DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

Improvement strategies have been recommended at study area intersections and off-ramps that have been identified as deficient under Opening Year Cumulative (2029) traffic conditions.

5.7.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

The effectiveness of the recommended improvement strategies to address Opening Year Cumulative (2029) traffic deficiencies are presented in Table 5-3 to achieve pre-project delay or better. Worksheets for Opening Year Cumulative (2029) With Project conditions, with improvements, HCM calculation worksheets are provided in Appendix 5.7.

5.7.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES FOR OFF-RAMP QUEUES

The effectiveness of the recommended improvement strategies to address Opening Year Cumulative (2029) off-ramp deficiencies are presented in Table 5-4. The improvements are consistent with the intersection improvements identified in Table 5-3. Worksheets for Opening Year Cumulative (2029) With Project conditions, with improvements, off-ramp queueing analysis worksheets are provided in Appendix 5.8.

TABLE 5-3: INTERSECTION ANALYSIS FOR OPENING YEAR CUMULATIVE (2029) CONDITIONS WITH IMPROVEMENTS

# Intersection	Traffic Control ³	Intersection Approach Lanes ¹												Delay ² (secs.)		Level of Service		
		Northbound			Southbound			Eastbound			Westbound			AM	PM	AM	PM	
		L	T	R	L	T	R	L	T	R	L	T	R					
1 Quarry Rd. & I-15 SB Ramps																		
- Without Improvements	CSS	0	1	0	0	1	0	0	0	0	0	1	0	12.9	>100.0	B	F	
- With Improvements	CSS	0	1	1	0	1	0	0	0	0	0	1	0	9.2	34.9	A	D	
2 Quarry Rd. & Stoddard Wells Rd.																		
- Without Improvements	CSS	0	0	0	0	1	0	0	1	0	0	1	0	13.7	>100.0	B	F	
- With Improvements	CSS	0	0	0	0	1	0	0	1	0	0	1	1	9.8	34.7	A	D	
3 I-15 NB Ramps & Stoddard Wells Rd.																		
- Without Improvements	CSS	0	1	0	0	1	0	0	1	0	0	1	0	>100.0	>100.0	F	F	
- With Improvements	TS	0	1	0	1	1	0	1	1	0	1	2	0	46.4	50.3	D	D	
4 Stoddard Wells Rd. & Johnson Rd.																		
- Without Improvements	CSS	0	1	0	0	1	0	0	0	0	0	1	0	>100.0	>100.0	F	F	
- With Improvements	TS	0	1	1	0	1	0	0	0	0	1	1	0	45.6	23.9	D	C	
5 I-15 SB Ramps & Dale Evans Pkwy.																		
- Without Improvements	CSS	0	0	0	0	1	0	0	1	0	0	1	0	>100.0	>100.0	F	F	
- With Improvements	TS	0	0	0	0	1	0	0	1	0	0	1	0	40.0	11.2	D	B	
7 Dale Evans Pkwy. & Stoddard Wells Rd.																		
- Without Improvements	CSS	0	1	0	0	1	0	0	1	0	0	1	0	86.6	50.9	F	F	
- With Improvements	TS	0	1	0	0	1	0	0	1	0	0	1	0	7.2	6.3	A	A	
8 Dale Evans Pkwy. & Quarry Rd.																		
- Without Improvements	CSS	0	1	0	0	1	0	0	1	0	0	1	0	>100.0	>100.0	F	F	
- With Improvements	TS	1	1	0	1	1	0	0	1	0	0	1	0	22.6	54.3	C	D	
9 Dale Evans Pkwy. & Johnson Rd.																		
- Without Improvements	AWS	1	1	1	1	1	0	0	1	0	0	1	1	>100.0	>100.0	F	F	
- With Improvements	TS	1	2	1	2	1	0	1	2	0	1	2	1	53.9	46.4	D	D	
10 Dale Evans Pkwy. (West) & Waalew Rd.																		
- Without Improvements	CSS	1	0	1	0	0	0	0	1	0	0	1	0	14.7	>100.0	B	F	
- With Improvements	TS	1	0	1	0	0	0	0	1	0	0	1	0	7.3	14.7	A	B	
11 Dale Evans Pkwy. (East) & Waalew Rd.																		
- Without Improvements	CSS	0	0	0	0	1	0	0	1	0	0	1	0	28.4	>100.0	D	F	
- With Improvements	TS	0	0	0	0	1	0	0	1	0	0	1	0	9.8	20.4	A	C	
12 Central Rd. & Johnson Rd.																		
- Without Improvements	CSS	0	1	0	0	1	0	0	1	0	0	1	0	>100.0	>100.0	F	F	
- With Improvements	TS	2	1	0	1	1	1	1	1	0	1	1	0	23.1	37.6	C	D	
13 Central Rd. & Gustine Rd.																		
- Without Improvements	CSS	0	1	0	0	1	0	0	1	0	0	1	0	37.5	>100.0	E	F	
- With Improvements	TS	0	1	0	0	1	0	0	1	0	0	1	0	9.0	19.7	A	B	
15 Central Rd. & Waalew Rd.																		
- Without Improvements	AWS	0	1	0	0	1	0	0	1	0	0	1	0	45.7	98.0	E	F	
- With Improvements	TS	0	1	0	0	1	0	0	1	0	0	1	0	11.8	13.9	B	B	

* **BOLD** = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

¹ When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; **1** = Improvement

² 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

³ CSS = Cross-Street Stop; TS = Traffic Signal

**TABLE 5-4: PEAK HOUR QUEUING SUMMARY FOR OPENING YEAR CUMULATIVE (2029)
CONDITIONS WITH IMPROVEMENTS**

Intersection	Movement	Available Stacking Distance (Feet)	2029 With Project			
			95th Percentile Queue (Feet)		Acceptable? ¹	
			AM Peak	PM Peak	AM	PM
I-15 NB Ramps & Stoddard Wells Rd.	<u>SBL</u>	1,000	911 ²	632 ²	Yes	Yes
	SBL/T/R	1,000	825 ²	613 ²	Yes	Yes
I-15 SB Ramps & Dale Evans Pkwy.	SBL/T/R	1,410	1,317 ²	494	Yes	Yes

Underline = Improvement

¹ Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided.

² 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

This Page Intentionally Left Blank

6 HORIZON YEAR (2050) TRAFFIC CONDITIONS

This section discusses the methods used to develop Horizon Year (2050) Without and With Project traffic forecasts, and the resulting intersection operations, traffic signal warrant, and freeway off-ramp queuing analyses.

6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Horizon Year (2050) 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.

6.2 WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes the refined post-process volumes obtained from the SBTAM (see Section 4.7 *Horizon Year (2050) Traffic Forecasts* for a detailed discussion on the post-processing methodology). The weekday AM and PM peak hour volumes which can be expected for Horizon Year (2050) Without Project traffic conditions are shown in Exhibit 6-1. The weekday ADT which can be expected for Horizon Year (2050) Without Project traffic conditions are shown on Exhibit 6-2.

6.3 WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes the refined post-process volumes obtained from the SBTAM. The weekday AM and PM peak hour volumes which can be expected for Horizon Year (2050) With Project traffic conditions are shown in Exhibit 6-3. The weekday ADT which can be expected for Horizon Year (2050) With Project traffic conditions are shown on Exhibit 6-4.

EXHIBIT 6-1 : HORIZON YEAR (2050) WITHOUT PROJECT PEAK HOUR INTERSECTION VOLUMES

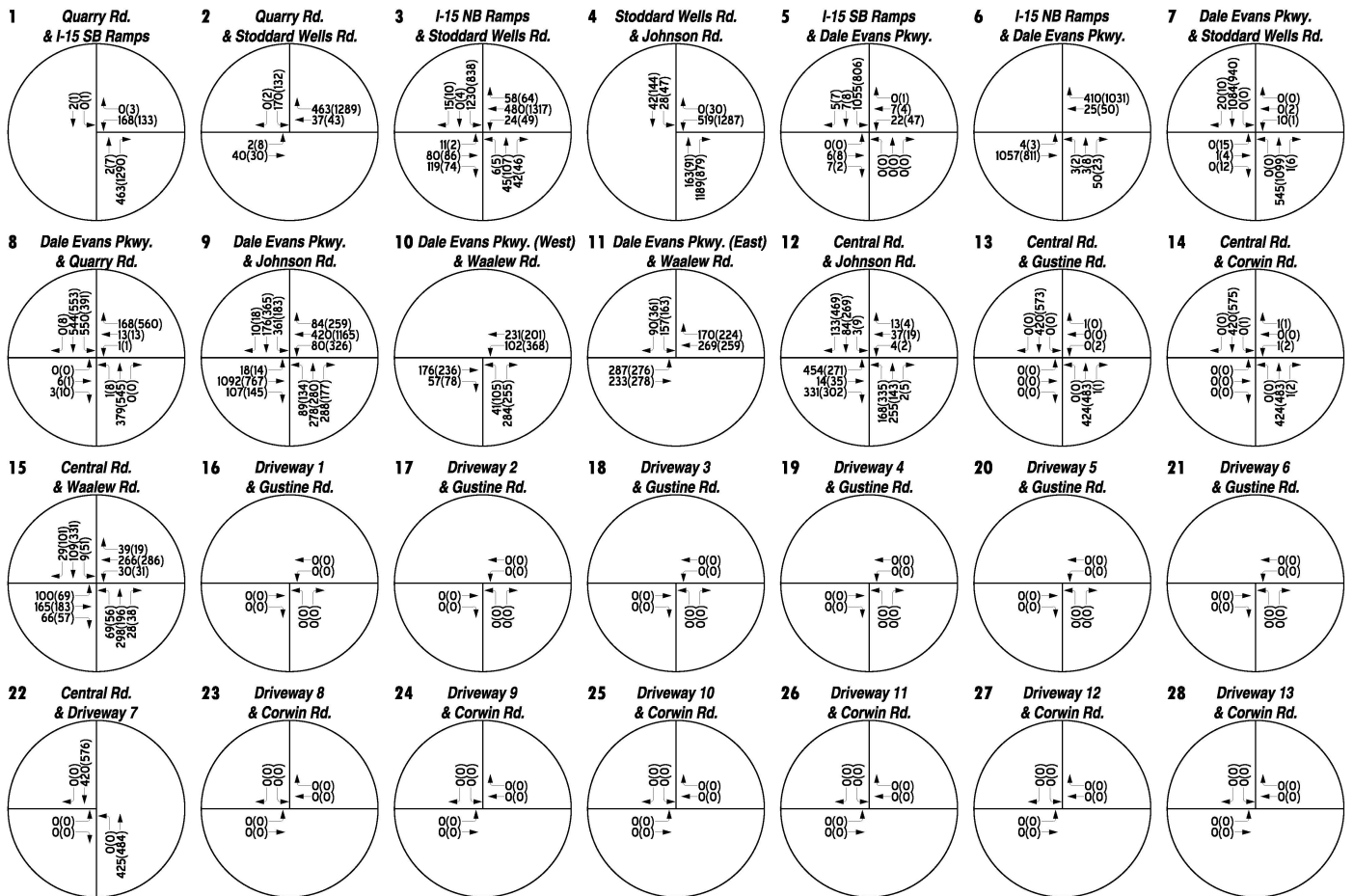
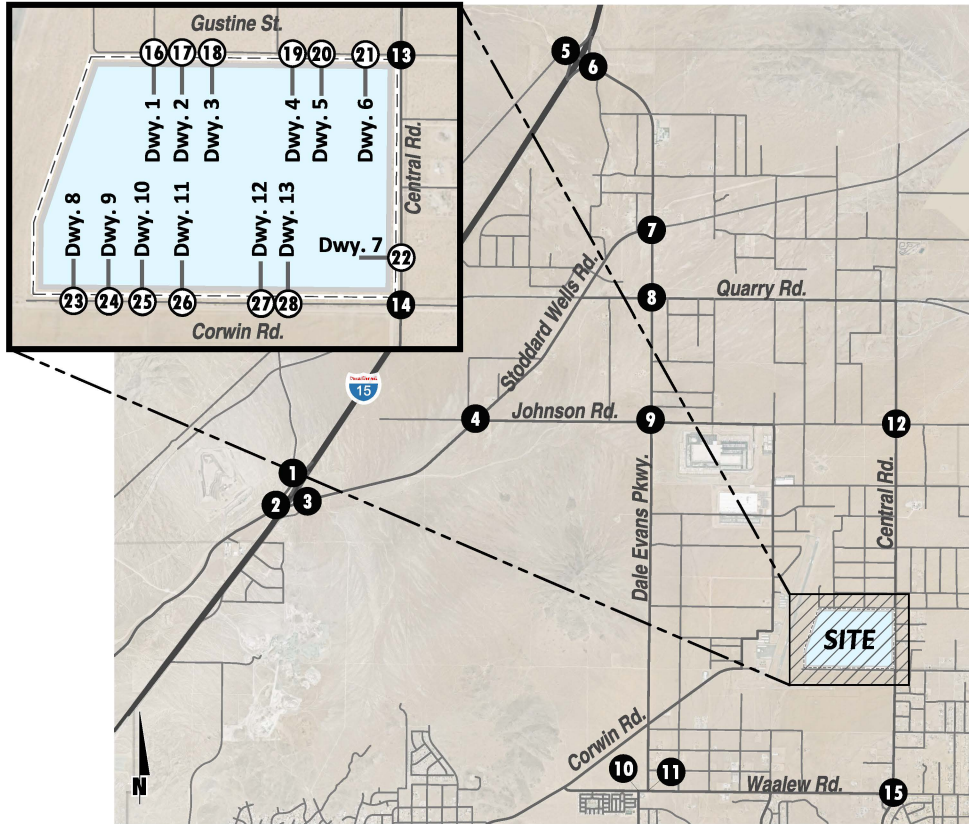


EXHIBIT 6-2 : HORIZON YEAR (2050) WITHOUT PROJECT AVERAGE DAILY TRAFFIC (ADT)

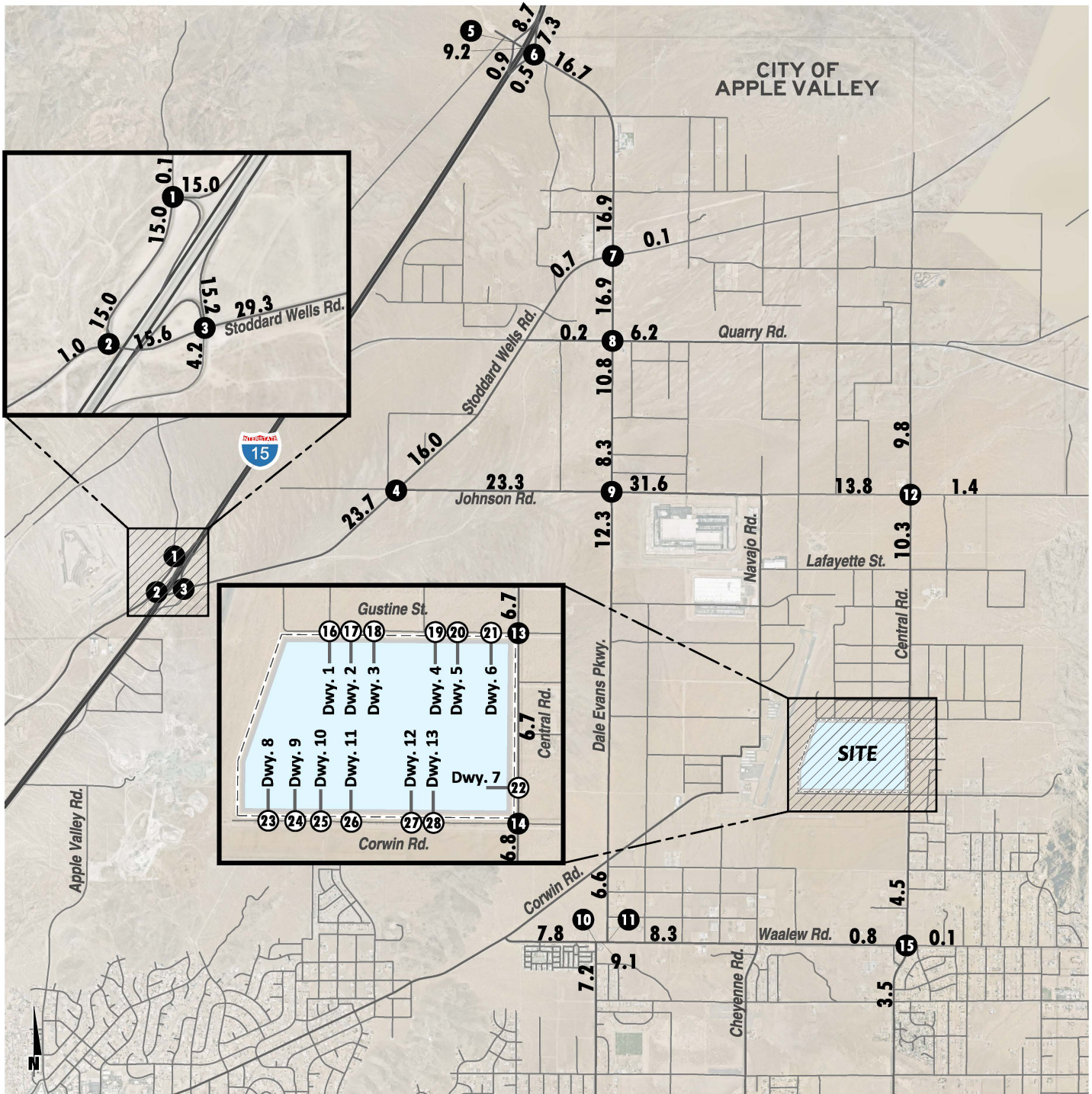


EXHIBIT 6-3 : HORIZON YEAR (2050) WITH PROJECT PEAK HOUR INTERSECTION VOLUMES

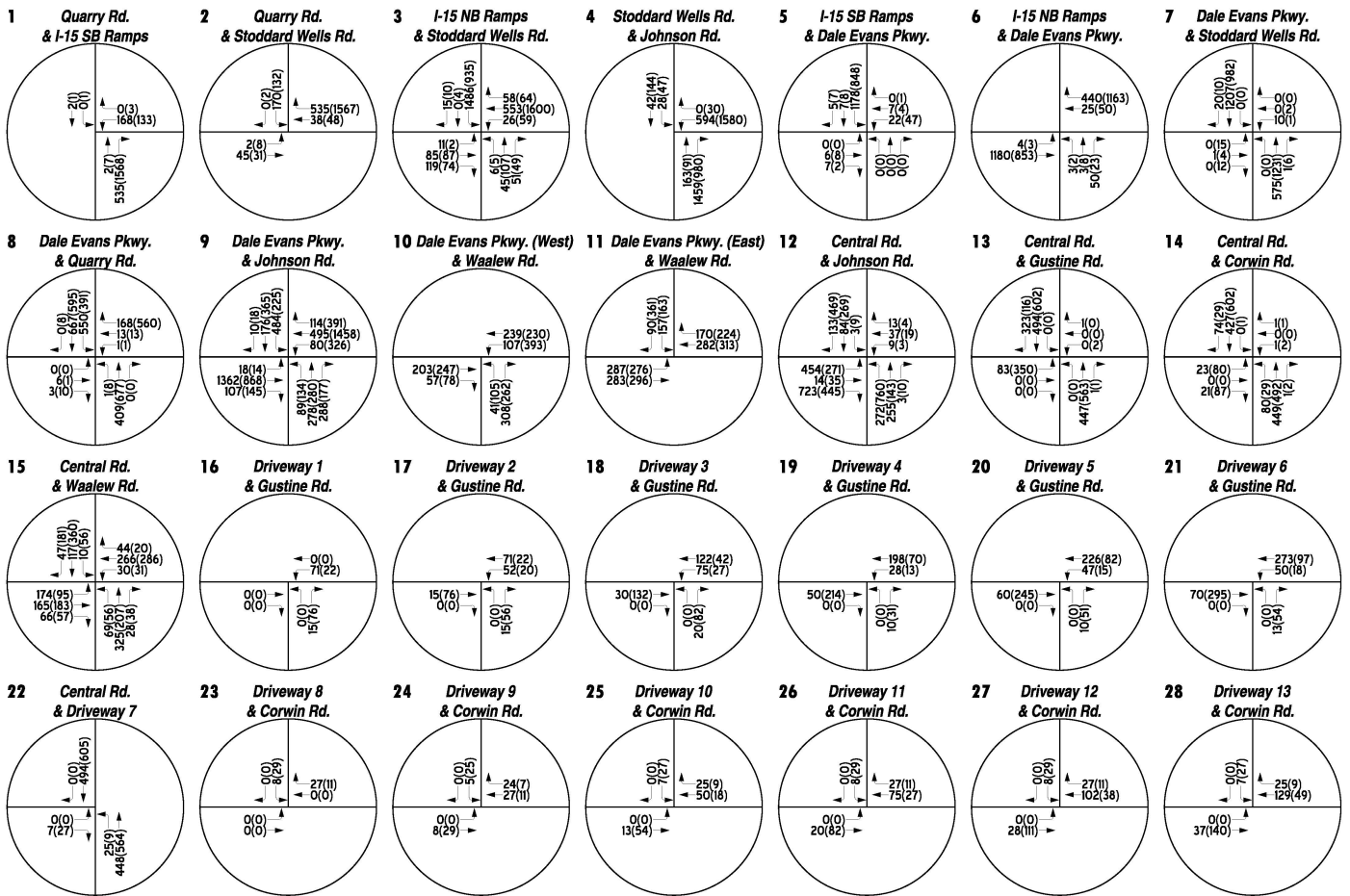
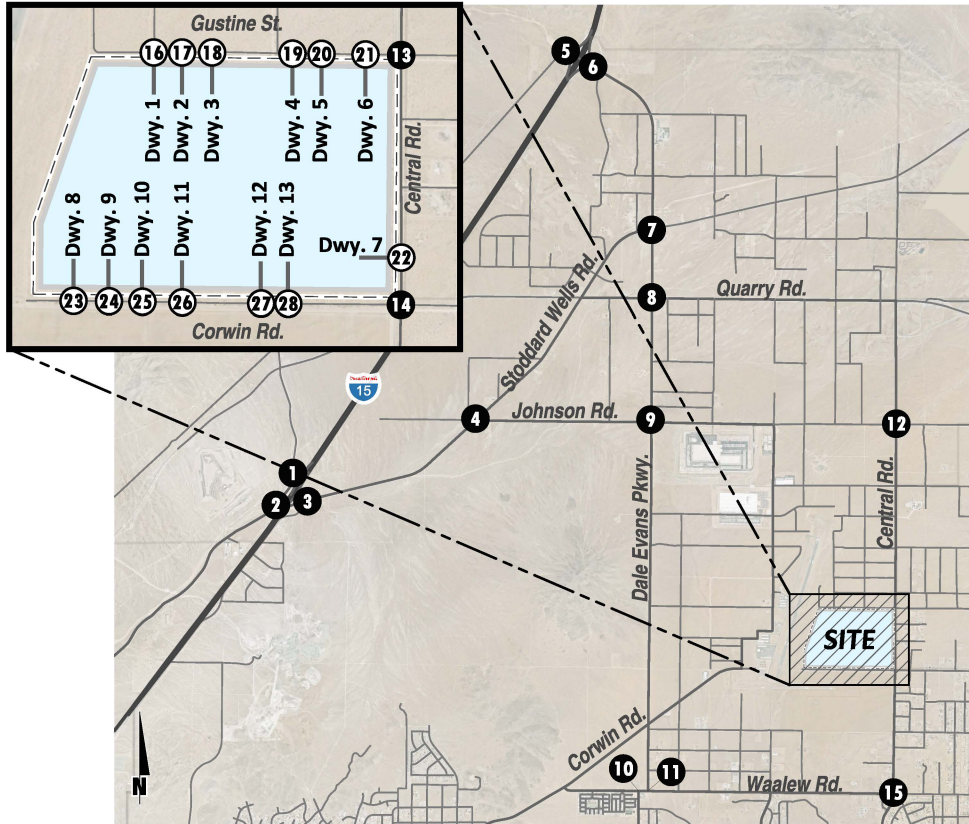
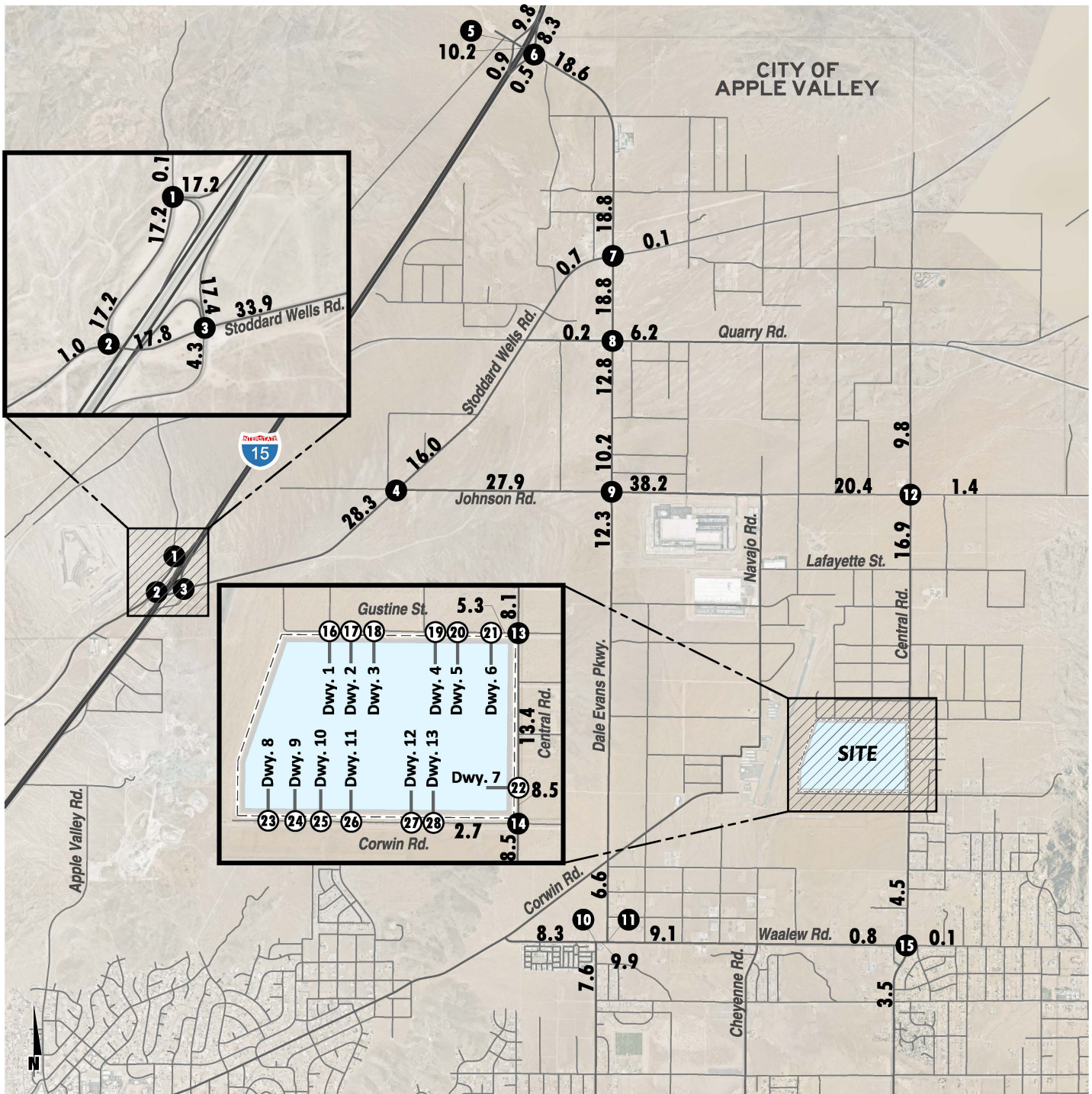


EXHIBIT 6-4 : HORIZON YEAR (2050) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

- = Existing Intersection Analysis Location
- = Future Intersection Analysis Location
- 10** = Average Daily Trips (1000's)

6.4 INTERSECTION OPERATIONS ANALYSIS

6.4.1 HORIZON YEAR (2050) WITHOUT PROJECT TRAFFIC CONDITIONS

LOS calculations were conducted for the study intersections to evaluate their operations under Horizon Year (2050) Without Project conditions with roadway and intersection geometrics consistent with Section 6.1 *Roadway Improvements*. As shown in Table 6-1, the following study area intersections are anticipated to operate at an unacceptable LOS under Horizon Year (2050) Without Project traffic conditions:

- I-15 Northbound Ramps & Stoddard Wells Road (#3) – LOS F AM and PM peak hours
- Stoddard Wells Road & Johnson Road (#4) – LOS F AM and PM peak hours
- I-15 Southbound Ramps & Dale Evans Parkway (#5) – LOS F AM and PM peak hours
- Dale Evans Parkway & Stoddard Wells Road (#7) – LOS F AM and PM peak hours
- Dale Evans Parkway & Quarry Road (#8) – LOS F AM and PM peak hours
- Dale Evans Parkway & Johnson Road (#9) – LOS F AM and PM peak hours
- Dale Evans Parkway (West) & Waalew Road (#10) – LOS F PM peak hour only
- Dale Evans Parkway (East) & Waalew Road (#11) – LOS F AM and PM peak hours
- Central Road & Johnson Road (#12) – LOS F AM and PM peak hours
- Central Road & Waalew Road (#15) – LOS F PM peak hour only

As a result of assuming a peak hour factor of 0.95 for the Horizon Year traffic conditions, consistent with County Guidelines, the PM peak hour conditions at the following intersections are anticipated to improve under Horizon Year (2050) Without Project traffic conditions compared to the previous scenario:

- Quarry Road & I-15 Southbound Ramps (#1)
- Quarry Road & Stoddard Wells Road (#2)

The intersection operations analysis worksheets for Horizon Year (2050) Without Project traffic conditions are included in Appendix 6.1.

6.4.2 HORIZON YEAR (2050) WITH PROJECT TRAFFIC CONDITIONS

As shown in Table 6-1, the following additional study area intersections are anticipated to operate at an unacceptable LOS with the addition of Project traffic under Horizon Year (2050) With Project traffic conditions:

- Central Road & Gustine Road (#13) – LOS F AM and PM peak hours
- Central Road & Waalew Road (#15) – LOS F AM peak hour

The intersection operations analysis worksheets for Horizon Year (2050) With Project traffic conditions are included in Appendix 6.2.

TABLE 6-1: INTERSECTION ANALYSIS FOR HORIZON YEAR (2050) CONDITIONS

# Intersection	Traffic Control ¹	2050 Without Project				2050 With Project			
		Delay ² (secs.)		Level of Service		Delay ² (secs.)		Level of Service	
		AM	PM	AM	PM	AM	PM	AM	PM
1 Quarry Rd. & I-15 SB Ramps	CSS	11.9	12.4	B	C	12.7	25.3	B	D
2 Quarry Rd. & Stoddard Wells Rd.	CSS	13.2	21.9	B	C	14.2	30.5	B	D
3 I-15 NB Ramps & Stoddard Wells Rd.	CSS	>100	>100	F	F	>100	>100	F	F
4 Stoddard Wells Rd. & Johnson Rd.	CSS	>100	>100	F	F	>100	>100	F	F
5 I-15 SB Ramps & Dale Evans Pkwy.	CSS	>100	95.1	F	F	>100	>100	F	F
6 I-15 NB Ramps & Dale Evans Pkwy.	CSS	30.7	18.8	D	C	31.6	20.1	D	C
7 Dale Evans Pkwy. & Stoddard Wells Rd.	CSS	93.2	>100	F	F	>100	>100	F	F
8 Dale Evans Pkwy. & Quarry Rd.	CSS	>100	>100	F	F	>100	>100	F	F
9 Dale Evans Pkwy. & Johnson Rd.	AWS	>100	>100	F	F	>100	>100	F	F
10 Dale Evans Pkwy. (West) & Waalew Rd.	CSS	15.2	>100	C	F	16.3	>100	C	F
11 Dale Evans Pkwy. (East) & Waalew Rd.	CSS	>100	>100	F	F	>100	>100	F	F
12 Central Rd. & Johnson Rd.	CSS	>100	>100	F	F	>100	>100	F	F
13 Central Rd. & Gustine Rd.	CSS	11.2	25.6	B	D	54.7	>100	F	F
14 Central Rd. & Corwin Rd.	CSS	14.1	18.8	B	C	23.6	34.9	C	D
15 Central Rd. & Waalew Rd.	AWS	26.5	63.7	D	F	57.8	>100	F	F
16 Driveway 1 & Gustine Rd.	CSS	Future Intersection				8.4	8.6	A	A
17 Driveway 2 & Gustine Rd.	CSS	Future Intersection				8.4	8.9	A	A
18 Driveway 3 & Gustine Rd.	CSS	Future Intersection				8.6	9.5	A	A
19 Driveway 4 & Gustine Rd.	CSS	Future Intersection				8.7	9.7	A	A
20 Driveway 5 & Gustine Rd.	CSS	Future Intersection				8.7	10.1	A	B
21 Driveway 6 & Gustine Rd.	CSS	Future Intersection				8.8	10.6	A	B
22 Central Rd. & Driveway 7	CSS	Future Intersection				10.7	13.3	B	B
23 Driveway 8 & Corwin Rd.	CSS	Future Intersection				8.6	8.7	A	A
24 Driveway 9 & Corwin Rd.	CSS	Future Intersection				8.8	8.9	A	A
25 Driveway 10 & Corwin Rd.	CSS	Future Intersection				9.0	9.1	A	A
26 Driveway 11 & Corwin Rd.	CSS	Future Intersection				9.2	9.4	A	A
27 Driveway 12 & Corwin Rd.	CSS	Future Intersection				8.6	9.7	A	A
28 Driveway 13 & Corwin Rd.	CSS	Future Intersection				9.8	10.0	A	B

* **BOLD** = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

¹ AWS = All-Way Stop; CSS = Cross-Street Stop; CSS = Improvement

² Per the Highway Capacity Manual (7th 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.

6.5 TRAFFIC SIGNAL WARRANT ANALYSIS

Traffic signal warrants have been performed for Horizon Year (2050) traffic conditions based on peak hour intersection turning movements volumes or planning level (ADT) volumes. No additional study area intersections are anticipated to meet either peak hour volume or ADT volume-based warrants for both Without and With Project traffic conditions (see Appendices 6.3 and 6.4, respectively).

6.6 OFF-RAMP QUEUING ANALYSIS

Queuing analysis findings for Horizon Year (2050) Without Project are presented in Table 6-2. As shown in Table 6-2, the following movements are anticipated to experience queueing issues during the weekday AM or weekday PM peak 95th percentile traffic flows under Horizon Year (2050) Without Project traffic conditions:

- I-15 Northbound Ramps & Stoddard Wells Road (#3) Southbound shared left-through-right – AM and PM peak hours

As a result of assuming a peak hour factor of 0.95 for the Horizon Year traffic conditions, the following movement is anticipated to improve under Horizon Year (2050) Without Project traffic conditions compared to the previous scenario:

- I-15 Southbound Ramps & Dale Evans Parkway (#5) Southbound shared left-through-right – AM peak hour only

With the addition of Project traffic, the following movement is anticipated to experience queueing issues during the weekday AM peak 95th percentile traffic flows under Horizon Year (2050) With Project traffic conditions:

- I-15 Southbound Ramps & Dale Evans Parkway (#5) Southbound shared left-through-right – AM peak hour only

Worksheets for Horizon Year (2050) Without Project and With Project traffic conditions queuing analysis are provided in Appendices 6.5 and 6.6, respectively.

TABLE 6-2: PEAK HOUR QUEUING SUMMARY FOR HORIZON YEAR (2050) CONDITIONS

Intersection	Movement	Available Stacking Distance (Feet)	2050 Without Project				2050 With Project			
			95th Percentile Queue (Feet)		Acceptable? ¹		95th Percentile Queue (Feet)		Acceptable? ¹	
			AM Peak	PM Peak	AM	PM	AM Peak	PM Peak	AM	PM
Quarry Rd. & I-15 SB Ramps	WBL/R	1,000	25	40	Yes	Yes	28	58	Yes	Yes
I-15 NB Ramps & Stoddard Wells Rd.	SBL/T/R	1,000	3,720	-- ²	No	No	4,820	-- ²	No	No
I-15 SB Ramps & Dale Evans Pkwy.	SBL/T/R	1,410	1,368	665	Yes	Yes	1,765	793	No	Yes
I-15 NB Ramps & Dale Evans Pkwy.	NBL/T/R	1,280	45	23	Yes	Yes	48	23	Yes	Yes

BOLD = 95th percentile queue exceeds the available storage.

¹ Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided.

² Overflow of vehicles, no queue reported in Synchro and assumed to exceed available storage.

6.7 PROJECT DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

Improvement strategies have been recommended at study area intersections and off-ramps that have been identified as deficient under Horizon Year (2050) traffic conditions.

6.7.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

The effectiveness of the recommended improvement strategies to address Horizon Year (2050) traffic deficiencies are presented in Table 6-3 to achieve pre-project delay or better. Worksheets for Horizon Year (2050) With Project conditions, with improvements, HCM calculation worksheets are provided in Appendix 6.7.

6.7.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES FOR OFF-RAMP QUEUES

The effectiveness of the recommended improvement strategies to address Horizon Year (2050) off-ramp deficiencies are presented in Table 6-4. The improvements are consistent with the intersection improvements identified in Table 6-3. Worksheets for Horizon Year (2050) With Project conditions, with improvements, off-ramp queuing analysis worksheets are provided in Appendix 6.8.

TABLE 6-3: INTERSECTION ANALYSIS FOR HORIZON YEAR (2050) CONDITIONS WITH IMPROVEMENTS

# Intersection	Traffic Control ³	Intersection Approach Lanes ¹												Delay ² (secs.)		Level of Service		
		Northbound			Southbound			Eastbound			Westbound			AM	PM	AM	PM	
		L	T	R	L	T	R	L	T	R	L	T	R					
3 I-15 NB Ramps & Stoddard Wells Rd.																		
- Without Improvements	CSS	0	1	0	0	1	0	0	1	0	0	1	0	>100	>100	F	F	
- With Improvements	IS	0	1	0	1	1	0	1	1	0	1	2	0	35.9	50.5	D	D	
4 Stoddard Wells Rd. & Johnson Rd.																		
- Without Improvements	CSS	0	1	0	0	1	0	0	0	0	0	1	0	>100	>100	F	F	
- With Improvements	IS	0	1	1	0	1	0	0	0	0	1	1	0	22.0	8.2	C	A	
5 I-15 SB Ramps & Dale Evans Pkwy.																		
- Without Improvements	CSS	0	0	0	0	1	0	0	1	0	0	1	0	>100	>100	F	F	
- With Improvements	IS	0	0	0	0	1	0	0	1	0	0	1	0	22.9	10.6	C	B	
7 Dale Evans Pkwy. & Stoddard Wells Rd.																		
- Without Improvements	CSS	0	1	0	0	1	0	0	1	0	0	1	0	>100	>100	F	F	
- With Improvements	IS	0	1	0	0	1	0	0	1	0	0	1	0	8.2	10.4	A	B	
8 Dale Evans Pkwy. & Quarry Rd.																		
- Without Improvements	CSS	0	1	0	0	1	0	0	1	0	0	1	0	>100	>100	F	F	
- With Improvements	IS	1	1	0	1	1	0	0	1	0	0	1	0	29.0	50.0	C	D	
9 Dale Evans Pkwy. & Johnson Rd.																		
- Without Improvements	AWS	1	1	1	1	1	0	0	1	0	0	1	1	>100	>100	F	F	
- With Improvements	IS	1	2	1	2	2	0	1	2	0	1	2	1	36.0	33.4	D	C	
10 Dale Evans Pkwy. (West) & Waalew Rd.																		
- Without Improvements	CSS	1	0	1	0	0	0	0	1	0	0	1	0	16.3	>100	C	F	
- With Improvements	IS	1	0	1	0	0	0	0	1	0	0	1	0	7.8	19.3	A	B	
11 Dale Evans Pkwy. (East) & Waalew Rd.																		
- Without Improvements	CSS	0	0	0	0	1	0	0	1	0	0	1	0	>100	>100	F	F	
- With Improvements	IS	0	0	0	0	1	0	0	1	0	0	1	0	32.4	29.6	C	C	
12 Central Rd. & Johnson Rd.																		
- Without Improvements	CSS	0	1	0	0	1	0	0	1	0	0	1	0	>100	>100	F	F	
- With Improvements	IS	2	1	0	1	1	1	1	1	0	1	1	0	21.2	37.2	C	D	
13 Central Rd. & Gustine Rd.																		
- Without Improvements	CSS	0	1	0	0	1	0	0	1	0	0	1	0	54.7	>100	F	F	
- With Improvements	IS	0	1	0	0	1	0	0	1	0	0	1	0	9.3	29.8	A	C	
15 Central Rd. & Waalew Rd.																		
- Without Improvements	AWS	0	1	0	0	1	0	0	1	0	0	1	0	57.8	>100	F	F	
- With Improvements	IS	0	1	0	0	1	0	0	1	0	0	1	0	12.6	13.8	B	B	

* **BOLD** = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

¹ When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; **1** = Improvement

² 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.

³ CSS = Cross-Street Stop; TS = Traffic Signal

TABLE 6-4: PEAK HOUR QUEUING SUMMARY FOR HORIZON YEAR (2050) CONDITIONS WITH IMPROVEMENTS

Intersection	Movement	Available Stacking Distance (Feet)	2050 With Project			
			95th Percentile Queue (Feet)		Acceptable? ¹	
			AM Peak	PM Peak	AM	PM
I-15 NB Ramps & Stoddard Wells Rd.	<u>SBL</u>	1,000	900 ²	663 ²	Yes	Yes
	SBL/T/R	1,000	767 ²	612 ²	Yes	Yes
I-15 SB Ramps & Dale Evans Pkwy.	SBL/T/R	1,410	1,299 ²	488	Yes	Yes

Underline = Improvement

¹ Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided.

² 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

This Page Intentionally Left Blank

7 LOCAL AND REGIONAL FUNDING MECHANISMS

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

7.1 TOWN OF APPLE VALLEY DEVELOPMENT IMPACT FEE (DIF) PROGRAM

The Town of Apple Valley has implemented a DIF program. This program collects fees from new single-family residential, multi-family residential, commercial, office use, and industrial developments. These fees serve to fund compliant regional facilities as well as local facilities such as law enforcement, storm drainage, sanitary sewer, and general government fees. Fees are also allocated to finance parks and Apple Valley fire. Under the Town's DIF program, the Town may grant 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.

7.2 MEASURE "I" FUNDS

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 San Bernardino County Transportation Authority (SBCTA) and concluded that each jurisdiction should include a regional fee component in their local programs 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 September 2017. Revenues collected through these programs are used in tandem with Measure "I" 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, and will continue to fund, new transportation facilities in San Bernardino County, including within the Town of Apple Valley.

7.3 FAIR SHARE CONTRIBUTION

Project improvements may include a combination of fee payments to established programs, construction of specific improvements, payment of a fair share contribution toward future improvements or a combination of these approaches. Improvements constructed by development may be eligible for a fee credit or reimbursement through the program where appropriate (to be determined at the Town's discretion).

When off-site improvements are identified with a minor share of responsibility assigned to proposed development, the approving jurisdiction may elect to collect a fair share contribution or require the development to construct improvements. Detailed fair share calculations, for each peak hour, have been provided for the applicable deficient study area intersections, in Table 7-1 for Opening Year Cumulative (2029) traffic conditions and in Table 7-2 for Horizon Year (2050) traffic conditions.

TABLE 7-1: OPENING YEAR CUMULATIVE (2029) PROJECT FAIR SHARE CALCULATIONS

#	Intersection	Existing (2024)	Project	2029 With Project	Total New Traffic	Project Fair Share	
1	Quarry Rd. & I-15 SB Ramps	AM:	141	108	773	632	17.1%
		PM:	222	314	1,723	1,501	20.9%
2	Quarry Rd. & Stoddard Wells Rd.	AM:	187	114	855	668	17.1%
		PM:	260	320	1,801	1,541	20.8%
3	I-15 NB Ramps & Stoddard Wells Rd.	AM:	359	414	2,550	2,191	18.9%
		PM:	520	463	3,019	2,499	18.5%
4	Stoddard Wells Rd. & Johnson Rd.	AM:	286	414	2,119	1,833	22.6%
		PM:	444	463	2,545	2,101	22.0%
5	I-15 SB Ramps & Dale Evans Pkwy.	AM:	181	130	1,305	1,124	11.6%
		PM:	313	50	953	640	7.8%
7	Dale Evans Pkwy. & Stoddard Wells Rd.	AM:	364	168	1,819	1,455	11.5%
		PM:	436	191	2,166	1,730	11.0%
8	Dale Evans Pkwy. & Quarry Rd.	AM:	386	168	1,844	1,458	11.5%
		PM:	459	191	2,191	1,732	11.0%
9	Dale Evans Pkwy. & Johnson Rd.	AM:	541	582	3,338	2,797	20.8%
		PM:	827	654	3,988	3,161	20.7%
10	Dale Evans Pkwy. (West) & Waalew Rd.	AM:	496	75	917	421	17.8%
		PM:	697	83	1,215	518	16.0%
11	Dale Evans Pkwy. (East) & Waalew Rd.	AM:	557	74	1,439	882	8.4%
		PM:	729	83	1,251	522	15.9%
12	Central Rd. & Johnson Rd.	AM:	124	587	1,688	1,564	37.5%
		PM:	215	660	2,501	2,286	28.9%
13	Central Rd. & Gustine Rd.	AM:	122	586	1,143	1,021	57.4%
		PM:	211	661	1,392	1,181	56.0%
15	Central Rd. & Waalew Rd.	AM:	517	155	1,148	631	24.6%
		PM:	620	173	1,354	734	23.6%

BOLD = Denotes highest fair share percentage.

TABLE 7-2: HORIZON YEAR (2050) PROJECT FAIR SHARE CALCULATIONS

#	Intersection	Existing (2024)	Project	2050 With Project	Total New Traffic	Project Fair Share	
1	Quarry Rd. & I-15 SB Ramps	AM:	141	108	837	696	15.5%
		PM:	222	314	1,801	1,579	19.9%
2	Quarry Rd. & Stoddard Wells Rd.	AM:	187	114	929	742	15.4%
		PM:	260	320	1,883	1,623	19.7%
3	I-15 NB Ramps & Stoddard Wells Rd.	AM:	359	414	2,696	2,337	17.7%
		PM:	520	463	3,188	2,668	17.4%
4	Stoddard Wells Rd. & Johnson Rd.	AM:	286	414	2,528	2,242	18.5%
		PM:	444	463	3,061	2,617	17.7%
5	I-15 SB Ramps & Dale Evans Pkwy.	AM:	181	130	1,364	1,183	11.0%
		PM:	313	50	1,008	695	7.2%
7	Dale Evans Pkwy. & Stoddard Wells Rd.	AM:	364	168	2,020	1,656	10.1%
		PM:	436	191	2,413	1,977	9.7%
8	Dale Evans Pkwy. & Quarry Rd.	AM:	386	168	2,031	1,645	10.2%
		PM:	459	191	2,424	1,965	9.7%
9	Dale Evans Pkwy. & Johnson Rd.	AM:	541	582	3,896	3,355	17.3%
		PM:	827	654	4,657	3,830	17.1%
10	Dale Evans Pkwy. (West) & Waalew Rd.	AM:	496	75	1,021	525	14.3%
		PM:	697	83	1,338	641	12.9%
11	Dale Evans Pkwy. (East) & Waalew Rd.	AM:	557	74	1,753	1,196	6.2%
		PM:	729	83	1,651	922	9.0%
12	Central Rd. & Johnson Rd.	AM:	124	587	1,743	1,619	36.3%
		PM:	215	660	2,593	2,378	27.8%
13	Central Rd. & Gustine Rd.	AM:	122	586	1,358	1,236	47.4%
		PM:	211	661	1,758	1,547	42.7%
15	Central Rd. & Waalew Rd.	AM:	517	155	1,397	880	17.6%
		PM:	620	173	1,614	994	17.4%

BOLD = Denotes highest fair share percentage.

This Page Intentionally Left Blank

8 REFERENCES

1. **County of San Bernardino.** *County of San Bernardino Transportation Impact Study Guidelines.* County of San Bernardino : s.n., July 2019.
2. **San Bernardino Associated Governments.** *Congestion Management Program for County of San Bernardino.* County of San Bernardino : s.n., Updated June 2016.
3. **Institute of Transportation Engineers.** *Trip Generation Manual.* 11th Edition. 2021.
4. **Transportation Research Board.** *Highway Capacity Manual (HCM).* 7th Edition. s.l.: National Academy of Sciences, 2022.
5. **Caltrans.** *California Manual on Uniform Traffic Control Devices (MUTCD).* [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CAMUTCD).* 2017.

This page intentionally left blank