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BUENA PARK GENERAL PLAN & ZONING CODE UPDATE

TRAFFIC ANALYSIS

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
ADU	Accessory Dwelling Units
CAMUTCD	California Manual on Uniform Traffic Control Devices
Caltrans	California Department of Transportation
DIF	Development Impact Fee
HCM	Highway Capacity Manual
ICU	Intersection Capacity Utilization
LOS	Level of Service
NCHRP	National Cooperative Highway Research Program
OCTA	Orange County Transportation Authority
OCTAM	Orange County Transportation Analysis Model
PHF	Peak Hour Factor
Project	Buena Park General Plan & Zoning code Update
RHNA	Regional Housing Needs Assessment
SCAG	Southern California Association of Governments
TA	Traffic Analysis
v/c	Volume to Capacity
VMT	Vehicle Miles Traveled

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1   EXECUTIVE SUMMARY

1.1   INTRODUCTION

The Buena Park General Plan & Zoning Code Update Traffic Analysis (TA) analyzes and identifies potential traffic-related deficiencies resulting from the rezoning and revised General Plan land use development assumptions. The purpose of the update to the Zoning Code and Land Use Element of the General Plan is to implement the Housing Element policy recommendations which has currently been completed as part of the recent update. Updates to the Zoning Code will include consideration of a mixed-use development land use category with a variety of densities reflected in the Housing Element.

The 6th Cycle Housing Element Update indicates that the City can accommodate approximately 10,322 housing units through various pending projects, its inventory of vacant/underutilized land, accessory dwelling units (ADUs), and rezoned/mixed-use overlay sites. In order to achieve the increased number of housing units, the City must update the Land Use Element, Single Family Residential Zones, and Multifamily Residential Zones to allow increased densities under the land use designations and provide development standards under the zoning ordinance that accommodates increased densities up to 100 dwelling units per acre (du/ac). There are a total of 410 parcels identified as part of the 2021-2029 Housing Element Update.

This traffic analysis has been prepared in accordance with the City's Traffic Impact Analysis Guidelines – 2020 for Vehicle Miles Traveled and Level of Service Assessment (dated June 2020). (1) Exhibit 1-1 identifies the locations of each of the Housing Element sites. The City approved Project Traffic Study Scoping agreement is provided in Appendix 1.1 of this TA.

1.2   PROPOSED SITE ACCESS AND CIRCULATION RECOMMENDATIONS

Given the number of Housing Element sites and lack of detailed site plans available, a detailed review of site access was not evaluated as part of this analysis. However, it is anticipated that implementing projects on each of the Housing Element sites will need to conduct focused traffic analyses that meet the City's standards which will provide a review of potential intersection operational deficiencies in conjunction with a detailed review of site access.

1.3   ANALYSIS SCENARIOS

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

- Existing (2022) Conditions
- Horizon Year (2045) Without Project Conditions
- Horizon Year (2045) With Project Conditions

All study area intersections have been evaluated using either Intersection Capacity Utilization (ICU) or Highway Capacity Manual (HCM) methodologies, depending on the types of intersections and its jurisdiction (for a detailed discussion see Section 3.2 *Intersection Capacity Analysis*).

EXHIBIT 1-1: HOUSING ELEMENT SITE LOCATION MAP
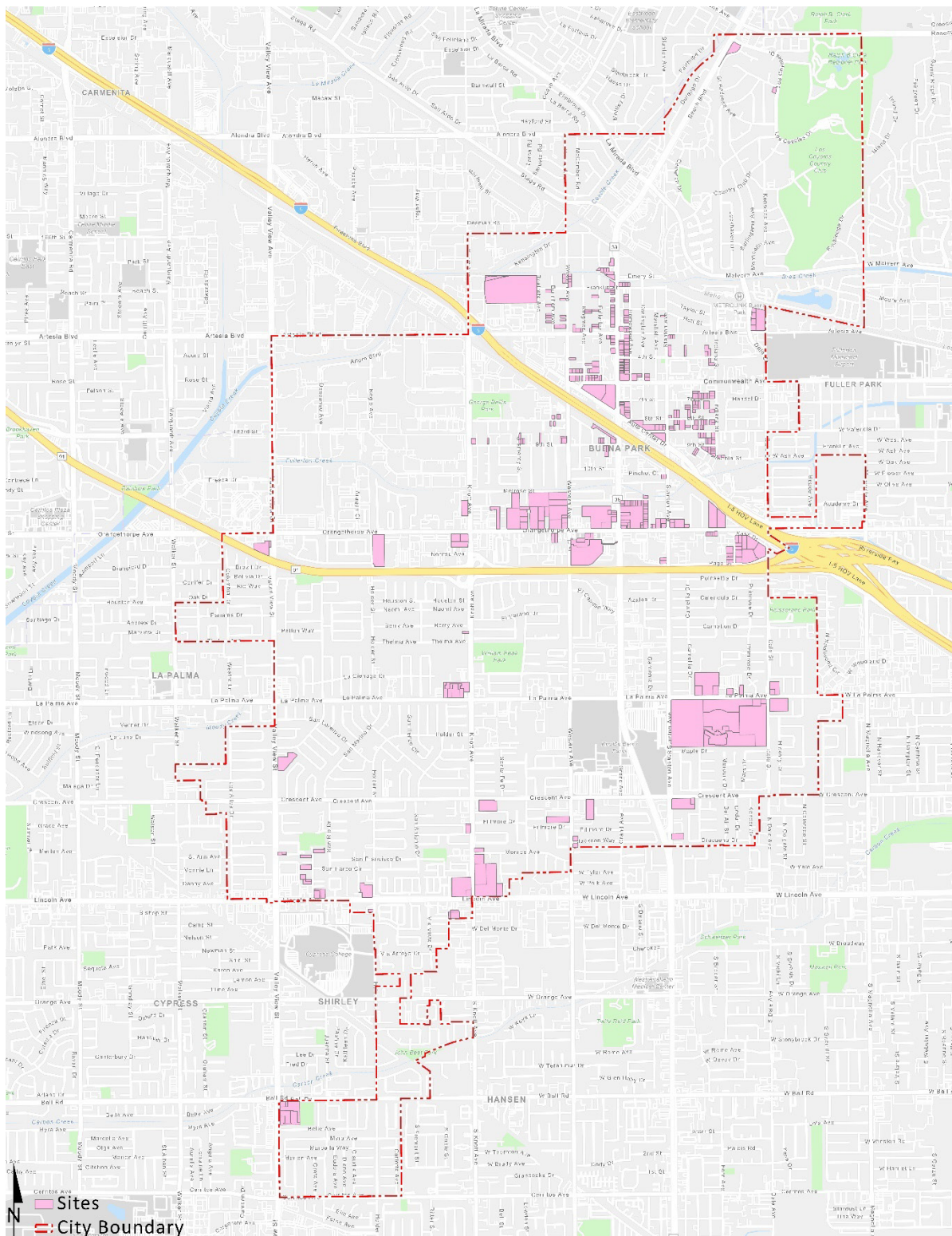
1.3.1   EXISTING (2022) CONDITIONS

Information for Existing (2022) conditions is disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared. For a detailed discussion on the existing traffic counts, see Section 4.5 *Existing (2022) Traffic Counts*.

1.3.2   HORIZON YEAR (2045) CONDITIONS

Traffic projections for Horizon Year (2045) conditions were derived from the Orange County Transportation Analysis Model (OCTAM) using accepted procedures for model forecast refinement and smoothing. The Horizon Year conditions analysis will be utilized to determine if improvements funded through regional transportation mitigation fee programs can accommodate the long-range cumulative traffic at the target Level of Service (LOS) identified in the City of Buena Park (lead agency) General Plan. Each of the applicable transportation fee programs are discussed in more detail in Section 6 *Local and Regional Funding Mechanisms*. For the purposes of this traffic analysis, the "Without Project" scenario represents the traffic forecasts associated with the OCTAM based on the current City of Buena Park General Plan. The "With Project" scenario represents the traffic forecast associated with the OCTAM based on changes in population related to each proposed.

1.4   STUDY AREA

To ensure that this TA satisfies the City of Buena Park's traffic study requirements, Urban Crossroads, Inc. prepared a Project traffic study scoping package for review by City of Buena Park staff prior to the preparation of this report. This agreement provides an outline of the Project study area and analysis methodology. The agreement approved by the City is included in Appendix 1.1 of this TA. The 39 study area intersections shown on Exhibit 1-2 and listed in Table 1-1 were selected for evaluation in this TA based on consultation with City of Buena Park staff. The study area roadway segments selected for evaluation are listed in Table 1-2 and shown on Exhibit 1-3.

1.5   DEFICIENCIES

This section provides a summary of deficiencies by analysis scenario. Section 3 *Methodologies* provides information on the methodologies used in the analysis and Section 5 *Horizon Year (2045) Traffic Conditions* includes the detailed analysis. A summary of the study area intersection LOS results for all analysis scenarios is presented in Table 1-3 while a summary of the study area roadway segment LOS is shown in Table 1-4.

1.5.1   EXISTING (2022) CONDITIONS

Intersections

The following study area intersections are currently operating at an unacceptable LOS during the weekday AM and PM peak hours under Existing traffic conditions:

- Knott Avenue & Firestone Boulevard (#6) – LOS E PM peak hour only
- I-5 SB On-Ramp & Artesia Boulevard (#8) – LOS F PM peak hour only

EXHIBIT 1-2: STUDY AREA INTERSECTIONS
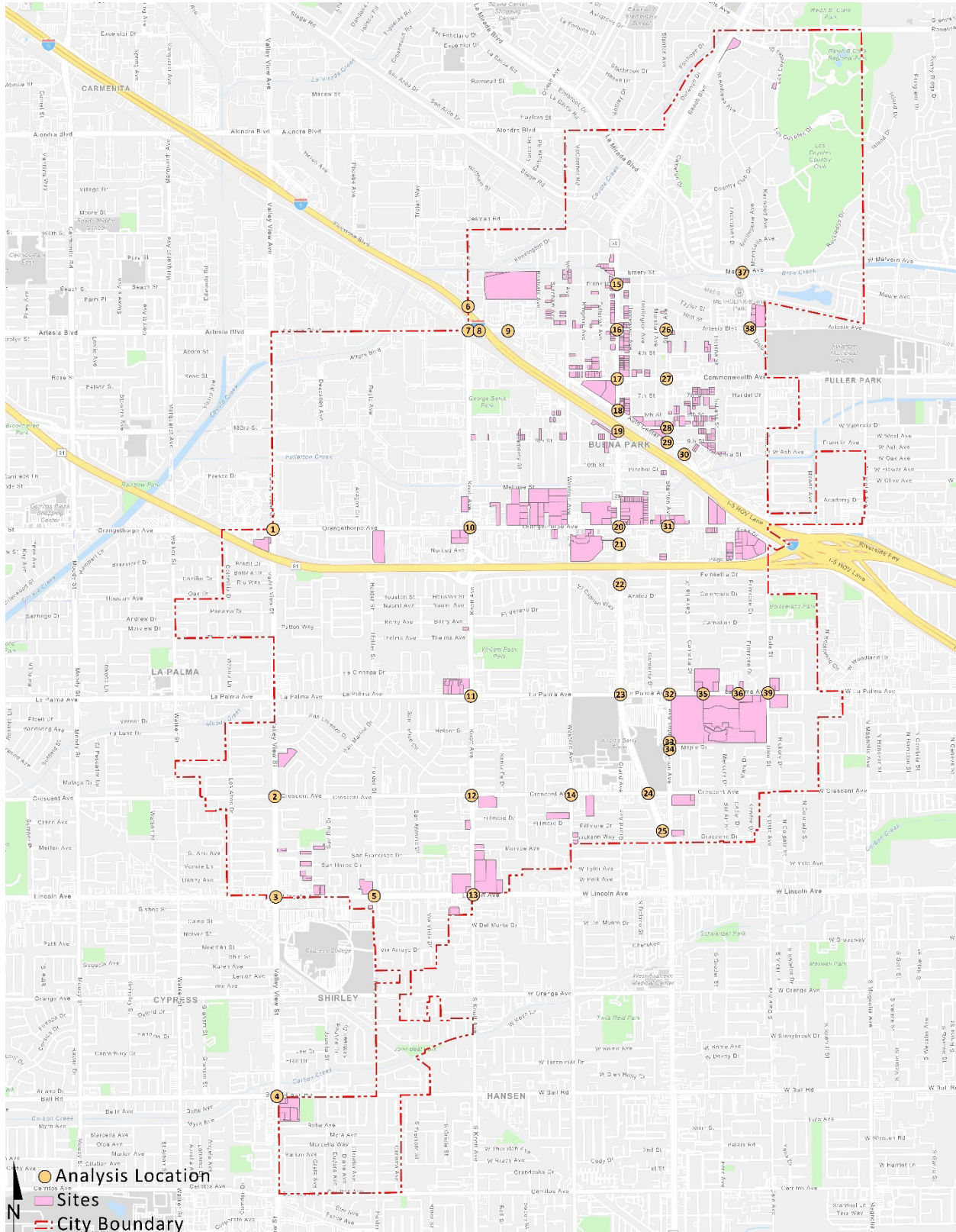
EXHIBIT 1-3: STUDY AREA ROADWAY SEGMENTS
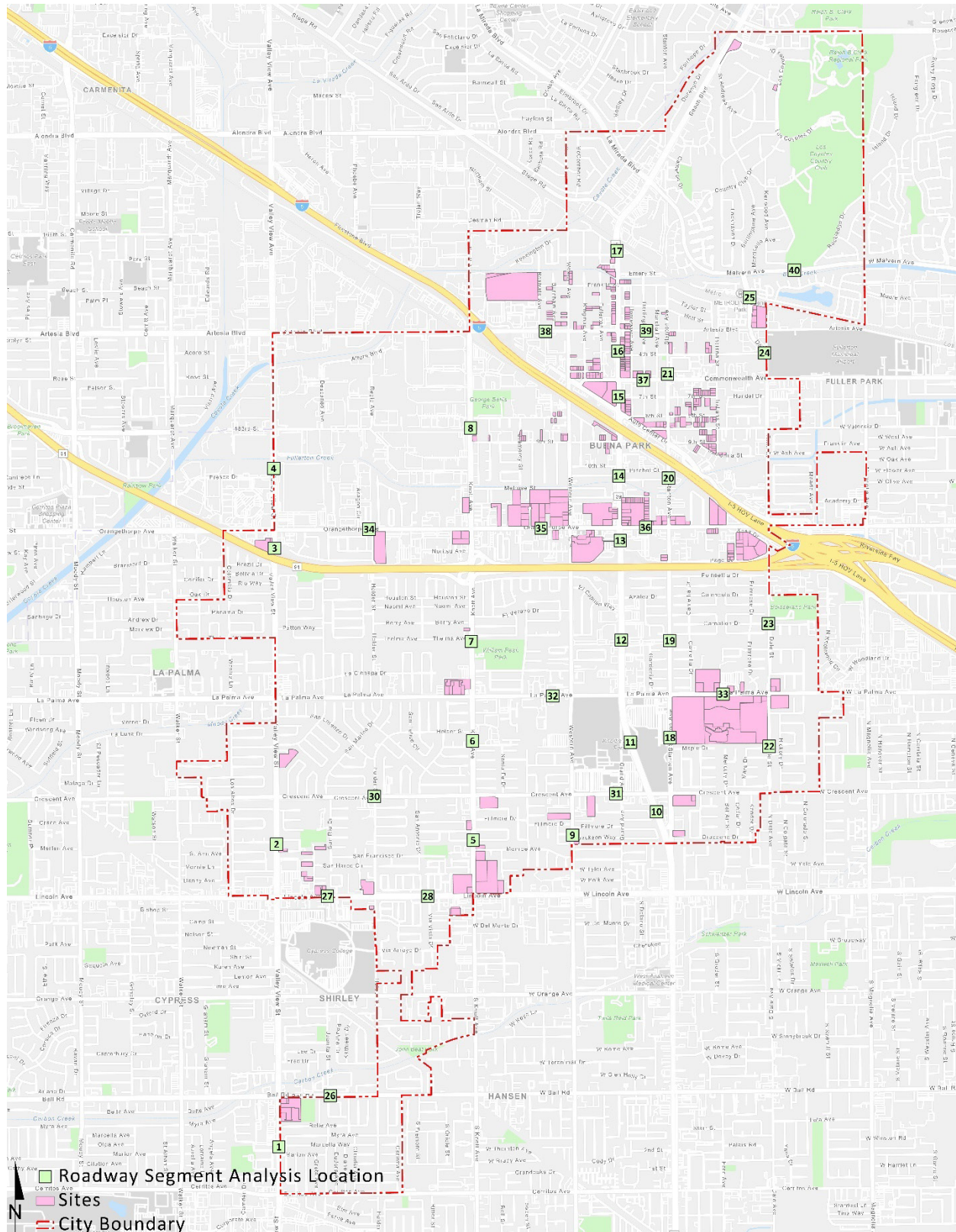
EXHIBIT 1-4: SUMMARY OF INTERSECTION LOS

#	Intersection	Existing		Horizon Year (2045) Without Project		Horizon Year (2045) With Project	
		AM	PM	AM	PM	AM	PM
1	Valley View St. & Orangethorpe Av.	🟢	🟢	🟢	🟢	🟢	🟢
2	Valley View St. & Crescent Av.	🟢	🟢	🟢	🟢	🟢	🟢
3	Valley View St. & Lincoln Av.	🟢	🟢	🟡	🟢	🟡	🟢
4	Valley View St. & Ball Rd.	🟢	🟢	🟢	🟢	🟢	🟢
5	Holder St. & Lincoln Av.	🟢	🟢	🟢	🟢	🟢	🟢
6	Knott Av. & Firestone Bl.	🟢	🟡	🟡	🔴	🟡	🔴
7	Knott Av. & Artesia Bl.	🟢	🟢	🟢	🟢	🟢	🟢
8	I-5 SB On-Ramp & Artesia Bl.	🟢	🔴	🟢	🔴	🟢	🔴
9	I-5 NB Ramps & Artesia Bl.	🟢	🟢	🟢	🟢	🟢	🟢
10	Knott Av. & Orangethorpe Av.	🟢	🟢	🟢	🟢	🟢	🟢
11	Knott Av. & La Palma Av.	🟢	🟢	🟢	🟢	🟢	🟢
12	Knott Av. & Crescent Av.	🟢	🟢	🟢	🟡	🟢	🟢
13	Knott Av. & Lincoln Av.	🟢	🟢	🟡	🟡	🟡	🟡
14	Western Av. & Crescent Av.	🟢	🟢	🟢	🟢	🟢	🟢
15	Beach Bl. (SR-39) & Franklin St.	🟢	🟢	🟡	🟢	🔴	🔴
16	Beach Bl. (SR-39) & Artesia Bl.	🟢	🟢	🟢	🟢	🟢	🟢
17	Beach Bl. (SR-39) & Commonwealth Av.	🟢	🟢	🟢	🟢	🟢	🟢
18	Beach Bl. (SR-39) & Auto Center Dr.	🟢	🟢	🟢	🟢	🟢	🟢
19	Beach Bl. (SR-39) & I-5 SB Ramps	🟢	🟢	🟢	🟢	🟢	🟢
20	Beach Bl. (SR-39) & Orangethorpe Av.	🟢	🟢	🟢	🟢	🟢	🟢
21	Beach Bl. (SR-39) & SR-91 WB Ramps	🟢	🟢	🟢	🟢	🟢	🟢
22	Beach Bl. (SR-39) & SR-91 EB Ramps	🟢	🟢	🟢	🟢	🟢	🟢
23	Beach Bl. (SR-39) & La Palma Av.	🟢	🟢	🟢	🟢	🟢	🟡
24	Beach Bl. (SR-39) & Crescent Av.	🟢	🟢	🟢	🟢	🟢	🟢
25	Beach Bl. (SR-39) & Stanton Av.	🟢	🟢	🟢	🟢	🟢	🟢
26	Stanton Av. & Artesia Bl.	🟢	🟢	🟢	🟢	🟢	🟢
27	Stanton Av. & Commonwealth Av.	🟢	🟢	🟢	🟢	🟢	🟢
28	Stanton Av. & Whitaker St.	🟢	🟢	🟢	🟢	🟢	🟢
29	Stanton Av. & Auto Center Dr.	🟢	🟢	🟢	🟢	🟢	🟢
30	I-5 NB Off-Ramp & Auto Center Dr.	🟢	🟢	🟢	🟢	🟢	🟢
31	Stanton Av. & Orangethorpe Av.	🟢	🟢	🟢	🟢	🟢	🟡
32	Stanton Av. & La Palma Av.	🟢	🟢	🟢	🟢	🟢	🟢
33	Stanton Av. & Buena Park Downtown	🟢	🟢	🟢	🟢	🟢	🟢
34	Stanton Av. & Maple Dr.	🟢	🟢	🟢	🟢	🟢	🟢
35	Buena Park Downtown West & La Palma Av.	🟢	🟢	🟢	🟢	🟢	🟢
36	Buena Park Downtown East & La Palma Av.	🟢	🟢	🟢	🟢	🟢	🟢
37	Dale Av. & Malvern Av.	🟢	🟢	🟢	🟢	🟢	🟢
38	Dale Av. & Artesia Bl.	🟢	🟢	🟢	🟢	🟢	🟢
39	Dale Av. & La Palma Av.	🟢	🟢	🟢	🟢	🟢	🟢

🟢 = A - D   🟡 = E   🔴 = F

EXHIBIT 1-5: SUMMARY OF ROADWAY SEGMENT LOS

# Roadway Segment	Existing	Horizon Year (2045) Without Project	Horizon Year (2045) With Project
1 Valley View St., Cerritos Av. to Ball Rd.	🟢	🟢	🟡
2 Valley View St., Lincoln Av. to Crescent Av.	🟢	🟢	🟢
3 Valley View St., SR-91 Freeway to Orangethorpe Av.	🟢	🟢	🟢
4 Valley View St., Orangethorpe Av. to 183rd St.	🟢	🟢	🟢
5 Knott Av., Lincoln Av. to Crescent Av.	🟢	🟢	🟢
6 Knott Av., Crescent Av. to La Palma Av.	🟡	🟡	🔴
7 Knott Av., La Palma Av. to Orangethorpe Av.	🟢	🟢	🟢
8 Knott Av., Orangethorpe Av. to Artesia Bl.	🟢	🟢	🟢
9 Western Av., Lincoln Av. to Crescent Av.	🟢	🟢	🟡
10 Beach Bl., Stanton Av. to Crescent Av.	🟢	🟢	🟢
11 Beach Bl., Crescent Av. to La Palma Av.	🟢	🟢	🟢
12 Beach Bl., La Palma Av. to SR-91 Freeway	🟢	🟢	🟢
13 Beach Bl., SR-91 Freeway to Orangethorpe Av.	🟢	🟢	🔴
14 Beach Bl., Orangethorpe Av. to I-5 Freeway	🟢	🟡	🔴
15 Beach Bl., I-5 Freeway to Commonwealth Av.	🟡	🔴	🔴
16 Beach Bl., Commonwealth Av. to Artesia Bl.	🟡	🔴	🔴
17 Beach Bl., Artesia Bl. to Stage Rd.	🔴	🔴	🔴
18 Stanton Av., Crescent Av. to La Palma Av.	🟢	🟢	🟢
19 Stanton Av., La Palma Av. to Orangethorpe Av.	🔴	🔴	🔴
20 Stanton Av., Orangethorpe Av. to Whitaker St.	🟡	🟡	🟡
21 Stanton Av., Whitaker St. to Artesia Bl.	🟢	🟢	🟢
22 Dale Av., Crescent Av. to La Palma Av.	🟢	🟢	🟢
23 Dale Av., La Palma Av. to Orangethorpe Av.	🟢	🟢	🔴
24 Dale Av., Commonwealth Av. to Artesia Bl.	🟢	🟢	🟢
25 Dale Av., N of Artesia Bl.	🟢	🟡	🟡
26 Ball Rd., Valley View St. to Holder St.	🟢	🟢	🟢
27 Lincoln Av., Valley View St. to Holder St.	🟢	🔴	🔴
28 Lincoln Av., Holder St. to Knott Av.	🟢	🟡	🟡
29 Crescent Av., Valley View St. to Knott Av.	🟢	🟢	🟢
30 Crescent Av., Knott Av. to Western Av.	🟢	🟢	🟢
31 Crescent Av., Western Av. to Beach Bl.	🟢	🟢	🟡
32 La Palma Av., Knott Av. to Beach Bl.	🟢	🟢	🟢
33 La Palma Av., Stanton Av. to Dale Av.	🟢	🟢	🟢
34 Orangethorpe Av., Valley View St. to Knott Av.	🟢	🟢	🟢
35 Orangethorpe Av., Knott Av. to Beach Bl.	🟢	🟢	🟢
36 Orangethorpe Av., Beach Bl. to Stanton Av.	🟢	🟢	🟢
37 Commonwealth Av., Beach Bl. to Stanton Av.	🟢	🟢	🟢
38 Artesia Bl., Knott Av. to Beach Bl.	🟢	🟢	🟢
39 Artesia Bl., Beach Bl. to Stanton Av.	🟢	🟢	🟡
40 Malvern Av., E of Dale Av.	🟢	🟡	🟢

🟢 = A - D   🟡 = E   🔴 = F

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

#	Intersection
1	Valley View St. & Orangethorpe Av.
2	Valley View St. & Crescent Av.
3	Valley View St. & Lincoln Av.
4	Valley View St. & Ball Rd.
5	Holder St. & Lincoln Av.
6	Knott Av. & I-5 NB Ramps
7	Knott Av. & Artesia Bl.
8	I-5 SB On-Ramp & Artesia Bl.
9	I-5 NB Ramps & Artesia Bl.
10	Knott Av. & Orangethorpe Av.
11	Knott Av. & La Palma Av.
12	Knott Av. & Crescent Av.
13	Knott Av. & Lincoln Av.
14	Western Av. & Crescent Av.
15	Beach Bl. (SR-39) & Franklin St.
16	Beach Bl. (SR-39) & Artesia Bl.
17	Beach Bl. (SR-39) & Commonwealth Av.
18	Beach Bl. (SR-39) & Auto Center Dr.
19	Beach Bl. (SR-39) & I-5 SB Ramps
20	Beach Bl. (SR-39) & Orangethorpe Av.
21	Beach Bl. (SR-39) & SR-91 WB Ramps
22	Beach Bl. (SR-39) & SR-91 EB Ramps
23	Beach Bl. (SR-39) & La Palma Av.
24	Beach Bl. (SR-39) & Crescent Av.
25	Beach Bl. (SR-39) & Stanton Av.
26	Stanton Av. & Artesia Bl.
27	Stanton Av. & Commonwealth Av.
28	Stanton Av. & Whitaker St.
29	Stanton Av. & Auto Center Dr.
30	I-5 NB Off-Ramp & Auto Center Dr.
31	Stanton Av. & Orangethorpe Av.
32	Stanton Av. & La Palma Av.
33	Stanton Av. & Buena Park Downtown
34	Stanton Av. & Maple Dr.
35	Buena Park Downtown West & La Palma Av.
36	Buena Park Downtown East & La Palma Av.
37	Dale Av. & Malvern Av.
38	Dale Av. & Artesia Bl.
39	Dale Av. & La Palma Av.

TABLE 1-2: ROADWAY SEGMENT ANALYSIS LOCATIONS

#	Roadway Segment
1	Valley View St., Cerritos Av. to Ball Rd.
2	Valley View St., Lincoln Av. to Crescent Av.
3	Valley View St., SR-91 Freeway to Orangethorpe Av.
4	Valley View St., Orangethorpe Av. to 183rd St.
5	Knott Av., Lincoln Av. to Crescent Av.
6	Knott Av., Crescent Av. to La Palma Av.
7	Knott Av., La Palma Av. to Orangethorpe Av.
8	Knott Av., Orangethorpe Av. to Artesia Bl.
9	Western Av., Lincoln Av. to Crescent Av.
10	Beach Bl., Stanton Av. to Crescent Av.
11	Beach Bl., Crescent Av. to La Palma Av.
12	Beach Bl., La Palma Av. to SR-91 Freeway
13	Beach Bl., SR-91 Freeway to Orangethorpe Av.
14	Beach Bl., Orangethorpe Av. to I-5 Freeway
15	Beach Bl., I-5 Freeway to Commonwealth Av.
16	Beach Bl., Commonwealth Av. to Artesia Bl.
17	Beach Bl., Artesia Bl. to Stage Rd.
18	Stanton Av., Crescent Av. to La Palma Av.
19	Stanton Av., La Palma Av. to Orangethorpe Av.
20	Stanton Av., Orangethorpe Av. to Whitaker St.
21	Stanton Av., Whitaker St. to Artesia Bl.
22	Dale Av., Crescent Av. to La Palma Av.
23	Dale Av., La Palma Av. to Orangethorpe Av.
24	Dale Av., Commonwealth Av. to Artesia Bl.
25	Dale Av., N of Artesia Bl.
26	Ball Rd., Valley View St. to Holder St.
27	Lincoln Av., Valley View St. to Holder St.
28	Lincoln Av., Holder St. to Knott Av.
29	Crescent Av., Valley View St. to Knott Av.
30	Crescent Av., Knott Av. to Western Av.
31	Crescent Av., Western Av. to Beach Bl.
32	La Palma Av., Knott Av. to Beach Bl.
33	La Palma Av., Stanton Av. to Dale Av.
34	Orangethorpe Av., Valley View St. to Knott Av.
35	Orangethorpe Av., Knott Av. to Beach Bl.
36	Orangethorpe Av., Beach Bl. to Stanton Av.
37	Commonwealth Av., Beach Bl. to Stanton Av.
38	Artesia Bl., Knott Av. to Beach Bl.
39	Artesia Bl., Beach Bl. to Stanton Av.
40	Malvern Av., E of Dale Av.

Roadway Segments

The following study area roadway segments are currently operating at an unacceptable LOS based on the daily roadway capacity thresholds and minimum LOS criteria:

- Knott Avenue, Crescent Avenue to La Palma Avenue (#6) – LOS E
- Beach Boulevard (SR-39), I-5 Freeway to Commonwealth Avenue (#15) – LOS E
- Beach Boulevard (SR-39), Commonwealth Avenue to Artesia Boulevard (#16) – LOS E
- Beach Boulevard (SR-39), Artesia Boulevard to Stage Road (#17) – LOS F
- Stanton Avenue, La Palma Avenue to Orangethorpe Avenue (#19) – LOS F
- Stanton Avenue, Orangethorpe Avenue to Whitaker Street (#20) – LOS E

1.5.2   HORIZON YEAR (2045) CONDITIONS

Intersections

The following study area intersections are anticipated to operate at an unacceptable LOS under Horizon Year (2045) Without Project traffic conditions:

- Valley View Street & Lincoln Avenue (#3) – LOS E AM peak hour only
- Knott Avenue & Firestone Boulevard (#6) – LOS E AM peak hour only; LOS F PM peak hour only
- I-5 SB On-Ramp & Artesia Boulevard (#8) – LOS F PM peak hour only
- Knott Avenue & Crescent Avenue (#12) – LOS E PM peak hour only
- Knott Avenue & Lincoln Avenue (#13) – LOS E AM and PM peak hours
- Beach Boulevard (SR-39) & Franklin Street (#15) – LOS E AM peak hour only

The following additional study area intersections are anticipated to operate at an unacceptable LOS under Horizon Year (2045) With Project traffic conditions:

- Beach Boulevard (SR-39) & La Palma Avenue (#23) – LOS E PM peak hour only
- Stanton Avenue & Orangethorpe Avenue (#31) – LOS E PM peak hour only

Peak hour operations are anticipated to improve at the following study area intersection under Horizon Year (2045) With Project traffic conditions as compared to Horizon Year (2045) Without Project traffic conditions due to the land use and intensity changes proposed by the Project:

- Knott Avenue & Crescent Avenue (#12)

Roadway Segments

The following study area roadway segments are anticipated to operate at an unacceptable LOS based on the daily roadway capacity thresholds and minimum LOS criteria under Horizon Year (2045) Without Project traffic conditions:

- Knott Avenue, Crescent Avenue to La Palma Avenue (#6) – LOS E
- Beach Boulevard (SR-39), Orangethorpe Avenue to I-5 Freeway (#14) – LOS E
- Beach Boulevard (SR-39), I-5 Freeway to Commonwealth Avenue (#15) – LOS F
- Beach Boulevard (SR-39), Commonwealth Avenue to Artesia Boulevard (#16) – LOS F
- Beach Boulevard (SR-39), Artesia Boulevard to Stage Road (#17) – LOS F
- Stanton Avenue, La Palma Avenue to Orangethorpe Avenue (#19) – LOS F
- Stanton Avenue, Orangethorpe Avenue to Whitaker Street (#20) – LOS E
- Dale Avenue, North of Artesia Boulevard (#25) – LOS E
- Lincoln Avenue, Valley View Street to Holder Street (#27) – LOS F
- Lincoln Avenue, Holder Street to Knott Avenue (#28) – LOS E
- Malvern Avenue, East of Dale Avenue (#40) – LOS E

As shown in Table 5-2, the following additional roadway segments are anticipated to operate at an unacceptable LOS under Horizon Year (2045) With Project traffic conditions:

- Valley View Street, Cerritos Avenue to Ball Road (#1) – LOS E
- Western Avenue, Lincoln Avenue to Crescent Avenue (#9) – LOS E
- Beach Boulevard (SR-39), SR-91 Freeway to Orangethorpe Avenue (#13) – LOS F
- Dale Avenue, La Palma Avenue to Orangethorpe Avenue (#23) – LOS F
- Crescent Avenue, Western Avenue to Beach Boulevard (SR-39) – LOS E
- Artesia Boulevard, Beach Boulevard (SR-39) to Stanton Avenue (#39) – LOS E

Daily roadway segment capacities are anticipated to improve at the following study area roadway segment under Horizon Year (2045) With Project traffic conditions as compared to Horizon Year (2045) Without Project traffic conditions due to the land use and intensity changes proposed by the Project:

- Malvern Avenue, East of Dale Avenue (#40)

It should be noted, there are some locations where the roadway segment LOS is anticipated to be deficient, but the intersection is anticipated to operate at acceptable LOS (i.e., Beach Boulevard, from Commonwealth Avenue to Artesia Boulevard, and the intersection of Beach Boulevard (SR-39) & Artesia Boulevard). Roadway segment capacity analysis is based on the ratio of average daily traffic volumes and the capacity (based on roadway width and the General Plan classification) and is considered a planning level analysis.

In cases where anticipated daily volumes exceed the defined roadway segment capacity (based on the City's General Plan), a review of the more detailed peak hour intersection operations analysis is undertaken. The more detailed peak hour intersection operations analysis explicitly accounts for factors that affect roadway capacity and is utilized to determine if roadway segment widening is actually necessary. If the intersection operations for the intersections on either side of the roadway segment are anticipated to operate at an acceptable LOS during the peak hours, roadway segment widening is typically not recommended. The intersections are considered "choke points" along the roadways and if the intersection operations analysis is anticipated to operate at acceptable levels, then it is anticipated that the intersections can process the traffic volumes along the roadway segment without the need for additional roadway segment widening. Therefore, roadway segment analysis is considered a planning level analysis whereas the intersection operations analysis is considered more design level analysis.

1.6   RECOMMENDATIONS

The improvements needed to address the cumulative deficiencies identified under each analysis scenario are summarized in Table 1-3. Table 1-3 also provides a summary of the applicable costs associated with each of the recommended improvements. It should be noted, these estimated costs are for discussion purposes only. Engineering costs are at the discretion of the City Traffic Engineer. A summary of the roadway segment improvements is provided in Table 1-4.

TABLE 1-3: SUMMARY OF INTERSECTION IMPROVEMENTS

#	Intersection Location	Jurisdiction	Existing (2022)	Analysis Scenario 2045 Without Project	2045 With Project	Improvements in DIF[1]	Cost[2]
3	Valley View St. & Lincoln Av.	Buena Park, Cerritos	None	Add 3rd EB through lane	Same	No	$327,600
				Add 3rd WB through lane	Same	No	$327,600
						Total:	**$655,200**
6	Knott Av. & Firestone Bl.	Buena Park, La Mirada, Caltrans	Add EB left turn lane	Same	Same	No	$91,000
				Install a Traffic Signal	Same	No	$455,000
						Total:	**$546,000**
8	I-5 SB On-Ramp & Artesia Bl.	Buena Park, Caltrans	Install a Traffic Signal	Same	Same	No	$455,000
						Total:	**$455,000**
12	Knott Av. & Crescent Av.	Buena Park	None	Add 2nd EB left turn lane	No Longer Necessary	No	$91,000
						Total:	**$91,000**
13	Knott Av. & Lincoln Av.	Buena Park, Anaheim	None	Add 3rd EB through lane	Same	No	$327,600
				Add 3rd WB through lane	Same	No	$327,600
						Total:	**$655,200**
15	Beach Bl. (SR-39) & Franklin St.	Buena Park, Caltrans	None	Restripe the EB approach to provide one left turn lane and one shared through-right turn lane	Same	No	$45,500
						Total:	**$45,500**
23	Beach Bl. (SR-39) & La Palma Av.	Buena Park, Caltrans	None	None	Modify the traffic signal to implement lead-lag operations for the NB/SB approaches, with the SB left turn running as lag	No	$136,500
						Total:	**$136,500**
31	Stanton Av. & Orangethorpe Av.	Buena Park	None	None	Restripe the EB approach to provide dual left turn lanes, two through lanes, and a shared through-right turn lane	No	$45,500
						Total:	**$45,500**

[1] Improvements included in regional/City DIF programs have been identified as such.
[2] Costs have been estimated using the data provided in Appendix "G" of the San Bernardino CMP (2003 Update) for preliminary construction costs with an application of 1.82 factor to adjust costs to 2023.

TABLE 1-4: SUMMARY OF ROADWAY SEGMENT IMPROVEMENTS

#	Roadway	Segment Limits	Jurisdiction	Existing (2022)	Analysis Scenario 2045 Without Project	2045 With Project	Improvements in DIF[1]	Cost[2]
27	Lincoln Av.	Valley View St. to Holder St.	Buena Park, Cypress	None	Widen to 6-lanes	Same	No	$0
28	Lincoln Av.	Holder St. to Knott Av.	Buena Park	None	Widen to 6-lanes	Same	No	$104,000

[1] Improvements included in regional/City DIF programs have been identified as such.

[2] A cost of $52 per square foot has been utilized for the purposes of estimating this cost, as discussed with the City of Buena Park.

The identified improvements to the roadway segment of Lincoln Avenue, from Valley View Street to Holder Street (#27), can be accommodated by restriping the existing pavement. As such, right-of-way acquisition is not necessary since the pavement is within the existing right-of-way.

The identified improvements to the roadway segment of Lincoln Avenue, from Holder Street to Knott Avenue (#28), has been calculated assuming that up to 5-feet of additional width will be necessary on the north side of Lincoln Avenue, west of Knott Avenue. This assumes all travel lanes will be 10-feet wide. The existing roadway cross section beginning 400-feet west of Knott Avenue has sufficient roadway width to provide the additional through lanes by restriping the existing pavement. As such, the cost estimated for right-of-way acquisition is calculated for 400-feet in length along Lincoln Avenue, for an additional 5-feet of right-of-way (for a total of 2,000 square feet).

The estimated square footage is multiplied by an assumed cost of $52.00 per square foot. This value has been provided by the City of Buena Park and is based on recent right-of-way acquisition costs. It should be noted, the above estimates are provided for the purposes of calculating a cost per dwelling unit and are considered rough order of magnitude cost. Detailed design costs for any intersection improvements and roadway widening should be evaluated at some time in the future when specific improvement projects are being evaluated, at the discretion of the City Traffic Engineer. For additional discussion on the traffic fee per dwelling unit costs, see Section 6.3 *Traffic Fee per Dwelling Unit*.

2   INTRODUCTION

2.1   PROJECT OBJECTIVES

The Buena Park 2021 – 2029 Final Housing Element has been prepared by the City in compliance with the update cycle of jurisdictions within the Southern California Association of Governments (SCAG) region to address the legal mandate that requires each local government to adequately plan to meet the existing and projected housing needs of all economic segments of the local community. The overarching goals of the Buena Park 2021-2029 Final Housing Element includes:

1. Goal 1: Maintain and enhance the existing viable housing stock and neighborhoods within Buena Park.
2. Goal 2: Assist in the provision of housing that meets the needs of economic segments of the community.
3. Goal 3: Provide suitable sites for housing development which can accommodate a range of housing by type, size, location, price, and tenure.
4. Goal 4: Mitigate any potential governmental constraints to housing production and affordability.
5. Goal 5: Continue to promote equal housing opportunity in the City's housing market.

This TA analyzes and identifies potential traffic-related deficiencies resulting from the rezoning and revised General Plan land use development assumptions necessary to address the City of Buena Park's regional housing needs assessment (RHNA) allocation. The 6th Cycle Housing Element Update indicates that the City can accommodate approximately 10,322 housing units through various pending projects, its inventory of vacant/underutilized land, ADUs, and rezoned/mixed-use overlay sites. In order to achieve the increased number of housing units, the City must update the Land Use Element, Single Family Residential Zones, and Multifamily Residential Zones to allow increased densities under the land use designations and provide development standards under the zoning ordinance that accommodates increased densities up to 100 dwelling units per acre (du/ac). There are a total of 410 parcels identified as part of the 2021-2029 Housing Element Update.

Of the 410 total parcels, the City has identified 155 parcels that would require no land use or zone change. These parcels are underutilized residential lots where development is not currently built out the maximum density as currently permitted. Of these 155 parcels, 60 parcels have a Housing Opportunities Overlay where the density on this overlay will increase from the current 30 du/ac to the proposed 50 du/ac.

The remaining 255 parcels are candidates for an Affordable Housing Overlay, change of zone, or General Plan land use designation amendment. Of these 255 candidate parcels, the Housing Element identifies 253 parcels will require the addition of an Affordable Housing Overlay, 1 parcel will require a land use designation amendment, and 1 parcel will require both a land use designation amendment and a change of zone. Of the 253 parcels that will require an Affordable Housing Overlay, 74 parcels will require a land use designation amendment and 1 parcel will require both a land use designation amendment and a change of zone. In total, the Project includes the addition of Affordable Housing Overlays on 253 parcels, land use designation amendments for 77 parcels, and change of zones for 2 parcels.   A summary of the parcels and proposed land use designations are shown in Table 2-1.

Table 2-2 provides a summary of the density ranges for the proposed overlays. Table 2-3 identifies the 255 overlay addition parcels and Table 2-4 summarizes the proposed rezone parcels. Housing Element sites are shown previously on Exhibit 1-1.

TABLE 2-1: PARCEL SUMMARY FOR THE PROPOSED LAND USE AMENDMENT

Current GP LU Designation	Proposed GP LU Designation	# of Parcels
Commercial (COM)	Central Buena Park Mixed Use (CBPMU)	7
Office Professional (OP)	CBPMU	2
Total CBPMU		**9**
COM	GMU	40
High Density Residential (HDR)	GMU	2
Light Industrial (LI)	GMU	8
Commercial Office Mixed-Use (OCM)	GMU	1
Office Manufacturing (OM)	GMU	6
OP	GMU	5
Tourist Entertainment (TE)	GMU	3
Total GMU		**65**
COM	HDR	1
Medium Density Residential (MDR)	HDR	1
Open Space (OS)	HDR	1
Total HDR		**3**
Total Proposed Parcels for Land Use Amendment		**77**

Note: GP LU = General Plan Land Use

TABLE 2-2: PROPOSED RESIDENTIAL OVERLAYS

Proposed Overlay	Proposed Based Density Range (du/ac)
Mixed Use Overlay - 45	20 to 45
Mixed Use Overlay - 60	20 to 60
Mixed Use Overlay - 100	20 to 100
Hotel/Motel Conversion Overlay	Not Applicable
Religious Congregational Overlay	Up to 40
Increase Existing Housing Opportunity Overlay (30 du/ac)	Up to 50

TABLE 2-3: PARCEL SUMMARY FOR THE LAND USE & COMMUNITY DESIGN ELEMENT AND RESIDENTIAL ZONING CODE UPDATES

General Plan LU Designation	Zoning	Affordable Housing Overlay	# of Parcels
Commercial (COM)	Auto Center Specific Plan (ACSP)	Mixed Use Overlay - 45	1
General Mixed-Use (GMU)	ACSP	Mixed Use Overlay - 45	4
COM	General Commercial (CG)	Mixed Use Overlay - 45	2
GMU	CG	Mixed Use Overlay - 45	12
High-Density Residential (HDR)	CG	Mixed Use Overlay - 45	2
GMU	Commercial Manufacturing (CM)	Mixed Use Overlay - 45	21
Office Manufacturing (OM)	CM	Mixed Use Overlay - 45	12
GMU	Commercial Office (CO)	Mixed Use Overlay - 45	3
Tourist Entertainment (TE)	CO	Mixed Use Overlay - 45	2
GMU	Community Shopping (CS)	Mixed Use Overlay - 45	24
GMU	Entertainment Corridor Specific Plan (ECSP)	Mixed Use Overlay - 45	3
GMU	GMU	Mixed Use Overlay - 45	6
GMU	Light Industrial (ML)	Mixed Use Overlay - 45	13
OM	Medium Density Multifamily Residential (RM-20)	Mixed Use Overlay - 45	1
HDR	RM-20	Mixed Use Overlay - 45	1
Total Mixed Use Overlay - 45			**107**
Central Buena Park Mixed-Use (CBPMU)	ACSP	Mixed-Use Overlay - 60	20
CBPMU	CG	Mixed-Use Overlay - 60	56
CBPMU	CO	Mixed-Use Overlay - 60	36
Total Mixed Use Overlay - 60			**112**
EMU	Regional Commercial (CR)	Mixed-Use Overlay - 60	13
Total Mixed Use Overlay - 100			**13**
COM	CG	Hotel/Motel Conversion Overlay	2
OM	CM		1
Total Hotel/Motel Conversion Overlay			**3**
COM	CG	Religional Congregational & Fraternal Overlay	6
GMU	CO	Religional Congregational & Fraternal Overlay	4
Office Professional (OP)	CO	Religional Congregational & Fraternal Overlay	1
HDR	CO	Religional Congregational & Fraternal Overlay	1
HDR	RM-20	Religional Congregational & Fraternal Overlay	3
Low-Density Residential (LDR)	One-Family Residential (RS-6)	Religional Congregational & Fraternal Overlay	2
Total Religious Congregational & Fraternal Overlay			**17**
HDR	CO	Housing Opporunties Overlay	1
Total Housing Opportunities Overlay			**1**
TOTAL PROPOSED AFFORDABLE HOUSING OVERLAY PARCELS			**253**
Low-Density Multifamily Residential (RM-10)	HDR	N/A	1
RM-20	HDR	N/A	1
TOTAL NON-AFFORDABLE HOUSING OVERLAY PARCELS			**2**
TOTAL CANDIDATE PARCELS			**255**

TABLE 2-4: PARCEL SUMMARY FOR PROPOSED REZONE

Current Zoning	Proposed Zoning	# of Parcels
Community Shopping (CS)	Medium Density Multifamily Residential (RM-20)	1
Open Space (OS)	RM-20	1
Total RM-20/Proposed Rezone Parcels		**2**

The Without Project scenario represents the currently adopted land use intensities based on the City of Buena Park's 2010 General Plan Update (last comprehensive update in 2010 and reflected in the Orange County Transportation Analysis Model). The With Project scenario reflects buildout of the proposed Final Housing Element (i.e., rezoning of the vacant or underutilized sites to multifamily residential use).

2.2 ANALYSIS OVERVIEW

The study area for this TA is comprised of the roadways and intersections in the immediate Project area and includes those locations that could potentially be affected by Project traffic (e.g., located in close proximity to one or more of the rezone sites). The specific intersections identified for analysis includes all facilities where peak hour intersection volume-to-capacity (v/c) ratios and delay may fall below the acceptable threshold. This is discussed in detail in Section 3 *Methodologies*.

The TA evaluates existing and long-range traffic conditions for the following scenarios:

- Existing (2022) Conditions – Existing volumes obtained from recent traffic counts (2022) and existing traffic controls and lane configurations
- Horizon Year (2045) Without Project – Traffic volumes and transportation system representing the area-wide growth anticipated based on the currently adopted City of Buena Park General Plan land use assumptions plus reasonably foreseeable development projects as provided by the City of Buena Park.
- Horizon Year (2045) With Project – 2045 conditions with the Final Housing Element land use assumptions.

3   METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are consistent with City of Buena Park's Traffic Study Guidelines.

3.1   LEVEL OF SERVICE

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

3.2   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. LOS analysis was conducted to determine existing traffic conditions using the ICU methodology for signalized study intersections. (2) The HCM (6th Edition) methodology was used to determine LOS's for unsignalized intersections and California Department of Transportation (Caltrans) facilities. The HCM methodology expresses the LOS at an intersection in terms of average control delay time for the various intersection approaches. (3)   The HCM uses different procedures depending on the type of intersection control.

3.2.1   SIGNALIZED INTERSECTIONS

The City of Buena Park requires study area intersections to be evaluated through ICU analysis which compares forecasts peak hour traffic volumes to intersection capacity. The traffic modeling software package Traffix (Version 8) has been utilized to analyze signalized intersections in ICU. Lane capacities of 1,700 vehicles per hour of green time have been assumed for the ICU calculations, with 0.10 lost time factor (clearance) and inherent vehicle delay between cycles with an assumed signal cycle of 100 seconds. The City of La Mirada, City of Cerritos, and City of Anaheim ICU analysis is consistent with the City of Buena Park analysis; therefore, the same assumptions were applied for intersections in all jurisdictions. Table 3-1 presents the ICU level of service thresholds utilized for this traffic study. A project is deemed to have an adverse effect on an intersection if the project results in deterioration of the LOS to an unacceptable LOS. LOS designation as described in Table 3-1.

TABLE 3-1: SIGNALIZED INTERSECTION LOS THRESHOLDS WITH ICU

Level of Services	ICU
A	<0.60
B	0.61 - 0.70
C	0.71 - 0.80
D	0.81 - 0.90
E	0.91 - 1.00
F	> 1.00

Analysis of Caltrans operated facilities has been conducted in Synchro (Version 11) through the application of the HCM 6th Edition methodology for signalized intersections. Lane configurations and various other parameters such as signal timing was based on current operating characteristics as obtained from field review and signal timing worksheets provided by District 12 staff. Future lane configurations were assumed the same as existing conditions for the 2045 Without Project and 2045 With Project scenarios. Table 3-2 presents the signalized intersection delay and LOS standards throughout 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.

The peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15-minute volumes. Customary practice for LOS analysis is to use a peak 15-minute rate of flow. However, flow rates are typically expressed in vehicles per hour. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume (e.g., PHF = [Hourly Volume] / [4 x Peak 15-minute Flow Rate]). The use of a 15-minute PHF produces a more detailed analysis as compared to analyzing vehicles per hour. Existing PHFs have been used for all analysis scenarios. Per the HCM, PHF values over 0.95 often are indicative of high traffic volumes with capacity constraints on peak hour flows while lower PHF values are indicative of greater variability of flow during the peak hour. (3)

TABLE 3-2: SIGNALIZED INTERSECTION LOS THRESHOLDS WITH HCM

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

Source: HCM, 6th Edition

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

3.2.2 UNSIGNALIZED INTERSECTIONS

The City of Buena Park requires the operations of unsignalized intersections be evaluated using the methodology described in the HCM. (3) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 3-3). At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. Delay for the intersection is reported for the worst individual movement at a two-way stop-controlled intersection. For all-way stop controlled intersections, LOS is computed for the intersection as a whole (average delay).

TABLE 3-3: UNSIGNALIZED INTERSECTION LOS THRESHOLDS

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

Source: HCM, 6th Edition

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

3.3   TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term "signal warrants" refers to the list of established criteria used by Caltrans and other public agencies to quantitatively justify or determine the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TA uses the signal warrant criteria presented in the latest edition of the Caltrans California Manual on Uniform Traffic Control Devices (CA MUTCD). (4)

The signal warrant criteria for Existing study area intersections are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. The CA MUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (4) Specifically, this TA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing traffic conditions and for all future analysis scenarios for existing unsignalized intersections. Warrant 3 is appropriate to use for this TA because it provides specialized warrant criteria for intersections with rural characteristics. For the purposes of this study, the speed limit was the basis for determining whether Urban or Rural warrants were used for a given intersection. Rural warrants have been used as posted speed limits on the major roadways with unsignalized intersections are 40 miles per hour or greater while the urban warrants have been used for locations where the major roadway has speeds less than 40 miles per hour.

Future intersections that do not currently exist have been assessed regarding the potential need for new traffic signals based on future average daily traffic (ADT) volumes, using the Caltrans planning level ADT-based signal warrant analysis worksheets. Similarly, the speed limit has been used as the basis for determining the use of Urban and Rural warrants. Traffic signal warrant analyses were performed for the following study area intersection shown in Table 3-4:

TABLE 3-4: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS

#	Intersection
6	Knott Av. & Firestone Bl.
8	I-5 SB On-Ramp & Artesia Bl.

The Existing conditions traffic signal warrant analysis is presented in the subsequent section, Section 4 *Area Conditions* of this report. The traffic signal warrant analyses for future conditions are presented in Section 5 *Horizon Year (2045) Traffic Conditions* of this report. It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

3.4 ROADWAY SEGMENT CAPACITY ANALYSIS

Roadway segment operations have been evaluated using the City of Buena Park Roadway Capacity Thresholds provided in the City's General Plan. (1) These roadway capacities are "rule of thumb" estimates for planning purposes and are affected by such factors as intersections (spacing, configuration and control features), degree of access control, roadway grades, design geometrics (horizontal and vertical alignment standards), sight distance, vehicle mix (truck and bus traffic) and pedestrian bicycle traffic. In other words, while using ADT for planning purposes is suitable with regards to evaluating potential volume to capacity with future forecasts, it is not suitable for operational analysis because it does not account for the factors listed previously. As such, where the ADT based roadway segment analysis indicates a deficiency (unacceptable LOS), a review of the more detailed peak hour intersection analysis and progression analysis are undertaken. The more detailed peak hour intersection analysis explicitly accounts for factors that affect roadway capacity.

3.5 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-5 Freeway at the Artesia Boulevard, Beach Boulevard (SR-39), and Auto Center Drive interchanges and the SR-91 Freeway at the Beach Boulevard interchange. Specifically, the off-ramp queuing analysis is utilized to identify any potential queuing and "spill back" onto the freeway mainline from the off-ramps. The 95th percentile queue has also been utilized to assess the queues at the study area interchanges to identify any potential peak hour queuing issues.

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.

3.6 MINIMUM ACCEPTABLE LEVELS OF SERVICE (LOS)

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

3.6.1 CITY OF BUENA PARK, ANAHEIM, CERRITOS, AND LA MIRADA

According to the City of Buena Park, City of Anaheim, City of Cerritos', and City of La Mirada's traffic study guidelines, LOS D is the minimum acceptable condition that should be maintained during the peak commute hours. (1)

3.6.2   CALTRANS

Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D on State Highway System facilities, however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. (5) If an existing State highway facility is operating at less than this target LOS, the existing LOS should be maintained. In general, the region-wide goal for an acceptable LOS on all freeways and intersections is LOS D. Consistent with the City of Buena Park, LOS threshold of LOS D will be used as the target LOS.

3.7   DEFICIENCY CRITERIA

This section outlines the methodology used in this analysis related to identifying circulation system deficiencies. Per the City's traffic study guidelines, a v/c ratio of 0.90 (LOS D) shall be the lowest acceptable LOS at intersections and roadway segments. Therefore, a deficiency is defined where the intersection LOS falls below an acceptable LOS. (1)

4   AREA CONDITIONS

This section provides a summary of the existing circulation network, the City of Buena Park General Plan Circulation Network, and a review of existing peak hour intersection operations, traffic signal warrant, roadway segment, and off-ramp queuing analyses.

4.1   EXISTING CIRCULATION NETWORK

Pursuant to the agreement with City of Buena Park staff (Appendix 1.1), the study area includes a total of 39 intersections and 40 roadway segments as shown previously on Exhibits 1-2 and 1-3, respectively. Exhibit 4-1 illustrates the study area intersections selected for evaluation and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

4.2   CITY OF BUENA PARK 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 City of Buena Park General Plan Circulation Element, are described subsequently. Exhibit 4-2 shows the City of Buena Park General Plan Circulation Element.
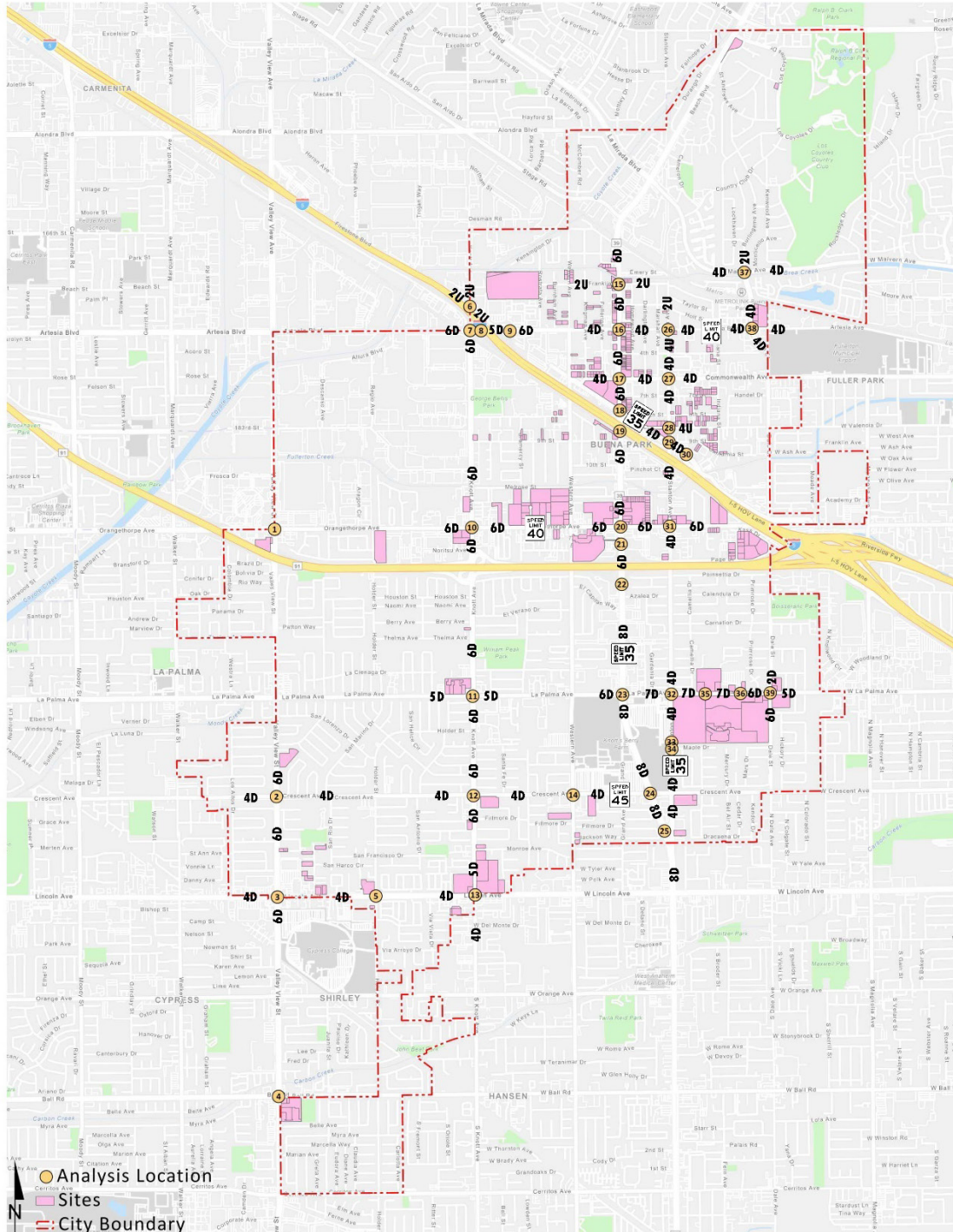
Principal Arterial Highways (8-Lanes) are identified as having a 144-foot right-of-way and 114-foot curb-to-curb measurement. Principal Arterial Highways include four lanes of travel in each direction and a 14-foot curbed and/or landscaped median. The following study area roadways within the City of Buena Park are classified as a Principal Arterial Highways:

- Beach Boulevard (SR-39), south of SR-91 Freeway
- Valley View Street, from Lincoln Avenue to SR-91 Freeway

Major Arterial Highways (6-Lanes) are identified as having a 120-foot right-of-way and 100-foot curb-to-curb measurement. Major Arterial Highways include three lanes of travel in each direction and a 14-foot curbed and/or landscaped median. The following study area roadways within the City of Buena Park are classified as a Major Arterial Highways:

- Lincoln Avenue
- Valley View Street, south of Lincoln Avenue and north of SR-91 Freeway
- Orangethorpe Avenue

EXHIBIT 4-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS (PAGE 1 OF 3)

4 = Number of Lanes

D = Divided

U = Undivided

SPEED LIMIT 25 = Speed Limit (MPH)

EXHIBIT 4-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS (PAGE 2 OF 3)

EXHIBIT 4-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS (PAGE 3 OF 3)

26 Stanton Av. & Artesia Bl.	**27** Stanton Av. & Commonwealth Av.	**28** Stanton Av. & Whitaker St.

= Traffic Signal

DEF = Defacto Right Turn

RTO = Right Turn Overlap

EXHIBIT 4-2: CITY OF BUENA PARK GENERAL PLAN CIRCULATION ELEMENT
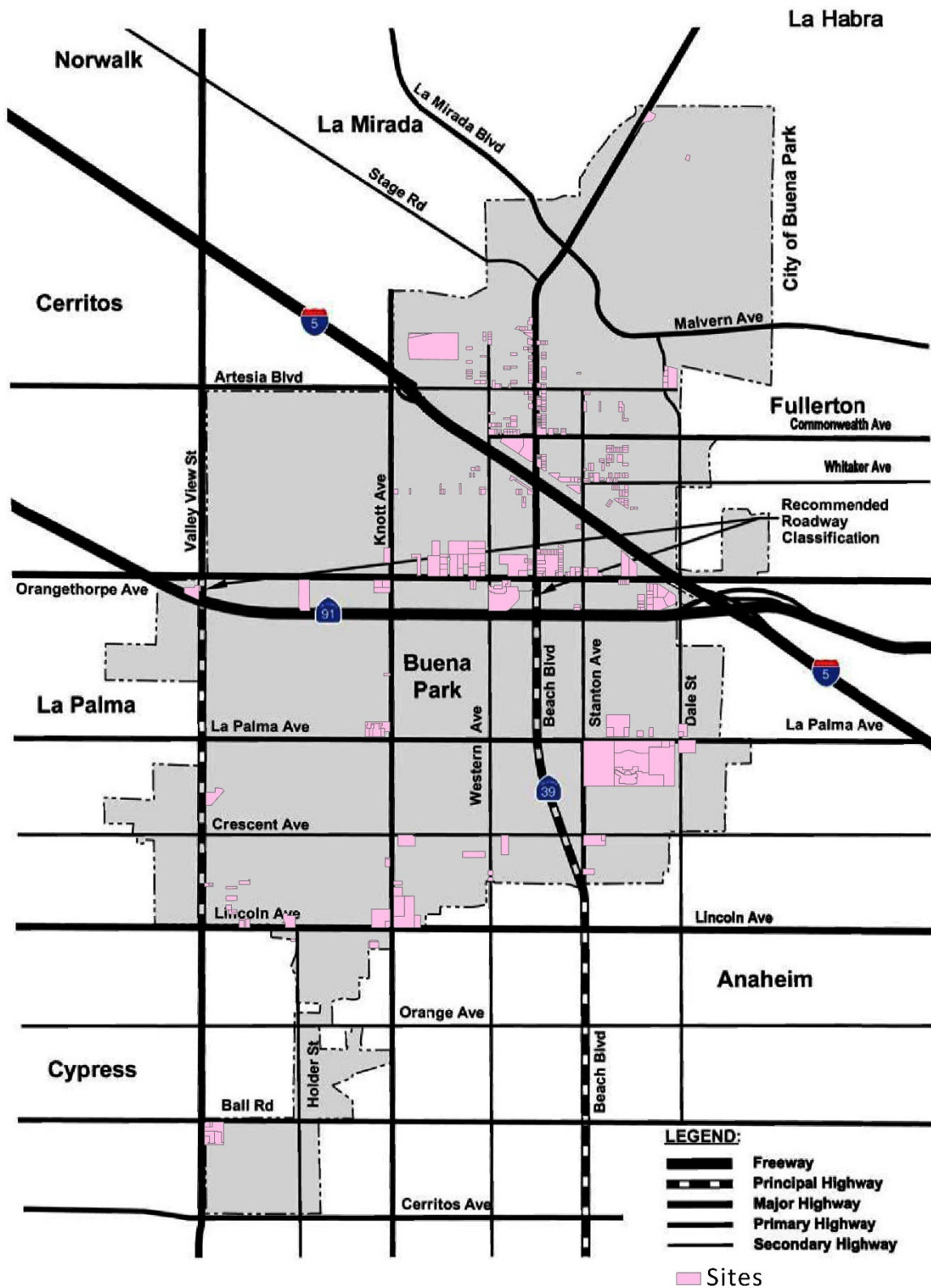
Primary Arterials (4-Lanes) are identified as having a 100-foot right-of-way and 84-foot curb-to-curb measurement. Primary Arterials include two lanes of travel in each direction and a 14-foot median. The following study area roadways within the City of Buena Park are classified as a Primary Arterial:

- Cerritos Avenue
- Ball Road
- La Palma Avenue
- Commonwealth Avenue
- Malvern Avenue
- Knott Avenue
- Stanton Avenue, south of La Palma Avenue
- Artesia Boulevard, west of Knott Avenue

Secondary Arterials (4-Lanes) are identified as having an 80-foot right-of-way and 64-foot curb-to-curb measurement. Secondary Arterials include two lanes of travel in each direction and are typically undivided roadways. The following study area roadways within the City of Buena Park are classified as a Secondary Arterial:

- Orange Avenue
- Holder Street
- Western Avenue
- Stanton Avenue, north of La Palma Avenue
- Dale Avenue
- Whitaker Avenue
- Artesia Boulevard, east of Knott Avenue

Local Streets (4-Lanes) are identified as having a 56-foot right-of-way and 40-foot curb-to-curb measurement. Local Streets include one lane of travel in each direction and are undivided roadways. Local Streets are not identified on the City of Buena Park General Plan.

4.3   BICYCLE & PEDESTRIAN FACILITIES

The City of Buena Park does not currently have a formal Bicycle Master Plan. A portion of Brea Creek Channel, east of Dale Avenue, is identified as a bike path. There are existing Class II bike lanes on portions of Stage Road, Rosecrans Avenue, Ball Road, and Malvern Avenue within City limits. There is a planned Class I bike path along Malvern Avenue, east of Dale Avenue. Sidewalks are provided on a majority of the arterial roadways and residential streets. Per the City's General Plan, the circulation system has been designed to ensure that adequate pedestrian facilities are provided throughout the City.

4.4   TRANSIT SERVICE

The study area within the City of Buena Park is currently served by Orange County Transportation Authority (OCTA), a public transit agency serving various jurisdictions within Orange County. Transit service is reviewed and updated by OCTA periodically to address ridership, budget, and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate. The City of Buena Park transit routes are illustrated on Exhibit 4-3.

4.5   TRUCK ROUTES

Truck routes within the City of Buena Park are designed by signage. The truck routes are intended to keep truck traffic on arterials and away from residential neighborhoods. Per the City's General Plan, large trucks may use any roadway classified as a Principal, Major, or Primary highway, however Beach boulevard (SR-39), Valley View Street, and Orangethorpe Avenue have been specifically identified as City truck routes. The City of Buena Park transit routes are illustrated on Exhibit 4-4.

4.6   EXISTING (2022) TRAFFIC COUNTS

The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in May 2022. The following peak hours were selected for analysis:

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

The 2022 weekday AM and 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 4.1.

Existing weekday ADT volumes are shown on Exhibit 4-5. Where actual 24-hour tube count data was not available, Existing ADT volumes were based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

Weekday PM Peak Hour (Approach Volume + Exit Volume) x 13.95 = Leg Volume

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 7.17 percent. As such, the above equation utilizing a factor of 13.95 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of 7.17 percent (i.e., 1/0.0717 = 13.95) and was assumed to sufficiently estimate ADT volumes for planning-level analyses. Existing weekday ADT and AM/PM peak hour intersection volumes are also shown on Exhibit 4-5.

EXHIBIT 4-3: CITY OF BUENA PARK TRANSIT ROUTES
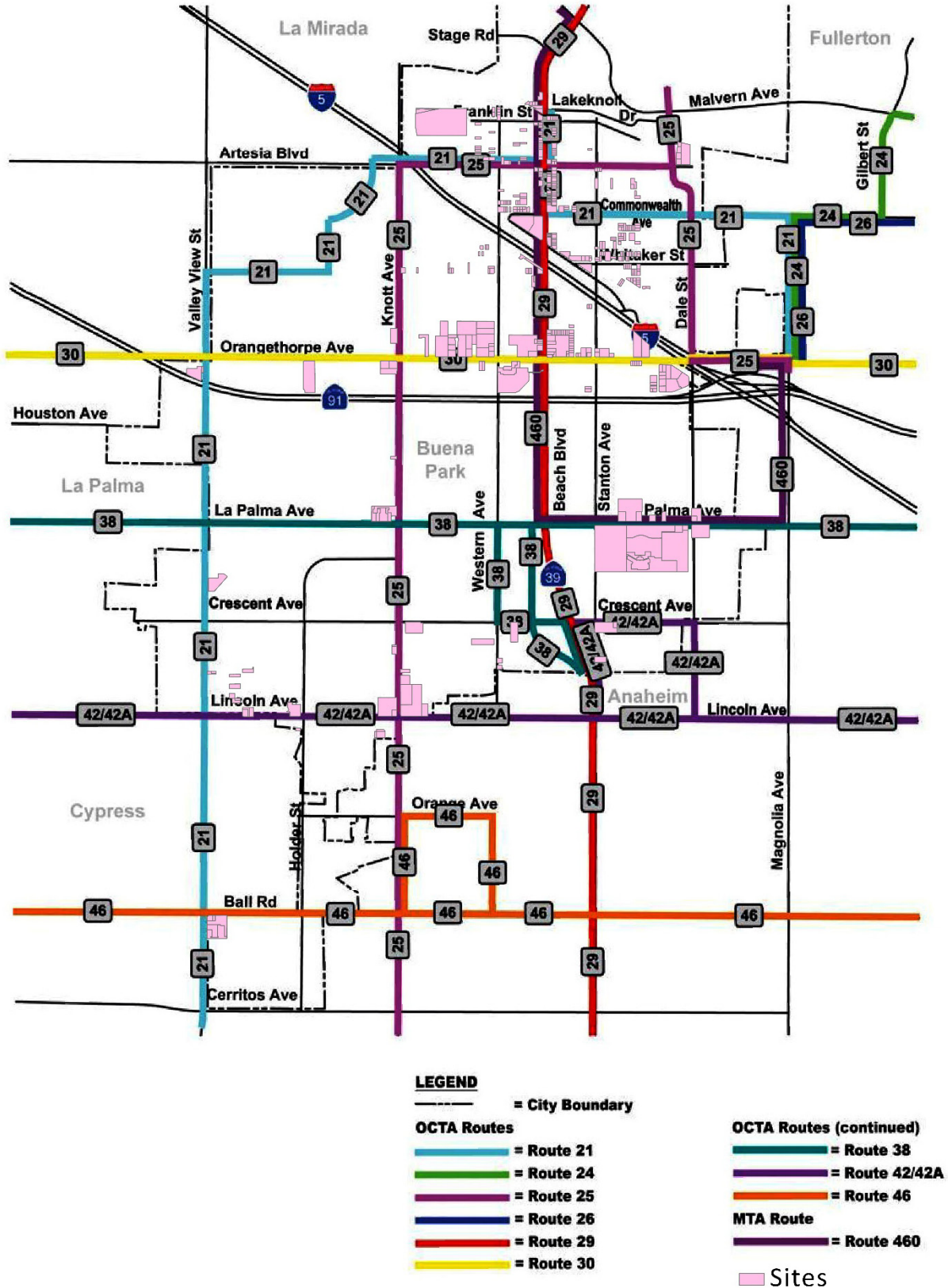
EXHIBIT 4-4: CITY OF BUENA PARK TRANSIT ROUTES

EXHIBIT 4-5: EXISTING (2022) TRAFFIC VOLUMES (PAGE 1 OF 2)

1 — Valley View St. & Orangethorpe Av.
25,500 | 22,000
99(190) 388(738) 116(201)
↰ 150(122)
← 420(579)
↩ 133(205)
243(109) →
542(523) →
145(323) →
414(427) 946(599) 145(128)
30,000 | 33,750

2 — Valley View St. & Crescent Av.
42,100 | 15,450
179(175) 1146(1206) 71(77)
↰ 74(54)
← 614(320)
↩ 135(110)
155(118) →
512(358) →
104(105) →
109(128) 1059(1389) 122(190)
16,800 | 43,650

3 — Valley View St. & Lincoln Av.
37,500 | 23,100
138(128) 1038(942) 92(189)
↰ 142(128)
← 593(482)
↩ 210(186)
177(189) →
435(535) →
144(161) →
126(152) 771(1111) 110(165)
23,000 | 37,900

4 — Valley View St. & Ball Rd.
44,550 | 21,850
190(130) 1215(1122) 183(175)
↰ 145(89)
← 674(525)
↩ 273(195)
253(215) →
610(640) →
175(175) →
210(262) 912(1463) 92(179)
27,150 | 47,400

5 — Holder St. & Lincoln Av.
6,100 | 21,700
79(60) 148(94) 50(42)
↰ 67(44)
← 656(621)
↩ 94(74)
61(85) →
523(683) →
87(90) →
109(78) 143(114) 150(92)
22,550 | 7,550

6 — Knott Av. & Firestone Bl.
5,050 | 15,300
9(27) 88(176)
↰ 289(156)
← 443(403)
14(2) →
311(360) →
11,050 | 11,250

7 — Knott Av. & Artesia Bl.
5,200 | 34,700
85(27) 158(178) 196(167)
← 833(640)
↩ 173(109)
608(1168) →
40(41) →
115(76) 376(402)
27,250 | 11,250

8 — I-5 SB On-Ramp & Artesia Bl.
31,850
← 1006(749)
↩ 358(390)
801(1143) →
379(594) →
34,700 | 13,750

9 — I-5 NB Ramps & Artesia Bl.
15,300 | 27,050
264(374) 8(8) 56(159)
↰ 356(239)
← 905(670)
↩ 341(256)
191(111) →
486(860) →
124(172) →
195(95) 155(207) 18(22)
31,850 | 10,600

10 — Knott Av. & Orangethorpe Av.
18,450 | 24,900
146(92) 308(535) 95(102)
↰ 109(58)
← 646(522)
↩ 172(200)
117(115) →
536(656) →
158(406) →
260(159) 260(159) 279(246)
27,200 | 27,450

11 — Knott Av. & La Palma Av.
35,600 | 23,400
119(134) 733(1104) 156(159)
↰ 89(123)
← 582(578)
↩ 133(186)
139(142) →
548(459) →
157(149) →
145(128) 810(843) 141(174)
22,200 | 36,050

12 — Knott Av. & Crescent Av.
31,600 | 14,250
93(114) 762(998) 70(72)
↰ 75(80)
← 446(332)
↩ 98(103)
141(131) →
504(359) →
77(70) →
66(66) 701(870) 96(76)
14,950 | 30,450

13 — Knott Av. & Lincoln Av.
31,100 | 23,050
180(181) 629(766) 125(204)
↰ 103(78)
← 495(501)
↩ 119(153)
165(251) →
493(570) →
101(115) →
185(144) 599(750) 143(145)
24,600 | 28,900

14 — Western Av. & Crescent Av.
18,900 | 13,900
81(93) 341(521) 76(91)
↰ 81(92)
← 396(318)
↩ 75(98)
123(90) →
450(326) →
76(81) →
107(88) 412(466) 61(72)
13,900 | 18,500

15 — Beach Bl. (SR-39) & Franklin St.
67,250 | 3,850
209(120) 2052(1851) 53(67)
↰ 76(142)
← 21(20)
↩ 3(18)
113(119) →
32(13) →
17(17) →
13(23) 1953(2522) 33(16)
4,350 | 62,050

16 — Beach Bl. (SR-39) & Artesia Bl.
62,350 | 19,800
246(318) 1697(1475) 70(132)
↰ 123(200)
← 603(479)
↩ 114(71)
368(485) →
380(473) →
60(73) →
139(78) 1510(1858) 69(64)
26,600 | 50,500

17 — Beach Bl. (SR-39) & Commonwealth Av.
53,200 | 11,150
51(59) 1905(1615) 33(77)
↰ 96(107)
← 182(192)
↩ 138(137)
41(79) →
157(150) →
29(34) →
36(27) 1593(1876) 136(138)
7,550 | 53,400

18 — Beach Bl. (SR-39) & Auto Center Dr.
54,950 | 11,300
31(29) 1951(1764) 38(47)
↰ 470(435)
← 304(152)
↩ 66(64)
124(276) →
46(51) →
76(116) →
147(159) 1181(1388) 55(62)
10,900 | 49,550

19 — Beach Bl. (SR-39) & I-5 SB Ramps
49,100 | 12,650
1371(1188) 691(721)
282(190) →
316(417) →
1101(1419) 127(184)
8,450 | 44,750

20 — Beach Bl. (SR-39) & Orangethorpe Av.
46,700 | 24,350
119(161) 1431(1244) 145(160)
↰ 46(82)
← 569(463)
↩ 254(207)
122(196) →
559(620) →
140(185) →
272(319) 1069(1207) 270(215)
27,100 | 47,100

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

EXHIBIT 4-5: EXISTING (2022) TRAFFIC VOLUMES (PAGE 2 OF 2)

Legend:
- #,### Average Daily Trips
- ## Peak Hour Intersection Volumes
- ##(##) AM(PM) Peak Hour Intersection Volumes

21 — Beach Bl. (SR-39) & SR-91 WB Ramps
ADT: 8,150 / 20,850 / 26,600
27(73), 5(29), 36(194)
23(126), 7(26), 19(121)
63(178), 536(692), 14(129)

22 — Beach Bl. (SR-39) & SR-91 EB Ramps
ADT: 20,050 / 24,600 / 28,750
195(229), 392(490), 50(62)
189(148), 339(453), 263(281)
62(35), 498(390), 183(188)

23 — Beach Bl. (SR-39) & La Palma Av.
ADT: 48,450 / 20,850 / 53,900 / 53,900
684(444), 1207(1340)
287(330), 513(881)
227(282), 57(111), 139(187)
18(13), 599(504), 136(104)

24 — Beach Bl. (SR-39) & Crescent Av.
ADT: 9,750 / 26,400 / 51,150
218(236), 1502(1985)
578(457)
1166(1184)
531(699)
83(89), 387(558), 112(135)
47(51), 294(303), 106(140)

25 — Beach Bl. (SR-39) & Stanton Av.
ADT: 56,800 / 26,050 / 59,100 / 13,750
135(197), 1531(1788), 213(279)
128(190), 514(511), 108(119)
1385(1393), 39(49)
121(171), 1(0), 88(181)
21(34), 125(129)
594(843)
4(7)
2(3), 0(1), 2(7)
4(8), 433(428), 39(29)

26 — Stanton Av. & Artesia Bl.
ADT: 6,200 / 14,800 / 53,900
17(15), 48(43), 51(27)
343(367), 388(282)

27 — Stanton Av. & Commonwealth Av.
ADT: 3,050 / 11,700 / 17,000
8(10), 431(523), 106(113)
49(25), 257(256), 63(53)
19(50), 301(286), 40(41)
83(89), 387(558), 112(135)

28 — Stanton Av. & Whitaker St.
ADT: 18,750 / 26,050 / 5,200
4(8), 433(428), 39(29)
2(3), 0(1), 2(7)
4(7), 594(843), 88(181)
21(34), 1(0), 125(129)

29 — Stanton Av. & Auto Center Dr.
ADT: 23,050 / 19,550 / 45,800
49(44), 508(514), 3(6)
37(108), 90(598), 34(419)
42(49), 369(536), 52(19)
263(443), 838(629), 107(114)

30 — I-5 NB Off-Ramp & Auto Center Dr.
ADT: 40,300 / 6,000 / 40,300
1600(1539), 4(24)
1256(1316), 1(9)
1(11), 374(483)

31 — Stanton Av. & Orangethorpe Av.
ADT: 20,200 / 20,200 / 21,200
227(282), 57(111), 139(187)
18(13), 599(504), 136(104)

32 — Stanton Av. & La Palma Av.
ADT: 20,050 / 11,100 / 28,300
81(87), 374(472), 90(192)
41(82), 395(552), 240(228)
58(115), 444(781), 100(126)
75(185)

33 — Stanton Av. & Buena Park Downtown
ADT: 21,650 / 350 / 22,250
512(633), 18(31)
690(821), 24(54)
16(66), 12(40)

34 — Stanton Av. & Maple Dr.
ADT: 21,600 / 25,750 / 23,050
487(640), 37(33)
659(847), 2(5)
55(28), 3(0)

35 — Buena Park Downtown West & La Palma Av.
ADT: 6,850 / 18,050 / 27,550
35(165), 2(13), 24(49)
3(76), 0(16), 3(43)
29(67), 553(853), 37(40)
43(182), 752(923), 6(103)

36 — Buena Park Downtown East & La Palma Av.
ADT: 24,600 / 26,750 / 8,600
21(84), 692(746), 66(185)

37 — Dale Av. & Malvern Av.
ADT: 3,400 / 26,750 / 23,500
15(2), 165(53), 33(31)
247(513), 196(127), 403(457)
31(26), 572(676), 404(357)
10(3)

38 — Dale Av. & Artesia Bl.
ADT: 21,900 / 21,400 / 11,000
431(348), 301(235), 24(9)
50(82), 217(553), 62(34)
139(179), 59(106)
11(24), 160(235), 25(39)
249(400)

39 — Dale Av. & La Palma Av.
ADT: 6,350 / 28,500 / 29,500
30(39), 67(72), 107(74)
132(176), 54(89), 229(205)
25(66), 618(760), 104(235)
25(114), 392(766), 150(197)

Additional ADT values: 18,950 / 11,700 / 11,700 / 350 / 2,650 / 900 / 32,100 / 200 / 18,050 / 16,550 / 4,050 / 13,600 / 13,850 / 22,350 / 30,900 / 18,350 / 25,450 / 11,100

4.7   INTERSECTION OPERATIONS ANALYSIS

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 3.2 *Intersection Capacity Analysis* of this report. The intersection operations analysis results are summarized in Table 4-1, which indicates the following existing study area intersections are currently operating at unacceptable LOS during the peak hours:

- Knott Avenue & Firestone Boulevard (#6) – LOS E PM peak hour only
- I-5 SB On-Ramp & Artesia Boulevard (#8) – LOS F PM peak hour only

The intersection operations analysis worksheets are included in Appendix 4.2 of this TA.

4.8   TRAFFIC SIGNAL WARRANTS ANALYSIS

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

- I-5 SB On-Ramp & Artesia Boulevard (#8)

Existing conditions traffic signal warrant analysis worksheets are provided in Appendix 4.3 of this TA.

4.9   ROADWAY SEGMENT ANALYSIS

The roadway capacities utilized for the study area roadway segment analysis are obtained from the City of Buena Park General Plan. These roadway segment capacities are approximate figures only and are used at the General Plan level to assist in determining the roadway functional classification (number of through lanes) needed to meet traffic demand. It should be noted, capacities have been interpolated where applicable for roadway sections not identified in the City's General Plan. Table 4-2 provides a summary of the Existing (2022) conditions roadway segment capacity analysis. As shown in Table 4-2, the following study area roadway segments are currently operating at an unacceptable LOS based on the daily roadway capacity thresholds and minimum LOS criteria:

- Knott Avenue, Crescent Avenue to La Palma Avenue (#6) – LOS E
- Beach Boulevard (SR-39), I-5 Freeway to Commonwealth Avenue (#15) – LOS E
- Beach Boulevard (SR-39), Commonwealth Avenue to Artesia Boulevard (#16) – LOS E
- Beach Boulevard (SR-39), Artesia Boulevard to Stage Road (#17) – LOS F
- Stanton Avenue, La Palma Avenue to Orangethorpe Avenue (#19) – LOS F
- Stanton Avenue, Orangethorpe Avenue to Whitaker Street (#20) – LOS E

TABLE 4-1: INTERSECTION ANALYSIS FOR EXISTING (2022) CONDITIONS

#	Intersection	Traffic Control[2]	Delay[1] (secs.) AM	Delay[1] (secs.) PM	Level of Service AM	Level of Service PM	ICU (v/c) AM	ICU (v/c) PM	Level of Service AM	Level of Service PM
1	Valley View St. & Orangethorpe Av.	TS	--[4]	--[4]	--	--	0.531	0.540	A	A
2	Valley View St. & Crescent Av.	TS	--[4]	--[4]	--	--	0.717	0.625	C	B
3	Valley View St. & Lincoln Av.	TS	--[4]	--[4]	--	--	0.600	0.633	A	B
4	Valley View St. & Ball Rd.	TS	--[4]	--[4]	--	--	0.753	0.684	C	B
5	Holder St. & Lincoln Av.	TS	--[4]	--[4]	--	--	0.466	0.462	A	A
6	Knott Av. & Firestone Bl.	CSS	25.9	**39.1**	D	**E**	--[3]	--[3]	--	--
7	Knott Av. & Artesia Bl.	TS	30.1	31.0	C	C	--[3]	--[3]	--	--
8	I-5 SB On-Ramp & Artesia Bl.	CSS	21.7	**>100.0**	C	**F**	--[3]	--[3]	--	--
9	I-5 NB Ramps & Artesia Bl.	TS	31.5	28.3	C	C	--[3]	--[3]	--	--
10	Knott Av. & Orangethorpe Av.	TS	--[4]	--[4]	--	--	0.550	0.568	A	A
11	Knott Av. & La Palma Av.	TS	--[4]	--[4]	--	--	0.640	0.744	B	C
12	Knott Av. & Crescent Av.	TS	--[4]	--[4]	--	--	0.591	0.631	A	B
13	Knott Av. & Lincoln Av.	TS	--[4]	--[4]	--	--	0.618	0.685	B	B
14	Western Av. & Crescent Av.	TS	--[4]	--[4]	--	--	0.496	0.510	A	A
15	Beach Bl. (SR-39) & Franklin St.	TS	44.2	35.8	D	D	--[3]	--[3]	--	--
16	Beach Bl. (SR-39) & Artesia Bl.	TS	48.9	32.2	D	C	--[3]	--[3]	--	--
17	Beach Bl. (SR-39) & Commonwealth Av.	TS	18.4	12.1	B	B	--[3]	--[3]	--	--
18	Beach Bl. (SR-39) & Auto Center Dr.	TS	45.9	33.8	D	C	--[3]	--[3]	--	--
19	Beach Bl. (SR-39) & I-5 SB Ramps	TS	25.1	35.2	C	D	--[3]	--[3]	--	--
20	Beach Bl. (SR-39) & Orangethorpe Av.	TS	26.8	26.8	C	C	--[3]	--[3]	--	--
21	Beach Bl. (SR-39) & SR-91 WB Ramps	TS	21.3	15.0	C	B	--[3]	--[3]	--	--
22	Beach Bl. (SR-39) & SR-91 EB Ramps	TS	12.3	10.3	B	B	--[3]	--[3]	--	--
23	Beach Bl. (SR-39) & La Palma Av.	TS	35.6	39.0	D	D	--[3]	--[3]	--	--
24	Beach Bl. (SR-39) & Crescent Av.	TS	23.7	26.6	C	C	--[3]	--[3]	--	--
25	Beach Bl. (SR-39) & Stanton Av.	TS	8.4	9.8	A	A	--[3]	--[3]	--	--
26	Stanton Av. & Artesia Bl.	TS	--[4]	--[4]	--	--	0.491	0.531	A	A
27	Stanton Av. & Commonwealth Av.	TS	--[4]	--[4]	--	--	0.435	0.501	A	A
28	Stanton Av. & Whitaker St.	TS	--[4]	--[4]	--	--	0.397	0.496	A	A
29	Stanton Av. & Auto Center Dr.	TS	--[4]	--[4]	--	--	0.557	0.606	A	B
30	I-5 NB Off-Ramp & Auto Center Dr.	TS	15.3	47.5	B	D	--[3]	--[3]	--	--
31	Stanton Av. & Orangethorpe Av.	TS	--[4]	--[4]	--	--	0.647	0.620	A	B
32	Stanton Av. & La Palma Av.	TS	--[4]	--[4]	--	--	0.438	0.576	A	A
33	Stanton Av. & Buena Park Downtown	TS	--[4]	--[4]	--	--	0.330	0.414	A	A
34	Stanton Av. & Maple Dr.	TS	--[4]	--[4]	--	--	0.350	0.386	A	A
35	Buena Park Downtown West & La Palma Av.	TS	--[4]	--[4]	--	--	0.263	0.537	A	A
36	Buena Park Downtown East & La Palma Av.	TS	--[4]	--[4]	--	--	0.280	0.517	A	A
37	Dale Av. & Malvern Av.	TS	--[4]	--[4]	--	--	0.663	0.641	B	B
38	Dale Av. & Artesia Bl.	TS	--[4]	--[4]	--	--	0.580	0.664	A	B
39	Dale Av. & La Palma Av.	TS	--[4]	--[4]	--	--	0.568	0.604	A	B

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

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

[2] CSS = Cross-Street Stop; TS = Traffic Signal

[3] ICU reported for signalized intersections only, with the exception of signalized intersections under the jurisdiction of Caltrans.

[4] HCM is reported for unsignalized intersections and signalized intersections within the jurisdiction of Caltrans.

TABLE 4-2: ROADWAY SEGMENT ANALYSIS FOR EXISTING (2022) CONDITIONS

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	Existing (2022) Volume	V/C[2]	LOS[3]
1	Valley View St.	Cerritos Av. to Ball Rd.	6D	56,300	47,377	0.842	D
2	Valley View St.	Lincoln Av. to Crescent Av.	6D	60,200	43,638	0.725	C
3	Valley View St.	SR-91 Freeway to Orangethorpe Av.	5D	46,950	33,761	0.719	C
4	Valley View St.	Orangethorpe Av. to 183rd St.	6D	56,300	25,500	0.453	A
5	Knott Av.	Lincoln Av. to Crescent Av.	5D	46,875	31,110	0.664	B
6	Knott Av.	Crescent Av. to La Palma Av.	4D	37,500	**36,049**	**0.961**	**E**
7	Knott Av.	La Palma Av. to Orangethorpe Av.	5D	46,875	27,427	0.585	A
8	Knott Av.	Orangethorpe Av. to Artesia Bl.	5D	46,875	18,443	0.393	A
9	Western Av.	Lincoln Av. to Crescent Av.	4D	25,000	18,875	0.755	C
10	Beach Bl. (SR-39)	Stanton Av. to Crescent Av.	8D	80,300	40,318	0.502	A
11	Beach Bl. (SR-39)	Crescent Av. to La Palma Av.	8D	80,300	51,158	0.637	B
12	Beach Bl. (SR-39)	La Palma Av. to SR-91 Freeway	8D	80,300	59,082	0.736	C
13	Beach Bl. (SR-39)	SR-91 Freeway to Orangethorpe Av.	6D	56,300	48,351	0.859	D
14	Beach Bl. (SR-39)	Orangethorpe Av. to I-5 Freeway	6D	56,300	46,690	0.829	D
15	Beach Bl. (SR-39)	I-5 Freeway to Commonwealth Av.	6D	56,300	**54,952**	**0.976**	**E**
16	Beach Bl. (SR-39)	Commonwealth Av. to Artesia Bl.	6D	56,300	**53,195**	**0.945**	**E**
17	Beach Bl. (SR-39)	Artesia Bl. to Stage Rd.	6D	56,300	**62,232**	**1.105**	**F**
18	Stanton Av.	Crescent Av. to La Palma Av.	4D	37,500	21,387	0.570	A
19	Stanton Av.	La Palma Av. to Orangethorpe Av.	4D	25,000	**25,432**	**1.017**	**F**
20	Stanton Av.	Orangethorpe Av. to Whitaker St.	4D	25,000	**23,033**	**0.921**	**E**
21	Stanton Av.	Whitaker St. to Artesia Bl.	4D	25,000	18,764	0.751	C
22	Dale Av.	Crescent Av. to La Palma Av.	4D	25,000	13,588	0.544	A
23	Dale Av.	La Palma Av. to Orangethorpe Av.	2D	12,500	6,334	0.507	A
24	Dale Av.	Commonwealth Av. to Artesia Bl.	4D	25,000	10,994	0.440	A
25	Dale Av.	North of Artesia Bl.	4D	25,000	21,889	0.876	D
26	Ball Rd.	Valley View St. to Holder St.	4D	37,500	21,826	0.582	A
27	Lincoln Av.	Valley View St. to Holder St.	4D	37,600	23,122	0.615	B
28	Lincoln Av.	Holder St. to Knott Av.	4D	37,600	23,033	0.613	B
29	Crescent Av.	Valley View St. to Knott Av.	4D	25,000	15,471	0.619	B
30	Crescent Av.	Knott Av. to Western Av.	4D	25,000	14,258	0.570	A
31	Crescent Av.	Western Av. to Beach Bl. (SR-39)	4D	25,000	19,559	0.782	C
32	La Palma Av.	Knott Av. to Beach Bl. (SR-39)	5D	46,875	26,074	0.556	A
33	La Palma Av.	Stanton Av. to Dale Av.	6D	56,250	28,297	0.503	A
34	Orangethorpe Av.	Valley View St. to Knott Av.	5D	46,950	27,204	0.579	A
35	Orangethorpe Av.	Knott Av. to Beach Bl. (SR-39)	5D	46,950	27,120	0.578	A
36	Orangethorpe Av.	Beach Bl. (SR-39) to Stanton Av.	6D	56,300	24,595	0.437	A
37	Commonwealth Av.	Beach Bl. (SR-39) to Stanton Av.	4D	37,500	11,714	0.312	A
38	Artesia Bl.	Knott Av. to Beach Bl. (SR-39)	5D	31,250	26,590	0.851	D
39	Artesia Bl.	Beach Bl. (SR-39) to Stanton Av.	4D	25,000	18,945	0.758	C
40	Malvern Av.	East of Dale Av.	4D	37,500	30,915	0.824	D

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

[1] These maximum roadway capacities are based on the City of Buena Park's thresholds. Capacities have been interpolated for roadway sections that are not readily available in the City's General Plan.

[2] V/C = Volume to Capacity Ratio

[3] LOS = Level of Service

4.10   OFF-RAMP QUEUING ANALYSIS

Queuing analysis findings for Existing (2022) are presented in Table 4-3. As shown in Table 4-3, there are no movements that are currently experiencing queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows under Existing (2022) traffic conditions. Worksheets for Existing (2022) traffic conditions queuing analysis are provided in Appendix 4.3.

TABLE 4-3: PEAK HOUR QUEUING SUMMARY FOR EXISTING (2022) CONDITIONS

Intersection	Movement	Available Stacking Distance (Feet)	95th Percentile Queue (Feet)		Acceptable? [1]	
			AM Peak Hour	PM Peak Hour	AM	PM
Knott Av. & Artesia Bl. (#7)	SBL	180	114	104	Yes	Yes
	SBT	2,060	108	122	Yes	Yes
I-5 NB Ramps & Artesia Bl. (#9)	NBL	1,100	214	115	Yes	Yes
	NBT	1,100	218	270	Yes	Yes
	NBR	560	0	0	Yes	Yes
Beach Bl. (SR-39) & I-5 SB Ramps (#19)	EBL	1,310	328	238	Yes	Yes
	EBR	470	357 [2]	585 [2,3]	Yes	Yes
Beach Bl. (SR-39) & SR-91 WB Ramps (#21)	WBL	1,230	184	293	Yes	Yes
	WBL/R	450	210	330	Yes	Yes
	WBR	300	309 [3]	329 [3]	Yes	Yes
Beach Bl. (SR-39) & SR-91 EB Ramps (#22)	EBL	1,180	346	349	Yes	Yes
	EBL/R	1,180	347	335	Yes	Yes
	EBR	420	302	302	Yes	Yes
I-5 NB Off-Ramp & Auto Center Dr. (#30)	NBL	820	578 [2]	595 [2]	Yes	Yes
	NBL/T/R	820	564 [2]	577 [2]	Yes	Yes

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

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

[3] Although 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the SR-91 Freeway mainline.

4.11   PROJECT DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

Improvements needed to achieve acceptable LOS have been identified at intersections, roadway segments, and off-ramps that are currently operating at a deficient LOS under Existing (2022) traffic conditions.

4.11.1 IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

Improvement strategies have been recommended at intersections that have been identified as deficient under Existing (2022) traffic conditions in an effort to achieve an acceptable LOS. The effectiveness of the recommended improvement strategies to address Existing (2022) traffic deficiencies are presented in Table 4-4. Worksheets for Existing (2022) conditions, with improvements, HCM calculation worksheets are provided in Appendix 4.5.

TABLE 4-4: INTERSECTION ANALYSIS FOR EXISTING (2022) CONDITIONS WITH IMPROVEMENTS

| | Traffic Control[3] | Intersection Approach Lanes[1] | | | | | | | | | | | | Delay[2]/ICU (secs.)/(v/c) | | Level of Service | |
| | | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | | | | |
		L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
6 Knott Av. & Firestone Bl.																	
Without Improvements:	CSS	0	0	0	1	0	1	**1**	1	0	0	1	0	25.9	**39.1**	D	**E**
With Improvements:	CSS	0	0	0	1	0	1	**1**	1	0	0	1	0	25.8	21.0	D	C
8 I-5 SB On-Ramp & Artesia Bl.																	
Without Improvements:	**TS**	0	0	0	0	0	0	0	3	0	1	2	0	21.7	**>100.0**	C	**F**
With Improvements:	**TS**	0	0	0	0	0	0	0	3	0	1	2	0	6.3	11.1	A	B

[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; **TS** = Improvement

4.11.2 IMPROVEMENTS TO ADDRESS DEFICIENCIES AT ROADWAY SEGMENTS

As shown previously in Table 4-2, there are study area roadway segments that are currently operating at an unacceptable LOS under Existing (2022) traffic conditions. However, these deficient roadway segments are currently built out to their ultimate cross-section width according to the City of Buena Park General Plan. Additionally, the study area intersections on either side of the deficient roadway segments are currently operating at an acceptable LOS during the peak hours under Existing (2022) traffic conditions, which indicates that additional roadway widening is not necessary since the intersections can process the peak hour flows. As such, no roadway segment widening has been identified for the deficient study area roadway segments.

4.11.3 IMPROVEMENTS TO ADDRESS DEFICIENCIES AT OFF-RAMPS

As shown previously in Table 4-3, there are no study area off-ramps that are currently experiencing queuing issues during the peak hours under Existing (2022) traffic conditions. As such, no improvements have been identified.

5   HORIZON YEAR (2045) TRAFFIC CONDITIONS

This section discusses the methods used to develop Horizon Year (2045) Without and With Project traffic forecasts, and the resulting intersection operations, traffic signal warrant, roadway segment operations, and off-ramp queuing analyses.

5.1   VOLUME DEVELOPMENT FOR HORIZON YEAR

Traffic projections for Horizon Year (2045) Without Project and With Project conditions were derived from the OCTAM Version 5.5 maintained by the OCTA. To develop future traffic forecast volumes in the vicinity of the 255 parcels proposed to be rezoned to multifamily residential use, changes in population related to each proposed site were added to the OCTAM models and rerun to forecast the "With Project" scenario. To identify trips generated for use in the OCTAM, residential units do not require a conversion rate as they translate directly to dwelling units. Additional variables are used to further define the characteristics of the residential component, such as population per household, median income, etc. Residential based trips are calculated based on the trip rate for each dwelling unit and associated data. Based on the citywide land use data and the regional socioeconomic growth projections, future trip activity is estimated and assigned to the roadway circulation system. Model output is post-processed based on established postprocessing methodologies. The post-processor applies the model's projected growth to each turning movement for both Horizon Year (2045) Without and With Project scenarios, forecasting a value that reflects future growth.

The traffic forecasts reflect the area-wide growth anticipated between Existing (2022) conditions and Horizon Year (2045) 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 (2045) 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 March 2022. The OCTAM has a base (validation) year of 2016 and a horizon (future forecast) year of 2045. The difference in model volumes (2045-2016) defines the growth in traffic over the 24-year period.

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

The OCTAM uses an AM peak period-to-peak hour factor of 0.36 and a PM peak period-to-peak hour factor of 0.266. These factors represent the relationship of the highest single AM peak hour to the modeled 3-hour AM peak period (an even distribution would result in a factor of 0.33) and the highest single PM peak hour to the modeled 4-hour PM peak period (an even distribution would result in a factor of 0.25).

Typically, the model growth is prorated and is subsequently added to the existing (base validation) traffic volumes to represent Horizon Year traffic conditions. In an effort to conduct a conservative analysis, reductions to traffic forecasts from either Existing traffic conditions were not assumed as part of this analysis. As such, in conjunction with the addition of cumulative projects that are not consistent with the General Plan, additional growth has also been applied on a movement-by-movement basis, where applicable, to estimate reasonable Horizon Year (2045) forecasts. Future estimated peak hour traffic data was used for new intersections and intersections with an anticipated change in travel patterns to further refine the Horizon Year (2045) peak hour forecasts.

The future Horizon Year (2045) Without Project and With Project peak hour turning movements were then reviewed by Urban Crossroads, Inc. for reasonableness, and in some cases, were adjusted to achieve flow conservation, reasonable growth, and reasonable diversion between parallel routes. Flow conservation checks ensure that traffic flow between two closely spaced intersections, such as two adjacent driveway locations, is verified in order to make certain that vehicles leaving one intersection are entering the adjacent intersection and that there is no unexplained loss of vehicles. The result of this traffic forecasting procedure is a series of traffic volumes which are suitable for traffic operations analysis. Post processing has been performed for the weekday AM and PM peak hours only as these are the only time periods where traffic model data was readily available. The post processed volumes for Horizon Year (2045) Without and With Project traffic conditions are provided in Appendices 5.1 and 5.2, respectively.

5.2   WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes the refined post-process volumes obtained from the OCTAM (included in Appendix 5.1 of this TA). The weekday ADT and AM/PM peak hour volumes which can be expected for Horizon Year (2045) Without Project traffic conditions are shown on Exhibit 5-1.

5.3   WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes the refined post-process volumes obtained from the OCTAM, with changes to reflect the traffic generated by the proposed Project (included in Appendix 5.2) of this TA. The weekday ADT and AM/PM peak hour volumes which can be expected for Horizon Year (2045) With Project traffic conditions are shown on Exhibit 5-2.

Project only ADT and AM/PM peak hour intersection turning movement volumes were developed based on the net change between With and Without Project forecast volumes and are shown on Exhibit 5-3.

EXHIBIT 5-1: HORIZON YEAR (2045) WITHOUT PROJECT TRAFFIC VOLUMES (PAGE 1 OF 2)

1 — Valley View St. & Orangethorpe Av.
29,050 / 28,700
↰ 239(131)
← 663(561)
↵ 199(219)
117(200) 432(857) 131(374)
253(99) →
536(759) →
141(293) →
497(464) 1146(720) 167(245)
33,400 / 38,300

2 — Valley View St. & Crescent Av.
44,100 / 19,650
↰ 66(82)
← 624(472)
↵ 158(207)
180(153) 1327(1340) 99(73)
143(109) →
745(350) →
125(120) →
126(133) 1081(1486) 196(214)
18,300 / 48,050

3 — Valley View St. & Lincoln Av.
42,000 / 40,400
↰ 208(248)
← 1028(1104)
↵ 319(308)
191(166) 1259(885) 264(269)
204(242) →
1230(891) →
172(177) →
131(202) 677(1248) 237(241)
37,250 / 41,850

4 — Valley View St. & Ball Rd.
45,650 / 23,300
↰ 139(118)
← 656(722)
↵ 295(230)
209(149) 1482(1103) 260(177)
289(232) →
915(630) →
226(168) →
207(317) 885(1714) 117(191)
28,500 / 49,400

5 — Holder St. & Lincoln Av.
6,950 / 35,000
↰ 65(46)
← 666(621)
↵ 90(76)
94(73) 167(117) 49(51)
70(92) →
520(716) →
99(96) →
145(86) 181(132) 164(103)
40,250 / 9,550

6 — Knott Av. & Firestone Bl.
5,900 / 17,950
↰ 340(183)
← 521(474)
11(32) 103(207)
16(2) →
366(423) →
13,000 / —

7 — Knott Av. & Artesia Bl.
8,550 / 38,400
← 796(868)
↵ 265(109)
146(103) 425(499) 363(357)
702(1149) →
67(53) →
129(146) 455(433)
28,600 / 15,150

8 — I-5 SB On-Ramp & Artesia Bl.
— / 36,300
← 1061(977)
↵ 348(448)
1164(1409) →
356(530) →
38,400 / 12,100

9 — I-5 NB Ramps & Artesia Bl.
18,000 / 31,700
↰ 418(281)
← 908(876)
↵ 421(401)
310(442) 9(9) 66(187)
235(143) →
712(1021) →
219(245) →
192(107) 182(243) 18(24)
36,300 / 12,000

10 — Knott Av. & Orangethorpe Av.
23,900 / 34,000
↰ 113(73)
← 645(887)
↵ 228(280)
191(150) 535(721) 200(129)
137(109) →
970(650) →
236(430) →
285(270) 285(270) 491(322)
36,300 / 37,150

11 — Knott Av. & La Palma Av.
37,050 / 28,150
↰ 106(181)
← 613(728)
↵ 158(281)
112(114) 776(1129) 247(156)
140(142) →
818(455) →
157(153) →
125(122) 794(937) 205(191)
24,050 / 37,400

12 — Knott Av. & Crescent Av.
33,250 / 15,900
↰ 68(28)
← 454(574)
↵ 120(55)
85(362) 831(979) 70(25)
176(299) →
776(445) →
129(246) →
71(324) 675(853) 114(40)
18,400 / 31,700

13 — Knott Av. & Lincoln Av.
32,000 / 35,650
↰ 127(127)
← 875(995)
↵ 217(227)
192(218) 689(690) 170(302)
216(277) →
1180(939) →
195(115) →
233(180) 527(769) 230(222)
36,150 / 30,050

14 — Western Av. & Crescent Av.
20,900 / 15,600
↰ 87(110)
← 416(386)
↵ 77(94)
91(126) 373(558) 87(106)
179(103) →
647(323) →
105(74) →
108(93) 429(483) 63(65)
15,800 / 19,900

15 — Beach Bl. (SR-39) & Franklin St.
70,600 / 4,250
↰ 77(135)
← 29(26)
↵ 4(19)
243(152) 2044(1909) 51(73)
126(140) →
41(18) →
22(22) →
18(31) 1967(2505) 38(19)
5,700 / 65,150

16 — Beach Bl. (SR-39) & Artesia Bl.
65,450 / 24,250
↰ 153(315)
← 646(608)
↵ 138(117)
222(251) 1724(1511) 116(168)
308(425) →
503(538) →
49(67) →
122(65) 1538(1920) 111(86)
27,100 / 53,650

17 — Beach Bl. (SR-39) & Commonwealth Av.
56,550 / 15,850
↰ 127(124)
← 251(516)
↵ 171(147)
57(162) 1904(1771) 56(110)
91(80) →
553(184) →
60(32) →
37(62) 1553(1856) 211(166)
14,750 / 56,500

18 — Beach Bl. (SR-39) & Auto Center Dr.
57,550 / 13,600
↰ 496(418)
← 404(154)
↵ 107(92)
26(21) 2021(1823) 29(40)
141(339) →
60(76) →
132(214) →
193(180) 1239(1500) 68(80)
12,750 / 53,350

19 — Beach Bl. (SR-39) & I-5 SB Ramps
52,850 / 13,200
1474(1279) 642(683)
326(210) →
556(591) →
1174(1550) 178(227)
11,150 / 52,300

20 — Beach Bl. (SR-39) & Orangethorpe Av.
54,900 / 30,150
↰ 93(88)
← 971(448)
↵ 365(235)
145(158) 1473(1433) 157(204)
166(221) →
569(824) →
136(222) →
290(344) 1350(1441) 255(302)
32,950 / 54,450

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

URBAN CROSSROADS

Buena Park General Plan & Zoning code Update Traffic Analysis

EXHIBIT 5-1: HORIZON YEAR (2045) WITHOUT PROJECT TRAFFIC VOLUMES (PAGE 2 OF 2)

Legend:

Average Daily Trips

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

Average Daily Trips

EXHIBIT 5-2: HORIZON YEAR (2045) WITH PROJECT TRAFFIC VOLUMES (PAGE 1 OF 2)

1 Valley View St. & Orangethorpe Av.	2 Valley View St. & Crescent Av.	3 Valley View St. & Lincoln Av.	4 Valley View St. & Ball Rd.	5 Holder St. & Lincoln Av.

1 — Valley View St. & Orangethorpe Av. — 29,600 / 31,650 / 34,900 / 39,850
110(179) 432(875) 138(337)
↰ 245(128)
← 641(562)
↵ 204(250)
246(94) ↱
547(743) →
137(324) ↘
481(486) 1179(734) 180(259)

2 — Valley View St. & Crescent Av. — 46,300 / 22,200 / 18,600 / 50,150
181(152) 1346(1351) 110(97)
↰ 72(95)
← 631(475)
↵ 161(210)
138(102) ↱
738(379) →
113(99) ↘
117(122) 1080(1574) 202(263)

3 — Valley View St. & Lincoln Av. — 43,300 / 41,550 / 38,050 / 43,800
187(166) 1300(878) 247(266)
↰ 203(246)
← 1035(1115)
↵ 339(309)
198(250) ↱
1175(926) →
181(184) ↘
138(214) 690(1295) 238(252)

4 — Valley View St. & Ball Rd. — 48,700 / 23,500 / 29,800 / 52,550
216(158) 1567(1149) 268(181)
↰ 139(122)
← 652(737)
↵ 300(231)
290(240) ↱
910(622) →
230(168) ↘
206(331) 886(1809) 117(193)

5 — Holder St. & Lincoln Av. — 8,200 / 36,400 / 41,700 / 10,600
126(112) 156(87) 72(35)
↰ 69(42)
← 1121(1335)
↵ 106(79)
107(137) ↱
1370(1114) →
167(163) ↘
143(173) 114(112) 178(91)

6 Knott Av. & Firestone Bl.	7 Knott Av. & Artesia Bl.	8 I-5 SB On-Ramp & Artesia Bl.	9 I-5 NB Ramps & Artesia Bl.	10 Knott Av. & Orangethorpe Av.

6 — Knott Av. & Firestone Bl. — 6,200 / 18,800 / 13,600
11(33) 108(217)
↰ 356(192)
← 545(496)
17(2) ↱
383(443) →

7 — Knott Av. & Artesia Bl. — 9,250 / 41,850 / 30,150 / 18,800
146(87) 440(583) 339(330)
← 818(841)
↵ 272(144)
689(1138) →
73(66) ↘
157(152) 521(496)

8 — I-5 SB On-Ramp & Artesia Bl. — 40,750 / 41,850
← 1090(985)
↵ 381(497)
1200(1493) →
349(471) ↘

9 — I-5 NB Ramps & Artesia Bl. — 18,850 / 37,400 / 40,750 / 12,950
325(460) 10(10) 69(196)
↰ 438(294)
← 960(917)
↵ 476(465)
241(150) ↱
766(1127) →
194(216) ↘
187(105) 191(255) 22(34)

10 — Knott Av. & Orangethorpe Av. — 29,450 / 43,150 / 41,100 / 46,600
188(154) 597(831) 193(155)
↰ 128(83)
← 672(927)
↵ 270(330)
152(111) ↱
974(710) →
274(450) ↘
290(280) 290(280) 493(393)

11 Knott Av. & La Palma Av.	12 Knott Av. & Crescent Av.	13 Knott Av. & Lincoln Av.	14 Western Av. & Crescent Av.	15 Beach Bl. (SR-39) & Franklin St.

11 — Knott Av. & La Palma Av. — 37,850 / 28,950 / 26,150 / 40,600
108(113) 799(1128) 190(160)
↰ 93(165)
← 625(745)
↵ 171(290)
150(130) ↱
819(481) →
210(159) ↘
147(135) 797(925) 192(219)

12 — Knott Av. & Crescent Av. — 37,050 / 18,750 / 19,250 / 32,900
91(203) 898(1063) 87(101)
↰ 89(106)
← 461(478)
↵ 122(89)
191(168) ↱
756(397) →
110(58) ↘
58(79) 710(956) 107(72)

13 — Knott Av. & Lincoln Av. — 36,200 / 36,300 / 38,200 / 32,050
211(236) 751(716) 199(327)
↰ 143(143)
← 888(1022)
↵ 218(224)
222(309) ↱
1161(959) →
179(113) ↘
219(175) 550(820) 230(216)

14 — Western Av. & Crescent Av. — 23,200 / 17,000 / 19,300 / 20,500
99(142) 392(562) 79(105)
↰ 84(112)
← 438(384)
↵ 78(84)
186(132) ↱
619(355) →
115(83) ↘
118(91) 425(484) 57(56)

15 — Beach Bl. (SR-39) & Franklin St. — 73,650 / 5,300 / 14,950 / 65,750
347(324) 2031(1814) 35(61)
↰ 68(118)
← 47(63)
↵ 4(20)
269(285) ↱
75(39) →
60(56) ↘
31(84) 1891(2438) 32(20)

16 Beach Bl. (SR-39) & Artesia Bl.	17 Beach Bl. (SR-39) & Commonwealth Av.	18 Beach Bl. (SR-39) & Auto Center Dr.	19 Beach Bl. (SR-39) & I-5 SB Ramps	20 Beach Bl. (SR-39) & Orangethorpe Av.

16 — Beach Bl. (SR-39) & Artesia Bl. — 66,050 / 25,250 / 26,250 / 55,050
202(277) 1712(1656) 99(206)
↰ 138(285)
← 642(577)
↵ 149(110)
306(392) ↱
515(577) →
58(64) ↘
136(66) 1556(1863) 116(97)

17 — Beach Bl. (SR-39) & Commonwealth Av. — 58,000 / 18,600 / 15,650 / 56,300
73(140) 1887(1605) 60(88)
↰ 127(155)
← 250(543)
↵ 131(162)
109(106) ↱
552(187) →
56(37) ↘
38(52) 1598(1866) 180(128)

18 — Beach Bl. (SR-39) & Auto Center Dr. — 60,300 / 13,500 / 13,300 / 57,950
22(17) 2084(1864) 26(29)
↰ 494(407)
← 401(158)
↵ 128(119)
131(307) ↱
58(66) →
148(257) ↘
201(199) 1306(1581) 73(80)

19 — Beach Bl. (SR-39) & I-5 SB Ramps — 57,400 / 13,900 / 12,000 / 57,750
1553(1403) 653(671)
↰
←
↵
338(206) ↱
527(637) ↘
1242(1654) 167(239)

20 — Beach Bl. (SR-39) & Orangethorpe Av. — 61,100 / 32,550 / 39,250 / 60,850
165(170) 1501(1577) 166(193)
↰ 98(87)
← 972(469)
↵ 328(252)
191(249) ↱
578(863) →
133(270) ↘
296(392) 1450(1554) 242(303)

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

EXHIBIT 5-2: HORIZON YEAR (2045) WITH PROJECT TRAFFIC VOLUMES (PAGE 2 OF 2)

21 — Beach Bl. (SR-39) & SR-91 WB Ramps
62,550 | 23,900 | 7,000 | 55,350
711(520), 1593(1764), 349(459), 491(806), 1400(1701), 407(320)

22 — Beach Bl. (SR-39) & SR-91 EB Ramps
65,350 | 10,800 | 19,200 | 66,100
417(410), 1667(2160), 597(634), 444(279), 1210(1387), 546(764)

23 — Beach Bl. (SR-39) & La Palma Av.
63,650 | 33,150 | 33,850 | 56,750
203(171), 1550(2150), 277(209), 66(213), 594(753), 72(224), 92(255), 659(683), 108(256), 303(196), 1683(1372), 85(48)

24 — Beach Bl. (SR-39) & Crescent Av.
50,750 | 17,050 | 22,700 | 44,450
159(181), 1838(1314), 109(94), 91(124), 443(422), 36(44), 113(328), 565(366), 116(102), 88(87), 1166(1818), 6(20)

25 — Beach Bl. (SR-39) & Stanton Av.
44,450 | 10,150 | 54,650
1889(1809), 8(26), 1(8), 597(576), 1303(1456), 2(15)

26 — Stanton Av. & Artesia Bl.
3,750 | 22,600 | 26,100 | 14,100
21(18), 59(53), 63(33), 22(16), 861(541), 215(72), 10(12), 428(839), 165(148), 329(349), 70(137), 142(181)

27 — Stanton Av. & Commonwealth Av.
16,650 | 16,400 | 17,800 | 18,000
68(53), 272(271), 137(72), 81(60), 303(585), 83(136), 47(50), 699(300), 45(34), 59(142), 462(549), 124(138)

28 — Stanton Av. & Whitaker St.
19,600 | 6,300 | 450 | 23,700
5(10), 583(411), 36(45), 13(91), 1(0), 167(189), 2(4), 0(1), 2(9), 5(9), 649(879), 164(165)

29 — Stanton Av. & Auto Center Dr.
24,550 | 31,500 | 33,650 | 30,200
83(45), 666(559), 3(5), 205(460), 1041(761), 103(133), 45(105), 102(659), 51(522), 76(70), 420(645), 55(26)

30 — I-5 NB Off-Ramp & Auto Center Dr.
250 | 7,400 | 22,200 | 20,650
0(6), 0(1), 0(1), 175(199), 5(6), 176(127), 1174(1148), 1174(1148), 110(162)

31 — Stanton Av. & Orangethorpe Av.
25,500 | 46,550 | 32,850 | 31,650
192(218), 405(587), 150(225), 251(96), 1194(535), 460(325), 81(170), 845(1092), 56(168), 107(76), 324(465), 455(552)

32 — Stanton Av. & La Palma Av.
27,200 | 32,150 | 33,600 | 27,900
98(107), 483(583), 71(170), 68(154), 609(816), 146(132), 56(139), 487(849), 85(111), 78(135), 500(724), 298(270)

33 — Stanton Av. & Buena Park Downtown
26,650 | 3,300 | 26,600
670(830), 22(38), 20(81), 15(54), 916(1011), 35(66)

34 — Stanton Av. & Maple Dr.
28,150 | 900 | 27,600
647(850), 38(35), 56(30), 3(0), 894(1047), 2(5)

35 — Buena Park Downtown West & La Palma Av.
8,450 | 33,900 | 39,550 | 5,000
43(203), 2(16), 30(60), 36(82), 681(1050), 46(49), 53(224), 1179(1136), 7(127), 4(94), 0(20), 4(53)

36 — Buena Park Downtown East & La Palma Av.
10,050 | 35,400 | 32,750 | 10,600
33(90), 6(36), 44(239), 78(219), 660(852), 17(159), 26(103), 1355(918), 81(228), 28(155), 9(32), 23(149)

37 — Dale Av. & Malvern Av.
4,150 | 33,450 | 29,600 | 26,800
18(2), 203(65), 41(38), 38(32), 547(759), 454(461), 12(4), 624(662), 326(188), 273(528), 241(156), 566(502)

38 — Dale Av. & Artesia Bl.
25,000 | 12,650 | 22,500 | 12,850
434(454), 335(252), 51(10), 19(25), 171(365), 30(50), 339(373), 248(210), 55(119), 35(141), 242(652), 91(50)

39 — Dale Av. & La Palma Av.
13,650 | 35,200 | 39,550 | 13,500
156(186), 282(133), 263(130), 72(168), 381(1151), 118(115), 275(186), 1083(850), 312(270), 138(383), 168(190), 114(164)

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

EXHIBIT 5-3: PROJECT ONLY TRAFFIC VOLUMES (PAGE 1 OF 2)

1 Valley View St. & Orangethorpe Av.	2 Valley View St. & Crescent Av.	3 Valley View St. & Lincoln Av.	4 Valley View St. & Ball Rd.	5 Holder St. & Lincoln Av.

1 — Valley View St. & Orangethorpe Av.
600 / 2,950
-7(-21), 0(18), 7(-37)
↳ 6(-3)
← -22(1)
↲ 5(31)
-7(-5) → ; 11(-16) → ; -4(31)
-16(22), 33(14), 13(14)
1,500 / 1,500

2 — Valley View St. & Crescent Av.
2,200 / 2,550
1(-1), 19(11), 11(24)
↳ 6(13)
← 7(3)
↲ 3(3)
-5(-7) → ; -7(29) → ; -12(-21)
-9(-11), -1(88), 6(49)
300 / 2,100

3 — Valley View St. & Lincoln Av.
1,300 / 1,150
-4(0), 41(-7), -17(-3)
↳ -5(-2)
← 7(11)
↲ 20(1)
-6(8) → ; -55(35) → ; 9(7)
7(12), 13(47), 1(11)
800 / 2,000

4 — Valley View St. & Ball Rd.
3,000 / 200
7(9), 85(46), 8(4)
↳ 0(4)
← -4(15)
↲ 5(1)
1(8) → ; -5(-8) → ; 4(0)
-1(14), 1(95), 0(2)
1,350 / 3,150

5 — Holder St. & Lincoln Av.
1,250 / 1,400
32(39), -11(-30), 23(-16)
↳ 4(-4)
← 455(714)
↲ 16(3)
37(45) → ; 850(398) → ; 68(67)
-2(87), -67(-20), 14(-12)
1,450 / 1,000

6 — Knott Av. & Firestone Bl.
300 / 850
1(2), 5(10)
↳ 16(9)
← 2 5(22)
1(0) → ; 17(20) →
600

7 — Knott Av. & Artesia Bl.
700 / 3,400
0(-16), 15(84), -24(27)
← 22(-27)
↲ 7(35)
-13(-11) → ; 6(13)
28(6), 66(63)
1,500 / 3,650

8 — I-5 SB On-Ramp & Artesia Bl.
4,450
36(84) → ; -7(-59)
3,400

9 — I-5 NB Ramps & Artesia Bl.
850 / 5,700
15(19), 3(9)
↳ 20(13)
← 52(41)
↲ 55(64)
7(6) → ; 54(106) → ; -25(-29)
-5(-2), 9(12), 4(10)
4,450 / 1,250

10 — Knott Av. & Orangethorpe Av.
5,550 / 9,150
-3(4), 62(110), -7(26)
↳ 15(10)
← 27(40)
↲ 42(50)
15(2) → ; 4(60) → ; 38(20)
5(10), 5(10), 2(71)
4,750 / 9,450

11 — Knott Av. & La Palma Av.
800 / 750
-4(-1), 23(-1), -57(4)
↳ -13(-16)
← 12(17)
↲ 13(9)
10(-12) → ; 1(26) → ; 53(6)
22(13), 3(-12), -13(28)
2,150 / 3,250

12 — Knott Av. & Crescent Av.
3,850 / 2,900
6(-159), 67(84), 17(76)
↳ 21(78)
← 7(-96)
↲ 2(34)
15(-131) → ; -20(-48) → ; -19(-188)
-13(-245), 35(103), -7(32)
900 / 1,250

13 — Knott Av. & Lincoln Av.
4,200 / 700
19(18), 62(26), 29(25)
↳ 16(16)
← 13(27)
↲ 1(-3)
6(32) → ; -19(20) → ; -16(-2)
-14(-5), 23(51), 0(6)
2,050 / 2,000

14 — Western Av. & Crescent Av.
2,300 / 1,400
8(16), 19(4), -8(-1)
↳ -3(2)
← 22(-2)
↲ 1(-10)
7(29) → ; -28(32) → ; 10(9)
10(-2), -4(1), -6(-9)
3,500 / 600

15 — Beach Bl. (SR-39) & Franklin St.
3,050 / 1,050
104(172), -13(-95), -16(-12)
↳ -9(-17)
← 18(37)
↲ 0(1)
143(145) → ; 34(21) → ; 38(34)
13(53), -76(-67), -6(1)
9,200 / 600

16 — Beach Bl. (SR-39) & Artesia Bl.
600 / 1,000
-20(26), -12(145), -17(38)
↳ -15(-30)
← -4(-31)
↲ 11(-7)
-2(-33) → ; 12(39) → ; 9(-3)
14(1), 18(-57), 5(11)
Nominal / 1,350

17 — Beach Bl. (SR-39) & Commonwealth Av.
1,450 / 2,800
16(-22), -17(-166), 4(-22)
↳ 0(31)
← -1(27)
↲ -40(15)
18(26) → ; -1(3) → ; -4(5)
1(-10), 45(10), -31(-38)
900 / Nominal

18 — Beach Bl. (SR-39) & Auto Center Dr.
2,750 / Nominal
-4(-4), 63(41), -3(-11)
↳ -2(-11)
← -3(4)
↲ 21(27)
-10(-32) → ; -2(-10) → ; 16(43)
8(19), 67(81), 5(0)
550 / 4,600

19 — Beach Bl. (SR-39) & I-5 SB Ramps
4,550 / 700
79(124), 11(-12)
12(-4) → ; -29(46)
68(104), -11(12)
850 / 5,450

20 — Beach Bl. (SR-39) & Orangethorpe Av.
6,250 / 2,400
20(12), 28(144), 9(-11)
↳ 5(-1)
← 1(21)
↲ -37(17)
25(28) → ; 9(39) → ; -3(48)
6(48), 100(113), -13(1)
6,300 / 6,400

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

Average Daily Trips

EXHIBIT 5-3: PROJECT ONLY TRAFFIC VOLUMES (PAGE 2 OF 2)

21 Beach Bl. (SR-39) & SR-91 WB Ramps	22 Beach Bl. (SR-39) & SR-91 EB Ramps	23 Beach Bl. (SR-39) & La Palma Av.	24 Beach Bl. (SR-39) & Crescent Av.	25 Beach Bl. (SR-39) & Stanton Av.

Intersection 21 — Beach Bl. (SR-39) & SR-91 WB Ramps
14,050 / 1,600 / 100 / 3,750
- 27(-10) 77(173)
- 1(104)
- 7(-93)
- -23(106) 15(0)
- -42(44) → [22]

Intersection 22 — Beach Bl. (SR-39) & SR-91 EB Ramps
4,450 / 350 / 2,300 / 3,000
- 73(100) 11(-20)
- -42(44) →
- 24(36) ↘
- 34(62) -1(10)

Intersection 23 — Beach Bl. (SR-39) & La Palma Av.
3,600 / 2,850 / 2,600 / 3,000
- 25(9) 4(57) 72(-13)
- -7(20)
- -61(64)
- -19(12)
- -3(22)
- 88(-30) 6(-3) 19(-11) 15(-7)
- -19(12)

Intersection 24 — Beach Bl. (SR-39) & Crescent Av.
Nominal / 1,400 / 1,250 / 300 / Nominal
- 6(-6) 12(0) -8(3)
- -9(8)
- 19(-9)
- 1(0)
- -11(14)
- -38(7) 10(-5) -12(68)
- 1(-1)

Intersection 25 — Beach Bl. (SR-39) & Stanton Av.
300 / 1,050 / 1,900
- 334(-170) 0(-4)
- -1(-1)
- 52(81)
- -285(111) 0(4)

26 Stanton Av. & Artesia Bl.	27 Stanton Av. & Commonwealth Av.	28 Stanton Av. & Whitaker St.	29 Stanton Av. & Auto Center Dr.	30 I-5 NB Off-Ramp & Auto Center Dr.

Intersection 26 — Stanton Av. & Artesia Bl.
150 / 1,050 / 1,150 / Nominal
- 1(1) 3(2) 3(2)
- 1(1)
- 50(1)
- 11(0)
- 0(1)
- -15(43) -20(-14) 3(6) -5(3)
- -11(-3)

Intersection 27 — Stanton Av. & Commonwealth Av.
Nominal / 1,750 / Nominal / 1,600
- -53(-14) -3(-6) 36(6)
- 18(8)
- -40(48)
- 30(36)
- -30(-27)
- 6(-51) -27(-4) 2(18) 48(35)
- -16(-9)

Intersection 28 — Stanton Av. & Whitaker St.
1,100 / Nominal / 200
- 23(1) 3(10)
- 0(30)
- 0(12)
- 9(29) 21(-12)

Intersection 29 — Stanton Av. & Auto Center Dr.
250 / 8,900 / 3,400 / 2,350
- -2(-10) 25(24)
- 0(28)
- 44(-3)
- 11(16)
- -5(-22)
- 3(29) 4(2) -1(22) 7(6)
- 1(22)

Intersection 30 — I-5 NB Off-Ramp & Auto Center Dr.
350 / 1,000 / 5,850
- 11(9)
- 8(6) →
- 44(31) 44(31) 0(-1)

31 Stanton Av. & Orangethorpe Av.	32 Stanton Av. & La Palma Av.	33 Stanton Av. & Buena Park Downtown	34 Stanton Av. & Maple Dr.	35 Buena Park Downtown West & La Palma Av.

Intersection 31 — Stanton Av. & Orangethorpe Av.
1,900 / 4,900 / 2,400 / 2,900
- -21(11) 11(37) 20(45)
- 43(14)
- 20(39)
- 63(29)
- -4(-5)
- 13(69) -22(-1) -4(32) 27(85)
- -6(-16)

Intersection 32 — Stanton Av. & La Palma Av.
1,400 / 1,600 / 2,800 / 2,400
- 6(8) 31(22) -7(-10)
- 7(-30)
- 140(-81)
- 33(-19)
- -9(18)
- -90(73) 8(25) -15(84) -14(20)
- -1(19)

Intersection 33 — Stanton Av. & Buena Park Downtown
1,200 / 150 / 1,200
- -12(86) 1(2)
- 1(4)
- 1(7)
- 78(32) 2(0)

Intersection 34 — Stanton Av. & Maple Dr.
2,450 / 2,500
- -10(94)
- -2(0)
- 82(31)

Intersection 35 — Buena Park Downtown West & La Palma Av.
400 / 1,550 / 1,800 / 250
- 2(9) 0(1) 1(3)
- 2(4)
- 31(47)
- 2(2)
- 2(10)
- 212(51) 0(4) 0(1) 0(2)
- 0(6)

36 Buena Park Downtown East & La Palma Av.	37 Dale Av. & Malvern Av.	38 Dale Av. & Artesia Bl.	39 Dale Av. & La Palma Av.	

Intersection 36 — Buena Park Downtown East & La Palma Av.
450 / 1,600 / 1,500
- 2(4) 0(2) 2(11)
- 4(10)
- 30(38)
- 1(7)
- 1(5)
- 458(41) 1(7) 0(1) 1(7)
- 4(10)

Intersection 37 — Dale Av. & Malvern Av.
200 / Nominal / 550 / 500
- 1(0) 9(3) 2(2)
- 2(1)
- -8(0)
- -6(20)
- 1(0)
- 10(-9) 8(25) 11(7) 30(-15)
- -4(9)

Intersection 38 — Dale Av. & Artesia Bl.
600 / 2,900 / 1,200 / 650
- -10(5) -7(26) 8(2)
- 0(4)
- -9(57)
- -1(12)
- 10(-21)
- 37(21) -1(-2) 10(7) 15(7)
- -2(3)

Intersection 39 — Dale Av. & La Palma Av.
2,600 / 5,000 / 8,450 / Nominal
- 43(91) 50(15) -32(9)
- 9(-9)
- 6(270)
- -14(-37)
- 172(42)
- 376(-9) 12(159) 33(37) -45(-12)
- 162(26)

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

5.4   INTERSECTION OPERATIONS ANALYSIS

5.4.1   HORIZON YEAR (2045) WITHOUT PROJECT TRAFFIC CONDITIONS

LOS calculations were conducted for the study intersections to evaluate their operations under Horizon Year (2045) Without Project conditions with roadway and intersection geometrics consistent with existing traffic conditions. As shown in Table 5-1, the following study area intersections are anticipated to operate at an unacceptable LOS under Horizon Year (2045) Without Project traffic conditions:

- Valley View Street & Lincoln Avenue (#3) – LOS E AM peak hour only
- Knott Avenue & Firestone Boulevard (#6) – LOS E AM peak hour only; LOS F PM peak hour only
- I-5 SB On-Ramp & Artesia Boulevard (#8) – LOS F PM peak hour only
- Knott Avenue & Crescent Avenue (#12) – LOS E PM peak hour only
- Knott Avenue & Lincoln Avenue (#13) – LOS E AM and PM peak hours
- Beach Boulevard (SR-39) & Franklin Street (#15) – LOS E AM peak hour only

The intersection operations analysis worksheets for Horizon Year (2045) Without Project traffic conditions are included in Appendix 5.3 of this TA.

5.4.2   HORIZON YEAR (2045) WITH PROJECT TRAFFIC CONDITIONS

As shown in Table 5-1, the following additional study area intersections are anticipated to operate at an unacceptable LOS under Horizon Year (2045) With Project traffic conditions:

- Beach Boulevard (SR-39) & La Palma Avenue (#23) – LOS E PM peak hour only
- Stanton Avenue & Orangethorpe Avenue (#31) – LOS E PM peak hour only

Peak hour operations are anticipated to improve at the following study area intersection under Horizon Year (2045) With Project traffic conditions as compared to Horizon Year (2045) Without Project traffic conditions due to the land use and intensity changes proposed by the Project:

- Knott Avenue & Crescent Avenue (#12)

The intersection operations analysis worksheets for Horizon Year (2045) With Project traffic conditions are included in Appendix 5.4 of this TA.

5.5   TRAFFIC SIGNAL WARRANTS ANALYSIS

The traffic signal warrant analysis for Horizon Year (2045) traffic conditions are based on the peak hour volumes or planning level ADT volume-based traffic signal warrants. The intersection of Knott Avenue & Firestone Boulevard (#6) is anticipated to meet a traffic signal warrant under Horizon Year (2045) Without Project traffic conditions, in addition to the intersection identified under Existing (2022) traffic conditions. The traffic signal warrant analysis sheets for Horizon Year (2045) Without Project and With Project traffic conditions are provided in Appendices 5.5 and 5.6, respectively.

TABLE 5-1: INTERSECTION ANALYSIS FOR HORIZON YEAR (2045) CONDITIONS

#	Intersection	Traffic Control[2]	2045 Without Project Delay[1] (secs.) AM	PM	Level of Service AM	PM	ICU (v/c) AM	PM	Level of Service AM	PM	2045 With Project Delay[1] (secs.) AM	PM	Level of Service AM	PM	ICU (v/c) AM	PM	Level of Service AM	PM
1	Valley View St. & Orangethorpe Av.	TS	--[4]	--[4]	--	--	0.647	0.618	B	B	--[4]	--[4]	--	--	0.653	0.634	B	B
2	Valley View St. & Crescent Av.	TS	--[4]	--[4]	--	--	0.782	0.696	C	B	--[4]	--[4]	--	--	0.780	0.693	C	B
3	Valley View St. & Lincoln Av.	TS	--[4]	--[4]	--	--	**0.929**	0.829	E	D	--[4]	--[4]	--	--	**0.931**	0.850	E	D
4	Valley View St. & Ball Rd.	TS	--[4]	--[4]	--	--	0.848	0.803	D	D	--[4]	--[4]	--	--	0.866	0.831	D	D
5	Holder St. & Lincoln Av.	TS	--[4]	--[4]	--	--	0.499	0.490	A	A	--[4]	--[4]	--	--	0.781	0.741	C	C
6	Knott Av. & Firestone Bl.[5]	AWS	**83.0**	**55.7**	F	F	--[3]	--[3]	--	--	>100.0	71.1	F	F	--[3]	--[3]	--	--
7	Knott Av. & Artesia Bl.	TS	44.0	41.4	D	D	--[3]	--[3]	--	--	54.8	51.3	D	D	--[3]	--[3]	--	--
8	I-5 SB On-Ramp & Artesia Bl.	CSS	24.8	>100.0	C	F	--[3]	--[3]	--	--	32.6	>100.0	D	F	--[3]	--[3]	--	--
9	I-5 NB Ramps & Artesia Bl.	TS	39.3	37.6	D	D	--[3]	--[3]	--	--	43.9	46.7	D	D	--[3]	--[3]	--	--
10	Knott Av. & Orangethorpe Av.	TS	--[4]	--[4]	--	--	0.762	0.703	C	C	--[4]	--[4]	--	--	0.790	0.764	C	C
11	Knott Av. & La Palma Av.	TS	--[4]	--[4]	--	--	0.735	0.803	C	D	--[4]	--[4]	--	--	0.763	0.823	C	D
12	Knott Av. & Crescent Av.	TS	--[4]	--[4]	--	--	0.723	**0.931**	C	E	--[4]	--[4]	--	--	0.725	0.730	C	C
13	Knott Av. & Lincoln Av.	TS	--[4]	--[4]	--	--	**0.908**	**0.915**	E	E	--[4]	--[4]	--	--	**0.908**	**0.967**	E	E
14	Western Av. & Crescent Av.	TS	--[4]	--[4]	--	--	0.566	0.562	A	A	--[4]	--[4]	--	--	0.576	0.584	A	A
15	Beach Bl. (SR-39) & Franklin St.	TS	60.8	48.8	E	D	--[3]	--[3]	--	--	>200.0	186.4	F	F	--[3]	--[3]	--	--
16	Beach Bl. (SR-39) & Artesia Bl.	TS	46.8	37.4	D	D	--[3]	--[3]	--	--	45.0	33.1	D	C	--[3]	--[3]	--	--
17	Beach Bl. (SR-39) & Commonwealth Av.	TS	36.7	27.0	D	C	--[3]	--[3]	--	--	37.1	34.5	D	C	--[3]	--[3]	--	--
18	Beach Bl. (SR-39) & Auto Center Dr.	TS	41.7	41.6	D	D	--[3]	--[3]	--	--	26.9	40.9	C	D	--[3]	--[3]	--	--
19	Beach Bl. (SR-39) & I-5 SB Ramps	TS	35.6	52.7	D	D	--[3]	--[3]	--	--	42.3	53.8	D	D	--[3]	--[3]	--	--
20	Beach Bl. (SR-39) & Orangethorpe Av.	TS	38.9	29.0	D	C	--[3]	--[3]	--	--	37.5	30.8	D	C	--[3]	--[3]	--	--
21	Beach Bl. (SR-39) & SR-91 WB Ramps	TS	16.0	13.6	B	B	--[3]	--[3]	--	--	15.7	12.5	B	B	--[3]	--[3]	--	--
22	Beach Bl. (SR-39) & SR-91 EB Ramps	TS	18.1	10.3	B	B	--[3]	--[3]	--	--	17.4	13.6	B	B	--[3]	--[3]	--	--
23	Beach Bl. (SR-39) & La Palma Av.	TS	47.8	48.4	D	D	--[3]	--[3]	--	--	49.5	**61.2**	D	E	--[3]	--[3]	--	--
24	Beach Bl. (SR-39) & Crescent Av.	TS	31.4	34.0	C	C	--[3]	--[3]	--	--	31.0	36.0	C	D	--[3]	--[3]	--	--
25	Beach Bl. (SR-39) & Stanton Av.	TS	10.8	10.6	B	B	--[3]	--[3]	--	--	11.8	11.6	B	B	--[3]	--[3]	--	--
26	Stanton Av. & Artesia Bl.	TS	--[4]	--[4]	--	--	0.630	0.655	B	B	--[4]	--[4]	--	--	0.618	0.659	B	B
27	Stanton Av. & Commonwealth Av.	TS	--[4]	--[4]	--	--	0.552	0.544	A	A	--[4]	--[4]	--	--	0.607	0.564	B	A
28	Stanton Av. & Whitaker St.	TS	--[4]	--[4]	--	--	0.448	0.530	A	A	--[4]	--[4]	--	--	0.459	0.550	A	A
29	Stanton Av. & Auto Center Dr.	TS	--[4]	--[4]	--	--	0.679	0.676	B	B	--[4]	--[4]	--	--	0.698	0.704	B	C
30	I-5 NB Off-Ramp & Auto Center Dr.	TS	16.8	49.8	B	D	--[3]	--[3]	--	--	18.1	50.8	B	D	--[3]	--[3]	--	--
31	Stanton Av. & Orangethorpe Av.	TS	--[4]	--[4]	--	--	0.790	0.869	C	D	--[4]	--[4]	--	--	0.840	**0.974**	D	**E**
32	Stanton Av. & La Palma Av.	TS	--[4]	--[4]	--	--	0.503	0.624	A	B	--[4]	--[4]	--	--	0.494	0.635	A	B
33	Stanton Av. & Buena Park Downtown	TS	--[4]	--[4]	--	--	0.379	0.474	A	A	--[4]	--[4]	--	--	0.399	0.487	A	A
34	Stanton Av. & Maple Dr.	TS	--[4]	--[4]	--	--	0.398	0.439	A	A	--[4]	--[4]	--	--	0.421	0.448	A	A
35	Buena Park Downtown West & La Palma Av.	TS	--[4]	--[4]	--	--	0.296	0.613	A	B	--[4]	--[4]	--	--	0.330	0.638	A	B
36	Buena Park Downtown East & La Palma Av.	TS	--[4]	--[4]	--	--	0.319	0.590	A	A	--[4]	--[4]	--	--	0.419	0.613	A	B
37	Dale Av. & Malvern Av.	TS	--[4]	--[4]	--	--	0.757	0.686	C	B	--[4]	--[4]	--	--	0.779	0.693	C	B
38	Dale Av. & Artesia Bl.	TS	--[4]	--[4]	--	--	0.634	0.777	B	C	--[4]	--[4]	--	--	0.631	0.784	B	C
39	Dale Av. & La Palma Av.	TS	--[4]	--[4]	--	--	0.653	0.617	B	B	--[4]	--[4]	--	--	0.726	0.690	C	B

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

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

[2] CSS = Cross-Street Stop; TS = Traffic Signal

[3] ICU reported for signalized intersections only, with the exception of signalized intersections under the jurisdiction of Caltrans.

[4] HCM is reported for unsignalized intersections and signalized intersections within the jurisdiction of Caltrans.

[5] Per the City of Buena Park, this intersection has been approved to convert to an all-way stop control. As such, for long-range conditions, the intersection has been evaluated assuming an all-way stop control.

5.6   ROADWAY SEGMENT ANALYSIS

The roadway capacities utilized for the study area roadway segment analysis are obtained from the City of Buena Park General Plan. These roadway segment capacities are approximate figures only and are used at the General Plan level to assist in determining the roadway functional classification (number of through lanes) needed to meet traffic demand. It should be noted, capacities have been interpolated where applicable for roadway sections not identified in the City's General Plan. Table 5-2 provides a summary of the Horizon Year (2045) conditions roadway segment capacity analysis. As shown in Table 5-2, the following study area roadway segments are anticipated to operate at an unacceptable LOS based on the daily roadway capacity thresholds and minimum LOS criteria under Horizon Year (2045) Without Project traffic conditions:

- Knott Avenue, Crescent Avenue to La Palma Avenue (#6) – LOS E
- Beach Boulevard (SR-39), Orangethorpe Avenue to I-5 Freeway (#14) – LOS E
- Beach Boulevard (SR-39), I-5 Freeway to Commonwealth Avenue (#15) – LOS F
- Beach Boulevard (SR-39), Commonwealth Avenue to Artesia Boulevard (#16) – LOS F
- Beach Boulevard (SR-39), Artesia Boulevard to Stage Road (#17) – LOS F
- Stanton Avenue, La Palma Avenue to Orangethorpe Avenue (#19) – LOS F
- Stanton Avenue, Orangethorpe Avenue to Whitaker Street (#20) – LOS E
- Dale Avenue, North of Artesia Boulevard (#25) – LOS E
- Lincoln Avenue, Valley View Street to Holder Street (#27) – LOS F
- Lincoln Avenue, Holder Street to Knott Avenue (#28) – LOS E
- Malvern Avenue, East of Dale Avenue (#40) – LOS E

As shown in Table 5-2, the following additional roadway segments are anticipated to operate at an unacceptable LOS under Horizon Year (2045) With Project traffic conditions:

- Valley View Street, Cerritos Avenue to Ball Road (#1) – LOS E
- Western Avenue, Lincoln Avenue to Crescent Avenue (#9) – LOS E
- Beach Boulevard (SR-39), SR-91 Freeway to Orangethorpe Avenue (#13) – LOS F
- Dale Avenue, La Palma Avenue to Orangethorpe Avenue (#23) – LOS F
- Crescent Avenue, Western Avenue to Beach Boulevard (SR-39) – LOS E
- Artesia Boulevard, Beach Boulevard (SR-39) to Stanton Avenue (#39) – LOS E

Daily roadway segment capacities are anticipated to improve at the following study area roadway segment under Horizon Year (2045) With Project traffic conditions as compared to Horizon Year (2045) Without Project traffic conditions due to the land use and intensity changes proposed by the Project:

- Malvern Avenue, East of Dale Avenue (#40)

TABLE 5-2: ROADWAY SEGMENT ANALYSIS FOR HORIZON YEAR (2045) CONDITIONS

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	2045 Without Project			2045 With Project		
					Volume	V/C[2]	LOS[3]	Volume	V/C[2]	LOS[3]
1	Valley View St.	Cerritos Av. to Ball Rd.	6D	56,300	49,409	0.878	D	**52,541**	**0.933**	**E**
2	Valley View St.	Lincoln Av. to Crescent Av.	6D	60,200	48,060	0.798	C	50,149	0.833	D
3	Valley View St.	SR-91 Freeway to Orangethorpe Av.	5D	46,950	38,318	0.816	D	39,834	0.848	D
4	Valley View St.	Orangethorpe Av. to 183rd St.	6D	56,300	29,037	0.516	A	29,623	0.526	A
5	Knott Av.	Lincoln Av. to Crescent Av.	5D	46,875	32,023	0.683	A	36,213	0.773	C
6	Knott Av.	Crescent Av. to La Palma Av.	4D	37,500	**37,389**	**0.997**	**E**	**40,620**	**1.083**	**F**
7	Knott Av.	La Palma Av. to Orangethorpe Av.	5D	46,875	37,064	0.791	C	37,861	0.808	D
8	Knott Av.	Orangethorpe Av. to Artesia Bl.	5D	46,875	23,910	0.510	A	29,470	0.629	B
9	Western Av.	Lincoln Av. to Crescent Av.	4D	25,000	20,889	0.836	D	**23,200**	**0.928**	**E**
10	Beach Bl. (SR-39)	Stanton Av. to Crescent Av.	8D	80,300	44,178	0.550	A	44,454	0.554	A
11	Beach Bl. (SR-39)	Crescent Av. to La Palma Av.	8D	80,300	56,803	0.707	C	56,730	0.706	C
12	Beach Bl. (SR-39)	La Palma Av. to SR-91 Freeway	8D	80,300	63,079	0.786	C	66,096	0.823	D
13	Beach Bl. (SR-39)	SR-91 Freeway to Orangethorpe Av.	6D	56,300	48,539	0.862	D	**62,556**	**1.111**	**F**
14	Beach Bl. (SR-39)	Orangethorpe Av. to I-5 Freeway	6D	56,300	**54,886**	**0.975**	**E**	**61,120**	**1.086**	**F**
15	Beach Bl. (SR-39)	I-5 Freeway to Commonwealth Av.	6D	56,300	**57,570**	**1.023**	**F**	**60,312**	**1.071**	**F**
16	Beach Bl. (SR-39)	Commonwealth Av. to Artesia Bl.	6D	56,300	**56,534**	**1.004**	**F**	**57,976**	**1.030**	**F**
17	Beach Bl. (SR-39)	Artesia Bl. to Stage Rd.	6D	56,300	**65,448**	**1.162**	**F**	**66,044**	**1.173**	**F**
18	Stanton Av.	Crescent Av. to La Palma Av.	4D	37,500	25,472	0.679	B	27,877	0.743	C
19	Stanton Av.	La Palma Av. to Orangethorpe Av.	4D	25,000	**28,767**	**1.151**	**F**	**31,668**	**1.267**	**F**
20	Stanton Av.	Orangethorpe Av. to Whitaker St.	4D	25,000	**24,300**	**0.972**	**E**	**24,529**	**0.981**	**E**
21	Stanton Av.	Whitaker St. to Artesia Bl.	4D	25,000	18,465	0.739	C	19,589	0.784	C
22	Dale Av.	Crescent Av. to La Palma Av.	4D	25,000	14,554	0.582	A	13,477	0.539	A
23	Dale Av.	La Palma Av. to Orangethorpe Av.	2D	12,500	11,077	0.886	D	**13,658**	**1.093**	**F**
24	Dale Av.	Commonwealth Av. to Artesia Bl.	4D	25,000	12,271	0.491	A	12,848	0.514	A
25	Dale Av.	North of Artesia Bl.	4D	25,000	**24,394**	**0.976**	**E**	**24,979**	**0.999**	**E**
26	Ball Rd.	Valley View St. to Holder St.	4D	37,500	23,298	0.621	B	23,521	0.627	B
27	Lincoln Av.	Valley View St. to Holder St.	4D	37,600	**40,403**	**1.075**	**F**	**41,530**	**1.105**	**F**
28	Lincoln Av.	Holder St. to Knott Av.	4D	37,600	**35,631**	**0.948**	**E**	**36,307**	**0.966**	**E**
29	Crescent Av.	Valley View St. to Knott Av.	4D	25,000	19,658	0.786	C	22,198	0.888	D
30	Crescent Av.	Knott Av. to Western Av.	4D	25,000	15,876	0.635	B	18,758	0.750	C
31	Crescent Av.	Western Av. to Beach Bl. (SR-39)	4D	25,000	21,452	0.858	D	**22,706**	**0.908**	**E**
32	La Palma Av.	Knott Av. to Beach Bl. (SR-39)	5D	46,875	31,214	0.666	B	33,827	0.722	C
33	La Palma Av.	Stanton Av. to Dale Av.	6D	56,250	30,571	0.543	A	32,148	0.572	A
34	Orangethorpe Av.	Valley View St. to Knott Av.	5D	46,950	36,314	0.773	C	41,075	0.875	D
35	Orangethorpe Av.	Knott Av. to Beach Bl. (SR-39)	5D	46,950	32,957	0.702	C	39,263	0.836	D
36	Orangethorpe Av.	Beach Bl. (SR-39) to Stanton Av.	6D	56,300	30,423	0.540	A	32,846	0.583	A
37	Commonwealth Av.	Beach Bl. (SR-39) to Stanton Av.	4D	37,500	14,631	0.390	A	16,393	0.437	A
38	Artesia Bl.	Knott Av. to Beach Bl. (SR-39)	5D	31,250	27,104	0.867	D	26,226	0.839	D
39	Artesia Bl.	Beach Bl. (SR-39) to Stanton Av.	4D	25,000	21,538	0.862	D	**22,590**	**0.904**	**E**
40	Malvern Av.	East of Dale Av.	4D	37,500	**33,898**	**0.904**	**E**	33,452	0.892	D

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

[1] These maximum roadway capacities are based on the County of Riverside's thresholds.

[2] V/C = Volume to Capacity Ratio

[3] LOS = Level of Service

5.7   OFF-RAMP QUEUING ANALYSIS

Queuing analysis findings for Horizon Year (2045) are presented in Table 5-3. As shown in Table 5-3, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows under Horizon Year (2045) Without Project and With Project traffic conditions. Worksheets for Horizon Year (2045) Without Project and With Project traffic conditions queuing analysis are provided in Appendices 5.7 and 5.8, respectively.

TABLE 5-3: PEAK HOUR QUEUING SUMMARY FOR HORIZON YEAR (2045) CONDITIONS

Intersection	Movement	Available Stacking Distance (Feet)	2045 Without Project				2045 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
Knott Av. & Artesia Bl. (#7)	SBL	180	176	185 [3]	Yes	Yes	164	171	Yes	Yes
	SBT	2,060	276	321	Yes	Yes	285	396 [2]	Yes	Yes
I-5 NB Ramps & Artesia Bl. (#9)	NBL	1,100	211	123	Yes	Yes	204	121	Yes	Yes
	NBT	1,100	243	308	Yes	Yes	251	324	Yes	Yes
	NBR	560	0	0	Yes	Yes	0	0	Yes	Yes
Beach Bl. (SR-39) & I-5 SB Ramps (#19)	EBL	1,310	340	254	Yes	Yes	363	249	Yes	Yes
	EBR	470	739 [2,3]	965 [2,3]	Yes	Yes	702 [2,3]	1,077 [2,3]	Yes	Yes
Beach Bl. (SR-39) & SR-91 WB Ramps (#21)	WBL	1,230	172	287	Yes	Yes	175	253	Yes	Yes
	WBL/R	450	196	324	Yes	Yes	200	284	Yes	Yes
	WBR	300	419 [2,3]	356 [3]	Yes	Yes	420 [2,3]	506 [3]	Yes	Yes
Beach Bl. (SR-39) & SR-91 EB Ramps (#22)	EBL	1,180	410	374	Yes	Yes	402	409	Yes	Yes
	EBL/R	1,180	419	376	Yes	Yes	408	415	Yes	Yes
	EBR	420	365	247	Yes	Yes	360	289	Yes	Yes
I-5 NB Off-Ramp & Auto Center Dr. (#30)	NBL	820	616 [2]	668 [2]	Yes	Yes	649 [2]	697 [2]	Yes	Yes
	NBL/T/R	820	611 [2]	660 [2]	Yes	Yes	655 [2]	682 [2]	Yes	Yes

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

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.
[3] Although 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the SR-91 and I-5 Freeway mainline.

5.8   PROJECT DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

Improvements needed to achieve acceptable LOS have been identified at intersections, roadway segments, and off-ramps that are anticipated to operate at a deficient LOS under Horizon Year (2045) traffic conditions.

5.8.1 IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

Improvement strategies have been recommended at intersections that have been identified as deficient under Horizon Year (2045) traffic conditions in an effort to achieve an acceptable LOS. The effectiveness of the recommended improvement strategies to address Horizon Year (2045) traffic deficiencies are presented in Table 5-4. Worksheets for Horizon Year (2045) Without Project and With Project conditions, with improvements, HCM calculation worksheets are provided in Appendices 5.9 and 5.10, respectively.

It should be noted for the intersection of Valley View Street & Lincoln Avenue (#3), there are currently bulb-outs constructed along the landscaping/sidewalks on either side of Lincoln Avenue with the City of Cypress. It is recommended that the City of Buena Park coordinate with the City of Cypress to modify or remove the bulb-outs and restrict on-street parking along Lincoln Avenue, in order to provide sufficient pavement width to accommodate the 3rd eastbound and westbound through lanes.

5.8.2 IMPROVEMENTS TO ADDRESS DEFICIENCIES AT ROADWAY SEGMENTS

As shown previously in Table 5-2, there are study area roadway segments that are anticipated to operate at an unacceptable LOS under Horizon Year (2045) traffic conditions. Improvements have been identified for the following roadway segments, which are consistent with the City of Buena Park General Plan:

- Lincoln Avenue, Valley View Street to Holder Street (#27)
- Lincoln Avenue, Holder Street to Knott Avenue (#28)

The remaining deficient roadway segments identified in Table 5-2 are currently built out to their ultimate cross-section width according to the City of Buena Park General Plan. Additionally, the study area intersections on either side of the deficient roadway segments are anticipated to operate at an acceptable LOS during the peak hours under Horizon Year (2045) traffic conditions, with the improvements identified in Table 5-3, which indicates that additional roadway widening is not necessary since the intersections can process the peak hour flows. As such, no additional widening has been identified for the remaining deficient study area roadway segments.

5.8.3 IMPROVEMENTS TO ADDRESS DEFICIENCIES AT OFF-RAMPS

As shown previously in Table 5-3, there are no study area off-ramps that are anticipated to experience queuing issues during the peak hours under Horizon Year (2045) traffic conditions. As such, no improvements have been identified.

TABLE 5-4: INTERSECTION ANALYSIS FOR HORIZON YEAR (2045) CONDITIONS WITH IMPROVEMENTS

	Traffic Control[3]	Northbound			Southbound			Eastbound			Westbound			Delay[2]/ICU (secs.)/(v/c)		Level of Service	
		L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
3 Valley View St. & Lincoln Av.																	
Without Project[4]:	TS	2	3	1	2	3	0	2	**3**	0	2	**3**	**0**	0.792	0.760	C	C
With Project[4]:	TS	2	3	1	2	3	0	2	**3**	0	2	**3**	**0**	0.798	0.773	C	C
Description: Add 3rd EB through and WB through lane (remove the WB right turn lane)																	
6 Knott Av. & Firestone Bl.																	
Without Project:	**TS**	0	0	0	1	0	1	**1**	1	0	0	1	0	0.676	0.609	B	B
With Project:	**TS**	0	0	0	1	0	1	**1**	1	0	0	1	0	0.704	0.634	C	B
Description: Install a traffic signal, add EB left turn lane																	
8 I-5 SB On-Ramp & Artesia Bl.																	
Without Project:	**TS**	0	0	0	0	0	0	0	3	0	1	2	0	7.3	14.9	A	B
With Project:	**TS**	0	0	0	0	0	0	0	3	0	1	2	0	8.1	18.5	A	B
Description: Install a traffic signal																	
12 Knott Av. & Crescent Av.																	
Without Project:	TS	1	2	1	1	2	1	**2**	2	0	1	2	0	0.723	0.844	C	D
With Project:							Not Applicable										
Description: Add 2nd EB left turn lane																	
13 Knott Av. & Lincoln Av.																	
Without Project[5]:	TS	1	2	1	1	2	1	2	**3**	0	2	**3**	0	0.773	0.805	C	D
With Project[5]:	TS	1	2	1	1	2	1	2	**3**	0	2	**3**	0	0.777	0.853	C	D
Description: Add 3rd EB through and WB through lane																	
15 Beach Bl. (SR-39) & Franklin St.																	
Without Project:	TS	1	3	0	1	3	0	**1**	1	**0**	0	1	1	12.0	11.5	B	B
With Project:	TS	1	3	0	1	3	0	**1**	1	**0**	0	1	1	26.1	24.2	C	C
Description: Restripe EB to a left and a shared through-right																	
23 Beach Bl. (SR-39) & La Palma Av.																	
Without Project:							Not Applicable										
With Project[6]:	TS	2	4	0	2	4	0	1	3	0	1	3	0	49.7	54.7	D	D
Description: Traffic signal modification																	
31 Stanton Av. & Orangethorpe Av.																	
Without Project:							Not Applicable										
With Project:	TS	1	2	0	1	2	0	2	**3**	**0**	2	3	1	0.757	0.867	C	D
Description: Add 3rd EB through lane by restriping the EB right																	

[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] TS = Traffic Signal; **TS** = Improvement

[4] Improvement includes coordination between the City of Cypress and City of Buena Park to modify the existing curb and bulb-outs along Lincoln Avenue in order to provide sufficient pavement width to provide the additional through lanes

[5] Improvement includes modification of the roadway cross-section and center median in order to provide sufficient pavement width for the additional through lanes.

[6] Improvement consists of modifying the traffic signal to implement lead-lag operations for the northbound and southbound left turns, with the southbound left turn running as lag.

TABLE 5-2: ROADWAY SEGMENT ANALYSIS FOR HORIZON YEAR (2045) CONDITIONS WITH IMPROVEMENTS

#	Roadway	Segment Limits	Roadway Section[4]	LOS Capacity[1,4]	2045 Without Project			2045 With Project		
					Volume	V/C[2]	LOS[3]	Volume	V/C[2]	LOS[3]
27	Lincoln Av.	Valley View St. to Holder St.	**6D**	**56.300**	40,403	0.718	C	41,530	0.738	C
28	Lincoln Av.	Holder St. to Knott Av.	**6D**	**56.300**	35,631	0.633	B	36,307	0.645	B

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

[1] These maximum roadway capacities are based on the County of Riverside's thresholds.

[2] V/C = Volume to Capacity Ratio

[3] LOS = Level of Service

[4] **4D** = Improvement

6   LOCAL AND REGIONAL FUNDING MECHANISMS

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

6.1   CITY OF BUENA PARK TRAFFIC IMPACT FEE PROGRAM

The City of Buena Park has created its own local DIF program to impose and collect fees from new residential, commercial, office, and industrial development for the purpose of funding roadways and intersections necessary to accommodate City growth as identified in the City's General Plan Circulation Element. Under the City's DIF program, the City may grant to developers a credit against specific components of fees when those developers construct certain facilities and landscaped medians identified in the list of improvements funded by the DIF program.

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

The Project Applicant will be subject to the City's DIF fee program and will pay the requisite City DIF fees at the rates then in effect pursuant to the City's ordinance. The Project Applicant's payment of the requisite DIF at the rates then in effect, pursuant to the City DIF Program, would satisfy the Project's proportional mitigation requirements at potentially affected DIF-funded facilities.

6.2   FAIR SHARE CONTRIBUTION

Project improvements may include a combination of fee payments to established programs (e.g., DIF), 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 City of Buena Park'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.

6.3   TRAFFIC FEE PER DWELLING UNIT

Based on the identified improvements and estimated costs from Table 1-3, there is an estimated total cost of $2,629,900 for the intersection improvements identified. From Table 1-4, there is an estimated total cost of $104,000 identified for the roadway segment improvements. Based on the proposed Project description, there will be a total of 10,322 dwelling units under the With Project conditions. This equates to a fee of $264.86 per dwelling unit. It should be noted, this cost per dwelling unit is in addition to the standard traffic impact fees required by the City.

7   VEHICLE MILES TRAVELED

The Vehicle Miles Traveled (VMT) report has been prepared under a separate cover.

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8   REFERENCES

1. **City of Buena Park.** *Traffic Impact Analysis Guidelines - 2020 for Vehicle Miles Traveled and Level of Service Assessment.* Buena Park : s.n., June 2020.

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3. **Transportation Research Board.** *Highway Capacity Manual (HCM).* 6th Edition. Washington, D.C. : National Academy of Sciences, 2016. 978-0-309-16077-3.

4. **California Department of Transportation.** California Manual on Uniform Traffic Control Devices (CA MUTCD). [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CA MUTCD).* 2014, Updated March 30, 2021 (Revision 6).

5. —. *Guide for the Preparation of Traffic Impact Studies.* December 2002.

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