San Diego Freeway (I-405) Improvement Project

ORANGE AND LOS ANGELES COUNTIES, CALIFORNIA
12-ORA-405 PM 9.3/24.2 / 07-LA-405 PM 0.0/1.2
12-ORA-22 PM R0.7/R3.8 / 12-ORA-22 PM R0.5/R0.7
12-ORA-73 PM R27.2/R27.8 / 12-ORA-605 PM 3.5/R1.6
07-LA-605 PM R0.0/R1.2
EA 0H1000 / PN 1200000180

Supplemental Draft Environmental Impact Report/ Environmental Impact Statement

Prepared by the
State of California Department of Transportation

The environmental review, consultation, and any other action in accordance with applicable federal laws for this project is being, or has been, carried out by the State of California Department of Transportation under its assumption of responsibility pursuant to 23 U.S.C. 327.

June 2013

General Information About This Document

What's In This Document:

The California Department of Transportation (Department or Caltrans), as assigned by the Federal Highway Administration (FHWA), has prepared this joint Supplemental Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) for the proposed San Diego Freeway (Interstate 405 [I-405]) Improvement Project. The Department is the lead agency under the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA). The Orange County Transportation Authority (OCTA) is the project sponsor.

This Supplemental Draft EIR/EIS provides new information on potential project-related traffic effects within the City of Long Beach and areas under Caltrans – District 7 jurisdiction. The new information and analysis presented within the Supplemental Draft EIR/EIS is based on the *Supplemental Traffic Study Report – Long Beach Area* (Supplemental Traffic Study), prepared in April 2013 in response to City of Long Beach comments on the Draft EIR/EIS (See Appendix A for a copy of the City's comment letter). The information and analysis within this Supplemental Draft EIR/EIS were not available during the circulation period for the Draft EIR/EIS.

What You Should Do:

- Please read the document.
- Additional copies of the document, as well as the technical study relied on to prepare the document, are available for review at Caltrans District 12, 3347 Michelson Drive, Suite100, Irvine, CA 92612-1692.
- Copies of the document are available at the following public libraries:
  - Costa Mesa/Donald Dungan Branch Library (1855 Park Avenue, Costa Mesa, CA 92627)
  - Mesa Verde Branch Library (2969 Mesa Verde Drive, Costa Mesa, CA 92626)
  - Garden Grove Regional Library (11200 Stanford Avenue, Garden Grove, CA 92840)
  - Huntington Beach Central Library (7111 Talbert Avenue, Huntington Beach, CA 92648-1296)
  - Heritage Park Regional Library (14361 Yale Avenue, Irvine, CA 92604)
  - Los Alamitos/Rossmoor Library (12700 Montecito, Seal Beach, CA 90740)
  - Mary Wilson Library (707 Electric Avenue, Seal Beach, CA 90740)
  - Westminster Branch Library (8180 13th Street, Westminster, CA 92683)
  - Fountain Valley Library (17635 Los Alamos, Fountain Valley, CA 92708)
  - Main Library (101 Pacific Avenue, Long Beach, CA 90822)

- Ruth Bach Neighborhood Library (4055 Bellflower Boulevard, Long Beach, CA 90808)
- Santa Ana Public Library (26 Civic Center Plaza, Santa Ana, CA 92701-4087)
- Main Library & History Center (407 E. Chapman Avenue, Orange, CA 92866)
- Newport Beach Public Library (1000 Avocado Avenue, Newport Beach, CA 92660)

- The document is available for review on Caltrans' Web site at the following address: www.dot.ca.gov/dist12/405/index.htm. OCTA has provided a link to Caltrans' Web site at the following address: www.octa.net/405improvement.
- Attend the public hearing on Wednesday July 24, 2013 at Hill Middle School, 1100 Iroquois Ave., Long Beach, CA 90815 from 6:00 to 8:00 P.M (public presentation starts at 6:30 P.M.).
- Tell us what you think. If you have any comments regarding the information contained in this Supplemental Draft EIR/EIS, please attend the public hearing and/or send your written comments to the Department by August 12, 2013.
- Reviewers are requested to limit their comments to only information that is provided in this Supplemental Draft EIR/EIS.
- Submit comments via postal mail to:

  Smita Deshpande, Branch Chief
  Caltrans-District 12, "Attn: 405 Supplemental Draft EIR/EIS Comment Period"
  2201 Dupont Drive, Suite 200
  Irvine, CA, 92612

- Submit comments via e-mail to: 405.Supplemental.Draft.EIR.EIS@parsons.com
- Submit comments by the deadline: August 12, 2013

What Happens Next:

After comments are received from the public and reviewing agencies, the Department, as assigned by FHWA, may: (1) give environmental approval to the proposed project, (2) do additional environmental studies, or (3) abandon the project. If the project is given environmental approval and funding is appropriated, the Department could design and construct all or part of the project.

For individuals with sensory disabilities, this document can be made available in Braille, in large print, on audiocassette, or on computer disk. To obtain a copy in one of these alternate formats, please call or write to: Department of Transportation, Attn: Smita Deshpande, Environmental Planning, Caltrans District 12, 3347 Michelson Drive, Suite 100, Irvine, CA 92612-1692; (949) 724-2705 Voice; or use the California Relay Service 1 (800) 735-2929 (TTY-English), 1 (800) 855-3000 (TTYSpanish), 1 (800) 735-2922 (voice-English), 1 (800) 855-3000 (voice-Spanish), or 711.

SCH# 2009091001
12-ORA-405 PM 9.3/24.2 / 07-LA-405 PM 0.0/1.2
12-ORA-22 PM R0.7/R3.8 / 12-ORA-22 PM R0.5/R0.7
12-ORA-73 PM R27.2/R27.8 / 12-ORA-605 PM 3.5/R1.6
07-LA-605 PM R0.0/R1.2
EA 0H1000 / PN 1200000180

The Interstate 405 Improvement Project between State Route 73 and Interstate 605

SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT REPORT/ ENVIRONMENTAL IMPACT STATEMENT

Submitted pursuant to (State) Division 13, California Public Resources Code
(Federal) 42 USC 4332(2)(C) and 49 USC 303

THE STATE OF CALIFORNIA
Department of Transportation

COOPERATING AGENCY
U.S. Army Corps of Engineers

RESPONSIBLE AGENCIES
California Department of Fish and Game
California Regional Water Quality Control Board
California Transportation Commission

6/20/13
Date of Approval

Ryan Chamberlain
District 12 Director
California Department of Transportation
NEPA and CEQA Lead Agency

The following person may be contacted for additional information concerning this document:

Smita Deshpande
Environmental Chief, Branch A
California Department of Transportation

3347 Michelson Drive, Suite 100
Irvine, CA 92612-1692
949-724-2000
Supplemental.Draft.EIR.EIS@Parsons.com

Abstract: The Interstate 405 (I-405) Improvement Project proposes to widen the corridor by adding: one general purpose (GP) lane in each direction between Euclid Street and Interstate 605 (I-605); or two GP lanes in each direction between Brookhurst/Euclid Streets and I-605; or one GP lane between Euclid Street and I-605 and one tolled Express Lane in each direction between State Route 73 (SR-73) and State Route 22 (SR-22) East to be managed jointly as a tolled Express Facility with two lanes in each direction between SR-73 and I-605. Please send your comments on this document to Smita Deshpande, Caltrans, at the address above, no later than August 12, 2013.

This recirculation focuses on new traffic information for areas north of the limits of the proposed freeway capacity enhancement in Orange County. The traffic information addresses the traffic changes in the Long Beach area along SR-22/ 7th Street, I-405, and I-605, and at their local interchanges and nearby intersections due to the proposed build alternatives.

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Acronyms

Caltrans	California Department of Transportation
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CFR	*Code of Federal Regulations*
CHP	California Highway Patrol
D/C	Demand Volume-to-Capacity Ratio
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
ft	Foot
GP	General Purpose
HCM	Highway Capacity Manual
HOV	High-Occupancy Vehicle
I-405	Interstate 405
I-605	Interstate 605
LOS	level of service
NAVWPNSTA	Naval Weapons Station
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NOP	Notice of Preparation
OCTA	Orange County Transportation Authority
OCTAM	Orange County Transportation Analysis Model
PA	Preferred Alternative
PeMS	Performance Monitoring System
PM	Post Mile
PSR	Project Study Report
ROD	Record of Decision
ROW	Right-of-Way
RTP	Regional Transportation Plan

SR	State Route
TAZ	Traffic Analysis Zone
TDM	Transportation Demand Management
TSM	Transportation System Management
V/C	Volume-to-Capacity Ratio
VMT	Vehicle Miles Traveled
vph	vehicles per hour
WCC	West County Connectors

Summary

The Federal Highway Administration (FWHA) National Environmental Policy Act (NEPA) regulations and California Environmental Quality Act (CEQA) Guidelines specify that the Lead Agency must recirculate an Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) when there is significant new information added to the project analysis after public notice of the Draft EIR/EIS. Caltrans is the Lead Agency for CEQA and the FHWA-delegated Lead Agency for NEPA. The Orange County Transportation Authority (OCTA) is the project sponsor for the project.

This Supplemental Draft EIR/EIS for the proposed San Diego Freeway (Interstate 405 [I-405]) Improvement Project provides new information on potential project-related traffic effects within the City of Long Beach. The new information and analysis presented within the Supplemental Draft EIR/EIS is based on the *Supplemental Traffic Study Report – Long Beach Area* (Supplemental Traffic Study), prepared in March 2013 in response to City of Long Beach comments on the Draft EIR/EIS (See Appendix A for a copy of the City's comment letter). The information and analysis within this Supplemental Draft EIR/EIS was not available during the circulation period for the Draft EIR/EIS.

As a result of comments received during circulation of the Draft EIR/EIS on project-related traffic effects within the City of Long Beach, and new information, analysis, and project effects in the Supplemental Traffic Study, Caltrans, as the Lead Agency, made the decision to disclose this new information to the public by preparing and circulating this Supplemental Draft EIR/EIS. The CEQA Guidelines Section 15088.5(c) allow for the lead agency to recirculate an environmental document that has been modified and address the new information that is the basis for the recirculation. Under FHWA regulation 23 *Code of Federal Regulations* (CFR) Section 771.130a(2), a Draft EIS may be supplemented if there is new information relevant to environmental concerns. This Supplemental Draft EIR/EIS only includes supplemental information, as applicable, for relevant sections related to the new information described in Table S-1 below. The remaining technical sections of the Draft EIR/EIS are not included because they do not require modification as a result of the Supplemental Traffic Study. The revisions in these sections will be included in the Final EIR/EIS that will be prepared following receipt of comments on the Supplemental Draft EIR/EIS.

Reviewers are requested to limit their comments to only information that is provided in this Supplemental Draft EIR/EIS. Comments that are received on information provided in this Supplemental Draft EIR/EIS will be responded to, and these responses will be provided in the

Final EIR/EIS for the Interstate 405 (I-405) Improvement Project, along with responses to comments on the original Draft EIR/EIS. Comments submitted on the Draft EIR/EIS are already recorded and do not need to be resubmitted.

Table S-1: Summary of Draft EIR/EIS Sections Addressed in the Supplemental Draft EIR/EIS

Section	Change
3.1.6 Traffic and Transportation/Pedestrian and Bicycle Facilities	Discussion added as a result of the Supplemental Traffic Study
3.6 Cumulative Impacts	Discussion added as a result of the Supplemental Traffic Study
4.0 California Environmental Quality Act (CEQA) Evaluation	Discussion added as a result of the Supplemental Traffic Study

Project Impacts and Traffic Minimization Measures Resulting from the New Information on Traffic and Transportation/Pedestrian and Bicycle Facilities

Based on the result of the Supplemental Traffic Study, it was determined that the proposed build alternatives would have project contributions to adverse cumulative effects on California Department of Transportation (Caltrans) and City of Long Beach intersections that were not previously considered within the May 2012 Draft EIR/EIS. Project contributions to adverse cumulative effects are evaluated through application of professional judgment to changes in level-of-service (LOS) and volume-to-capacity (V/C) ratios. (For future conditions, the v/c ratio is the demand-to-capacity (D/C) ratio, where the demand volume is used.) Detailed discussion and analysis, as summarized from the Supplemental Traffic Study, are provided in Chapter 3 of this Supplemental Draft EIR/EIS. A summary of the number of adversely affected intersections under the jurisdiction of the City of Long Beach and Caltrans – District 7 is provided below.

- Opening Year (2020):
  - Alternative 1 – 2 intersections
  - Alternative 2 – 5 intersections
  - Alternative 3 – 3 intersections
- Design Horizon Year (2040):
  - Alternative 1 – 4 intersections
  - Alternative 2 – 9 intersections

- Alternative 3 – 7 intersections

With implementation of the proposed traffic measures below, all project contributions to adverse cumulative effects at all of these intersections would be minimized.

Proposed Measures for Traffic and Transportation/Pedestrian and Bicycle Facilities Impacts

The proposed measures include fair share contributions. Appendix B-3 presents the data on which the fair share contribution percentages are based.

City of Long Beach Intersections

T-10 A payment shall be made by the Orange County Transportation Authority (OCTA) to the City of Long Beach based on a Cooperative Agreement to be negotiated and executed between OCTA and the City of Long Beach. The Cooperative Agreement shall identify the project's fair share of the costs for the improvements at intersections owned by the City of Long Beach based on the Preferred Alternative (PA) and in accordance with the fair share percentages for each location identified below. The Cooperative Agreement shall provide:

- **T**hat the City of Long Beach's Transportation Mitigation Program will be revised to include the locations listed below under A, B, or C for the PA;
- **T**hat the payment made by OCTA shall be placed into the City of Long Beach Transportation Mitigation Program and shall only be used to provide improvements to remedy impacts of the PA at the intersections listed below under A, B, or C for the PA;
- **T**he amount of the total payment to be applied to each location; and
- **T**hat the proposed improvements shall be implemented by the City of Long Beach, with the City of Long Beach bearing responsibility for necessary clearances and permits.

A. If PA is Alternative 1:
   - Los Coyotes Diagonal and Bellflower Boulevard intersection:
     - Add a second left-turn lane to eastbound approach.
     - Fair Share Percentage: 4.45%. (estimated total construction cost in 2013 dollars is $250,000)

B. If PA is Alternative 2:

- Willow Street and Bellflower Boulevard intersection:
  - Add an exclusive right-turn lane to eastbound approach;
  - Add a second left-turn lane to westbound approach; and
  - Add a second left-turn lane to southbound approach.
  - Fair Share Percentage: 10.41%. (estimated total construction cost in 2013 dollars is $810,000)
- Willow Street and Los Coyotes Diagonal intersection:
  - Add a second left-turn lane to eastbound approach; and
  - Add a second left-turn lane to southbound approach.
  - Fair Share Percentage: 31.57%. (estimated total construction cost in 2013 dollars is $440,000)
- Willow Street and Woodruff Avenue intersection:
  - Add a second left-turn lane to northbound approach.
  - Fair Share Percentage: 10.40%. (estimated total construction cost in 2013 dollars is $240,000)

C. If PA is Alternative 3:

- Willow Street and Bellflower Boulevard intersection:
  - Add an exclusive right-turn lane to eastbound approach;
  - Add a second left-turn lane to westbound approach; and
  - Add a second left-turn lane to southbound approach.
  - Fair Share Percentage: 10.41%. (estimated total construction cost in 2013 dollars is $810,000)
- Los Coyotes Diagonal and Bellflower Boulevard intersection:
  - Add a second left-turn lane to eastbound approach.
  - Fair Share Percentage: 8.32%. (estimated total construction cost in 2013 dollars is $250,000)
- Willow Street and Los Coyotes Diagonal intersection:
  - Add a second left-turn lane to eastbound approach; and
  - Add a second left-turn lane to southbound approach.
  - Fair Share Percentage: 30.03%. (estimated total construction cost in 2013 dollars is $440,000)

State of California Intersections

T-11 A payment shall be made by OCTA to Caltrans based on a Traffic Mitigation Agreement Fair Share Deferment to be negotiated and executed between OCTA and Caltrans. The Traffic Mitigation Agreement Fair Share Deferment shall identify the project's fair share of the costs for the improvements at intersections owned by the State of California based on the PA and in accordance with the fair share percentages for each location identified below. The Traffic Mitigation Agreement Fair Share Deferment shall provide:

- That Caltrans will establish separate accounts for each of the locations listed below under A, B, or C for the PA;
- That the payment made by OCTA shall be held by Caltrans and shall only be used to provide improvements to remedy impacts of the PA at the intersections listed below under A, B, or C for the PA;
- The amount of the total payment to be applied to each location;
- That the amounts for different locations shall not be commingled; and
- That the proposed improvements shall be implemented by Caltrans, with Caltrans bearing responsibility for necessary clearances and permits.

It should be noted that the State of California would implement a project only when enough funds have been collectively received for that specific mitigation measure.

A. If PA is Alternative 1:
   - SR-22 westbound on-/off-ramp and College Park Drive intersection:
     - Add a second northbound through lane to the off-ramp approach to College Park Drive starting approximately 300 feet (ft) south of their intersection; and
     - Replace existing traffic control with a traffic signal.
     - Fair Share Percentage: 12.11%. (estimated total construction cost in 2013 dollars is $1,570,000)
   - 7th Street and Pacific Coast Highway intersection:
     - Add protected/permitted signal phasing to the eastbound and westbound approaches of Pacific Coast Highway to Bellflower Boulevard.
     - Fair Share Percentage: 11.70%. (estimated total construction cost in 2013 dollars is $450,000)

- 7th Street and West Campus Drive intersection:
  - Add an exclusive right-turn lane to westbound approach, modifying traffic signals as needed.
  - Fair Share Percentage: 9.16%. (estimated total construction cost in 2013 dollars is $300,000)
- 7th Street and Bellflower Boulevard intersection:
  - Add a second left-turn lane to eastbound approach, modifying signals and adjusting sidewalk as necessary.
  - Fair Share Percentage: 11.70%. (estimated total construction cost in 2013 dollars is $640,000)

B. If PA is Alternative 2:

- SR-22 westbound on-/off-ramp and College Park Drive intersection:
  - Add a second northbound through lane to the off-ramp approach to College Park Drive starting approximately 300 ft south of their intersection; and
  - Replace existing traffic control with a traffic signal.
  - Fair Share Percentage: 33.25%. (estimated total construction cost in 2013 dollars is $1,570,000)
- 7th Street and Pacific Coast Highway intersection:
  - Add protected/permitted signal phasing to the eastbound and westbound approaches of Pacific Coast Highway to Bellflower Boulevard.
  - Fair Share Percentage: 7.84%. (estimated total construction cost in 2013 dollars is $450,000)
- 7th Street and Bellflower Boulevard intersection:
  - Add a second left-turn lane to eastbound approach, modifying signals and adjusting sidewalk as necessary.
  - Fair Share Percentage: 16.92%. (estimated total construction cost in 2013 dollars is $640,000)
- 7th Street and Channel Drive intersection:
  - Add a second left-turn lane to westbound approach, modifying signals as necessary; and
  - Provide dual southbound exclusive left-turn lanes.
  - Fair Share Percentage: 13.59%. (estimated total construction cost in 2013 dollars is $240,000)

- 7th Street and West Campus Drive intersection:
  - Add an exclusive right-turn lane to westbound approach, modifying traffic signals as necessary.
  - Fair Share Percentage: 27.34%. (estimated total construction cost in 2013 dollars is $300,000)
- 7th Street and East Campus Drive intersection:
  - Add a right-turn lane to westbound approach, modifying traffic signals as necessary and maximizing eastbound and westbound left-turn pocket lengths.
  - Fair Share Percentage: 21.30%. (estimated total construction cost in 2013 dollars is $450,000)

C. If PA is Alternative 3:

- 7th Street and Pacific Coast Highway intersection:
  - Add protected/permitted signal phasing to the eastbound and westbound approaches of Pacific Coast Highway to Bellflower Boulevard.
  - Fair Share Percentage: 8.08%. (estimated total construction cost in 2013 dollars is $450,000)
- 7th Street and Bellflower Boulevard intersection:
  - Add a second left-turn lane to eastbound approach, modifying signals and adjusting sidewalk as necessary.
  - Fair Share Percentage: 17.64%. (estimated total construction cost in 2013 dollars is $640,000)
- 7th Street and Channel Drive intersection:
  - Add a second left-turn lane to westbound approach, modifying signals as necessary; and
  - Provide dual southbound exclusive left-turn lanes.
  - Fair Share Percentage: 14.01%. (estimated total construction cost in 2013 dollars is $240,000)
- 7th Street and West Campus Drive intersection:
  - Add an exclusive right-turn lane to westbound approach, modifying traffic signals as necessary.
  - Fair Share Percentage: 25.02%. (estimated total construction cost in 2013 dollars is $300,000)
- 7th Street and East Campus Drive intersection:

- Add a right-turn lane to westbound approach, modifying traffic signals as necessary and maximizing eastbound and westbound left-turn pocket lengths.
- Fair Share Percentage: 7.39%. (estimated total construction cost in 2013 dollars is $450,000)

Chapter 1 Introduction

This Supplemental Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) for the proposed 1-405 Improvement Project provides new information relevant to the proposed project, information that was not available when the Draft EIR/EIS was circulated for public review and comments in May 2012. This document is called a Supplemental Draft EIR/EIS because it only includes information and analysis updated since the Draft EIR/EIS was circulated. The new information is based on the California Department of Transportation (Caltrans) decision to prepare a Supplemental Traffic Study.

1.1 Public Review of Draft EIR/EIS

Public review of the Draft EIR/EIS began on May 18, 2012, and was originally scheduled to conclude after 45 days on July 2, 2012. In response to the City of Long Beach's request, the public review period was extended by 15 days and ended on July 17, 2012.

1.2 Public Hearings

Four public hearings were held for the project at Orange Coast College in Costa Mesa on June 4, 2012; Westminster Community Center on June 6, 2012; Rush Park Auditorium in Rossmoor on June 7, 2012; and Fountain Valley Senior Center on June 14, 2012. The public hearings were attended by members of the public, Caltrans staff, Orange County Transportation Authority (OCTA) staff, and consultants.

The public hearings included a presentation by OCTA's consultant, followed by a public comment period, an open forum where individuals could voice their concerns and ask questions. The public was able to submit comments orally to a court reporter at each hearing and by submitting comment cards.

1.3 Comments Received

Comments provided by members of the public at the public hearing are recorded in the public hearing transcript and will be addressed in the Final EIR/EIS. In addition, public comments on the Supplemental Draft EIR/EIS transmitted to Caltrans via letters, comment cards, or e-mails will be addressed in the Final EIR/EIS.

The new information and analysis presented within the Supplemental Draft EIR/EIS is based on the Supplemental Traffic Study, prepared in April 2013 in response to City of Long Beach comments on the Draft EIR/EIS (See Appendix A for a copy of the City's comment letter).

1.4 Decision to Recirculate the EIR/EIS

As a result of the comments received on potential traffic effects within the City of Long Beach, Caltrans prepared the Supplemental Traffic Study. The purpose of the study was to evaluate the existing and future traffic flow conditions within the Los Angeles County traffic study area including, at a minimum, demand, capacity, and level of service (LOS) for the mainline freeway segments and ramp-freeway junctions, weaving areas, ramp/arterial street intersections, and arterial/arterial street intersections affecting interchange operations to further evaluate potential project-related traffic effects within the City of Long Beach not considered within the Draft EIR/EIS.

The California Environmental Quality Act (CEQA) Guidelines Section 15088.5(a) specify that the Lead Agency must recirculate an EIR when there is significant new information added to the project analysis after public review of the Draft EIR, but before certification of the Final EIR. Caltrans has determined that the Supplemental Traffic Study represents new significant information and thus requires recirculation under CEQA Guidelines Section 15088.5(a). Consistent with CEQA Guidelines Section 15088.5(c), only those portions of the Draft EIR/EIS that have been modified as a result of the new information are included within the Supplemental Draft EIR/EIS. The new information in this Supplemental Draft EIR/EIS results in new CEQA-significant cumulative traffic impacts.

Council on Environmental Quality (CEQ) regulations, 40 *Code of Federal Regulations* (CFR) Section 1502.9(c) allows agencies to prepare supplements to either a Draft or Final EIS if: (i) The agency makes substantial changes in the proposed action that are relevant to environmental concerns; or (ii) There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. As stated above, for this particular project, Caltrans considers the Supplemental Traffic Study analysis and results to be new information. Caltrans is disclosing this new information to the public by preparing and circulating this Supplemental Draft EIR/EIS. Under Federal Highway Administration (FHWA) regulation 23 CFR Section 771.130a(2), a Draft EIS may be supplemented if there is new information relevant to environmental concerns. Therefore, this Supplemental Draft EIR/EIS only includes sections from Chapters 3, 4, and 5 and the Environmental Commitment Record of the Draft EIR/EIS, as shown in Table 1-1, because they are the only sections relevant to the information contained in the Supplemental Traffic Study.

Table 1-1: Summary of Draft EIR/EIS Sections Addressed in the Supplemental Draft EIR/EIS

Section	Change
3.1.6 Traffic and Transportation/Pedestrian and Bicycle Facilities	Discussion added as a result of the Supplemental Traffic Study
3.6 Cumulative Impacts	Discussion added as a result of the Supplemental Traffic Study
4.0 California Environmental Quality Act (CEQA) Evaluation	Discussion added as a result of the Supplemental Traffic Study

1.5 Public Review and Comments on this Document

The public is provided with a 45-day review period for the Supplemental Draft EIR/EIS, beginning the day the Notice of Availability is published in the *Federal Register*. Reviewers are requested to limit their comments to only information that is provided in this Supplemental Draft EIR/EIS. Comments that are received on information provided in this Supplemental Draft EIR/EIS will be responded to, and these responses will be provided in the Final EIR/EIS for the Interstate 405 (I-405) Improvement Project, along with responses to comments on the original Draft EIR/EIS.

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Chapter 2 Purpose and Need/Project Description

The following is a brief description of the project purpose and need to assist the reader in reviewing the document. It is not intended to replace the Project Purpose and Need discussion provided in the Draft EIR/EIS. For a full discussion of the Project Purpose and Need, please refer to Chapter 1 of the Draft EIR/EIS.

The project purpose is a set of objectives the project is intended to meet. The project need is the transportation deficiency that the project was initiated to address.

2.1 Purpose of the Project

The purpose of the proposed action is to:

- Reduce congestion;
- Enhance operations;
- Increase mobility, improve trip reliability, maximize throughput, and optimize operations; and
- Minimize environmental impacts and right-of-way (ROW) acquisition.

In furtherance of the project's purpose, the following objective is established:

- To be consistent with regional plans and find a cost-effective early project solution for delivery.

2.2 Need for the Project

Current deficiencies of I-405 within the project limits are summarized below:

- The I-405 mainline general purpose (GP) lanes peak-period traffic demand exceeds available capacity;
- The I-405 mainline high-occupancy vehicle (HOV) lanes peak-period traffic demand exceeds available capacity;
- The I-405 mainline GP traffic lanes have operational and geometric deficiencies;
- The interchanges along I-405 within the study area have geometric, storage, and operational capacity deficiencies; and
- I-405 currently has limitations in detecting traffic incidents and providing rapid response and clearance due to lack of capacity and technological infrastructure.

2.3 Project Description

The following is a brief discussion of the Project Description to assist the reader in reviewing this document. It is not intended to replace the Project Description provided in the Draft EIR/EIS. For a full discussion of the Project Description, please refer to Chapter 2 of the Draft EIR/EIS.

The project proposes to improve the mainline freeway and interchanges on I-405 in Orange and Los Angeles counties. The proposed project would relieve congestion and improve operational efficiency on I-405 between State Route (SR)-73 and Interstate 605 (I-605). The approximately 16-mile-long project corridor is primarily located on I-405 in Orange County and traverses the cities of Costa Mesa, Fountain Valley, Huntington Beach, Westminster, Garden Grove, Seal Beach, Los Alamitos, Long Beach, and the community of Rossmoor. The project limits extend from 0.2-mile south of Bristol Street (12-ORA-405 Post Mile [PM] 9.3) to the Orange County/ Los Angeles county line (12-ORA-405 PM 24.2) and in Los Angeles County from the county line (07-LA-405 PM 0.00) to 1.4 miles north of I-605 (07-LA-405 PM 1.2). Improvements are proposed on SR-22 West in Orange County from 0.2-mile west of I-605 (12-ORA-22 PM R0.5) to I-405 (12-ORA-22 PM R0.7) and on SR-22 East in Orange County from I-405 (12-ORA-22 PM R0.7) to 0.2-mile east of the Beach Boulevard Undercrossing (12-ORA-22 PM R3.8). Improvements on SR-73 will be from the Bear Street Overcrossing (12-ORA-73 PM R27.2) to I-405 (12-ORA-73 PM R27.8). Improvements on I-605 in Orange County will be from I-405 (12-ORA-605 PM 3.5) to the county line (12-ORA-605 PM R1.6) and in Los Angeles County from the county line (07-LA-605 PM R0.0) to 0.9-mile north of the Spring Street Overcrossing (07-LA-605 PM R1.2). Improvements in Los Angeles County are associated with signing and striping to accommodate the transition from the existing to the proposed facility. I-405 is currently a controlled-access highway facility, with 8 to 12 mixed-flow GP lanes and two HOV lanes, which is over capacity and subject to traffic congestion and travel delays.

I-405 is generally a north-south route with 24 miles in Orange County and 48 miles in Los Angeles County. I-405 is part of the National Highway System and is considered a bypass route to Interstate 5 (the Santa Ana/Golden State Freeway) providing intra-regional and inter-regional access between Orange and Los Angeles counties. I-405 also serves as a critical goods movement corridor connecting the San Diego and U.S./Mexico border region with the ports of Long Beach and Los Angeles.

Within the project limits, I-405 connects with SR-73 at the southern end and with I-605 at the northern end, and for approximately 2 miles between Bolsa Chica Road and I-605 it overlaps with SR-22. Fifteen (15) local street interchanges and 3 freeway-to-freeway interchanges are within the limits of the project improvements.

The north and south termini of the project, at the I-605 and SR-73, respectively, are locations where multiple freeways converge, generating congestion and causing delay. The termini have been logically chosen based on geography and transportation needs to ensure adequate response to transportation deficiencies at and around these points of intersection. The northern terminus of the proposed project is at the interchange of I-405 and I-605. The proposed additional lanes on I-405 south of this interchange would terminate into and provide enhanced traffic service between SR-73 and SR-22 and I-605. The proposed additional lanes would enhance lane continuity along I-405 and terminate new lanes into available lanes on these other freeways. The southern terminus of the proposed project is at the interchange of SR-73. The additional lanes provided on I-405 would terminate either at locations north of the SR-73 interchange where lanes are currently dropped/added, thereby removing the lane drop/add, or at SR-73, depending upon the alternative.

In addition to the No Build Alternative, three build alternatives are proposed: Alternative 1 – Add One GP Lane in Each Direction; Alternative 2 – Add Two GP Lanes in Each Direction; and Alternative 3 – Express Lanes (Tolled) and Add One GP Lane in Each Direction.

Alternative 1 – Add One GP Lane in Each Direction

Alternative 1 would add a single GP lane in each direction on I-405 from Euclid Street to the I-605 interchange. Preliminary cost estimates for this alternative are $1.30 billion. The construction duration for Alternative 1 is estimated to be 48 months.

The proposed improvements under Alternative 1 would take place on the following routes within the stated post miles (PM). (Post miles are the established method of consistently identifying locations along a roadway; on I-405 in Orange County, post miles are the distance from the I-405/I-5 interchange.)

- 12-Ora-405 PM 12.1/23.9
- 12-Ora-22 PM R0.6/R0.7 (SR-22 West)
- 12-Ora-22 PM R0.7/R1.0 (SR-22 East)

Alternative 1 would provide a full standard highway cross section, with 12-foot (ft)-wide mainline travel lanes. Right-side (outside) shoulders would be 10 ft wide, and left-side (inside) shoulders would have a maximum width of 10 ft. Alternative 1 would require design exceptions. Nine mandatory and 18 advisory design standards would require design exceptions at one or more locations along the corridor.

Alternative 1 would provide continuous access between the HOV and GP lanes. On July 31, 2007, the Department approved a Project Study Report (PSR) for a separate project (EA 0J440K)

to provide continuous ingress and egress from the HOV lanes on the entire length of I-405 in Orange County. This separate project has not yet been programmed or funded; however, the proposed continuous access would be implemented as part of Alternative 1 of the proposed project for the segment of I-405 between Euclid Street and I-605. Transit vehicles and HOV2+ would continue to be eligible to utilize the HOV lanes.

Under Alternative 1, auxiliary lanes would be added at various locations to provide efficient merge and diverge operations. In the northbound direction, the existing auxiliary lane from the Magnolia Street on-ramp to the Beach Boulevard off-ramp would be retained. Additional northbound auxiliary lanes would be provided at the following locations:

- At the approach to the Euclid Street/Ellis Avenue off-ramp; and
- From the Seal Beach Boulevard on-ramp to the westbound SR-22/7th Street off-ramp.

In the southbound direction, the existing auxiliary lane from the Beach Boulevard on-ramp to the Magnolia Street off-ramp would not be retained. The existing auxiliary lane from the SR-22/7th Street on-ramp to Seal Beach Boulevard would be retained, as would the existing auxiliary lane from the Harbor Boulevard on-ramp to the Fairview Road off-ramp. The southbound auxiliary lane currently provided approaching the Harbor Boulevard off-ramp would be extended to start at the Euclid Street on-ramp.

In the northern segment of the project area where SR-22 and I-405 overlap, Alternative 1 would result in a freeway with 9 to 10 lanes in each direction. Signage would be provided far enough upstream to accommodate the required number of lane changes to exit the freeway for traffic in the left lanes, including the HOV lanes. Alternative 1 is considered a viable project alternative because it would achieve the project's purpose and need by accomplishing the following:

- Reduce congestion;
- Enhance operations;
- Increase mobility, improve trip reliability, maximize throughput, and optimize operations; and
- Minimize environmental impacts and ROW acquisition.

Alternative 2 – Add Two GP Lanes in Each Direction

Alternative 2 would add one GP lane in each direction on I-405 from Euclid Street to the I-605 interchange (as in Alternative 1), plus add a second GP lane in the northbound direction from Brookhurst Street to the SR-22/7th Street interchange and a second GP lane in the southbound direction from the Seal Beach Boulevard on-ramp to Brookhurst Street. Preliminary cost

estimates for this alternative are $1.4 billion. The construction duration for Alternative 2 is estimated to be 51 months.

The proposed improvements under Alternative 2 would take place on the following routes within the stated post miles:

- 12-Ora-405 PM 12.1/23.9
- 12-Ora-22 PM R0.6/R0.7 (SR-22 West)
- 12-Ora-22 PM R0.7/R1.0 (SR-22 East)

Alternative 2 would provide a full standard highway cross section, with 12-ft-wide mainline travel lanes. Right-side (outside) shoulders would be 10 ft wide, and left-side (inside) shoulders would have a maximum width of 10 ft. This alternative would provide nonstandard highway cross sections with 11-ft-wide mainline travel lanes from Seal Beach Boulevard to SR-22 to avoid Naval Weapons Station (NAVWPNSTA) Seal Beach. Alternative 2 would require design exceptions. Nine mandatory and 17 advisory design standards would require design exceptions at one or more locations along the corridor.

Alternative 2 would provide continuous access between the HOV and GP lanes. On July 31, 2007, the Department approved a PSR for a separate project (EA 0J440K) to provide continuous ingress and egress from the HOV lanes on the entire length of I-405 in Orange County. This separate project has not yet been programmed or funded; however, the proposed continuous access would be implemented as part of Alternative 2 of the proposed project for the segment of I-405 between Euclid Street and I-605. Transit vehicles and HOV2+ would continue to be eligible to utilize the HOV lanes.

Under Alternative 2, auxiliary lanes would be added at various locations to provide efficient merge and diverge operations. In the northbound direction, the existing auxiliary lane from the Magnolia Street on-ramp to the Beach Boulevard off-ramp would be retained. A northbound auxiliary lane would be provided at the northerly approach to the Euclid Street/Ellis Avenue off-ramp, as well as between the Euclid Street/Ellis Avenue on-ramp and the Brookhurst Street/ Magnolia Street off-ramp.

In the southbound direction, the existing auxiliary lane from the Beach Boulevard on-ramp to the Magnolia Street off-ramp would not be retained. The existing auxiliary lane from the SR-22/7th Street on-ramp to Seal Beach Boulevard would be retained, as would the existing auxiliary lane from the Harbor Boulevard on-ramp to the Fairview Road off-ramp. The southbound auxiliary lane currently provided approaching the Harbor Boulevard off-ramp would be extended to start at the Euclid Street southbound on-ramp.

In the northern section of the project area where SR-22 and I-405 overlap, Alternative 2 would result in a freeway with 9 to 10 lanes in each direction. Signage would be provided far enough upstream to accommodate the required number of lane changes to exit the freeway for traffic in the left lanes, including the HOV lanes.

Alternative 2 is considered a viable project alternative because it would achieve the project's purpose and need by accomplishing the following:

- Reduce congestion;
- Enhance operations;
- Increase mobility, improve trip reliability, maximize throughput, and optimize operations; and
- Minimize environmental impacts and ROW acquisition.

Alternative 3 – Express Lanes (Tolled) and Add One GP Lane in Each Direction

Alternative 3 would add one GP lane in each direction on I-405 from Euclid Street to the I-605 interchange (as in Alternatives 1 and 2), plus add a tolled Express Lane in each direction of I-405 from SR-73 to SR-22 East. The tolled Express Lane and the existing HOV lanes would be managed jointly as a tolled Express Facility with two lanes in each direction from SR-73 to I-605. The tolled Express Facility would operate so that HOV2s would be tolled and HOV3+ would either be free or receive a discount. From SR-22 to I-605, the existing HOV lane and the second HOV lane that is being built as part of the WCC Project would become part of the tolled Express Facility. Preliminary cost estimates for this alternative are $1.7 billion. The construction duration for Alternative 3 is estimated to be 54 months.

The proposed improvements under Alternative 3 would take place on the following routes within the stated post miles:

- 12-Ora-405 PM 9.3/24.2
- 07-LA-405 PM 0.0/1.2
- 12-Ora-22 PM R0.7/R3.8 (SR-22 East)
- 12-Ora-22 PM R0.5/R0.7 (SR-22 West)
- 12-Ora-73 PM R27.2/R27.812-Ora-605 PM 3.5/R1.6
- 07-LA-605 PM R0.0/R1.2

The current plan is that the tolled Express Facility would provide discounts or free use to HOVs with 3 or more occupants, zero emission vehicles, motorcycles, vehicles with disabled license plates, and disabled veterans; these vehicles would use the I-405 Express Lanes free of charge

except during the most congested hours when such vehicles would receive a 50 percent toll discount. The Express Lanes would be free to the following users at all times: transit vehicles, California Highway Patrol (CHP) vehicles, Caltrans vehicles, and emergency vehicles responding to an emergency.

Alternative 3 would provide a full standard highway cross section, with 12-ft-wide mainline travel lanes. Right-side (outside) shoulders would be 10 ft wide, and left-side (inside) shoulders would have a maximum width of 10 ft. The Express Facility would be separated from the GP lanes by a 1-ft to 4-ft buffer. Alternative 3 would require design exceptions. Nine mandatory and 20 advisory design standards would require design exceptions at one or more locations along the corridor.

Under Alternative 3, auxiliary lanes would be added at various locations to provide efficient merge and diverge operations. In the northbound direction, the existing auxiliary lane from the Magnolia Street on-ramp to the Beach Boulevard off-ramp would be retained. Additional northbound auxiliary lanes would be at the northerly approach to the Euclid Street/Ellis Avenue off-ramp, and between the Seal Beach Boulevard on-ramp and the SR-22/7th Street off-ramp.

In the southbound direction, the existing auxiliary lane from the Beach Boulevard on-ramp to the Magnolia Street off-ramp would not be retained. The existing auxiliary lane from the SR-22/7th Street on-ramp to Seal Beach Boulevard would be retained, as would the existing auxiliary lane from the Harbor Boulevard on-ramp to the Fairview Road off-ramp. The southbound auxiliary lane currently provided approaching the Harbor Boulevard off-ramp would be extended to start at the Euclid Street southbound on-ramp.

In the northern section of the project area where SR-22 and I-405 overlap, Alternative 3 would result in a freeway with seven GP lanes in each direction. For traffic in the left lanes to exit the freeway properly, signage would be provided far enough upstream to accommodate the required number of lane changes to exit the freeway.

Alternative 3 is considered a viable project alternative because it would achieve the project's purpose and need by accomplishing the following:

- Reduce congestion;
- Enhance operations;
- Increase mobility, improve trip reliability, maximize throughput, and optimize operations; and
- Minimize environmental impacts and ROW acquisition.

Transportation System Management/Transportation Demand Management Alternative

A stand-alone Transportation System Management (TSM)/Transportation Demand Management (TDM) Alternative was identified for the corridor. The TSM/TDM Alternative consists primarily of operational investments, policies, and actions aimed at improving traffic flow, promoting travel safety, and increasing transit usage and rideshare participation.

TSM consists of strategies to maximize efficiency of the existing facility by providing options such as ridesharing, parking, and traffic-signal optimization. TSM options to improve traffic flow typically increase the number of vehicle trips a facility can carry without increasing the number of through lanes. Such strategies include replacing existing stop signs with traffic signals at intersections to improve existing peak-hour traffic flow and to reduce queuing of vehicles. TSM also encourages automobile, public and private transit, ridesharing programs, and bicycle and pedestrian improvements as elements of a unified urban transportation system. Multimodal alternatives integrate multiple forms of transportation modes, such as pedestrian, bicycle, automobile, rail, and transit.

TDM focuses on regional strategies for reducing the number of vehicle trips and vehicle miles traveled (VMT), as well as increasing vehicle occupancy. It facilitates higher vehicle occupancy or reduces traffic congestion by expanding the traveler's transportation choice in terms of travel experience. Typical activities within this alternative reduce the amount of single-occupancy vehicle trips by providing funds to regional agencies that are actively promoting ridesharing, maintaining rideshare databases, and providing limited rideshare services to employers and individuals. Promoting mass transit and facilitating nonmotorized alternatives are two such examples, but TDM strategies may also include reducing the need for travel altogether through initiatives such as telecommuting.

No Build (No Action) Alternative

Under the No Build Alternative, no improvements would be made to the I-405 corridor within the project limits by the proposed project. No additional lanes or interchange improvements would be provided. The No Build Alternative configuration would not accommodate future traffic demand, and existing nonstandard geometric features would not be corrected. Congestion along the corridor would not be alleviated, and the situation would deteriorate with time.

The No Build Alternative provides a condition for comparing impacts associated with the build alternatives because environmental review must consider the effects of not implementing the proposed project. This alternative is inconsistent with the Caltrans goal of providing an efficient and effective interregional mobility system. Other direct effects of the No Build Alternative would include continued deterioration of freeway and local interchange operations and increases

of emissions and maintenance costs associated with inefficiencies. Indirect and cumulative effects of the No Build Alternative could include increased effects on the communities related to increased commute times and traffic diversion through adjacent neighborhoods. Additionally, the No Build Alternative could increase the total amount of time the corridor cities have to endure construction-related effects associated with addressing the corridor needs through many smaller projects completed over an extended period of time.

Compared to the existing condition, as recorded in the Notice of Preparation (NOP) (issued August 31, 2009) and the Notice of Intent (NOI) (issued September 1, 2009), the future No Build Alternative includes the future completion of the following two projects:

- The SR-22 West County Connectors (WCC) Project (currently in the construction phase), which has received environmental document approval and is proceeding through the design and construction phases; and
- Project EA 0J440K, which would provide continuous ingress and egress from the HOV lanes on the entire length of I-405 in Orange County. This separate project has not yet been programmed or funded.

The following improvements in the project area are to be constructed by the SR-22 WCC Project and are considered part of the future No Build Alternative:

- An additional HOV lane in each direction between SR-22 East and I-605;
- HOV lane direct connectors at the I-405/SR-22 East and I-405/I-605 interchanges;
- Relocation of the existing off-ramp to southbound Bolsa Chica Road, which currently exits from the eastbound SR-22 branch connector, to exit from the I-405 southbound mainline;
- Replacement of the Seal Beach Boulevard overcrossing;
- Replacement of the SR-22 separation bridge carrying westbound SR-22 over I-405 near 7th Street;
- Replacement of the SR-22 separation bridge carrying eastbound SR-22 over I-405 near Valley View Street;
- New bridge carrying the planned I-405/SR-22 HOV direct connectors over I-405 northbound; and
- New bridge carrying the planned I-405/I-605 HOV direct connector over I-405 northbound.

Each of the new and replacement bridges constructed as part of the SR-22 WCC Project has been designed to have a span and structural support positioning that would accommodate future I-405 widening proposed by Alternatives 1, 2, and 3 of the proposed project.

The future configuration under the No Build Alternative would also assume completion of the planned improvement on Seal Beach Boulevard north and south of I-405 currently underway by the City of Seal Beach. The proposed improvement north of I-405 principally involves the addition of a through lane on southbound Seal Beach Boulevard between Lampson Avenue and Old Ranch Parkway. The proposed improvements south of I-405 consist of the addition of a northbound right-turn lane on Seal Beach Boulevard to the southbound on-ramp and construction of a raised median between the northbound and southbound lanes of Seal Beach Boulevard.

Construction Staging

Construction of the proposed project is planned to commence in 2015 and is anticipated to be completed in 2020. The duration of construction for the build alternatives is 48 months for Alternative 1, 51 months for Alternative 2, and 54 months for Alternative 3. The proposed improvements are envisioned to be constructed in multiple stages due to the scale of the project and the need to minimize impacts and maintain traffic during construction. Construction of interchange improvements, consisting of freeway ramp reconstruction, local arterial improvements, and overcrossing structure replacement, is envisioned to be staggered throughout stages to minimize impacting two consecutive interchanges or closing two consecutive on- or off-ramps at the same time. Arterials and overcrossing improvements that would add capacity over the existing condition are proposed in the earlier stages in efforts to ease traffic congestion during subsequent construction stages. Construction staging area locations will be finalized during final design, but they are anticipated to generally be located within the existing ROW at interchange locations. Additionally, no material borrow sites have been identified for this project. Imported borrow material for the project construction ranges from 870,000 cubic yards for Alternative 1 up to 1,124,000 cubic yards for Alternative 3. The contractor will be responsible for ensuring that all import material comes from permitted commercial material providers and does not contain hazardous materials, in accordance with 2010 Caltrans Standard Special Specifications 19-7.

Construction operation would necessitate the closures of various facilities, such as the I-405 mainline, branch connectors, interchange ramps, and local arterials. Closures of these facilities may be overnight, short-term, during an extended weekend (i.e., 55-hour window from Friday night to Monday morning), or long-term, as discussed in Section 3.1.4, Community Impacts, of the Draft EIR/EIS. Lane reductions and restrictions are also anticipated on mainline, connector, ramp, and arterial roadway facilities to accommodate construction activities. Long-term closure of arterial overcrossings may be employed during construction to expedite construction and shorten the duration that the overcrossing is out of service.

Chapter 3 Environmental Setting, Consequences, and Avoidance, Minimization, and Mitigation Measures

The following is additional information for Draft EIR/EIS Section 3.1.6, Traffic and Transportation/Pedestrian and Bicycle Facilities. This information will be added to Section 3.1.6, Traffic and Transportation/Pedestrian and Bicycle Facilities of the Final EIR/EIS.

3.1 Traffic and Transportation Facilities

This section addresses the potential effects to traffic and circulation in the Long Beach area associated with construction of the proposed project. The traffic and circulation analysis is based on the results of the Supplemental Traffic Study Report. The Supplemental Traffic Study evaluates the existing and future traffic flow conditions within the Long Beach traffic study area (defined below) including, at a minimum, demand, capacity, and LOS for the mainline freeway segments and ramp-freeway junctions, weaving areas, ramp/arterial street intersections, and arterial/arterial street intersections affecting interchange operations. LOS analysis was conducted for the AM and PM peak hours based on the Highway Capacity Manual (HCM) 2000, which states:

> Level of service (LOS) is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Six LOS are defined for each type of facility that has analysis procedures available. Letters designate each level, from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each level of service represents a range of operating conditions and the driver's perception of those conditions. (HCM page 2-2)

The HCM does not provide a method to measure LOS for intersections without a stop sign or traffic signal, such as where a freeway entrance ramp merges into or diverges from an arterial street. A volume-to-capacity (v/c) ratio analysis is provided for such locations. A v/c ratio is a comparison of an amount of traffic on a road with the capacity of that road. A v/c ratio is expressed as a decimal, with values less than 1.00 indicating that volume is less than capacity and values more than 1.00 indicating that volume exceeds capacity. As values approach 1.00, congestion becomes more severe with values more than 1.00 indicating severe congestion.

Because much of I-405 within the project area operates and is expected in the future to operate at LOS F conditions, v/c ratios are provided as an indicator of the severity of congestion. For future conditions, the v/c ratio is the demand-to-capacity ratio, where the forecast demand volume is used.

Analysis of vehicle queues (i.e., lines of stopped vehicles waiting to proceed) was conducted for AM and PM peak hours at three types of locations for the reasons described below:

1. *Arterial at Ramps*: Left- and right-turn pockets were analyzed to determine if the pockets were of adequate length to contain the anticipated queues.
2. *Arterial/Arterial Intersections*: Queuing analysis was conducted for all turn lanes to determine if the pockets were of adequate length to contain the anticipated queues.
3. *Off-Ramp at Arterials*: Anticipated vehicle queuing for AM and PM peak hours at every freeway off-ramp was analyzed to determine if queues might back up onto the freeway mainline.

The analyses were conducted for the following scenarios:

- Existing (CEQA Baseline) Traffic Conditions – Year 2009
- Opening Year No Build Traffic Conditions – Year 2020
- Opening Year Alternative 1 Traffic Conditions – Year 2020
- Opening Year Alternative 2 Traffic Conditions – Year 2020
- Opening Year Alternative 3 Traffic Conditions – Year 2020
- Design Year No Build Traffic Conditions – Year 2040
- Design Year Alternative 1 Traffic Conditions – Year 2040
- Design Year Alternative 2 Traffic Conditions – Year 2040
- Design Year Alternative 3 Traffic Conditions – Year 2040

3.1.1 Affected Environment

The existing lane configurations, traffic volumes, LOS, and other operational characteristics within the Long Beach traffic study area are presented in this subsection. The information presented in this subsection is additional information for Draft EIR/EIS Section 3.1.6.2, Affected Environment. This information will be added to Section 3.1.6.2 of the Final EIR/EIS.

Traffic Study Area

The Long Beach study traffic study area includes:

- I-405 from I-605 to Lakewood Boulevard;
- I-605 from Katella Avenue to Carson Street; and
- SR-22/7th Street from I-405 to Park Avenue.

The study area includes all of the interchanges along I-405 and I-605 within the limits noted above, including arterial/ramp intersections and arterial/arterial intersections in the immediate vicinity of the interchanges. Figure 3-1 shows the Long Beach traffic study area.

Within the Long Beach traffic study area, 12 freeway segments have been analyzed. These are shown in Figure 3-1 and include:

1. I-405 between Lakewood Boulevard/Willow Street and Temple Avenue
2. I-405 between Bellflower Boulevard and Lakewood Boulevard/Willow Street
3. I-405 between Woodruff Avenue and Bellflower Boulevard
4. I-405 between Palo Verde Avenue/Stearns Street and Woodruff Avenue
5. I-405 between Studebaker Road and Palo Verde Avenue/Stearns Street
6. I-405 between I-605 and Studebaker Road
7. I-405 between SR-22/7th Street and I-605
8. I-605 between Spring Street/Cerritos Avenue and Carson Street
9. I-605 between Willow Street/Katella Avenue and Spring Street/Cerritos Avenue
10. I-605 between I-405/I-605 and Willow Street/Katella Avenue
11. SR-22/7th Street between Pepper Tree Lane and Studebaker Road
12. SR-22/7th Street between Studebaker Road and I-405/I-605

To simplify the comparison of future conditions and alternatives, the freeways in the Long Beach study area were divided into four segments (referred to as “study segments” hereafter): I-405 from Studebaker Road to I-605, I-405 from Studebaker Road to Lakewood Boulevard, I-605 from I-405 to Carson Street, and SR-22/7th Street from Studebaker Road to I-405/I-605 Interchange. This segmentation is generally based on the similarity of lane cross section by segment.

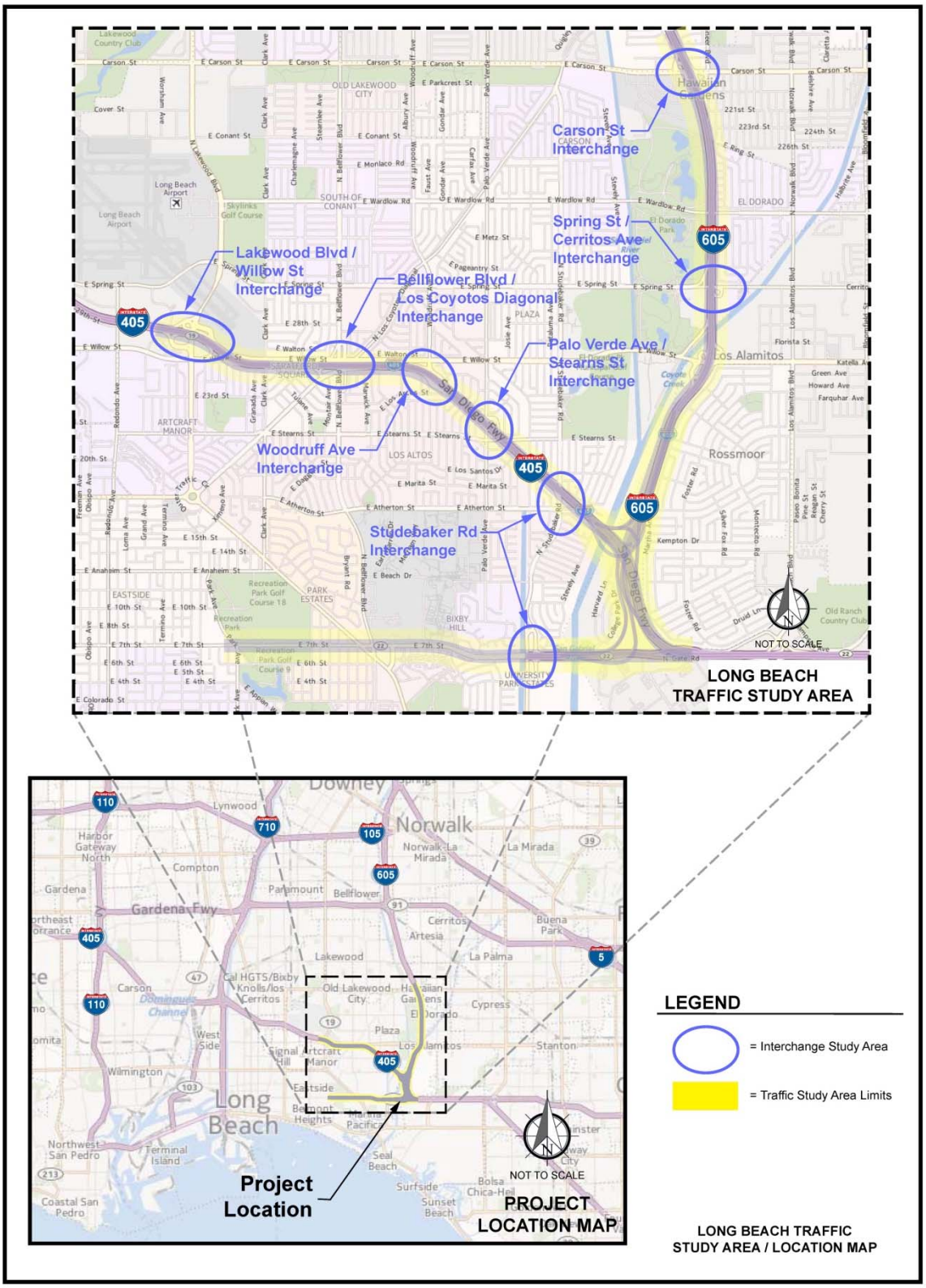

Figure 3-1 Long Beach Study Area

Within the Long Beach traffic study area, the following local interchanges have been analyzed:

1. Carson Street Interchange at I-605
2. Spring Street/Cerritos Avenue Interchange at I-605
3. Lakewood Boulevard and Willow Street Interchange at I-405
4. Bellflower Boulevard and Los Coyotes Diagonal Interchange at I-405
5. Woodruff Avenue Interchange at I-405
6. Palo Verde Avenue and Stearns Street Interchange at I-405
7. Studebaker Road Interchange at I-405
8. Studebaker Road Interchange at SR-22/7th Street
9. 7th Street between Park Avenue and East Campus Drive (includes Pacific Coast Highway at Bellflower Boulevard)

A list of study intersections, grouped by freeway interchange area, is shown in Table 3-1. Intersections identified for evaluation include those controlled with traffic signals, as well as stop-controlled or uncontrolled intersections within the Long Beach study area.

Existing (Year 2009) Lane Configuration

Existing (year 2009) traffic control and lane geometrics for the freeway mainline and intersections within the Long Beach study area are illustrated in Figures 3-2 and 3-3, respectively.

I-405 Mainline

Within the Long Beach study area, I-405 is a controlled-access freeway oriented in a northwest-southeast direction with four GP lanes in each direction. There is one HOV lane in each direction. The HOV lanes are generally separated from the GP lanes with a striped buffer (1 to 4 ft wide).

I-605 Mainline

Within the Long Beach study area, I-605 is a controlled-access freeway oriented in a northeast-southwest direction with four GP lanes in each direction. There is one HOV lane in the northbound direction. The HOV lane is generally separated from the GP lanes with a striped buffer (1 to 4 ft wide).

SR-22/7th Street Mainline

SR-22/7th Street consists of two GP lanes in each direction from Studebaker Road to the I-405/ I-605 interchange and is oriented in an east-west direction. There are three GP lanes in each direction west of Studebaker Road.

Carson Street Interchange at I-605

The I-605/Carson Street interchange is a partial cloverleaf interchange with two loop on-ramps in the northwest and southeast quadrants. The intersections of Carson Street/I-605 northbound off-ramp, Carson Street/I-605 southbound off-ramp, and Carson Street/Pioneer Boulevard are currently signalized intersections. All other ramp/arterial intersections are not signalized and provide continuous right turns. Between the two signalized ramp intersections, Carson Street consists of three to four lanes in each direction.

Spring Street/Cerritos Avenue Interchange at I-605

The I-605/Spring Street/Cerritos Avenue interchange is a partial interchange with a northbound loop on-ramp in the southeast quadrant and a southbound tangent off-ramp in the northwest quadrant. The I-605 northbound and southbound ramp intersections with Spring Street/Cerritos Avenue are currently signalized. Between the two ramp intersections, Spring Street/Cerritos Avenue consists of two to three lanes in each direction.

Lakewood Boulevard/Willow Street Interchange at I-405

The I-405/Lakewood Boulevard/Willow Street interchange is a cloverleaf interchange with a tangent on-ramp located on Willow Street. The intersection of Lakewood Boulevard/Willow Street is signalized. All other ramp/arterial intersections are not signalized and provide continuous right turns. Between the ramp intersections along Lakewood Boulevard, Lakewood Boulevard is an eight-lane roadway.

Bellflower Boulevard/Los Coyotes Diagonal Interchange at I-405

The I-405/Bellflower Boulevard/Los Coyotes Diagonal interchange is currently a partial cloverleaf interchange with ramps located on Bellflower Boulevard and Los Coyotes Diagonal. The intersections of Bellflower Boulevard/I-405 northbound ramps, Bellflower Boulevard/ Willow Street, Bellflower Boulevard/Los Coyotes Diagonal, Los Coyotes Diagonal/I-405 southbound off-ramp, and Los Coyotes Diagonal/Willow Street are currently signalized intersections. All other ramp/arterial intersections are not signalized and provide continuous right turns. Bellflower Boulevard, Willow Street, and Los Coyotes Diagonal within the interchange are six-lane roadways.

Table 3-1: Years 2020 and 2040 Peak-Hour Intersections LOS and Adverse Effect Determination for Alternative 1

Interchange Location	Intersection #	Intersection Location		Traffic Control	Year 2009						Year 2020													Year 2040												
					Existing Traffic						No Build Traffic on No Build Geometry						Alternative 1 Traffic on No Build Geometry						No Build-Alternative 1 Adverse Effect	No Build Traffic on No Build Geometry						Alternative 1 Traffic on No Build Geometry						No Build-Alternative 1 Adverse Effect
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			
		East/West Street	North/South Street		V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS		D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	
Carson Street at I-605	1	Carson Street	I-605 SB Off-Ramp	Sig	0.58	21.9	C	0.61	17.8	B	0.57	22.3	C	0.68	23.8	C	0.56	18.7	B	0.67	20.1	C	N	0.62	22.4	C	0.73	24.5	C	0.61	18.8	B	0.73	20.8	C	N
	2	Carson Street	I-605 SB Direct On-Ramp	None	0.15	--	--	0.25	--	--	0.22	--	--	0.33	--	--	0.24	--	--	0.38	--	--	--	0.24	--	--	0.36	--	--	0.26	--	--	0.41	--	--	--
		Carson Street	I-605 SB Loop On-Ramp	None	0.24	--	--	0.20	--	--	0.33	--	--	0.33	--	--	0.35	--	--	0.36	--	--	--	0.35	--	--	0.36	--	--	0.38	--	--	0.39	--	--	--
	3	Carson Street	I-605 NB Off-Ramp	Sig	0.55	14.8	B	0.66	12.4	B	0.59	21.8	C	0.76	20.6	C	0.59	20.3	C	0.76	16.6	B	N	0.63	23.6	C	0.82	23.2	C	0.63	21.8	C	0.82	18.4	B	N
		Carson Street	I-605 NB Loop On-Ramp	None	0.23	--	--	0.45	--	--	0.31	--	--	0.35	--	--	0.30	--	--	0.35	--	--	--	0.33	--	--	0.37	--	--	0.33	--	--	0.37	--	--	--
		Carson Street	I-605 NB Direct On-Ramp	None	0.40	--	--	0.32	--	--	0.52	--	--	0.49	--	--	0.51	--	--	0.46	--	--	--	0.56	--	--	0.53	--	--	0.55	--	--	0.49	--	--	--
	4	Carson Street	Pioneer Boulevard	Sig	0.76	48.1	D	0.76	35.1	D	0.79	31.1	C	0.84	33.7	C	0.79	30.7	C	0.87	31.6	C	N	0.86	35.1	D	0.92	43.9	D	0.87	34.7	C	0.90	41.4	D	N
Spring Street/ Cerritos Avenue at I-605	5	Spring Street/Cerritos Avenue	I-605 SB Off-Ramp	Sig	0.79	26.2	C	0.60	18.4	B	0.68	14.2	B	0.65	10.9	B	0.68	14.0	B	0.64	10.3	B	N	0.74	15.4	B	0.71	12.0	B	0.73	15.2	B	0.70	11.4	B	N
	6	Spring Street/Cerritos Avenue	I-605 NB On-Ramp	Sig	0.84	13.5	B	0.81	11.1	B	0.76	10.5	B	0.79	8.2	A	0.73	9.3	A	0.78	8.1	A	N	0.82	11.6	B	0.86	9.8	A	0.79	10.3	B	0.85	9.5	A	N
Lakewood Boulevard/ Willow Street at I-405	7	I-405 NB Direct Off-Ramp	Lakewood Boulevard	None	0.35	--	--	0.34	--	--	0.38	--	--	0.38	--	--	0.43	--	--	0.41	--	--	--	0.41	--	--	0.41	--	--	0.47	--	--	0.44	--	--	--
		I-405 NB Direct On-Ramp	Lakewood Boulevard	None	0.22	--	--	0.21	--	--	0.38	--	--	0.23	--	--	0.38	--	--	0.22	--	--	--	0.41	--	--	0.25	--	--	0.41	--	--	0.24	--	--	--
		I-405 NB Loop Off-Ramp	Lakewood Boulevard	None	0.19	--	--	0.18	--	--	0.23	--	--	0.22	--	--	0.26	--	--	0.22	--	--	--	0.25	--	--	0.23	--	--	0.28	--	--	0.24	--	--	--
		I-405 NB Loop On-Ramp	Lakewood Boulevard	None	0.50	--	--	0.38	--	--	0.53	--	--	0.41	--	--	0.53	--	--	0.41	--	--	--	0.57	--	--	0.44	--	--	0.57	--	--	0.44	--	--	--
	8	I-405 SB Loop On-Ramp	Lakewood Boulevard	None	0.19	--	--	0.23	--	--	0.22	--	--	0.25	--	--	0.23	--	--	0.25	--	--	--	0.24	--	--	0.27	--	--	0.25	--	--	0.27	--	--	--
		I-405 SB Direct Off-Ramp	Lakewood Boulevard	None	0.40	--	--	0.31	--	--	0.43	--	--	0.48	--	--	0.41	--	--	0.46	--	--	--	0.46	--	--	0.52	--	--	0.44	--	--	0.50	--	--	--
	9	Willow Street	Lakewood Boulevard	Sig	0.76	31.1	C	**0.92**	**66.2**	**E**	0.75	31.2	C	0.89	43.0	D	0.74	28.9	C	0.96	46.5	D	N	0.81	33.6	C	0.93	48.4	D	0.79	33.1	C	0.93	48.7	D	N
	10	Willow Street	I-405 SB Loop Off-Ramp	None	0.32	--	--	0.30	--	--	0.35	--	--	0.46	--	--	0.33	--	--	0.45	--	--	--	0.37	--	--	0.50	--	--	0.36	--	--	0.48	--	--	--
		Willow Street	I-405 SB Direct On-Ramp	None	0.26	--	--	0.38	--	--	0.28	--	--	0.41	--	--	0.28	--	--	0.41	--	--	--	0.31	--	--	0.44	--	--	0.31	--	--	0.44	--	--	--
Bellflower Boulevard/ Los Coyotes Diagonal at I-405	11	I-405 NB Off-Ramp	Bellflower Boulevard	Sig	0.41	9.3	A	0.48	11.9	B	0.51	10.8	B	0.53	10.6	B	0.51	10.4	B	0.53	10.9	B	N	0.55	11.6	B	0.58	11.3	B	0.55	11.3	B	0.58	11.3	B	N
		I-405 NB Loop On-Ramp	Bellflower Boulevard	None	0.49	--	--	0.35	--	--	0.53	--	--	0.37	--	--	0.51	--	--	0.37	--	--	--	0.57	--	--	0.40	--	--	0.55	--	--	0.40	--	--	--
		I-405 NB Direct On-Ramp	Bellflower Boulevard	None	0.28	--	--	0.18	--	--	0.31	--	--	0.19	--	--	0.29	--	--	0.19	--	--	--	0.33	--	--	0.20	--	--	0.32	--	--	0.20	--	--	--
	12	Willow Street	Bellflower Boulevard	Sig	**0.84**	**81.2**	**F**	0.92	40.1	D	1.01	48.8	D	1.01	54.4	D	1.00	50.1	D	1.00	51.2	D	N	**1.09**	**67.3**	**E**	**1.09**	**70.6**	**E**	**1.09**	**68.2**	**E**	**1.10**	**68.1**	**E**	N
	13	Los Coyotes Diagonal	Bellflower Boulevard	Sig	0.63	31.3	C	**0.97**	**72.8**	**E**	0.65	26.4	C	1.00	42.1	D	0.64	27.5	C	1.06	44.6	D	N	0.70	26.9	C	**1.13**	**56.8**	**E**	0.70	28.1	C	**1.15**	**59.4**	**E**	Y
		Los Coyotes Diagonal	I-405 SB Direct On-Ramp	None	0.06	--	--	0.09	--	--	0.06	--	--	0.12	--	--	0.08	--	--	0.12	--	--	--	0.07	--	--	0.13	--	--	0.08	--	--	0.13	--	--	--
	14	I-405 SB Loop Off-Ramp	Bellflower Boulevard	None	0.12	--	--	0.26	--	--	0.12	--	--	0.32	--	--	0.12	--	--	0.29	--	--	--	0.13	--	--	0.34	--	--	0.13	--	--	0.32	--	--	--
	15	Los Coyotes Diagonal	I-405 SB Direct Off-Ramp	Sig	0.44	14.4	B	0.45	13.4	B	0.52	10.0	B	0.47	16.0	B	0.52	10.3	B	0.47	14.0	B	N	0.56	10.6	B	0.51	16.8	B	0.56	10.8	B	0.51	14.7	B	N
		Los Coyotes Diagonal	I-405 SB Loop On-Ramp	None	0.14	--	--	0.13	--	--	0.16	--	--	0.17	--	--	0.25	--	--	0.17	--	--	--	0.18	--	--	0.18	--	--	0.27	--	--	0.18	--	--	--
	16	Willow Street	Los Coyotes Diagonal	Sig	0.72	51.5	D	**0.74**	**102.8**	**F**	0.78	44.4	D	1.02	35.1	D	0.77	31.7	C	1.04	36.7	D	N	0.87	48.8	D	1.18	45.4	D	0.86	36.4	D	1.20	50.4	D	N
Woodruff Avenue at I-405	17	Willow Street	Woodruff Avenue	Sig	**1.07**	**86.8**	**F**	0.77	30.4	C	**1.33**	**147.9**	**F**	0.87	40.4	D	**1.32**	**146.2**	**F**	0.88	40.9	D	N	**1.44**	**180.5**	**F**	0.94	51.5	D	**1.43**	**179.2**	**F**	0.94	53.1	D	N
	18	I-405 NB Direct Off-Ramp	Woodruff Avenue	None	0.15	--	--	0.17	--	--	0.39	--	--	0.19	--	--	0.39	--	--	0.20	--	--	--	0.42	--	--	0.20	--	--	0.43	--	--	0.22	--	--	--
		I-405 NB Direct On-Ramp	Woodruff Avenue	None	0.25	--	--	0.20	--	--	0.31	--	--	0.21	--	--	0.31	--	--	0.21	--	--	--	0.34	--	--	0.23	--	--	0.34	--	--	0.23	--	--	--
	19	I-405 SB Direct Off-Ramp	Woodruff Avenue	None	0.48	--	--	0.38	--	--	0.52	--	--	0.47	--	--	0.51	--	--	0.45	--	--	--	0.56	--	--	0.51	--	--	0.55	--	--	0.49	--	--	--
		I-405 SB Direct On-Ramp	Woodruff Avenue	None	0.27	--	--	0.19	--	--	0.41	--	--	0.23	--	--	0.43	--	--	0.23	--	--	--	0.45	--	--	0.25	--	--	0.47	--	--	0.25	--	--	--
Palo Verde Avenue/ Stearns Street at I-405	20	I-405 NB Direct Off-Ramp	Palo Verde Avenue	Sig	0.54	11.3	B	0.45	13.7	B	0.78	17.7	B	0.61	11.8	B	0.78	17.0	B	0.63	12.0	B	N	0.95	21.2	C	0.70	12.6	B	0.96	20.6	C	0.73	13.1	B	N
		I-405 NB Loop On-Ramp	Palo Verde Avenue	None	0.11	--	--	0.20	--	--	0.13	--	--	0.22	--	--	0.15	--	--	0.20	--	--	--	0.14	--	--	0.23	--	--	0.17	--	--	0.21	--	--	--
	21	Woodruff Avenue	Palo Verde Avenue	Sig	**0.87**	**86.6**	**F**	0.59	21.3	C	0.84	13.6	B	0.66	10.3	B	0.84	12.9	B	0.68	10.2	B	N	0.91	15.9	B	0.72	11.3	B	0.91	15.4	B	0.74	11.2	B	N
	22	Stearns Street	Palo Verde Avenue	Sig	0.73	19.4	B	0.75	25.2	C	0.86	18.9	B	0.83	20.5	C	0.86	18.5	B	0.85	21.0	C	N	0.94	22.0	C	0.92	24.4	C	0.94	21.7	C	0.93	25.1	C	N
	23	Stearns Street	I-405 SB Direct On-Ramp	None	0.28	--	--	0.39	--	--	0.30	--	--	0.46	--	--	0.33	--	--	0.44	--	--	--	0.33	--	--	0.50	--	--	0.35	--	--	0.48	--	--	--

Table 3-1: Years 2020 and 2040 Peak-Hour Intersections LOS and Adverse Effect Determination for Alternative 1

Interchange Location	Intersection #	Intersection Location		Traffic Control	Year 2009						Year 2020													Year 2040												
					Existing Traffic						No Build Traffic on No Build Geometry						Alternative 1 Traffic on No Build Geometry						No Build-Alternative 1 Adverse Effect	No Build Traffic on No Build Geometry						Alternative 1 Traffic on No Build Geometry						No Build-Alternative 1 Adverse Effect
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			
		East/West Street	North/South Street		V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS		D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	
Studebaker Road at I-405	24	I-405 NB Direct On-Ramp	Studebaker Road	Sig	0.50	4.0	A	0.55	4.3	A	0.51	2.6	A	0.47	4.7	A	0.51	1.2	A	0.50	3.1	A	N	0.55	2.8	A	0.51	4.9	A	0.55	1.4	A	0.54	3.2	A	N
	25	I-405 SB Direct Off-Ramp	Studebaker Road	Stop	0.15	13.8	B	0.04	10.8	B	**0.86**	**68.4**	**F**	0.34	16.2	C	**1.03**	**113.3**	**F**	0.51	24.8	C	N	**1.02**	**98.3**	**F**	0.33	15.7	C	**1.24**	**170.6**	**F**	0.53	25.2	D	N
				*Sig**	*N/A*						*0.65*	*8.4*	*A*	*0.66*	*5.8*	*A*	*0.66*	*8.9*	*A*	*0.65*	*6.2*	*A*		*0.71*	*9.1*	*A*	*0.72*	*7.0*	*A*	*0.72*	*9.8*	*A*	*1.72*	*7.1*	*A*	
	26	Atherton Street	Studebaker Road	Sig	0.46	9.2	A	0.74	23.3	C	0.54	9.3	A	0.78	13.8	B	0.54	10.3	B	0.79	14.8	B	N	0.60	10.7	B	0.85	15.7	B	0.58	11.1	B	0.86	16.9	B	N
Studebaker Road at SR-22/ 7th Street	27	SR-22 WB On-/Off-Ramp	Studebaker Road	Sig	0.49	16.0	B	0.74	22.1	C	0.46	12.8	B	0.79	28.0	C	0.53	13.0	B	0.76	27.3	C	N	0.50	13.1	B	0.86	30.4	C	0.52	13.5	B	0.82	29.1	C	N
	28	SR-22 EB On-/Off-Ramp	Studebaker Road	Sig	0.72	17.6	B	0.82	17.1	B	0.91	21.3	C	0.93	25.8	C	0.97	28.9	C	0.96	28.6	C	N	0.99	30.4	C	1.03	37.1	D	1.05	43.5	D	1.06	40.4	D	N
	29	SR-22 WB On-/Off-Ramp	College Park Drive	Stop	0.39	18.8	C	**0.65**	**59.9**	**F**	0.43	21.3	C	**0.61**	**88.7**	**F**	0.51	24.3	C	**0.73**	**104.8**	**F**	Y	0.51	25.3	D	**0.84**	**152.1**	**F**	0.61	30.2	D	**1.00**	**184.2**	**F**	Y
				*Sig**	*N/A*						*0.65*	*14.1*	*B*	***1.07****	***110.1***	***F****	*0.70*	*15.1*	*B*	***1.10****	***119.9***	***F****		*0.71*	*15.5*	*B*	***1.16****	***147.2***	***F****	*0.75*	*17.3*	*B*	***1.19****	***156.9***	***F****	
7th Street	30	7th Street	Pacific Coast Highway	Sig	**0.95**	**92.9**	**F**	**1.03**	**82.6**	**F**	0.94	49.2	D	0.95	35.9	D	0.96	53.2	D	0.96	37.4	D	N	**1.02**	**65.8**	**E**	**1.03**	**58.7**	**E**	**1.04**	**71.5**	**E**	**1.04**	**62.4**	**E**	Y
	31	7th Street	Bellflower Boulevard	Sig	**1.01**	**73.6**	**E**	**0.91**	**90.3**	**F**	**1.04**	**68.9**	**E**	0.98	47.9	D	**1.06**	**71.4**	**E**	0.96	42.8	D	Y	**1.13**	**82.4**	**F**	**1.06**	**63.0**	**E**	**1.14**	**84.9**	**F**	**1.04**	**57.2**	**E**	N
	32	Pacific Coast Highway	Bellflower Boulevard	Sig	0.47	22.3	C	0.73	22.5	C	0.53	38.8	D	0.70	20.4	C	0.50	36.6	D	0.69	19.5	B	N	0.57	39.1	D	0.82	32.1	C	0.54	36.9	D	0.81	32.0	C	N
	33	7th Street	Channel Drive	Sig	0.72	32.9	C	0.88	30.3	C	0.71	24.5	C	0.94	22.7	C	0.74	23.2	C	0.95	25.6	C	N	0.77	25.7	C	1.02	50.8	D	0.80	24.3	C	**1.03**	**55.3**	**E**	N
	34	7th Street	W. Campus Drive	Sig	**0.83**	**112.9**	**F**	0.72	31.1	C	0.79	31.2	C	0.81	32.0	C	0.79	33.2	C	0.82	35.6	D	N	0.85	53.1	D	**0.87**	**58.5**	**E**	**0.86**	**55.3**	**E**	**0.89**	**64.3**	**E**	Y
	35	7th Street	E. Campus Drive	Sig	0.97	23.1	C	0.73	24.7	C	1.03	35.8	D	0.87	14.6	B	1.03	38.0	D	0.88	14.9	B	N	**1.12**	**55.8**	**E**	0.96	16.7	B	**1.13**	**58.6**	**E**	0.97	17.2	B	N
	36	7th Street	Park Avenue	Sig	0.68	12.2	B	0.74	15.7	B	0.69	14.8	B	0.81	19.2	B	0.76	14.4	B	0.83	20	B	N	0.82	17.1	B	0.86	23.7	C	0.82	16.4	B	0.87	24.8	C	N

Notes:

1. LOS – Level of Service; V/C – Volume-to-Capacity Ratio; D/C – Demand Volume-to-Capacity Ratio; N/A – Not Applicable (see Note 2)
2. * = Intersection is not signalized under existing or No Build conditions. The signalized row is included only to determine if there is an adverse effect at the intersection. If a stop-controlled intersection has an LOS E or F under future conditions, then the intersection is reanalyzed as a signalized intersection to identify any adverse effects, because stop-controlled analysis does not provide an overall intersection metric. The number of LOS E or F locations and the number of locations with V/C or D/C greater than 1.00 identified in the text does not include the signalized row because the existing and no-build operation is based on the current stop control.
3. Bold indicates an intersection forecast to operate at LOS E or F.
4. Shaded cells indicate an adverse effect.
5. -- = LOS and average delay are not calculated for intersections without traffic control. The adverse effect determination applies only to controlled intersections.
6. Intersection numbers correspond to the intersection numbers shown on the intersection traffic volumes figures.
7. For future conditions, the D/C ratio is used instead of the V/C ratio.

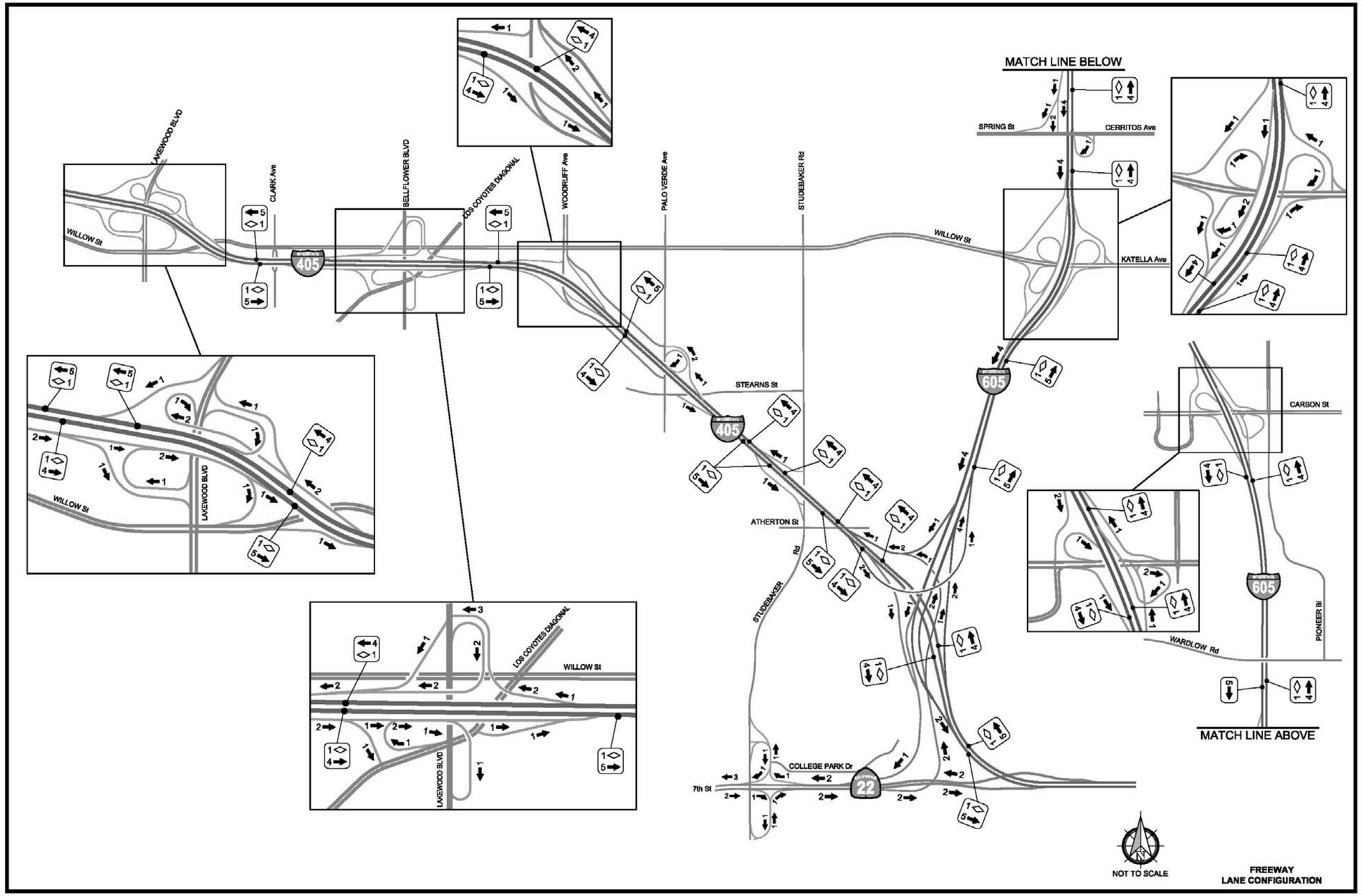

Figure 3-2 Long Beach Study Area Freeway Lane Configuration

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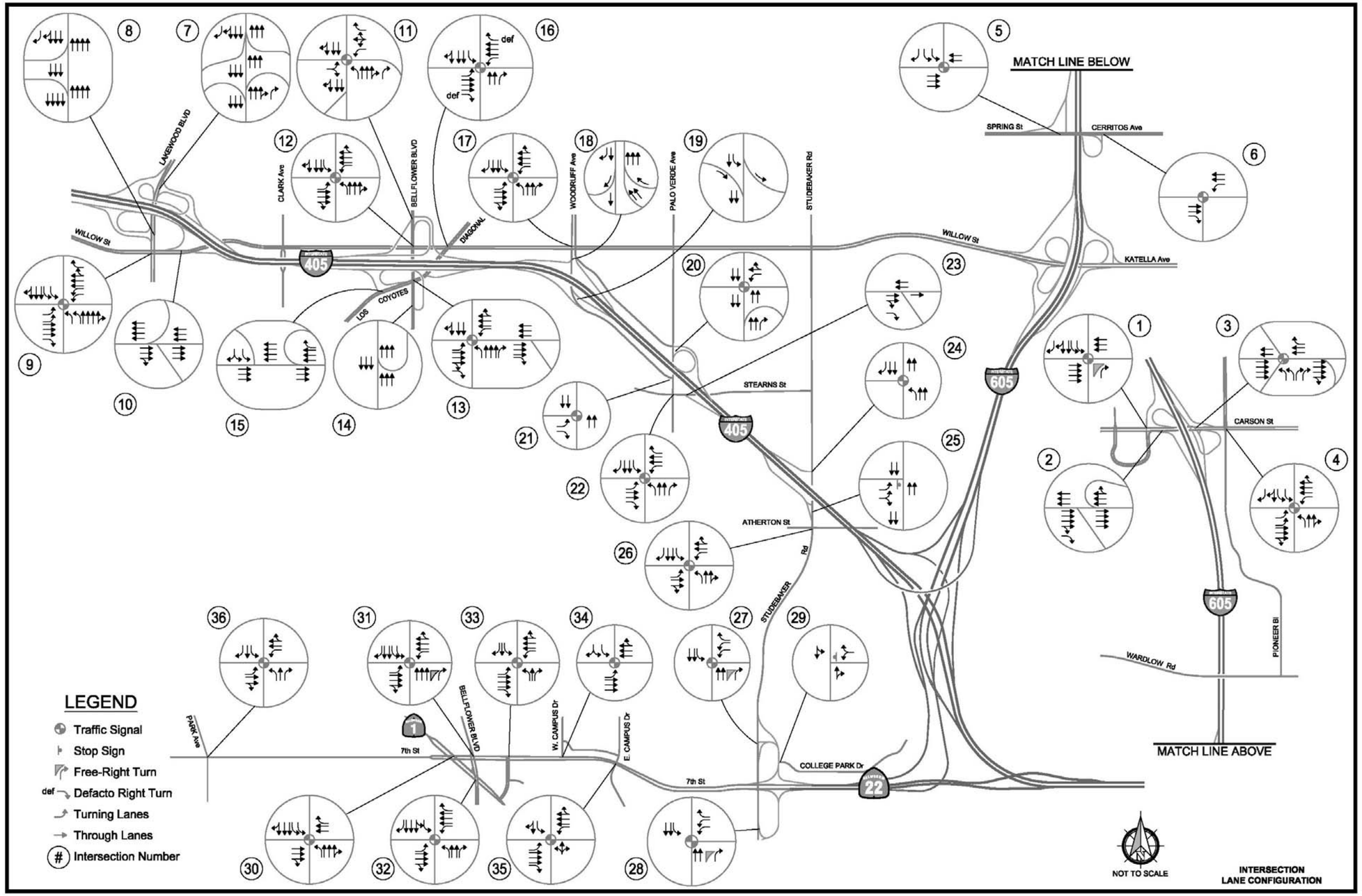

Figure 3-3 Long Beach Study Area Intersection Lane Configuration

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Woodruff Avenue Interchange at I-405

The I-405/Woodruff Avenue interchange is a diamond interchange. None of the ramp intersections are signalized. The intersection of Woodruff Avenue and Willow Street is signalized. Woodruff Avenue within the interchange consists of one lane in each direction.

Palo Verde Avenue/Stearns Street Interchange at I-405

The I-405/Palo Verde Avenue/Stearns Street interchange is a partial interchange with two tangent off-ramps, a northbound loop on-ramp, and a tangent on-ramp located on Stearns Street. The I-405 northbound ramp at Palo Verde Avenue, I-405 southbound ramp at Palo Verde Avenue, and Stearns Street at Palo Verde Avenue are currently signalized. In between the two ramp intersections with Palo Verde Avenue, Palo Verde Avenue is a four-lane roadway.

Studebaker Road Interchange at I-405

The I-405/Studebaker Road interchange is a partial interchange with one northbound tangent on-ramp and one southbound tangent ramp. The intersections of I-405 northbound on-ramp/ Studebaker Road and Atherton Street/Studebaker Road are currently signalized. The I-405 southbound off-ramp/Studebaker Road intersection is currently stop sign controlled for ramp traffic. All other ramp/arterial intersections are not signalized and provide continuous right turns. In between the two ramp intersections with Studebaker Road, Studebaker Road is a four-lane roadway.

Studebaker Road Interchange at SR-22/7th Street

The SR-22/7th Street interchange at Studebaker Road consists of two tangent ramps and two loop ramps. The ramp intersections of Studebaker Road/SR-22/7th Street westbound and eastbound ramps are currently signalized. In between the two ramp intersections with Studebaker Road, Studebaker Road is a four-lane roadway.

7th Street between Pacific Coast Highway and East Campus Drive

7th Street between Pacific Coast Highway and East Campus Drive is currently a six-lane roadway. Pacific Coast Highway, Bellflower Boulevard, Channel Drive, West Campus Drive, and East Campus Drive at their intersections with 7th Street are currently signalized intersections. The intersection of Pacific Coast Highway and Bellflower Boulevard is also currently signalized.

Existing (Year 2009) Traffic Conditions

Existing traffic data for the Long Beach traffic study area are for the year 2009. Traffic data and the results of operational analysis are presented below for the existing (2009) condition for both the freeway mainline and the interchange areas.

Freeway Mainline

Existing (year 2009) traffic volumes for the mainline freeway were obtained from Caltrans Performance Monitoring System (PeMS) data and Caltrans-published traffic volumes data available on the Caltrans Web site (http://traffic-counts.dot.ca.gov). Existing (year 2009) AM and PM peak-hour traffic volumes for the I-405 mainline and all interchange ramps within the study area are illustrated in Figure 3-4.

V/C Ratio and LOS. Table 3-2 presents the LOS and v/c ratios for peak hours of the existing year (2009) in the GP lanes of the freeway mainline. Under existing conditions, the I-405 mainline between I-605 and Lakewood Boulevard operates at LOS E and F in the AM peak hour in the northbound direction and LOS D and E in the southbound direction. In the PM peak hour, the I-405 freeway mainline is LOS D and E in the northbound direction and LOS D and F in the southbound direction. The range of v/c ratios in the GP lanes of the I-405 freeway mainline during the AM peak hour is **0.85 to 0.98** and **0.81 to 0.90** during the PM peak hour.

The I-605 mainline operates at LOS C in the AM peak hour in the northbound direction and LOS E in the southbound direction under existing conditions. In the PM peak hour, the I-605 freeway mainline is LOS E in both directions. The v/c ratios in the GP lanes of the I-605 freeway mainline during the AM peak hour are **0.81** in the northbound direction and **1.09** in the southbound direction. During the PM peak hour, the v/c ratios are **0.97** in the northbound direction and **1.00** in the southbound direction.

The SR-22/7th Street freeway mainline operates at LOS F in the AM peak hour in the eastbound direction and LOS E in the westbound direction under existing conditions. In the PM peak hour, the SR-22/7th Street freeway mainline is LOS F in the eastbound direction and LOS D in the westbound direction. The v/c ratios in the GP lanes of the SR-22/7th Street freeway mainline during the AM peak hour are **1.24** in the eastbound direction and **1.08** in the westbound direction. During the PM peak hour, the v/c ratios are **1.38** in the eastbound direction and **0.89** in the westbound direction.

Table 3-3 presents the v/c ratios for peak hours of the existing year (2009) in the HOV (carpool) lanes. The range of v/c ratios in the HOV lanes during the AM peak hour is **0.45 to 1.06** and **0.38 to 1.04** during the PM peak hour (shown in bold in the table).

A more-detailed link-by-link presentation of the existing freeway mainline LOS under 2009 traffic conditions for GP and HOV lanes is included in Appendix B.1.

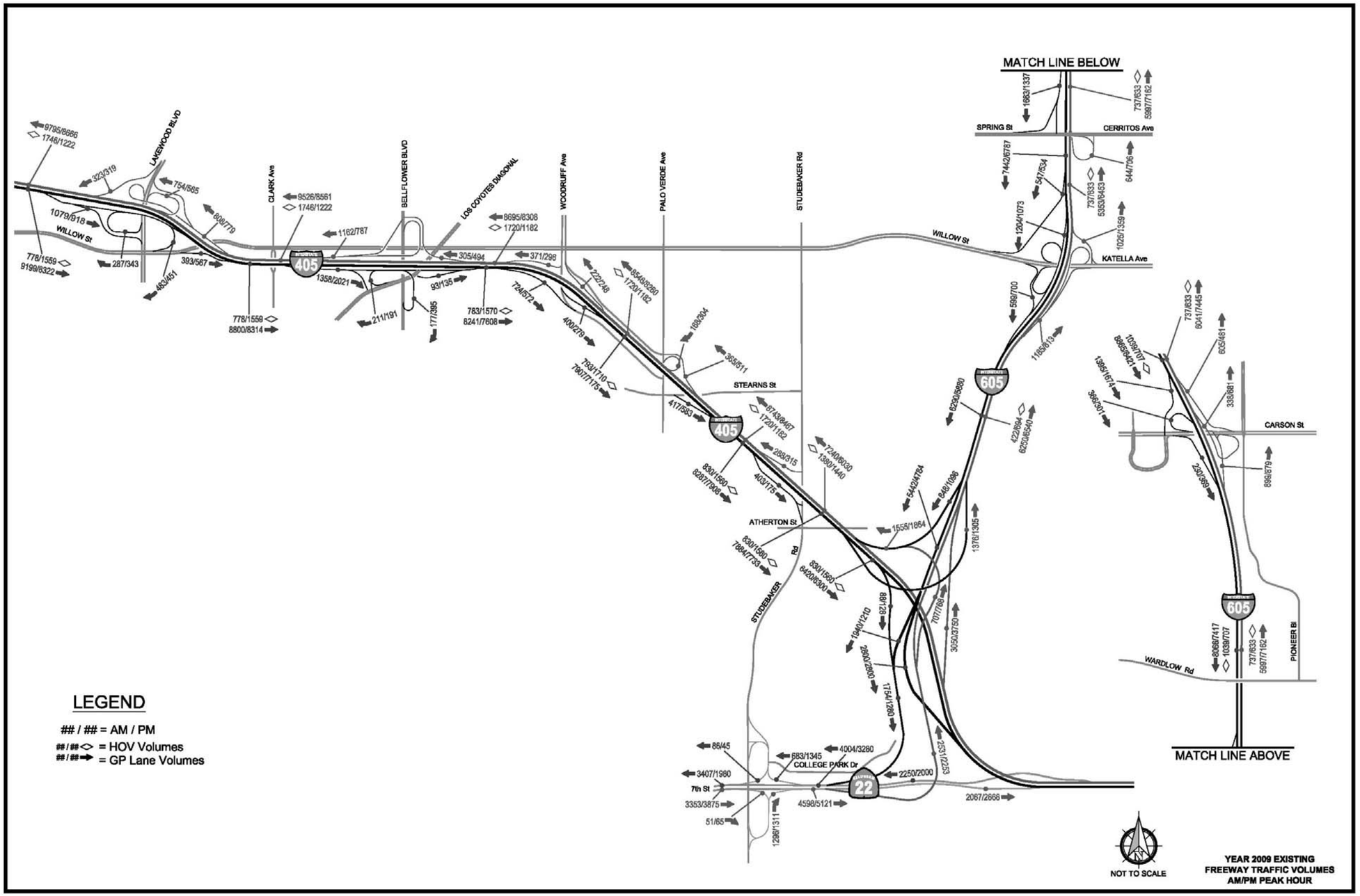

Figure 3-4 Existing (2009) Freeway Traffic Volumes – AM/PM Peak Hour

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Table 3-2: Mainline GP Lane Density, LOS, and Volume-to-Capacity Ratio – Year 2020

Segment	Direction	Existing 2009						No Build – 2020*						Alternative 1 – 2020*						Alternative 2 – 2020*						Alternative 3 – 2020*					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		V/C	Den	LOS	V/C	Den	LOS	D/C	Den	LOS	D/C	Den	LOS	D/C	Den	LOS	D/C	Den	LOS	D/C	Den	LOS	D/C	Den	LOS	D/C	Den	LOS	D/C	Den	LOS
I-405 Mainline I-605 to Studebaker Road	NB	0.98	38.2	E	0.81	26.9	D	1.16	**	F	1.29	**	F	1.19	**	F	1.40	**	F	1.20	**	F	1.37	**	F	1.23	**	F	1.42	**	F
	SB	0.85	26.6	D	0.84	31.9	D	0.92	29.7	D	0.98	38.5	E	0.94	30.7	D	0.98	38.5	E	0.94	30.7	D	0.99	38.9	E	0.97	32.2	D	1.02	41.1	E
I-405 Mainline Studebaker Road to Lakewood Boulevard	NB***	0.94	52.4	F	0.90	38.1	E	0.90	51.5	F	1.02	45.2	F	0.92	52.6	F	1.10	49.7	F	0.92	52.4	F	1.07	47.8	F	0.95	55.0	F	1.11	50.3	F
	SB***	0.95	42.0	E	0.90	61.6	F	1.00	45.2	F	1.05	71.1	F	1.01	45.3	F	1.08	75.7	F	1.01	45.4	F	1.04	70.9	F	1.03	46.4	F	1.08	73.4	F
I-605 Mainline I-405 to Carson Street	NB	0.81	26.3	C	0.97	35.7	E	0.80	25.8	C	1.00	37.9	E	0.83	27.0	D	1.01	38.5	E	0.75	24.1	C	0.88	31.3	D	0.78	25.0	C	0.88	31.5	D
	SB	1.09	41.1	E	1.00	36.1	E	1.05	37.7	E	0.98	35.0	D	1.07	39.1	E	1.00	36.1	E	1.08	40.4	E	1.00	36.0	E	1.04	37.4	E	1.03	37.8	E
SR-22/7th Street Mainline Studebaker Road to I-405/ I-605	EB	1.24	**	F	1.38	**	F	1.19	**	F	1.08	38.4	E	1.19	**	F	0.98	31.8	D	1.18	**	F	0.95	30.4	D	1.12	41.3	E	0.96	30.8	D
	WB	1.08	38.3	E	0.89	27.3	D	1.06	36.4	E	1.05	36.2	E	1.15	43.9	E	1.09	38.8	E	1.14	42.9	E	1.11	40.9	E	1.11	40.9	E	1.31	**	F

NB – Northbound; SB – Southbound; EB – Eastbound; WB – Westbound; Den – Density; LOS – Level of Service; V/C – Volume-to-Capacity Ratio; D/C – Demand Volume–to-Capacity Ratio.

* – For future conditions, the D/C ratio is used instead of the V/C ratio.

** – Density is not calculated under HCM because volume exceeds the range of the density algorithm.

*** – Density and LOS is based on weaving analysis.

Table 3-3: Mainline HOV Volume-to-Capacity Ratio – Year 2020

Segment	Direction	Existing 2009		No Build 2020*		Alternative 1 2020*		Alternative 2 2020*		Alternative 3 2020*	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
I-405 HOV I-605 to Studebaker Road	NB	0.84	0.87	**1.35**	**1.51**	**1.30**	1.08	**1.24**	**1.46**	**1.12**	**1.24**
	SB	0.50	0.95	1.16	1.11	1.21	1.09	1.19	1.09	0.96	1.06
I-405 HOV Studebaker Road to Lakewood Boulevard	NB	**1.06**	0.74	**1.01**	1.18	1.12	1.11	1.11	1.26	1.01	1.11
	SB	0.50	**1.04**	1.16	1.12	1.21	1.16	1.19	1.09	0.94	1.15
I-605 HOV I-405 to Carson Street	NB	**0.45**	**0.38**	**1.01**	1.32	**1.00**	**1.31**	**1.00**	1.32	0.99	1.01
	SB	0.63	0.43	1.16	**0.99**	1.19	**1.02**	1.21	**1.08**	**0.81**	**0.76**

NB – Northbound; SB – Southbound; EB – Eastbound; WB – Westbound; V/C – Volume-to-Capacity Ratio

Bolded V/C and D/C (demand volume-to-capacity) ratios indicate the minimum and maximum values as discussed in the text.

* – For future conditions, the D/C ratio is used instead of the V/C ratio.

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Freeway Connector Volumes

Table 3-4 provides the existing branch connector volumes on ramps within the I-405/I-605/ SR-22/7th Street interchange not presented in the Draft EIR/EIS. Branch connectors are the ramps connecting one freeway to another. The freeway-to-freeway branch connectors are currently operating under capacity during both AM and PM peak hours. Branch connectors operate with v/c ratios ranging from **0.36 to 0.97** under existing conditions (shown in bold in the table).

Arterials, Intersections, and Interchanges

To establish existing (year 2009) traffic conditions for arterial and interchange study locations, AM and PM peak-hour turning movement counts were collected. Existing (year 2009) AM and PM peak-hour traffic volumes for arterial and interchange study locations within the study area are illustrated in Figure 3-5. A summary of the LOS analysis and v/c ratios for AM and PM peak hours for existing conditions is provided in Table 3-1 for all of the study intersections. The study intersections are currently operating at LOS D or better, except for ten intersections that are operating at LOS E or F during either the AM or PM peak hour or both (shown in bold in the table). Table 3-1 also shows that study intersections are currently operating under capacity (i.e., v/c less than 1.00) during peak hours, except for three intersections that are currently operating over capacity.

A comparison of existing vehicle queuing (higher of AM or PM peak-hour 95th percentile queues) with available storage (in feet) was conducted at all arterial interchange study intersections and is summarized in Table 3-5. The table shows that all off-ramps with traffic control at their arterial intersections have adequate turning lane storage under existing conditions. Table 3-5 also shows that 82 percent of arterials have adequate turning lane storage at ramp intersections and 54 percent of turning lanes at arterial/arterial intersections have adequate storage.

3.1.2 Environmental Consequences

The information presented in this subsection is additional information for Draft EIR/EIS Section 3.1.6, Traffic and Transportation/Pedestrian and Bicycle Facilities, under Subsection 3.1.6.3, Environmental Consequences. This information will be added to Section 3.1.6.3 of the Final EIR/EIS.

Traffic Forecasting Model

Traffic forecasts for the Long Beach area were developed for each of the four alternatives under study using Orange County Transportation Analysis Model (OCTAM) Version 3.3. Traffic forecasts were prepared for each freeway segment and each study intersection. The forecast years are Opening Year 2020 and Design Year 2040. Forecast AM and PM peak-hour traffic volumes

on the freeway mainline and ramps are shown for each alternative for years 2020 and 2040 in Figures 3-6 through 3-13. Forecast AM and PM peak-hour traffic volumes for each of the study intersections are shown for each alternative for years 2020 and 2040 in Figures 3-14 through 3-21.

Traffic data and the results of operational analysis are presented below for the No Build Alternative and three build alternatives for the freeway mainline and the interchange areas. Analysis and data are presented for the expected Opening Year 2020 and the Design Year 2040.

No Build Alternative

Freeway Mainline

The Opening Year (2020) and Design Year (2040) No Build Alternative AM/PM peak-hour traffic volumes for the freeway mainline and all interchange ramps within the Long Beach study area are presented in Figures 3-6 and 3-10, respectively. The freeway mainline and all interchange ramps are assumed to be unchanged from the existing conditions. There are no committed projects within the Long Beach study area.

V/C Ratio and LOS. Table 3-2 presents the LOS and v/c ratios for peak hours of the No Build Alternative in 2020 for the GP lanes of the freeway mainline. Under no-build conditions in year 2020, the I-405 freeway mainline between I-605 and Lakewood Boulevard is anticipated to operate at LOS F in the AM peak hour in the northbound direction and LOS D and F in the southbound direction. In the PM peak hour, the I-405 freeway mainline is anticipated to operate at LOS F in the northbound direction and LOS E and F in the southbound direction. The range of v/c ratios in the GP lanes of the I-405 freeway mainline during the AM peak hour is **0.90 to 1.16** and **0.98 to 1.29** during the PM peak hour.

The I-605 mainline is anticipated to operate at LOS C in the AM peak hour in the northbound direction and LOS E in the southbound direction in 2020. In the PM peak hour, the I-605 freeway mainline is anticipated to operate at LOS E in the northbound direction and LOS D in the southbound direction. The v/c ratios in the GP lanes of the I-605 freeway mainline during the AM peak hour are **0.80** in the northbound direction and **1.05** in the southbound direction. During the PM peak hour, the v/c ratios are **1.00** in the northbound direction and **0.98** in the southbound direction.

The SR-22/7th Street freeway mainline is anticipated to operate at LOS F in the AM peak hour in the eastbound direction and LOS E in the westbound direction in 2020. In the PM peak hour, the SR-22/7th Street freeway mainline is LOS E in both directions. The v/c ratios in the GP lanes of the SR-22/7th Street freeway mainline during the AM peak hour is **1.19** in the eastbound direction and **1.06** in the westbound direction. During the PM peak hour, the v/c ratio is **1.08** in the eastbound direction and **1.05** in the westbound direction.

Table 3-4: 2020 Branch Connector Volumes and Volume-to-Capacity Ratios

Branch Connector	Existing 2009				No Build – 2020*				Alternative 1 – 2020*				Alternative 2 – 2020*				Alternative 3 – 2020*			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Volume	V/C	Volume	V/C	Volume	D/C	Volume	D/C	Volume	D/C	Volume	D/C	Volume	D/C	Volume	D/C	Volume	D/C	Volume	D/C
I-605 SB to I-405 NB	848	0.47	1,096	0.61	920	0.51	1,120	0.62	800	0.44	1,000	0.56	790	0.44	960	0.53	790	0.44	1,000	0.56
I-605 SB/7th Street to I-405 NB	1,555	0.43	1,864	0.52	1,680	0.47	1,620	0.45	1,550	0.43	1,480	0.41	1,500	0.42	1,440	0.40	1,460	0.41	1,430	0.40
I-405 SB to I-605 NB	1,376	0.38	1,305	**0.36**	1,400	0.39	1,260	0.35	1,290	0.36	1,060	0.29	1,250	0.35	980	0.27	1,310	0.36	1,130	0.31
I-605 SB/I-405 SB to 7th Street	1,754	**0.97**	1,280	0.71	2,040	**1.13**	1,360	0.76	2,150	**1.19**	1,120	0.62	2,050	**1.14**	1,040	0.58	2,020	**1.12**	1,930	1.07
7th Street to I-605 NB/ I-405 NB	2,531	0.70	2,253	0.63	1,210	0.34	1,330	0.37	1,120	0.31	1,230	0.34	1,060	0.29	1,230	0.34	1,340	0.37	1,170	0.33
7th Street to I-405 NB	707	0.39	768	0.43	770	0.43	440	**0.24**	750	0.42	430	**0.24**	720	0.40	420	**0.23**	720	0.40	430	**0.24**

V/C – Volume-to-Capacity Ratio based on branch connector capacity of 1,800 vehicles per lane for GP branch connector lanes.

D/C – Demand Volume-to-Capacity Ratio based on branch connector capacity of 1,800 vehicles per lane for GP branch connector lanes.

Bolded V/C and D/C ratios indicate the minimum and maximum values as discussed in the text.

* – For future conditions, the D/C ratio is used instead of the V/C ratio.

Table 3-5: Number of Locations with Adequate Vehicle Storage[1] in 2009 and 2040

Location	Existing 2009			No Build – 2040			Alternative 1 – 2040			Alternative 2 – 2040			Alternative 3 – 2040		
	Number of Locations with Adequate Storage	Number of Locations	% with Adequate Storage	Number of Locations with Adequate Storage	Number of Locations	% with Adequate Storage	Number of Locations with Adequate Storage	Number of Locations	% with Adequate Storage	Number of Locations with Adequate Storage	Number of Locations	% with Adequate Storage	Number of Locations with Adequate Storage	Number of Locations	% with Adequate Storage
Off-Ramp at Arterials	10	10	100	9	10	90	9	10	90	9	10	90	10	10	100
Arterials at Ramps	9	11	82	7	11	64	8	11	73	7	11	64	8	11	73
Arterial/Arterial Intersections	35	65	54	29	65	45	29	65	45	32	65	49	33	65	51

[1] Storage is considered adequate if it will contain the 95th percentile queue.

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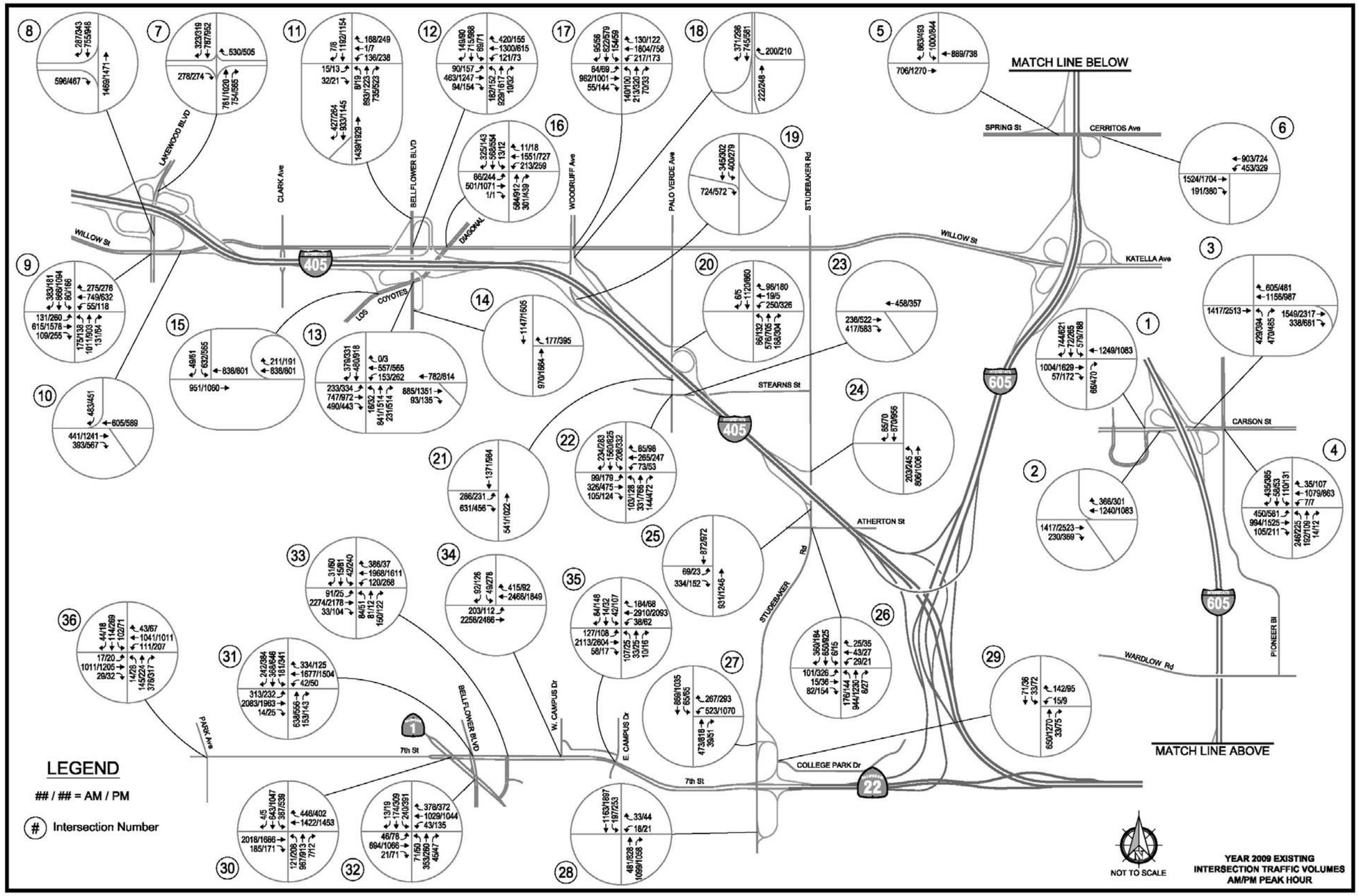

Figure 3-5 Existing (2009) Intersection Traffic Volumes – AM/PM Peak Hour

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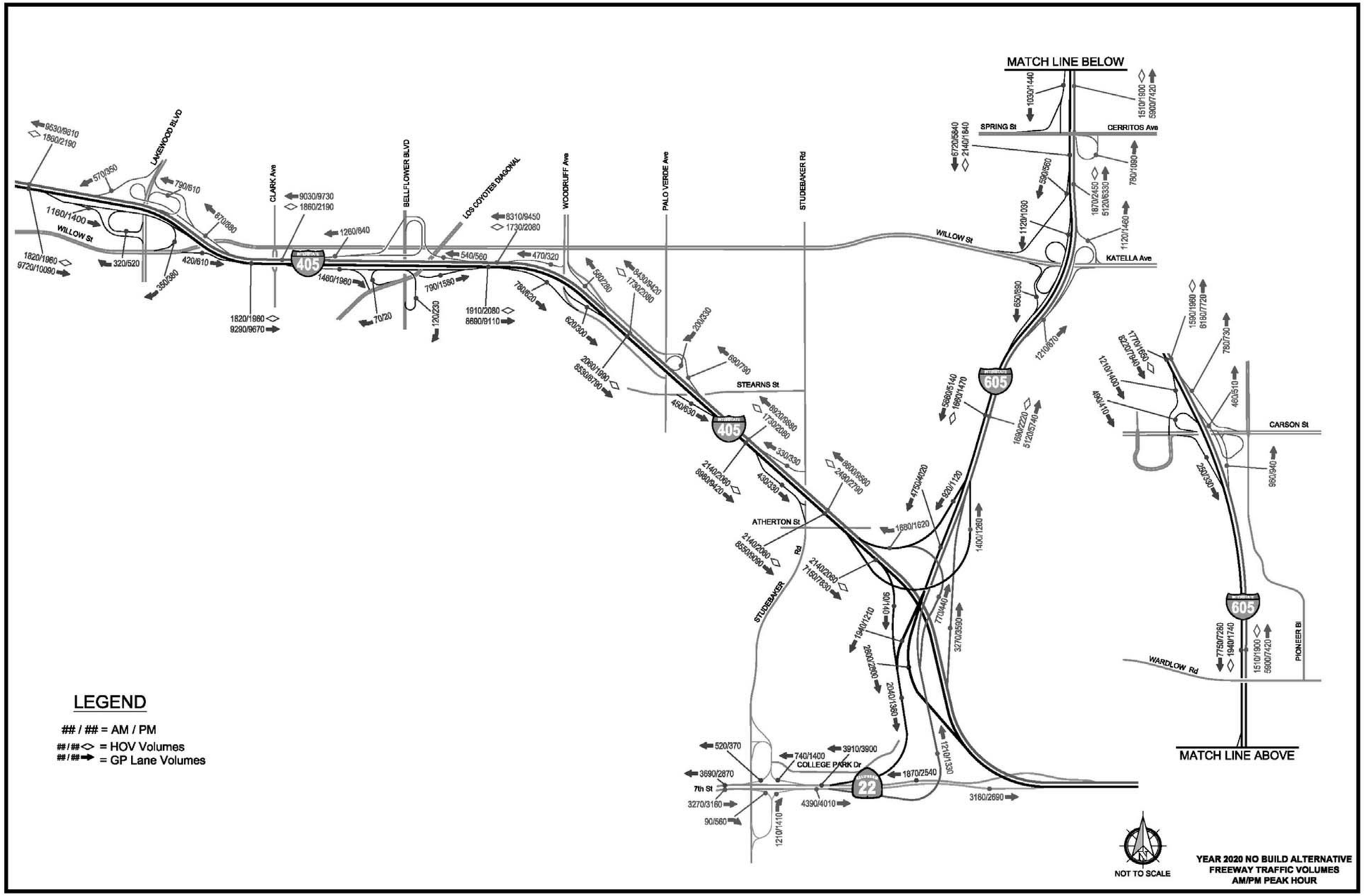

Figure 3-6 2020 No Build Freeway Traffic Volumes AM/PM Peak Hours

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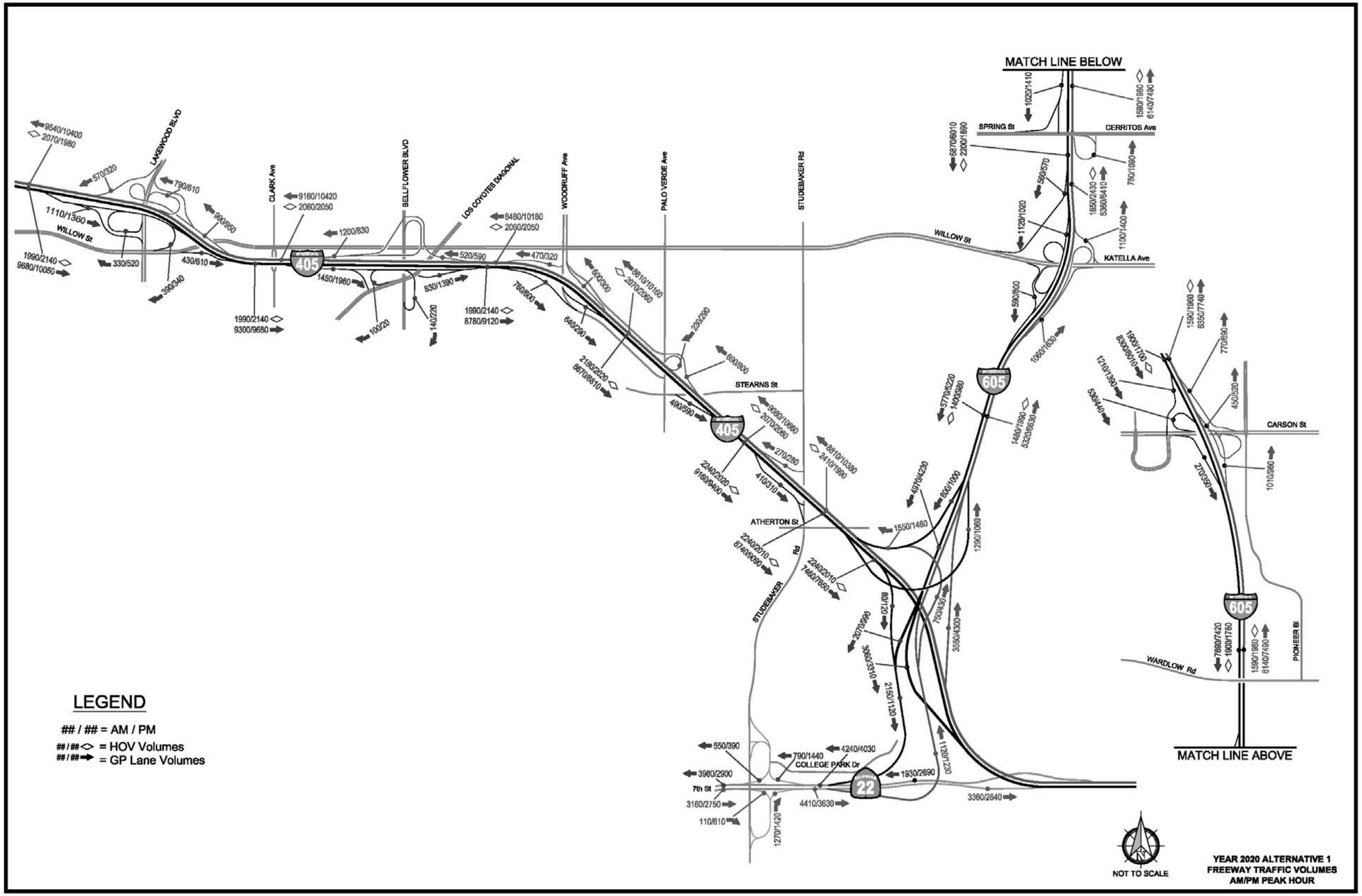

Figure 3-7 2020 Alternative 1 Freeway Traffic Volumes AM/PM Peak Hours

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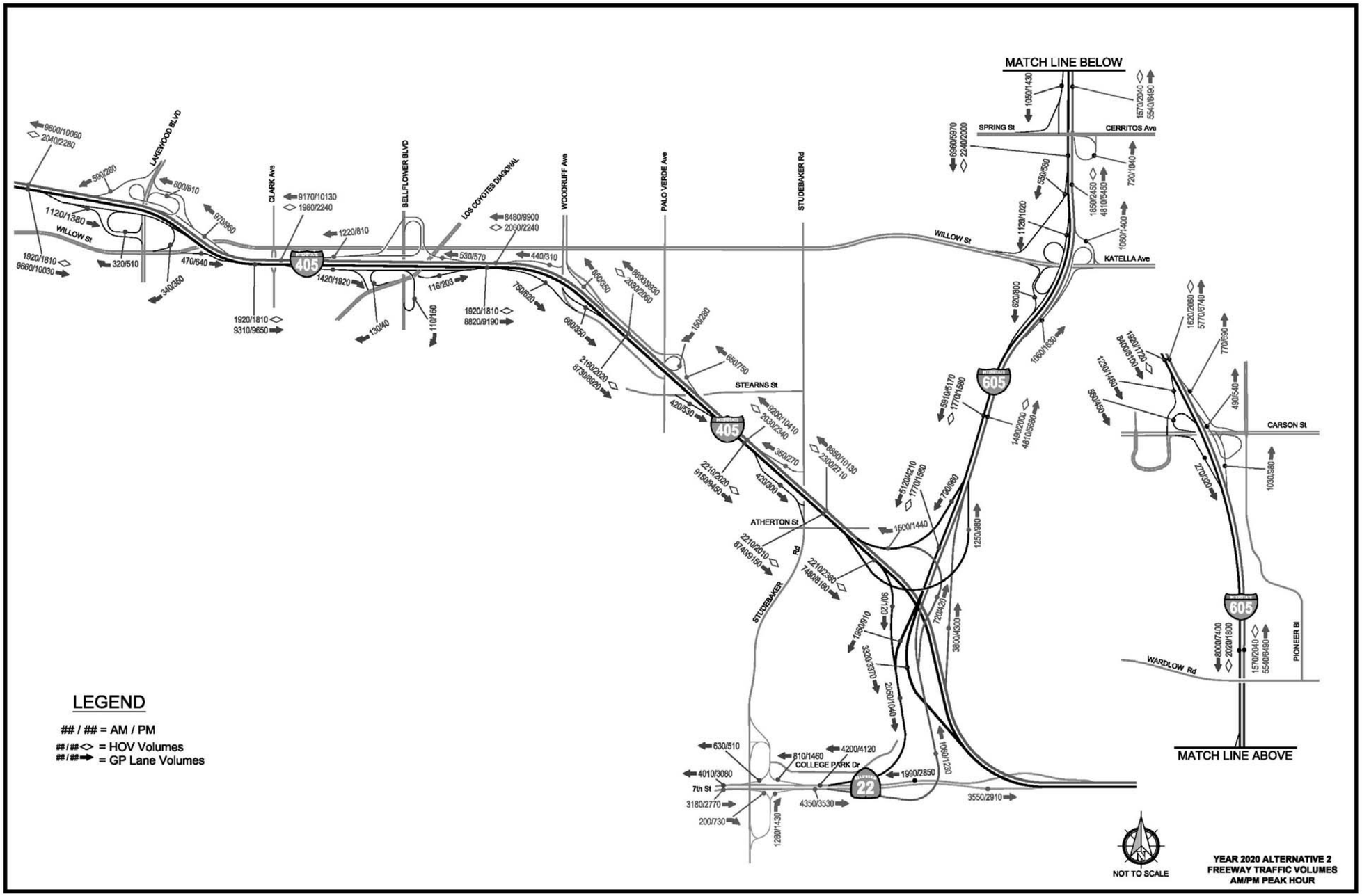

Figure 3-8 2020 Alternative 2 Freeway Traffic Volumes AM/PM Peak Hours

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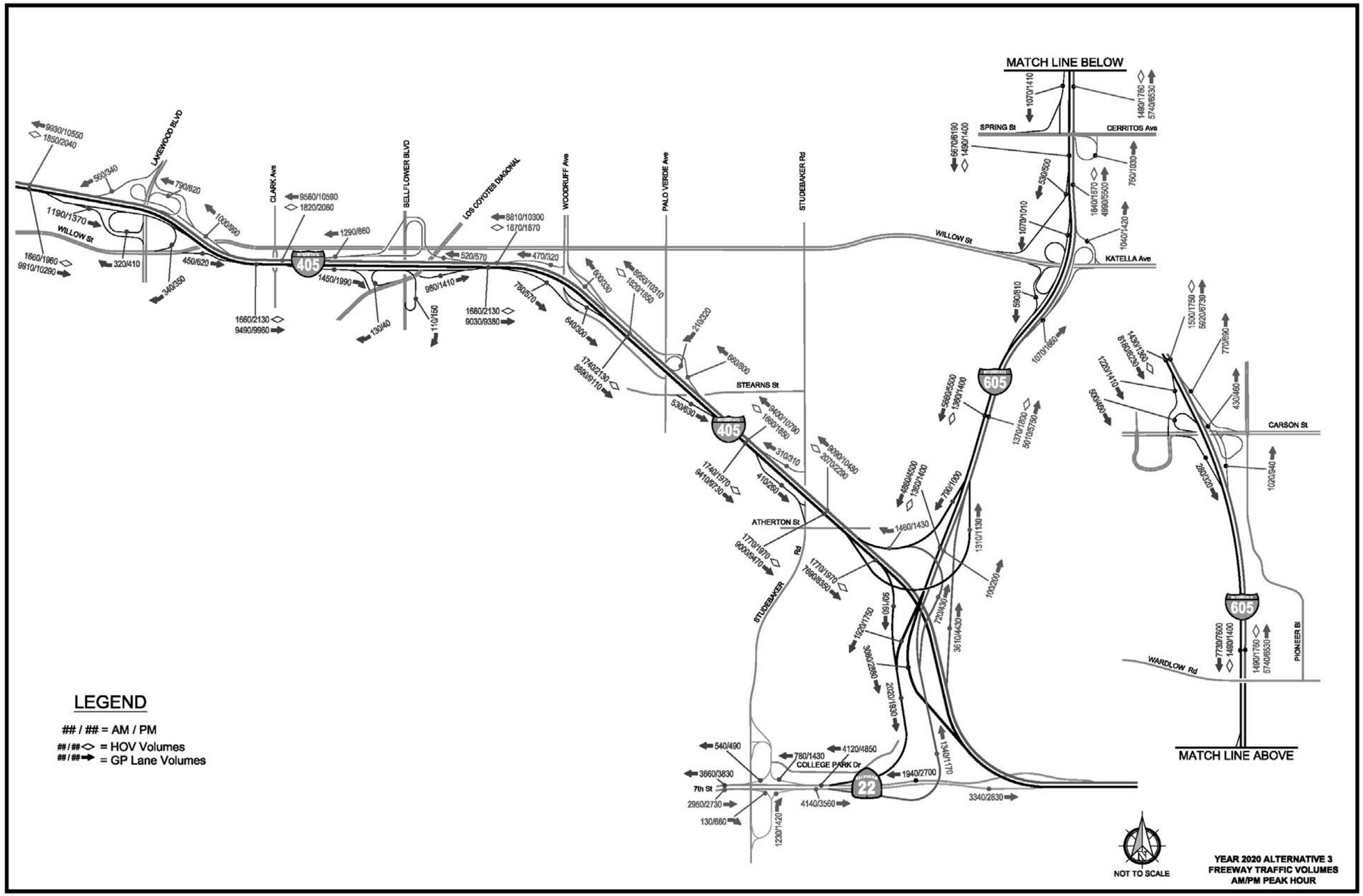

Figure 3-9 2020 Alternative 3 Freeway Traffic Volumes AM/PM Peak Hours

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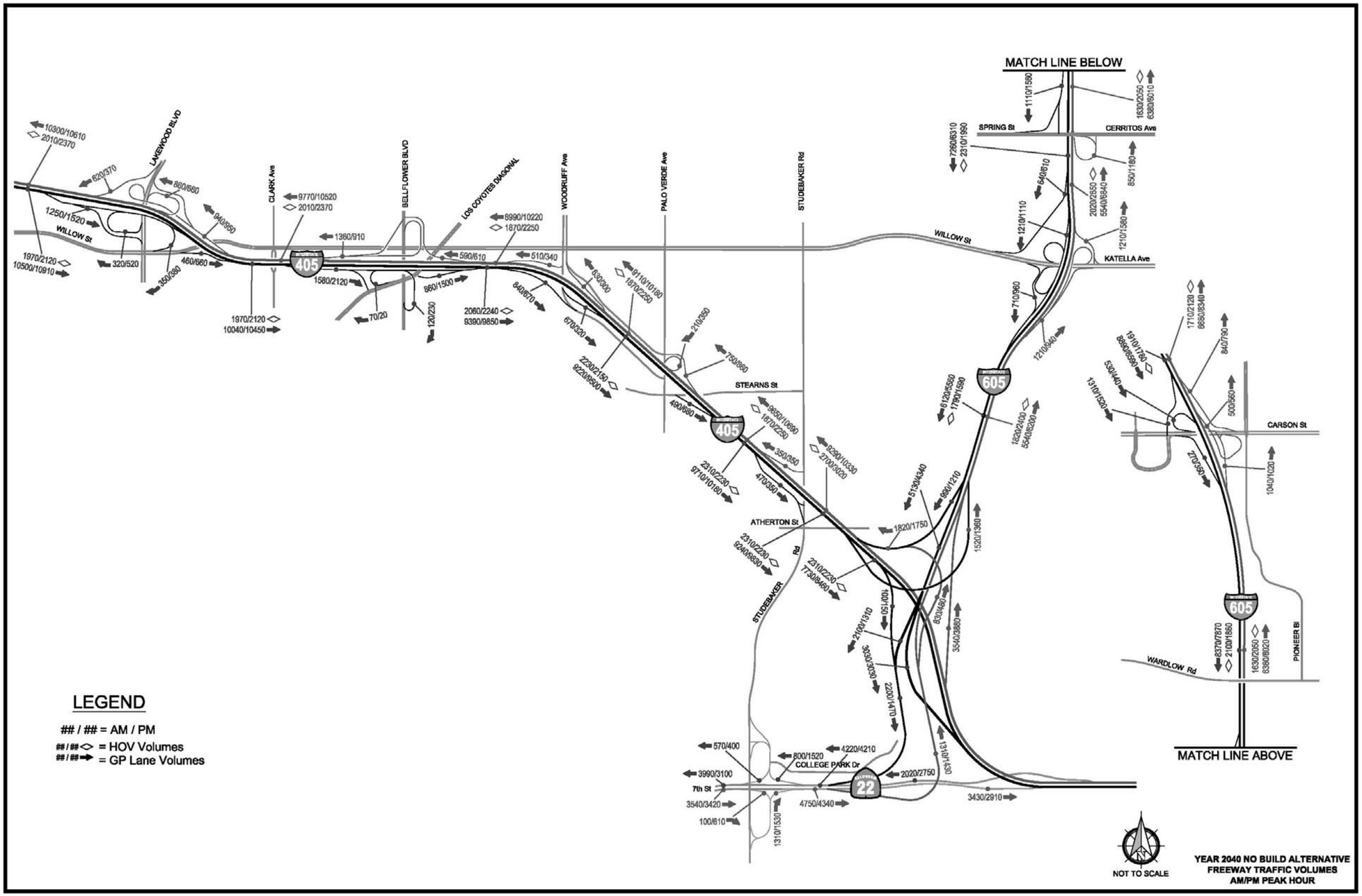

Figure 3-10 2040 No Build Freeway Traffic Volumes AM/PM Peak Hours

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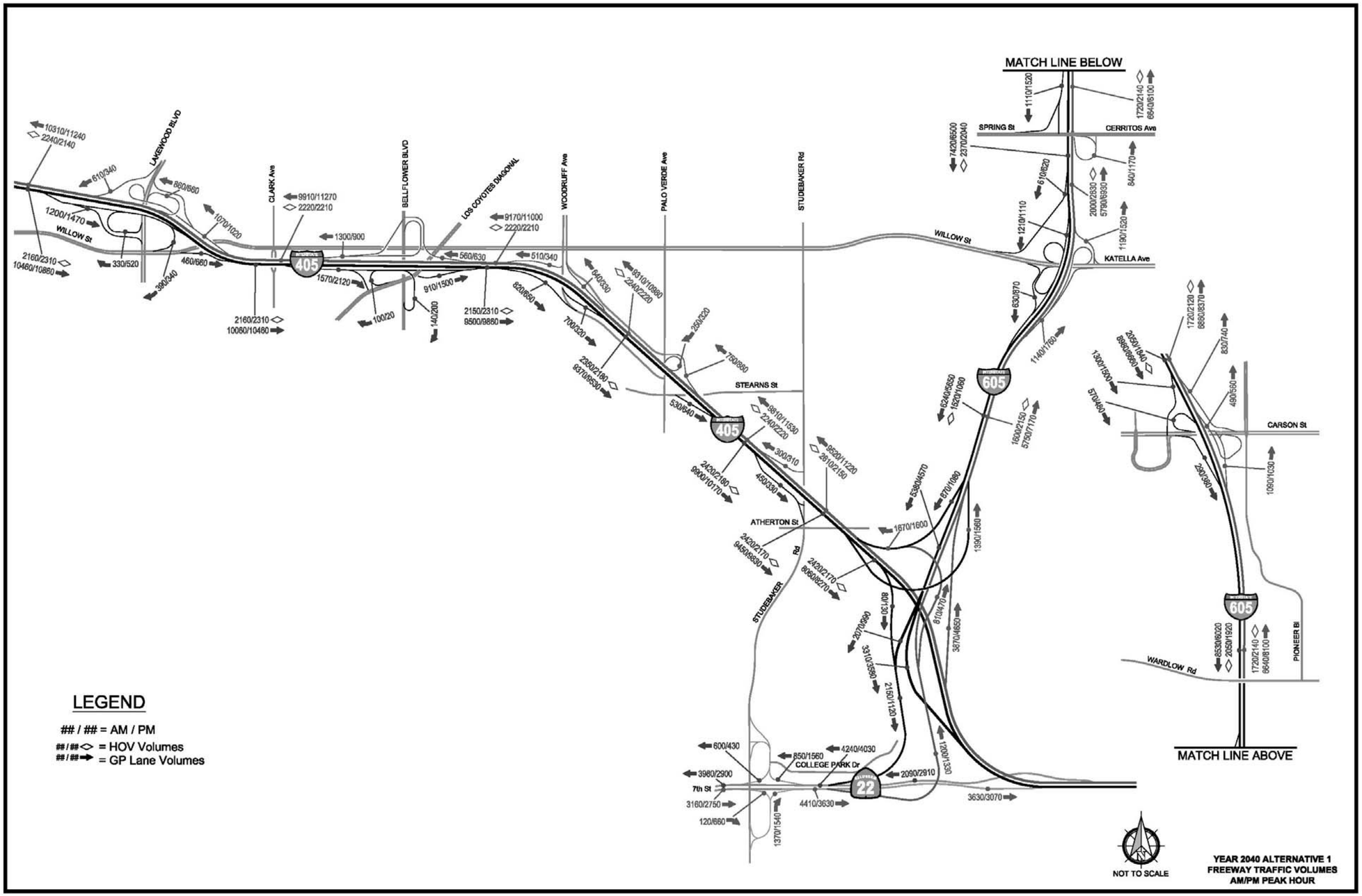

Figure 3-11 2040 Alternative 1 Freeway Traffic Volumes AM/PM Peak Hours

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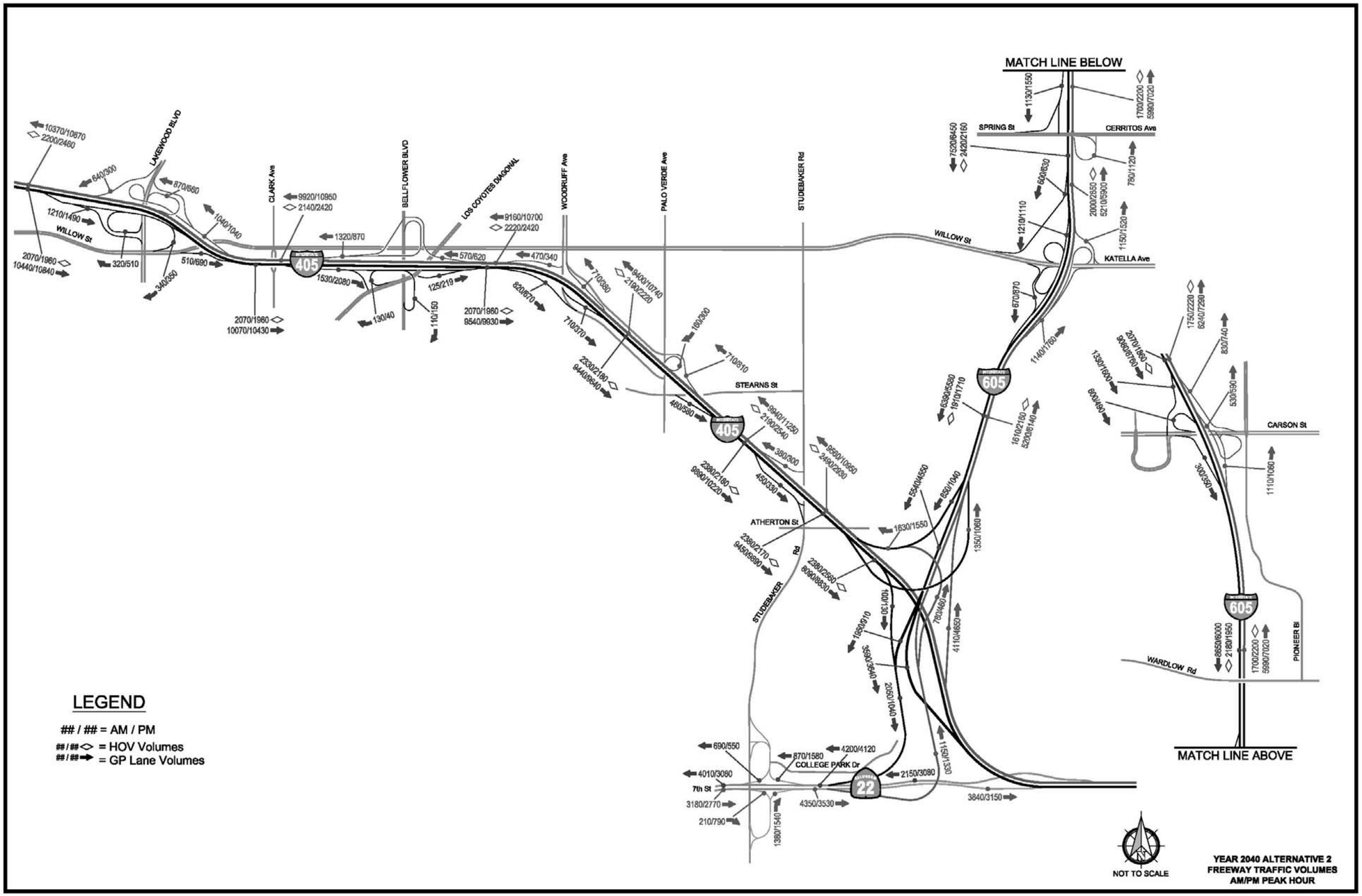

Figure 3-12 2040 Alternative 2 Freeway Traffic Volumes AM/PM Peak Hours

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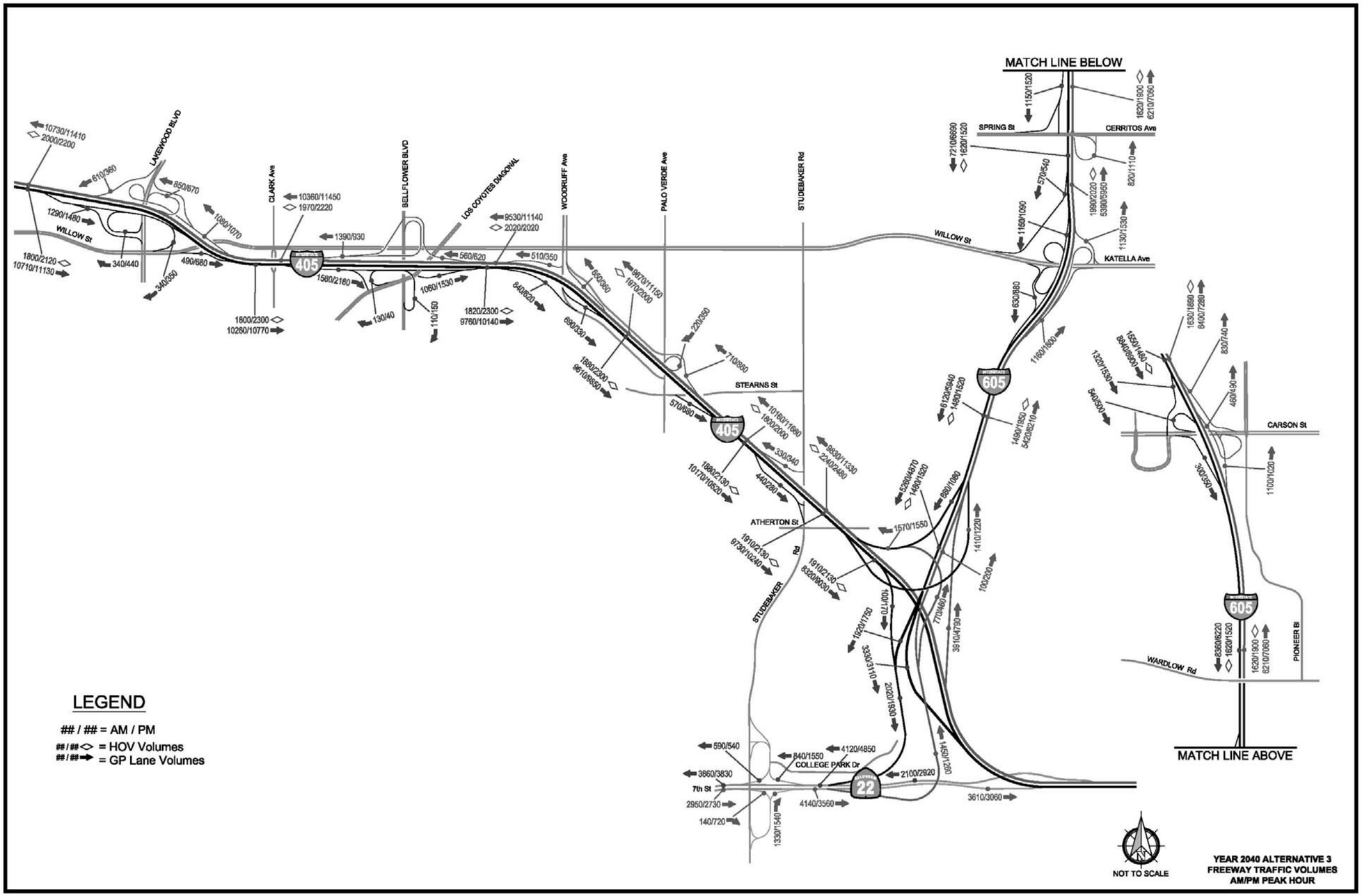

Figure 3-13 2040 Alternative 3 Freeway Traffic Volumes AM/PM Peak Hours

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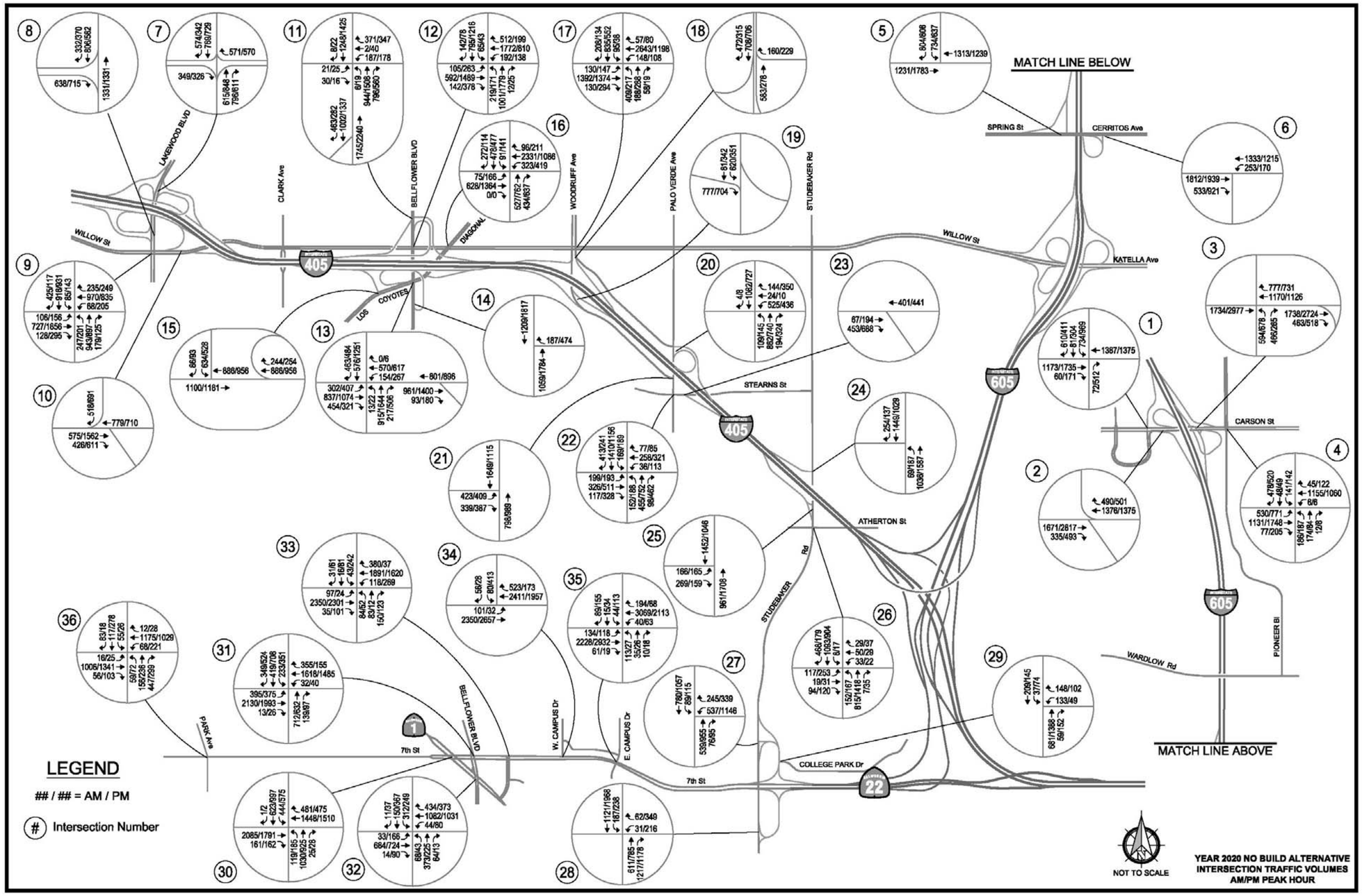

Figure 3-14 2020 No Build Intersection Traffic Volumes AM/PM Peak Hours

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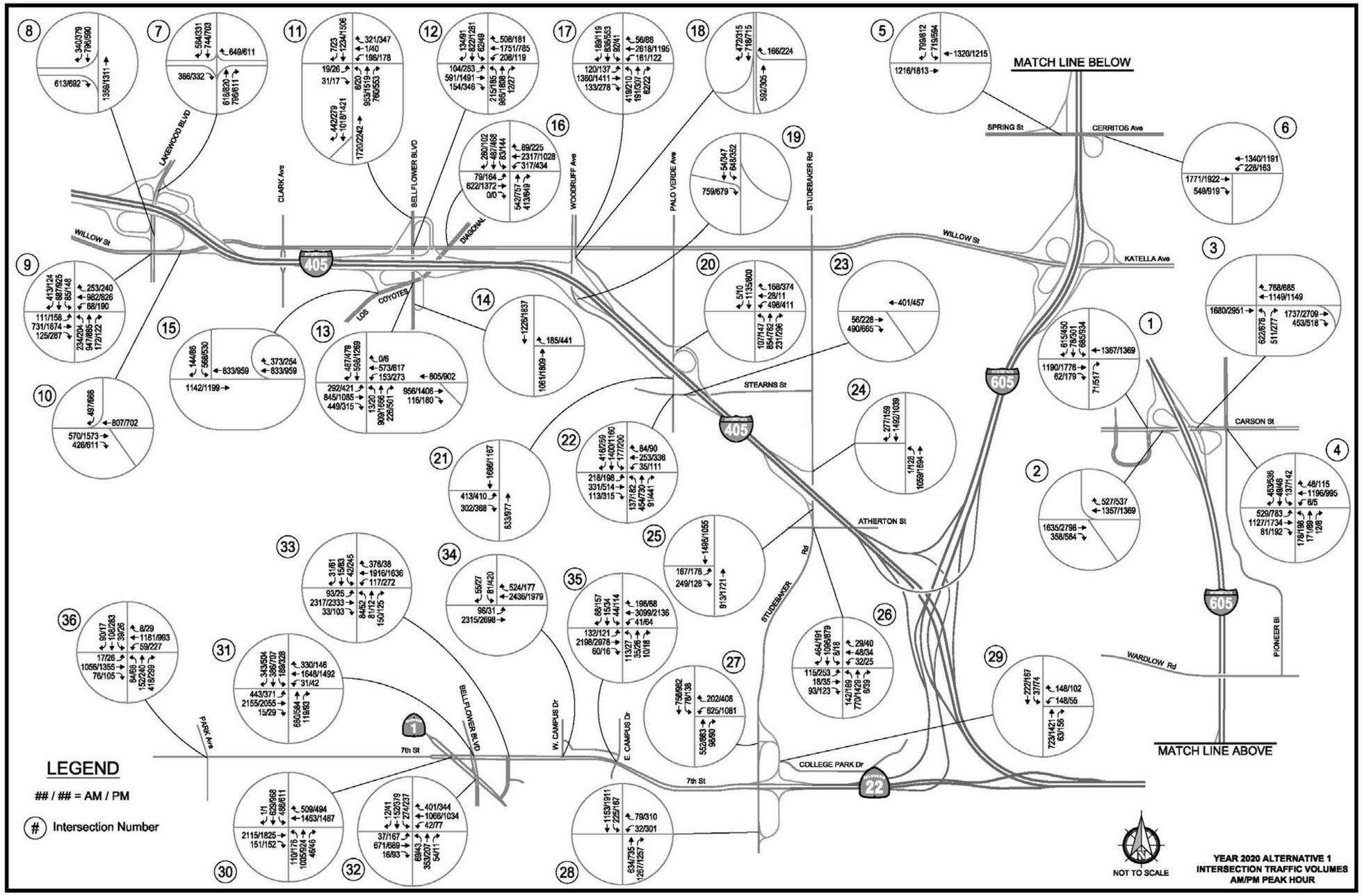

Figure 3-15 2020 Alternative 1 Intersection Traffic Volumes AM/PM Peak Hours

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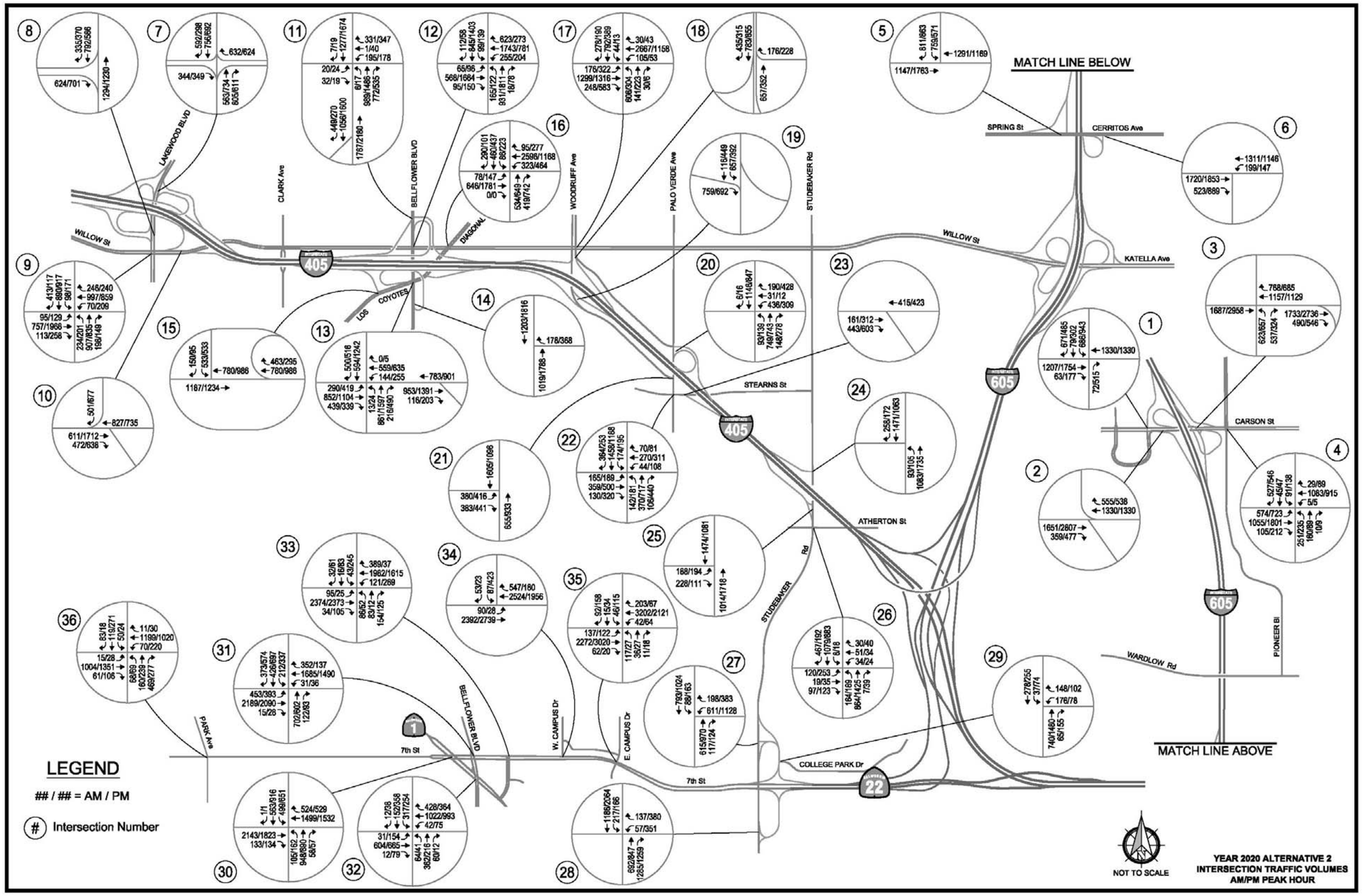

Figure 3-16 2020 Alternative 2 Intersection Traffic Volumes AM/PM Peak Hours

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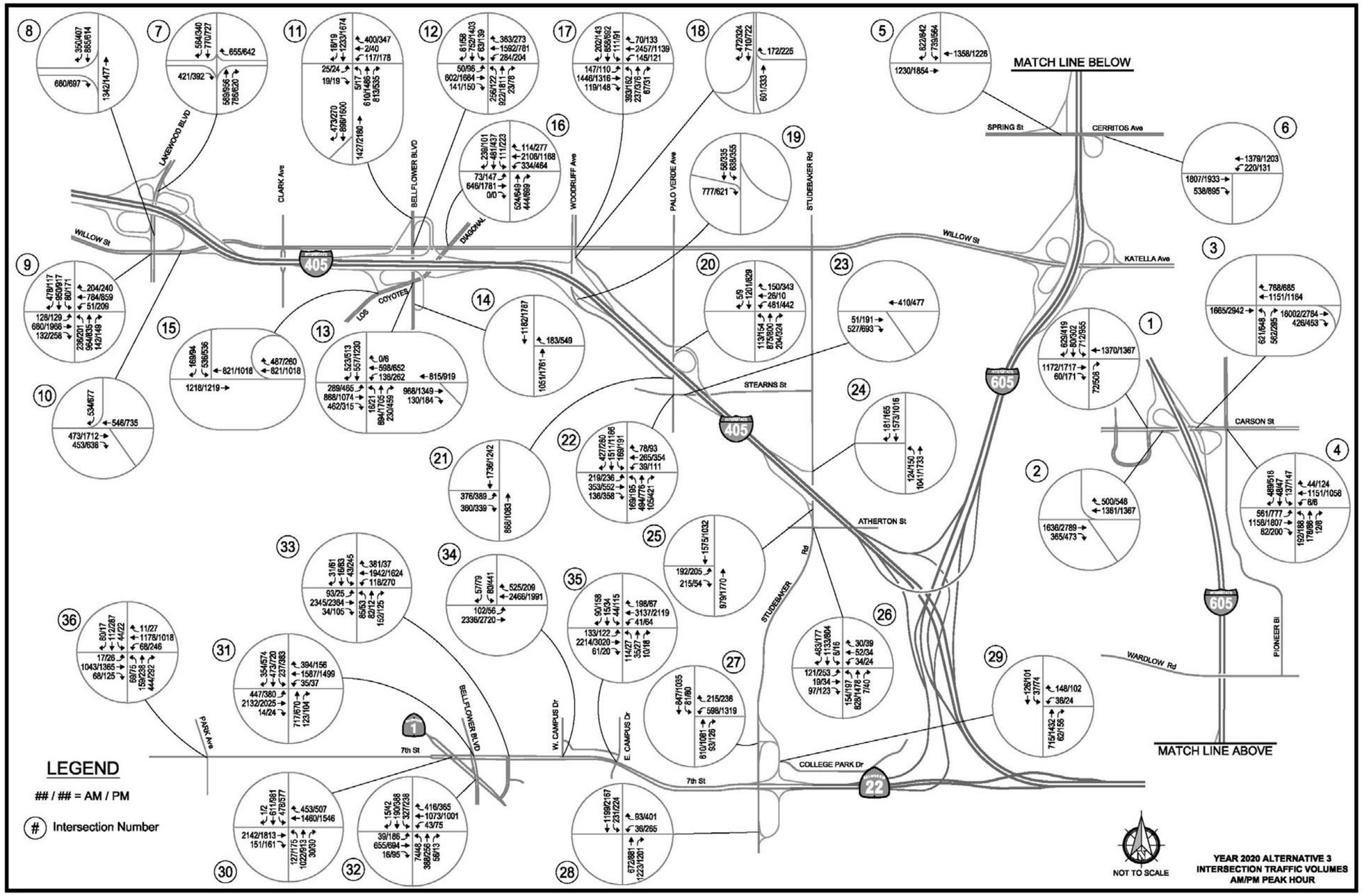

Figure 3-17 2020 Alternative 3 Intersection Traffic Volumes AM/PM Peak Hours

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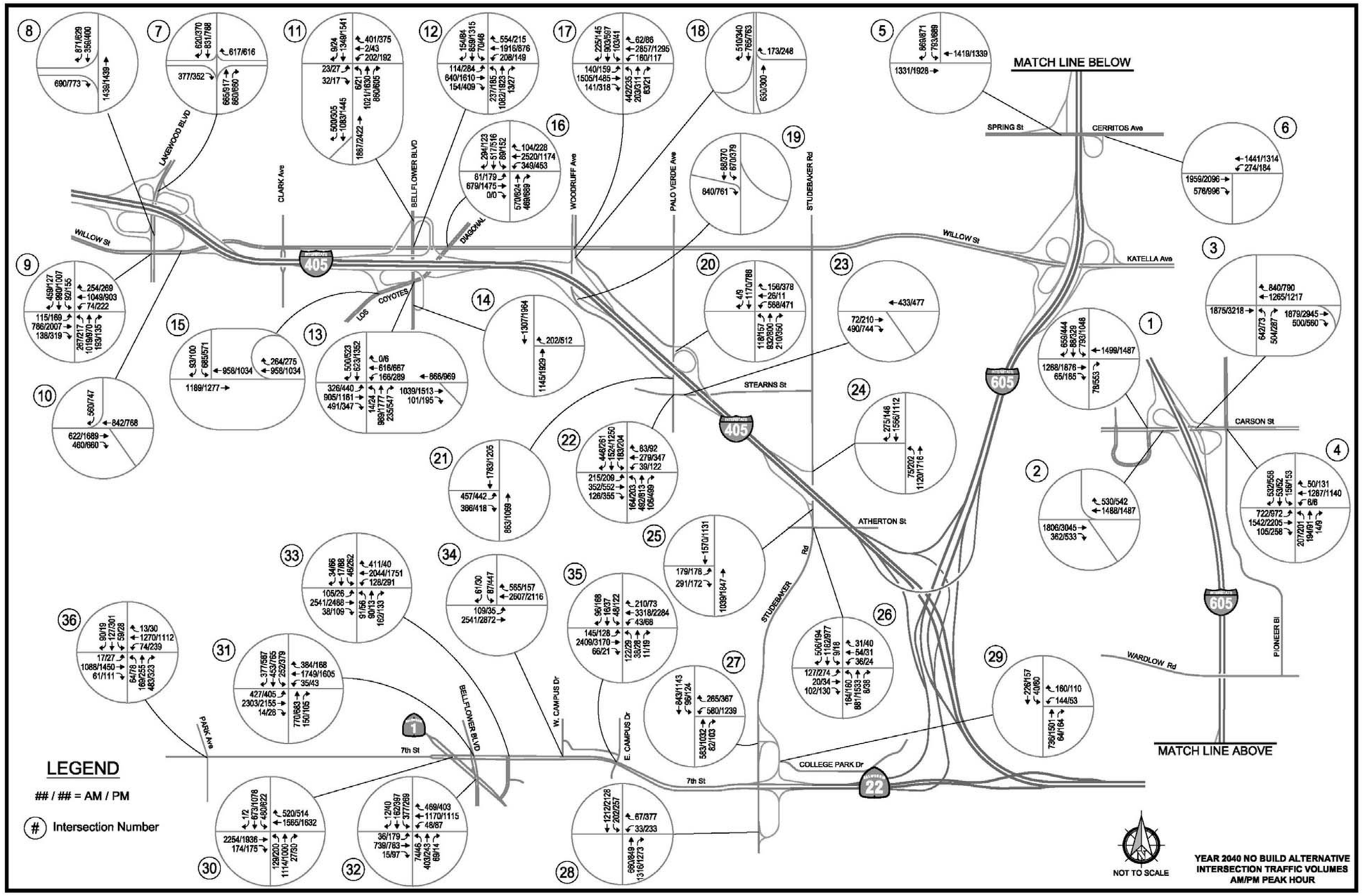

Figure 3-18 2040 No Build Intersection Traffic Volumes AM/PM Peak Hours

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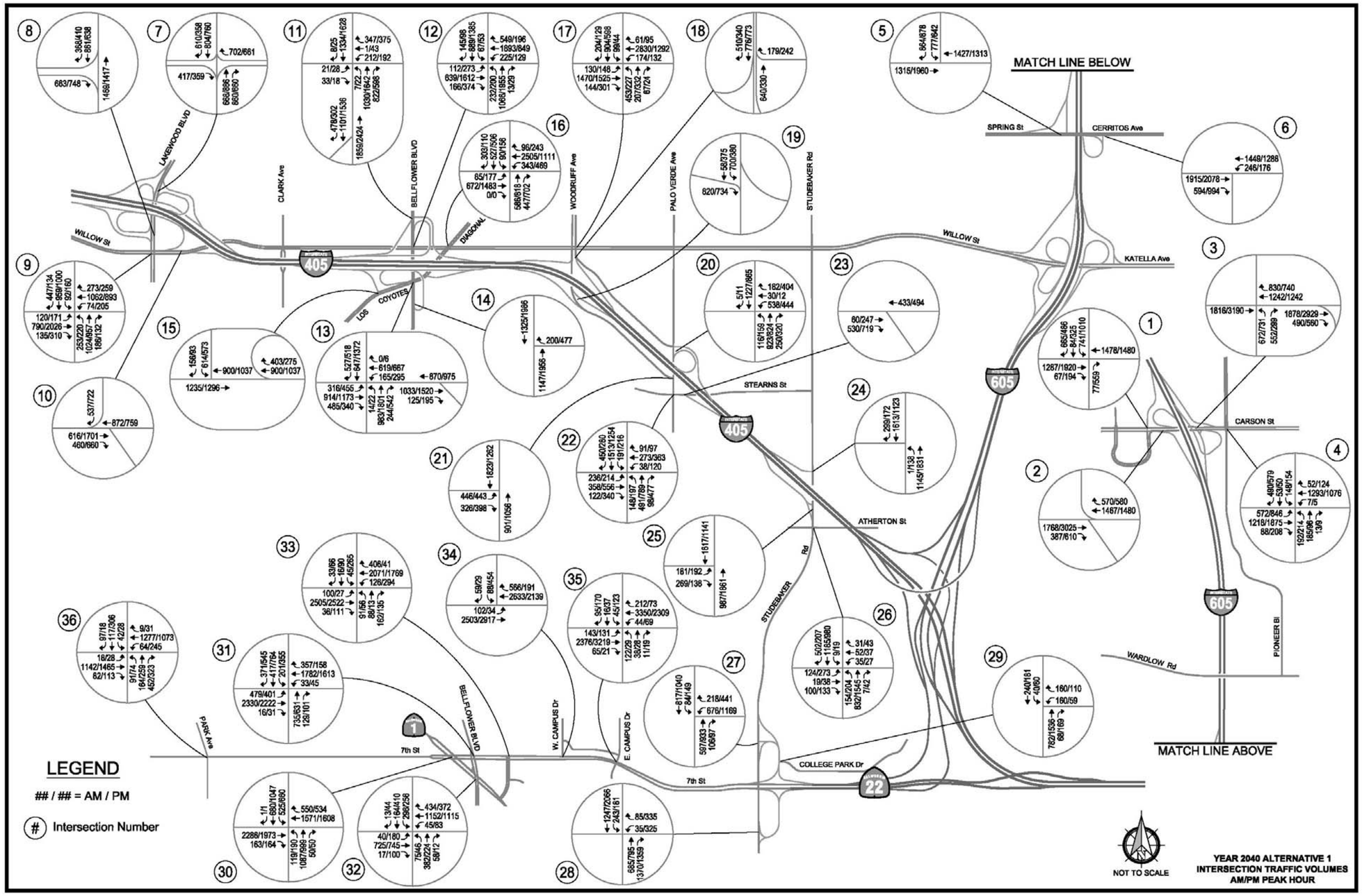

Figure 3-19 2040 Alternative 1 Intersection Traffic Volumes AM/PM Peak Hours

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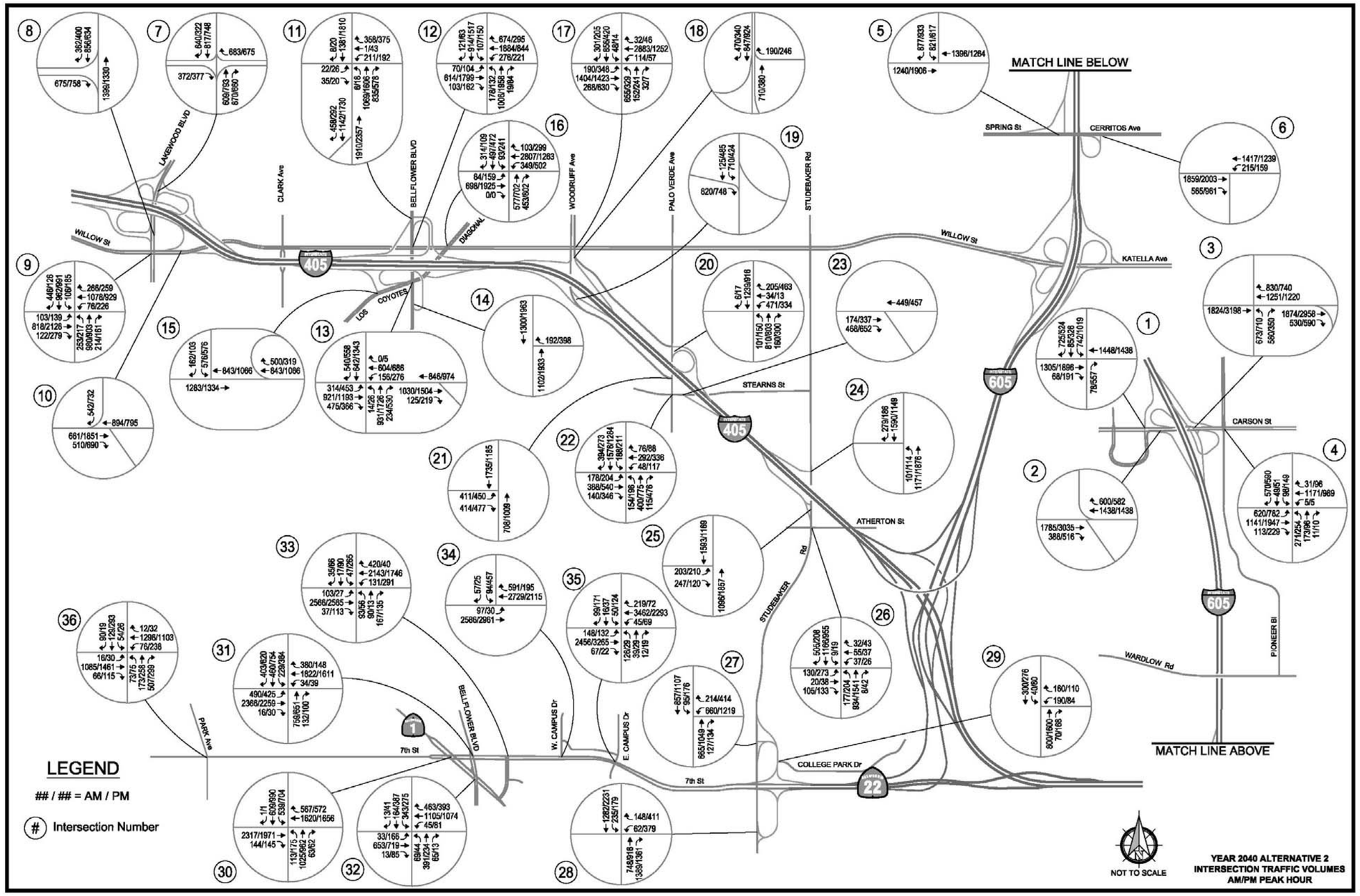

Figure 3-20 2040 Alternative 2 Intersection Traffic Volumes AM/PM Peak Hours

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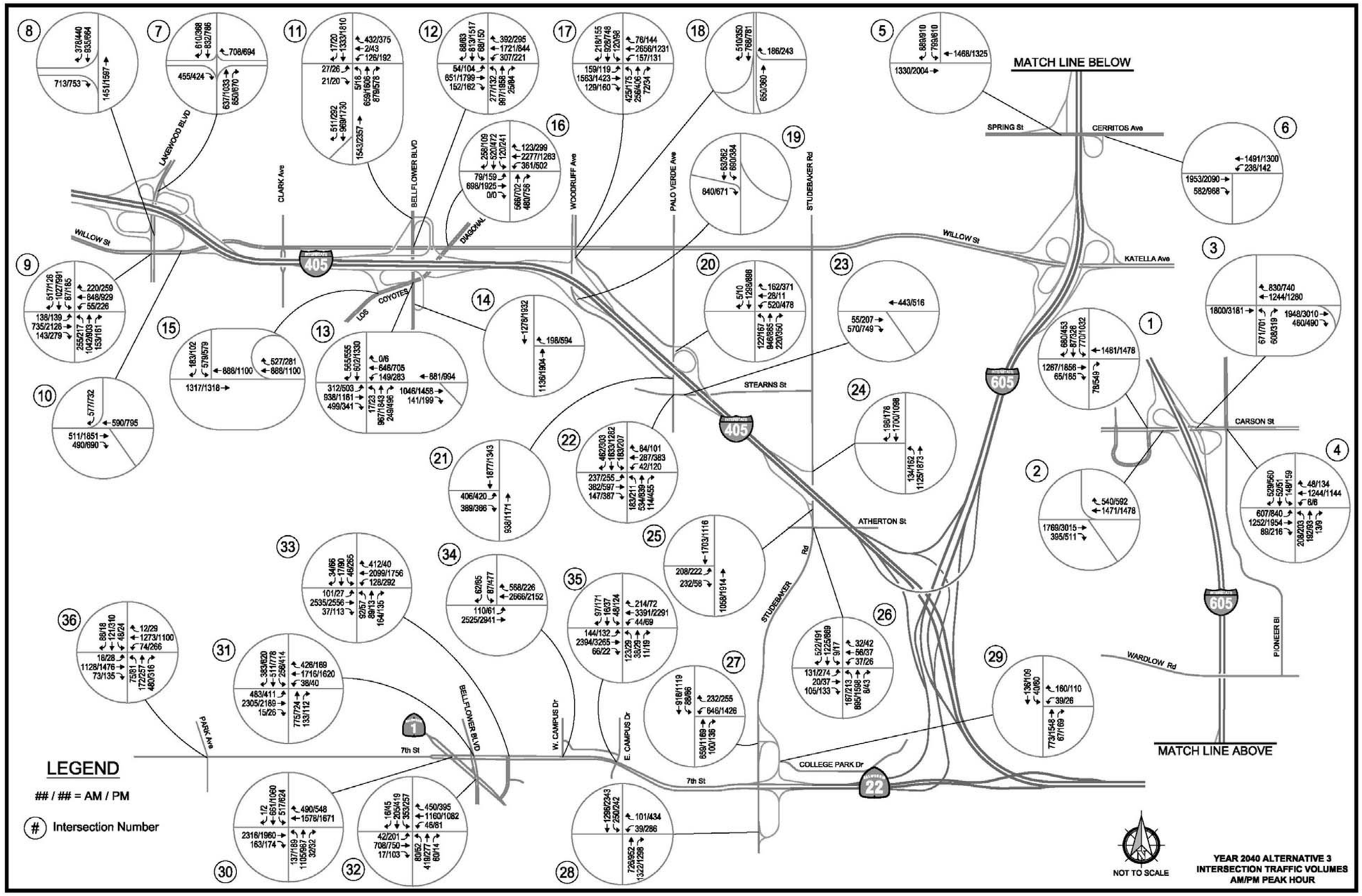

Figure 3-21 2040 Alternative 3 Intersection Traffic Volumes AM/PM Peak Hours

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Table 3-3 presents the v/c ratios for peak hours of the No Build Alternative in 2020 for the HOV (carpool) lanes. The range of v/c ratios in the HOV lanes during the AM peak hour is **1.01 to 1.35** and **0.99 to 1.51** during the PM peak hour (shown in bold in the table).

Table 3-6 presents the LOS and v/c ratios for peak hours of the No Build Alternative in 2040 for the GP lanes of the freeway mainline. Under no-build conditions in year 2040, the freeway mainline between I-605 and Lakewood Boulevard is anticipated to operate at LOS F in the AM peak hour in the northbound direction and LOS D and F in the southbound direction. In the PM peak hour, the I-405 freeway mainline is anticipated to operate at LOS F in the northbound direction and LOS E and F in the southbound direction. The range of v/c ratios in the GP lanes of the I-405 freeway mainline during the AM peak hour is **0.97 to 1.26** and **1.06 to 1.40** during the PM peak hour.

The I-605 mainline is anticipated to operate at LOS D in the AM peak hour in the northbound direction and LOS F in the southbound direction in 2040. In the PM peak hour, the I-605 freeway mainline is anticipated to operate at LOS E in both directions. The v/c ratios in the GP lanes of the I-605 freeway mainline during the AM peak hour are **0.86** in the northbound direction and **1.13** in the southbound direction. During the PM peak hour, the v/c ratios are **1.08** in the northbound direction and **1.06** in the southbound direction.

The SR-22/7th Street mainline is anticipated to operate at LOS F in the eastbound direction and LOS E in the westbound direction during the AM and PM peak hours in 2040. The v/c ratios in the GP lanes of the SR-22/7th Street freeway mainline during the AM peak hour is **1.28** in the eastbound direction and **1.14** in the westbound direction. During the PM peak hour, the v/c ratios are **1.17** in the eastbound direction and **1.14** in the westbound direction.

Table 3-7 presents the v/c ratios for peak hours of the No Build Alternative in 2040 for the HOV (carpool) lanes. The range of v/c ratios in the HOV lanes during the AM peak hour is **1.09 to 1.46** and **1.08 to 1.63** during the PM peak hour (shown in bold in the table).

A more-detailed link-by-link presentation of the No Build Alternative in 2020 and 2040 traffic conditions for GP and HOV lanes is included in Appendix B.1.

Freeway Connector Volumes

Tables 3-4 and 3-8 provide the 2020 and 2040 forecast for the no-build condition, respectively, of branch connector volumes and v/c ratios on ramps within the I-405/I-605/ SR-22/7th Street interchange not presented in the Draft EIR/EIS. Branch connectors are forecast to operate with v/c ratios ranging from **0.24 to 1.13** in 2020 and from **0.27 to 1.22** in 2040 under the no-build condition (shown in bold in the table). The branch connector from I-605 southbound/I-405

southbound to 7th Street is anticipated to operate with a v/c ratio in excess of 1.00 in 2040 during the AM peak hour.

Arterials, Intersections, and Interchanges

The No Build Alternative AM and PM peak-hour traffic volumes for arterial and interchange study locations within the study area in 2020 and 2040 are illustrated in Figures 3-14 and 3-18, respectively. A summary of the LOS analysis and v/c ratios for AM and PM peak hours for 2020 no-build conditions is provided in Table 3-1 for all of the study intersections. In Table 3-1 for 2020 under no-build conditions, the study intersections are anticipated to operate at LOS D or better, except for four intersections (as shown in bold) that are anticipated to operate at LOS E or F during either the AM or PM peak hour or both.

Table 3-1 shows that the study intersections are anticipated to operate under capacity (i.e., v/c less than or equal to 1.00) in 2020 under no-build conditions during peak hours, except for five intersections that are anticipated to operate over capacity during either the AM or PM peak hour or both.

A summary of the LOS analysis and v/c ratios for AM and PM peak hours for 2040 no-build conditions is provided in Table 3-1 for all of the study intersections. In Table 3-1 for 2040 under no-build conditions, the study intersections are anticipated to operate at LOS D or better, except for nine intersections (as shown in bold) that are anticipated to operate at LOS E or F during either the AM or PM peak hour or both.

Table 3-1 shows that the study intersections are anticipated to operate under capacity (i.e., v/c less than or equal to 1.00) in 2040 under no-build conditions during peak hours, except for 10 intersections that are anticipated to operate over capacity during either the AM or PM peak hour or both.

A comparison of vehicle queuing (higher of AM or PM peak-hour 95th percentile queues) in year 2040 with available storage (in feet) was conducted at all arterial interchange study intersections and is summarized in Table 3-5. Table 3-5 shows that 90 percent of off-ramps with traffic control at their arterial intersections are anticipated to have adequate turning lane storage under no-build conditions in 2040. Table 3-5 also shows that 64 percent of arterials are anticipated to have adequate turning lane storage at ramp intersections, and 45 percent of turning lanes at arterial/arterial intersections are anticipated to have adequate storage under no-build conditions in 2040.

Table 3-6: Mainline GP Lane Density, LOS, and Volume-to-Capacity Ratio – Year 2040

Segment	Direction	Existing 2009						No Build – 2040*						Alternative 1 – 2040*						Alternative 2 – 2040*						Alternative 3 – 2040*					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		V/C	Den	LOS	V/C	Den	LOS	D/C	Den	LOS	D/C	Den	LOS	D/C	Den	LOS	D/C	Den	LOS	D/C	Den	LOS	D/C	Den	LOS	D/C	Den	LOS	D/C	Den	LOS
I-405 Mainline I-605 to Studebaker Road	NB	0.98	38.2	E	0.81	26.9	D	1.26	**	F	1.40	**	F	1.29	**	F	1.52	**	F	1.29	**	F	1.48	**	F	1.33	**	F	1.53	**	F
	SB	0.85	26.6	D	0.84	31.9	D	1.00	33.7	D	1.06	44.1	E	1.02	35.1	E	1.06	44.1	E	1.02	35.1	E	1.07	44.7	E	1.05	37.2	E	1.11	**	F
I-405 Mainline Studebaker Road to Lakewood Boulevard	NB***	0.94	52.4	F	0.90	38.1	E	0.97	57.0	F	1.10	50.2	F	0.99	58.3	F	1.19	55.1	F	0.99	57.9	F	1.16	51.5	F	1.03	60.9	F	1.20	56.1	F
	SB***	0.95	42.0	E	0.90	61.6	F	1.09	50.1	F	1.13	78.5	F	1.09	49.9	F	1.13	78.5	F	1.09	50.3	F	1.13	78.3	F	1.11	51.3	F	1.16	81.2	F
I-605 Mainline I-405 to Carson Street	NB	0.81	26.3	C	0.97	35.7	E	0.86	28.3	D	1.08	44.4	E	0.90	29.8	D	1.09	**	F	0.81	26.2	D	0.95	34.7	D	0.84	27.4	D	0.95	35.0	D
	SB	1.09	41.1	E	1.00	36.1	E	1.13	**	F	1.06	40.6	E	1.15	**	F	1.08	42.4	E	1.17	**	F	1.08	42.2	E	1.13	**	F	1.11	**	F
SR-22/7th Street Mainline Studebaker Road to I-405/ I-605	EB	1.24	**	F	1.38	**	F	1.28	**	F	1.17	**	F	1.19	**	F	0.98	31.8	D	1.18	**	F	0.95	30.4	D	1.12	41.3	E	0.96	30.8	D
	WB	1.08	38.3	E	0.89	27.3	D	1.14	43.4	E	1.14	43.1	E	1.15	43.9	E	1.09	38.8	E	1.14	42.9	E	1.11	40.9	E	1.11	40.9	E	1.31	**	F

NB – Northbound; SB – Southbound; EB – Eastbound; WB – Westbound; Den – Density; LOS – Level of Service; V/C – Volume-to-Capacity Ratio; D/C – Demand Volume-to-Capacity Ratio.

* – For future conditions, the D/C ratio is used instead of the V/C ratio.

** – Density is not calculated under HCM because volume exceeds the range of the density algorithm.

*** – Density and LOS is based on weaving analysis.

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Table 3-7: Mainline HOV Volume-to-Capacity Ratio – Year 2040

Segment	Direction	Existing 2009		No Build 2040*		Alternative 1 2040*		Alternative 2 2040*		Alternative 3 2040*	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
I-405 HOV I-605 to Studebaker Road	NB	0.84	0.87	**1.46**	**1.63**	**1.41**	1.16	**1.35**	**1.58**	**1.21**	**1.34**
	SB	0.50	0.95	1.25	1.21	1.31	1.17	1.29	**1.17**	1.03	1.15
I-405 HOV Studebaker Road to Lakewood Boulevard	NB	**1.06**	0.74	**1.09**	1.28	1.21	1.20	1.20	1.37	1.09	1.09
	SB	0.50	**1.04**	1.25	1.21	1.31	1.25	1.29	1.18	**1.02**	1.24
I-605 HOV I-405 to Carson Street	NB	**0.45**	**0.38**	**1.09**	1.43	**1.08**	**1.42**	**1.08**	1.43	1.08	1.09
	SB	0.63	0.43	1.25	**1.08**	1.28	**1.10**	1.31	**1.17**	0.88	**0.82**

NB – Northbound; SB – Southbound; EB – Eastbound; WB – Westbound; V/C – Volume-to-Capacity Ratio

Bolded V/C and D/C (demand volume-to-capacity) ratios indicate the minimum and maximum values as discussed in the text.

* – For future conditions, the D/C ratio is used instead of the V/C ratio.

Table 3-8: 2040 Branch Connector Volumes and Volume-to-Capacity Ratios

Branch Connector	Existing 2009				No Build – 2040*				Alternative 1 – 2040*				Alternative 2 – 2040*				Alternative 3 – 2040*			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Volume	V/C	Volume	V/C	Volume	D/C	Volume	D/C	Volume	D/C	Volume	D/C	Volume	D/C	Volume	D/C	Volume	D/C	Volume	D/C
I-605 SB to I-405 NB	848	0.47	1,096	0.61	990	0.55	1,210	0.67	870	0.48	1,080	0.60	850	0.47	1,040	0.58	860	0.48	1,080	0.60
I-605 SB/7th Street to I-405 NB	1,555	0.43	1,864	0.52	1,820	0.51	1,750	0.49	1,670	0.46	1,600	0.44	1,630	0.45	1,550	0.43	1,570	0.44	1,550	0.43
I-405 SB to I-605 NB	1,376	0.38	1,305	**0.36**	1,520	0.42	1,360	0.38	1,390	0.39	1,560	0.43	1,350	0.38	1,060	0.29	1,410	0.39	1,220	0.34
I-605 SB/I-405 SB to 7th Street	1,754	**0.97**	1,280	0.71	2,200	**1.22**	1,470	0.82	2,150	**1.19**	1,120	0.62	2,050	**1.14**	1,040	0.58	2,020	**1.12**	1,930	1.07
7th Street to I-605 NB/I-405 NB	2,531	0.70	2,253	0.63	1,310	0.36	1,430	0.40	1,200	0.33	1,330	0.37	510	0.14	380	**0.11**	1,450	0.40	1,260	0.35
7th Street to I-405 NB	707	0.39	768	0.43	830	0.46	480	**0.27**	810	0.45	470	**0.26**	780	0.43	460	0.26	770	0.43	460	**0.26**

V/C – Volume-to-Capacity Ratio based on branch connector capacity of 1,800 vehicles per lane for GP branch connector lanes.

D/C – Demand Volume-to-Capacity Ratio based on branch connector capacity of 1,800 vehicles per lane for GP branch connector lanes.

Bolded V/C and D/C ratios indicate the minimum and maximum values as discussed in the text.

* – For future conditions, the D/C ratio is used instead of the V/C ratio.

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Alternative 1

Freeway Mainline

The Opening Year (2020) and Design Year (2040) Alternative 1 AM/PM peak-hour traffic volumes for the freeway mainline and all interchange ramps within the Long Beach study area are presented in Figures 3-7 and 3-11, respectively. The freeway mainline and all interchange ramps are assumed to be unchanged from the existing conditions.

V/C Ratio and LOS. Table 3-2 presents the LOS and v/c ratios for peak hours of Alternative 1 in 2020 for the GP lanes of the freeway mainline. Under Alternative 1 in year 2020, the I-405 freeway mainline between I-605 and Lakewood Boulevard is anticipated to operate at LOS F in the AM peak hour in the northbound direction and LOS D and F in the southbound direction. In the PM peak hour, the I-405 freeway mainline is anticipated to operate at LOS F in the northbound direction and LOS E and F in the southbound direction. The range of v/c ratios in the GP lanes of the I-405 freeway mainline during the AM peak hour is **0.92 to 1.19** and **0.98 to 1.40** during the PM peak hour.

The I-605 mainline is anticipated to operate at LOS D in the AM peak hour in the northbound direction and LOS E in the southbound direction in 2020. In the PM peak hour, the I-605 freeway mainline is anticipated to operate at LOS E in both directions. The v/c ratios in the GP lanes of the I-605 freeway mainline during the AM peak hour are **0.83** in the northbound direction and **1.07** in the southbound direction. During the PM peak hour, the v/c ratios are **1.01** in the northbound direction and **1.00** in the southbound direction.

The SR-22/7th Street freeway mainline is anticipated to operate at LOS F in the AM peak hour in the eastbound direction and LOS E in the westbound direction in 2020. In the PM peak hour, the SR-22/7th Street freeway mainline is LOS D in the eastbound direction and LOS E in the westbound direction. The v/c ratios in the GP lanes of the SR-22/7th Street freeway mainline during the AM peak hour are **1.19** in the eastbound direction and **1.15** in the westbound direction. During the PM peak hour, the v/c ratios are **0.98** in the eastbound direction and **1.09** in the westbound direction.

Table 3-3 presents the v/c ratios for peak hours of Alternative 1 in 2020 for the HOV (carpool) lanes. The range of v/c ratios in the HOV lanes during the AM peak hour is **1.00 to 1.30** and **1.02 to 1.31** during the PM peak hour (shown in bold in the table).

Table 3-6 presents the LOS and v/c ratios for peak hours of Alternative 1 in 2040 for the GP lanes of the freeway mainline. Under Alternative 1 conditions in year 2040, the freeway mainline between I-605 and Lakewood Boulevard is anticipated to operate at LOS F in the AM peak hour in the northbound direction and LOS E and F in the southbound direction. In the PM peak hour, the

I-405 freeway mainline is anticipated to operate at LOS F in the northbound direction and LOS E and F in the southbound direction. The range of v/c ratios in the GP lanes of the I-405 freeway mainline during the AM peak hour is **0.99 to 1.29** and **1.06 to 1.52** during the PM peak hour.

The I-605 mainline is anticipated to operate at LOS D in the AM peak hour in the northbound direction and LOS F in the southbound direction in 2040. In the PM peak hour, the I-605 freeway mainline is anticipated to operate at LOS F in the northbound direction and LOS E in the southbound direction. The v/c ratios in the GP lanes of the I-605 freeway mainline during the AM peak hour are **0.90** in the northbound direction and **1.15** in the southbound direction. During the PM peak hour, the v/c ratios are **1.09** in the northbound direction and **1.08** in the southbound direction.

The SR-22/7th Street freeway mainline is anticipated to operate at LOS F in the eastbound direction and LOS E in the westbound direction during the AM peak hour in 2040. In the PM peak hour, the SR-22/7th Street freeway mainline is anticipated to operate at LOS D in the eastbound direction and LOS E in the westbound direction. The v/c ratios in the GP lanes of the SR-22/7th Street freeway mainline during the AM peak hour are **1.19** in the eastbound direction and **1.15** in the westbound direction. During the PM peak hour, the v/c ratios are **0.98** in the eastbound direction and **1.09** in the westbound direction.

Table 3-7 presents the v/c ratios for peak hours of Alternative 1 in 2040 for the HOV (carpool) lanes. The range of v/c ratios in the HOV lanes during the AM peak hour is **1.08 to 1.41** and **1.10 to 1.42** during the PM peak hour.

A more-detailed link-by-link presentation of Alternative 1 traffic conditions in 2020 and 2040 for GP and HOV lanes is included in Appendix B.1.

Freeway Connector Volumes

Tables 3-4 and 3-8 provide the 2020 and 2040 forecast for Alternative 1, respectively, of branch connector volumes and v/c ratios on ramps within the I-405/I-605/SR-22/ 7th Street interchange not presented in the Draft EIR/EIS. Branch connectors are forecast to operate with v/c ratios ranging from **0.24 to 1.19** in 2020 and from **0.26 to 1.19** in 2040 under Alternative 1. The branch connector from I-605 southbound/I-405 southbound to 7th Street is anticipated to operate with a v/c ratio in excess of 1.00 in 2040 during the AM peak hour.

In no instance would additional lanes on branch connectors be feasible. Ramp metering was considered as a means to improve connector operations, but it was not included in the project because it would further reduce the capacity of the branch connectors.

Arterials, Intersections, and Interchanges

Alternative 1 AM and PM peak-hour traffic volumes for arterial and interchange study locations within the study area in 2020 and 2040 are illustrated in Figures 3-15 and 3-19, respectively. A summary of the LOS analysis and v/c ratios for AM and PM peak hours for 2020 Alternative 1 conditions is provided in Table 3-1 for all of the study intersections. The Alternative 1 condition appears in Table 3-1 under the "Alternative 1 Traffic on No Build Geometry" heading, where forecast Alternative 1 traffic is evaluated on no-build lanes and traffic control. In 2020 under Alternative 1, the study intersections are anticipated to operate at LOS D or better, except for four intersections that are anticipated to operate at LOS E or F during either the AM or PM peak hour or both (shown in bold in the table); these same four intersections are anticipated to operate at LOS E or F under no-build conditions in 2020.

Table 3-1 shows that the study intersections are anticipated to operate under capacity (i.e., v/c less than or equal to 1.00) in 2020 under Alternative 1 during peak hours, except for six intersections that are anticipated to operate over capacity during either the AM or PM peak hour or both. Five of these intersections are anticipated to operate over capacity under the no-build condition in 2020.

A summary of the LOS analysis and v/c ratios for AM and PM peak hours for 2040 Alternative 1 conditions is provided in Table 3-1 for all of the study intersections. In 2040 under Alternative 1, the study intersections are anticipated to operate at LOS D or better, except for 10 intersections that are anticipated to operate at LOS E or F during either the AM or PM peak hour or both (shown in bold in the table). Nine of these 10 intersections are anticipated to operate at LOS E or F under the no-build conditions in 2040.

Table 3-1 shows that the study intersections are anticipated to operate under capacity (i.e., v/c less than or equal to 1.00) in 2040 under Alternative 1 during peak hours, except for 10 intersections that are anticipated to operate over capacity during either the AM or PM peak hour or both. The same 10 intersections are anticipated to operate over capacity under the no-build condition in 2040.

As highlighted in Table 3-1, the project has contributes to adverse cumulative effects on the following four study intersections in 2040:

- Los Coyotes Diagonal and Bellflower Boulevard (2040 PM peak hour under No Build Alternative projected D/C ratio is 1.13 with LOS E and under Alternative 1 projected D/C ratio is 1.15 with LOS E)

- SR-22 Westbound Ramp and College Park Drive (2040 PM peak hour under No Build Alternative projected D/C ratio is 1.16 with LOS F and under Alternative 1 projected D/C ratio is 1.19 with LOS F)
- 7th Street and Pacific Coast Highway (2040 AM peak hour under No Build Alternative projected D/C ratio is 1.02 with LOS E and under Alternative 1 projected D/C ratio is 1.04 with LOS E)7th Street and West Campus Drive (2040 PM peak hour under No Build Alternative projected D/C ratio is 0.87 with LOS E and under Alternative 1 projected D/C ratio is 0.89 with LOS E)

As highlighted in Table 3-1, the project contributes to adverse cumulative effects on the following two study intersections in 2020, the first of which also has an adverse cumulative effect in 2040 and the second of which does not:

- SR-22 Westbound Ramp and College Park Drive (2020 PM peak hour under No Build Alternative projected D/C ratio is 1.07 with LOS F and under Alternative 1 projected D/C ratio is 1.10 with LOS F)
- 7th Street and Bellflower Boulevard (2020 AM peak hour under No Build Alternative projected D/C ratio is 1.04 with LOS E and under Alternative 1 projected D/C ratio is 1.06 with LOS E)

Measures to Lessen Traffic Impacts at Intersections

The traffic measures listed in Section 3.1.3 of this Supplemental Draft EIR/EIS are proposed to address the project contributions to adverse cumulative effects at the intersections identified above.

Table 3-9 provides a summary of the LOS analysis and v/c ratios for all of the study intersections during AM and PM peak hours anticipated in 2020 under Alternative 1 with all improvements, including the proposed traffic measures identified in Section 3.1.3 of this Supplemental Draft EIR/EIS. LOS and v/c ratios with all improvements, including proposed traffic measures, appear in the table under the heading “Alternative 1 Traffic on Alternative 1 Geometry including Traffic Measures.” Table 3-9 shows that, with all improvements including proposed traffic measures, Alternative 1 does not contribute to adverse cumulative effects on any study intersection in 2020.

Table 3-9 provides a summary of the LOS analysis and v/c ratios for all of the study intersections during AM and PM peak hours anticipated in 2040 under Alternative 1 with all improvements, including the measures identified in Section 3.1.3 of this Supplemental Draft EIR/EIS. Table 3-9 shows that, with all improvements including proposed traffic measures, Alternative 1 does not contribute to adverse cumulative effects on any study intersection in 2040.

Table 3-9: Years 2020 and 2040 Peak-Hour Intersections LOS and Adverse Effect Determination after Traffic Measures for Alternative 1

Interchange Location	Intersection #	Intersection Location		Traffic Control	Year 2009						Year 2020													Year 2040												
					Existing Traffic						No Build Traffic on No Build Geometry						Alternative 1 Traffic on Alternative 1 Geometry including Traffic Measures						No Build-Alternative 1 Adverse Effect	No Build Traffic on No Build Geometry						Alternative 1 Traffic on Alternative 1 Geometry including Traffic Measures						No Build-Alternative 1 Adverse Effect
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			
		East/West Street	North/South Street		V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS		D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	
Carson Street at I-605	1	Carson Street	I-605 SB Off-Ramp	Sig	0.58	21.9	C	0.61	17.8	B	0.57	22.3	C	0.68	23.8	C	0.56	18.7	B	0.67	20.1	C	N	0.62	22.4	C	0.73	24.5	C	0.61	18.8	B	0.73	20.8	C	N
	2	Carson Street	I-605 SB Direct On-Ramp	None	0.15	--	--	0.25	--	--	0.22	--	--	0.33	--	--	0.24	--	--	0.38	--	--	--	0.24	--	--	0.36	--	--	0.26	--	--	0.41	--	--	--
		Carson Street	I-605 SB Loop On-Ramp	None	0.24	--	--	0.20	--	--	0.33	--	--	0.33	--	--	0.35	--	--	0.36	--	--	--	0.35	--	--	0.36	--	--	0.38	--	--	0.39	--	--	--
	3	Carson Street	I-605 NB Off-Ramp	Sig	0.55	14.8	B	0.66	12.4	B	0.59	21.8	C	0.76	20.6	C	0.59	20.3	C	0.76	16.6	B	N	0.63	23.6	C	0.82	23.2	C	0.63	21.8	C	0.82	18.4	B	N
		Carson Street	I-605 NB Loop On-Ramp	None	0.23	--	--	0.45	--	--	0.31	--	--	0.35	--	--	0.30	--	--	0.35	--	--	--	0.33	--	--	0.37	--	--	0.33	--	--	0.37	--	--	--
		Carson Street	I-605 NB Direct On-Ramp	None	0.40	--	--	0.32	--	--	0.52	--	--	0.49	--	--	0.51	--	--	0.46	--	--	--	0.56	--	--	0.53	--	--	0.55	--	--	0.49	--	--	--
	4	Carson Street	Pioneer Boulevard	Sig	0.76	48.1	D	0.76	35.1	D	0.79	31.1	C	0.84	33.7	C	0.79	30.7	C	0.87	31.6	C	N	0.86	35.1	D	0.92	43.9	D	0.87	34.7	C	0.90	41.4	D	N
Spring Street/ Cerritos Avenue at I-605	5	Spring Street/Cerritos Avenue	I-605 SB Off-Ramp	Sig	0.79	26.2	C	0.60	18.4	B	0.68	14.2	B	0.65	10.9	B	0.68	14.0	B	0.64	10.3	B	N	0.74	15.4	B	0.71	12.0	B	0.73	15.2	B	0.70	11.4	B	N
	6	Spring Street/Cerritos Avenue	I-605 NB On-Ramp	Sig	0.84	13.5	B	0.81	11.1	B	0.76	10.5	B	0.79	8.2	A	0.73	9.3	A	0.78	8.1	A	N	0.82	11.6	B	0.86	9.8	A	0.79	10.3	B	0.85	9.5	A	N
Lakewood Boulevard/ Willow Street at I-405	7	I-405 NB Direct Off-Ramp	Lakewood Boulevard	None	0.35	--	--	0.34	--	--	0.38	--	--	0.38	--	--	0.43	--	--	0.41	--	--	--	0.41	--	--	0.41	--	--	0.47	--	--	0.44	--	--	--
		I-405 NB Direct On-Ramp	Lakewood Boulevard	None	0.22	--	--	0.21	--	--	0.38	--	--	0.23	--	--	0.38	--	--	0.22	--	--	--	0.41	--	--	0.25	--	--	0.41	--	--	0.24	--	--	--
		I-405 NB Loop Off-Ramp	Lakewood Boulevard	None	0.19	--	--	0.18	--	--	0.23	--	--	0.22	--	--	0.26	--	--	0.22	--	--	--	0.25	--	--	0.23	--	--	0.28	--	--	0.24	--	--	--
		I-405 NB Loop On-Ramp	Lakewood Boulevard	None	0.50	--	--	0.38	--	--	0.53	--	--	0.41	--	--	0.53	--	--	0.41	--	--	--	0.57	--	--	0.44	--	--	0.57	--	--	0.44	--	--	--
	8	I-405 SB Loop On-Ramp	Lakewood Boulevard	None	0.19	--	--	0.23	--	--	0.22	--	--	0.25	--	--	0.23	--	--	0.25	--	--	--	0.24	--	--	0.27	--	--	0.25	--	--	0.27	--	--	--
		I-405 SB Direct Off-Ramp	Lakewood Boulevard	None	0.40	--	--	0.31	--	--	0.43	--	--	0.48	--	--	0.41	--	--	0.46	--	--	--	0.46	--	--	0.52	--	--	0.44	--	--	0.50	--	--	--
	9	Willow Street	Lakewood Boulevard	Sig	0.76	31.1	C	**0.92**	**66.2**	**E**	0.75	31.2	C	0.89	43.0	D	0.74	28.9	C	0.96	46.5	D	N	0.81	33.6	C	0.93	48.4	D	0.79	33.1	C	0.93	48.7	D	N
	10	Willow Street	I-405 SB Loop Off-Ramp	None	0.32	--	--	0.30	--	--	0.35	--	--	0.46	--	--	0.33	--	--	0.45	--	--	--	0.37	--	--	0.50	--	--	0.36	--	--	0.48	--	--	--
		Willow Street	I-405 SB Direct On-Ramp	None	0.26	--	--	0.38	--	--	0.28	--	--	0.41	--	--	0.28	--	--	0.41	--	--	--	0.31	--	--	0.44	--	--	0.31	--	--	0.44	--	--	--
Bellflower Boulevard/ Los Coyotes Diagonal at I-405	11	I-405 NB Off-Ramp	Bellflower Boulevard	Sig	0.41	9.3	A	0.48	11.9	B	0.51	10.8	B	0.53	10.6	B	0.51	10.4	B	0.53	10.9	B	N	0.55	11.6	B	0.58	11.3	B	0.55	11.3	B	0.58	11.3	B	N
		I-405 NB Loop On-Ramp	Bellflower Boulevard	None	0.49	--	--	0.35	--	--	0.53	--	--	0.37	--	--	0.51	--	--	0.37	--	--	--	0.57	--	--	0.40	--	--	0.55	--	--	0.40	--	--	--
		I-405 NB Direct On-Ramp	Bellflower Boulevard	None	0.28	--	--	0.18	--	--	0.31	--	--	0.19	--	--	0.29	--	--	0.19	--	--	--	0.33	--	--	0.20	--	--	0.32	--	--	0.20	--	--	--
	12	Willow Street	Bellflower Boulevard	Sig	**0.84**	**81.2**	**F**	0.92	40.1	D	1.01	48.8	D	1.01	54.4	D	1.00	50.1	D	1.00	51.2	D	N	**1.09**	**67.3**	**E**	**1.09**	**70.6**	**E**	**1.09**	**68.2**	**E**	**1.10**	**68.1**	**E**	N
	13	Los Coyotes Diagonal	Bellflower Boulevard	Sig	0.63	31.3	C	**0.97**	**72.8**	**E**	0.65	26.4	C	1.00	42.1	D	0.64	27.5	C	1.06	44.6	D	N	0.70	26.9	C	**1.13**	**56.8**	**E**	0.71	25.7	C	1.14	53.7	D	N
		Los Coyotes Diagonal	I-405 SB Direct On-Ramp	None	0.06	--	--	0.09	--	--	0.06	--	--	0.12	--	--	0.08	--	--	0.12	--	--	--	0.07	--	--	0.13	--	--	0.08	--	--	0.13	--	--	--
	14	I-405 SB Loop Off-Ramp	Bellflower Boulevard	None	0.12	--	--	0.26	--	--	0.12	--	--	0.32	--	--	0.12	--	--	0.29	--	--	--	0.13	--	--	0.34	--	--	0.13	--	--	0.32	--	--	--
	15	Los Coyotes Diagonal	I-405 SB Direct Off-Ramp	Sig	0.44	14.4	B	0.45	13.4	B	0.52	10.0	B	0.47	16.0	B	0.52	10.3	B	0.47	14.0	B	N	0.56	10.6	B	0.51	16.8	B	0.56	10.8	B	0.51	14.7	B	N
		Los Coyotes Diagonal	I-405 SB Loop On-Ramp	None	0.14	--	--	0.13	--	--	0.16	--	--	0.17	--	--	0.25	--	--	0.17	--	--	--	0.18	--	--	0.18	--	--	0.27	--	--	0.18	--	--	--
	16	Willow Street	Los Coyotes Diagonal	Sig	0.72	51.5	D	**0.74**	**102.8**	**F**	0.78	44.4	D	1.02	35.1	D	0.77	31.7	C	1.04	36.7	D	N	0.87	48.8	D	1.18	45.4	D	0.86	36.4	D	1.20	50.4	D	N
Woodruff Avenue at I-405	17	Willow Street	Woodruff Avenue	Sig	**1.07**	**86.8**	**F**	0.77	30.4	C	**1.33**	**147.9**	**F**	0.87	40.4	D	**1.32**	**146.2**	**F**	0.88	40.9	D	N	**1.44**	**180.5**	**F**	0.94	51.5	D	**1.43**	**179.2**	**F**	0.94	53.1	D	N
	18	I-405 NB Direct Off-Ramp	Woodruff Avenue	None	0.15	--	--	0.17	--	--	0.39	--	--	0.19	--	--	0.39	--	--	0.20	--	--	--	0.42	--	--	0.20	--	--	0.43	--	--	0.22	--	--	--
		I-405 NB Direct On-Ramp	Woodruff Avenue	None	0.25	--	--	0.20	--	--	0.31	--	--	0.21	--	--	0.31	--	--	0.21	--	--	--	0.34	--	--	0.23	--	--	0.34	--	--	0.23	--	--	--
	19	I-405 SB Direct Off-Ramp	Woodruff Avenue	None	0.48	--	--	0.38	--	--	0.52	--	--	0.47	--	--	0.51	--	--	0.45	--	--	--	0.56	--	--	0.51	--	--	0.55	--	--	0.49	--	--	--
		I-405 SB Direct On-Ramp	Woodruff Avenue	None	0.27	--	--	0.19	--	--	0.41	--	--	0.23	--	--	0.43	--	--	0.23	--	--	--	0.45	--	--	0.25	--	--	0.47	--	--	0.25	--	--	--
Palo Verde Avenue / Stearns Street at I-405	20	I-405 NB Direct Off-Ramp	Palo Verde Avenue	Sig	0.54	11.3	B	0.45	13.7	B	0.78	17.7	B	0.61	11.8	B	0.78	17.0	B	0.63	12.0	B	N	0.95	21.2	C	0.70	12.6	B	0.96	20.6	C	0.73	13.1	B	N
		I-405 NB Loop On-Ramp	Palo Verde Avenue	None	0.11	--	--	0.20	--	--	0.13	--	--	0.22	--	--	0.15	--	--	0.20	--	--	--	0.14	--	--	0.23	--	--	0.17	--	--	0.21	--	--	--
	21	Woodruff Avenue	Palo Verde Avenue	Sig	**0.87**	**86.6**	**F**	0.59	21.3	C	0.84	13.6	B	0.66	10.3	B	0.84	12.9	B	0.68	10.2	B	N	0.91	15.9	B	0.72	11.3	B	0.91	15.4	B	0.74	11.2	B	N
	22	Stearns Street	Palo Verde Avenue	Sig	0.73	19.4	B	0.75	25.2	C	0.86	18.9	B	0.83	20.5	C	0.86	18.5	B	0.85	21.0	C	N	0.94	22.0	C	0.92	24.4	C	0.94	21.7	C	0.93	25.1	C	N
	23	Stearns Street	I-405 SB Direct On-Ramp	None	0.28	--	--	0.39	--	--	0.30	--	--	0.46	--	--	0.33	--	--	0.44	--	--	--	0.33	--	--	0.50	--	--	0.35	--	--	0.48	--	--	--

Table 3-9: Years 2020 and 2040 Peak-Hour Intersections LOS and Adverse Effect Determination after Traffic Measures for Alternative 1

Interchange Location	Intersection #	Intersection Location		Traffic Control	Year 2009						Year 2020													Year 2040												
					Existing Traffic						No Build Traffic on No Build Geometry						Alternative 1 Traffic on Alternative 1 Geometry including Traffic Measures						No Build-Alternative 1 Adverse Effect	No Build Traffic on No Build Geometry						Alternative 1 Traffic on Alternative 1 Geometry including Traffic Measures						No Build-Alternative 1 Adverse Effect
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			
		East/West Street	North/South Street		V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS		D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	
Studebaker Road at I-405	24	I-405 NB Direct On-Ramp	Studebaker Road	Sig	0.50	4.0	A	0.55	4.3	A	0.51	2.6	A	0.47	4.7	A	0.51	1.2	A	0.50	3.1	A	N	0.55	2.8	A	0.51	4.9	A	0.55	1.4	A	0.54	3.2	A	N
	25	I-405 SB Direct Off-Ramp	Studebaker Road	Stop	0.15	13.8	B	0.04	10.8	B	**0.86**	**68.4**	**F**	0.34	16.2	C	**1.03**	**113.3**	**F**	0.51	24.8	C	N	**1.02**	**98.3**	**F**	0.33	15.7	C	**1.24**	**170.6**	**F**	0.53	25.2	D	N
				*Sig**	*N/A*						*0.65*	*8.4*	*A*	*0.66*	*5.8*	*A*	*0.66*	*8.9*	*A*	*0.65*	*6.2*	*A*		*0.71*	*9.1*	*A*	*0.72*	*7.0*	*A*	*0.72*	*9.8*	*A*	*0.72*	*7.1*	*A*	
	26	Atherton Street	Studebaker Road	Sig	0.46	9.2	A	0.74	23.3	C	0.54	9.3	A	0.78	13.8	B	0.54	10.3	B	0.79	14.8	B	N	0.60	10.7	B	0.85	15.7	B	0.58	11.1	B	0.86	16.9	B	N
Studebaker Road at SR-22/ 7th Street	27	SR-22 WB On-/Off-Ramp	Studebaker Road	Sig	0.49	16.0	B	0.74	22.1	C	0.46	12.8	B	0.79	28.0	C	0.53	13.0	B	0.76	27.3	C	N	0.50	13.1	B	0.86	30.4	C	0.52	13.5	B	0.82	29.1	C	N
	28	SR-22 EB On-/Off-Ramp	Studebaker Road	Sig	0.72	17.6	B	0.82	17.1	B	0.91	21.3	C	0.93	25.8	C	0.97	28.9	C	0.96	28.6	C	N	0.99	30.4	C	1.03	37.1	D	1.05	43.5	D	1.06	40.4	D	N
	29	SR-22 WB On-/Off-Ramp	College Park Drive	Stop	0.39	18.8	C	**0.65**	**59.9**	**F**			N/A						N/A				N			N/A						N/A				N
				Sig*	N/A						0.65	14.1	B	**1.07**	**110.1**	**F**	0.43	10.6	B	0.69	10.8	B		0.71	15.5	B	**1.16**	**147.2**	**F**	0.47	11.2	B	0.67	20.2	C	
7th Street	30	7th Street	Pacific Coast Highway	Sig	**0.95**	**92.9**	**F**	**1.03**	**82.6**	**F**	0.94	49.2	D	0.95	35.9	D	0.96	36.7	D	0.95	38.7	D	N	**1.02**	**65.8**	**E**	**1.03**	**58.7**	**E**	1.09	54.9	D	1.00	52.3	D	N
	31	7th Street	Bellflower Boulevard	Sig	**1.01**	**73.6**	**E**	**0.91**	**90.3**	**F**	**1.04**	**68.9**	**E**	0.98	47.9	D	0.90	31.3	C	0.80	33.7	C	N	**1.13**	**82.4**	**F**	**1.06**	**63.0**	**E**	0.98	37.5	D	0.91	33.0	C	N
	32	Pacific Coast Highway	Bellflower Boulevard	Sig	0.47	22.3	C	0.73	22.5	C	0.53	38.8	D	0.70	20.4	C	0.52	33.5	C	0.56	30.5	C	N	0.57	39.1	D	0.82	32.1	C	0.56	35.4	D	0.61	31.1	C	N
	33	7th Street	Channel Drive	Sig	0.72	32.9	C	0.88	30.3	C	0.71	24.5	C	0.94	22.7	C	0.71	10.8	B	0.94	29.2	C	N	0.77	25.7	C	1.02	50.8	D	0.77	11.5	B	1.01	48.2	D	N
	34	7th Street	W. Campus Drive	Sig	**0.83**	**112.9**	**F**	0.72	31.1	C	0.79	31.2	C	0.81	32.0	C	0.74	18.3	B	0.77	24.5	C	N	0.85	53.1	D	**0.87**	**58.5**	**E**	0.80	15.4	B	0.83	39.2	D	N
	35	7th Street	E. Campus Drive	Sig	0.97	23.1	C	0.73	24.7	C	1.03	35.8	D	0.87	14.6	B	1.04	39.7	D	0.87	16.6	B	N	**1.12**	**55.8**	**E**	0.96	16.7	B	**1.13**	**60.6**	**E**	0.95	19.2	B	N
	36	7th Street	Park Avenue	Sig	0.68	12.2	B	0.74	15.7	B	0.69	14.8	B	0.81	19.2	B	0.76	14.4	B	0.83	20	B	N	0.82	17.1	B	0.86	23.7	C	0.82	16.4	B	0.87	24.8	C	N

Notes:

1. LOS – Level of Service; V/C – Volume-to- Capacity Ratio; D/C – Demand Volume-to-Capacity Ratio; N/A – Not Applicable (see Note 2)
2. * = Intersection is not signalized under existing or No Build conditions.
   - At the I-405 SB Direct Off-Ramp intersection with Studebaker Road, the signalized row is included only to determine if there is an adverse effect at the intersection. If a stop-controlled intersection has an LOS E or F under future conditions, then the intersection is reanalyzed as a signalized intersection to identify any adverse effects, because stop-controlled analysis does not provide an overall intersection metric.
   - The proposed traffic measure includes installation of a signal at the SR-22 WB On-/Off-Ramp intersection with College Park Drive. To determine if the measure addresses the adverse effect, a comparison is made between the proposed signalized intersection and the no-build condition assuming a traffic signal. The traffic signal is assumed for the no-build condition because stop-controlled analysis does not provide an overall intersection metric to determine if the adverse effect at the intersection has been addressed.
3. Bold indicates an intersection forecast to operate at LOS E or F.
4. Shaded cells indicate an adverse effect.
5. -- = LOS and average delay are not calculated for intersections without traffic control. The adverse effect determination applies only to controlled intersections.
6. Intersection numbers correspond to the intersection numbers shown on the intersection traffic volumes figures.
7. For future conditions, the D/C ratio is used instead of the V/C ratio.

No additional ROW is anticipated to implement the proposed measures. Noise and air quality impacts of construction would be temporary and not anticipated to be an adverse effect. It is anticipated that all of the proposed measures could be implemented without the necessity of closing travel lanes during weekday peak hours. It may be necessary to narrow lanes. Short-term off-peak, nighttime, and weekend lane closures may be necessary. As noted in the traffic measures listed in Section 3.1.3, the agencies implementing the measures would bear responsibility for necessary clearances and permits.

Alternative 2

Freeway Mainline

The Opening Year (2020) and Design Year (2040) Alternative 2 AM/PM peak-hour traffic volumes for the freeway mainline and all interchange ramps within the Long Beach study area, are presented in Figures 3-8 and 3-12, respectively. The freeway mainline and all interchange ramps are assumed to be unchanged from the existing conditions.

V/C Ratio and LOS. Table 3-2 presents the LOS and v/c ratios for peak hours of Alternative 2 in 2020 for the GP lanes of the freeway mainline. Under Alternative 2 in year 2020, the I-405 freeway mainline between I-605 and Lakewood Boulevard is anticipated to operate at LOS F in the AM peak hour in the northbound direction and LOS D and F in the southbound direction. In the PM peak hour, the I-405 freeway mainline is anticipated to operate at LOS F in the northbound direction and LOS E and F in the southbound direction. The range of v/c ratios in the GP lanes of the I-405 freeway mainline during the AM peak hour is **0.92 to 1.20** and **0.99 to 1.37** during the PM peak hour.

The I-605 mainline is anticipated to operate at LOS C in the AM peak hour in the northbound direction and LOS E in the southbound direction in 2020. In the PM peak hour, the I-605 freeway mainline is anticipated to operate at LOS D in the northbound direction and LOS E in the southbound direction. The v/c ratios in the GP lanes of the I-605 freeway mainline during the AM peak hour are **0.75** in the northbound direction and **1.08** in the southbound direction. During the PM peak hour, the v/c ratios are **0.88** in the northbound direction and **1.00** in the southbound direction.

The SR-22/7th Street freeway mainline is anticipated to operate at LOS F in the AM peak hour in the eastbound direction and LOS E in the westbound direction in 2020. In the PM peak hour, the SR-22/7th Street freeway mainline is LOS D in the eastbound direction and LOS E in the westbound direction. The v/c ratios in the GP lanes of the SR-22/7th Street freeway mainline during the AM peak hour are **1.18** in the eastbound direction and **1.14** in the westbound direction. During the PM peak hour, the v/c ratios are **0.95** in the eastbound direction and **1.11** in the westbound direction.

Table 3-3 presents the v/c ratios for peak hours of Alternative 2 in 2020 for the HOV (carpool) lanes. The range of v/c ratios in the HOV lanes during the AM peak hour is **1.00 to 1.24** and **1.08 to 1.46** during the PM peak hour.

Table 3-6 presents the LOS and v/c ratios for peak hours of Alternative 2 in 2040 for the GP lanes of the freeway mainline. Under Alternative 2 conditions in year 2040, the freeway mainline between I-605 and Lakewood Boulevard is anticipated to operate at LOS F in the AM peak hour in the northbound direction and LOS E and F in the southbound direction. In the PM peak hour, the I-405 freeway mainline is anticipated to operate at LOS F in the northbound direction and LOS E and F in the southbound direction. The range of v/c ratios in the GP lanes of the I-405 freeway mainline during the AM peak hour is **1.02 to 1.29** and **1.07 to 1.48** during the PM peak hour.

The I-605 mainline is anticipated to operate at LOS D in the AM peak hour in the northbound direction and LOS F in the southbound direction in 2040. In the PM peak hour, the I-605 freeway mainline is anticipated to operate at LOS D in the northbound direction and LOS E in the southbound direction. The v/c ratios in the GP lanes of the I-605 freeway mainline during the AM peak hour are **0.81** in the northbound direction and **1.17** in the southbound direction. During the PM peak hour, the v/c ratios are **0.95** in the northbound direction and **1.08** in the southbound direction.

The SR-22/7th Street freeway mainline is anticipated to operate at LOS F in the eastbound direction and LOS E in the westbound direction during the AM peak hour in 2040. In the PM peak hour, the SR-22/7th Street freeway mainline is anticipated to operate at LOS D in the eastbound direction and LOS E in the westbound direction. The v/c ratios in the GP lanes of the SR-22/7th Street freeway mainline during the AM peak hour are **1.18** in the eastbound direction and **1.14** in the westbound direction. During the PM peak hour, the v/c ratios are **0.95** in the eastbound direction and **1.11** in the westbound direction.

Table 3-7 presents the v/c ratios for peak hours of Alternative 2 in 2040 for the HOV (carpool) lanes. The range of v/c ratios in the HOV lanes during the AM peak hour is **1.08 to 1.35** and **1.17 to 1.58** during the PM peak hour.

A more-detailed link-by-link presentation of Alternative 2 traffic conditions in 2020 and 2040 for GP and HOV lanes is included in Appendix B.1.

Freeway Connector Volumes

Tables 3-4 and 3-8, respectively, provide the 2020 and 2040 forecast for Alternative 2, respectively, of branch connector volumes and v/c ratios on ramps within the I-405/I-605/SR-22/7th Street interchange not presented in the Draft EIR/EIS. Branch connectors are forecast to

operate with v/c ratios ranging from **0.23 to 1.14** in 2020 and from **0.11 to 1.14** in 2040 under Alternative 2. The branch connector from I-605 southbound/I-405 southbound to 7th Street is anticipated to operate with a v/c ratio in excess of **1.00** in 2040 during the AM peak hour.

In no instance would additional lanes on branch connectors be feasible. Ramp metering was considered as a means to improve connector operations, but it was not included in the project because it would further reduce the capacity of the branch connectors.

Arterials, Intersections, and Interchanges

Alternative 2 AM and PM peak-hour traffic volumes for arterial and interchange study locations within the study area in 2020 and 2040 are illustrated in Figures 3-16 and 3-20, respectively. A summary of the LOS analysis and v/c ratios for AM and PM peak hours for 2020 Alternative 2 conditions is provided in Table 3-10 for all of the study intersections. Alternative 2 conditions appear in Table 3-10 under the "Alternative 2 Traffic on No Build Geometry" heading, where forecast Alternative 2 traffic is evaluated on no-build lanes and traffic control. In Table 3-10 for 2020 under Alternative 2, the study intersections are anticipated to operate at LOS D or better, except for six intersections (as shown in bold) that are anticipated to operate at LOS E or F during either the AM or PM peak hour or both. These six intersections include the four intersections that are anticipated to operate at LOS E or F under no-build conditions in 2020.

Table 3-10 shows that the study intersections are anticipated to operate under capacity (i.e., v/c less than or equal to 1.00) in 2020 under Alternative 2 during peak hours, except for seven intersections that are anticipated to operate over capacity during either the AM or PM peak hour or both. These seven intersections include the five intersections that are anticipated to operate over capacity under the no-build condition in 2020.

A summary of the LOS analysis and v/c ratios for AM and PM peak hours for 2040 Alternative 2 conditions is provided in Table 3-10 for all of the study intersections. In Table 3-10 for 2040 under Alternative 2, the study intersections are anticipated to operate at LOS D or better, except for 10 intersections (as shown in bold) that are anticipated to operate at LOS E or F during either the AM or PM peak hour or both. Nine of these 10 intersections are anticipated to operate at LOS E or F under no-build conditions in 2040.

Table 3-10 shows that the study intersections are anticipated to operate under capacity (i.e., v/c less than or equal to 1.00) in 2040 under Alternative 2 during peak hours, except for 12 intersections that are anticipated to operate over capacity during either the AM or PM peak hour or both. These 12 intersections include the 10 intersections that are anticipated to operate over capacity under the no-build condition in 2040.

As highlighted in Table 3-10, the project contributes to adverse cumulative effects on the following nine study intersections under Alternative 2 in 2040:

- Willow Street and Bellflower Boulevard (2040 PM peak hour under No Build Alternative projected D/C ratio is 1.09 with LOS E and under Alternative 2 projected D/C ratio is 1.25 with LOS F)
- Willow Street and Los Coyotes Diagonal (2040 AM peak hour under No Build Alternative projected D/C ratio is 0.87 with LOS D and under Alternative 2 projected D/C ratio is 0.99 with LOS E; 2040 PM peak hour under No Build Alternative projected D/C ratio is 1.18 with LOS D, and under Alternative 2 projected D/C ratio is 1.41 with LOS F)
- Willow Street and Woodruff Avenue (2040 AM peak hour under No Build Alternative projected D/C ratio is 1.44 with LOS F and under Alternative 2 projected D/C ratio is 1.53 with LOS F)
- SR-22 Westbound Ramp and College Park Drive (2040 PM peak hour under No Build Alternative projected D/C ratio is 1.16 with LOS F and under Alternative 2 projected D/C ratio is 1.24 with LOS F)
- 7th Street and Pacific Coast Highway (2040 AM peak hour under No Build Alterative projected D/C ratio is 1.02 with LOS E and under Alternative 2 projected D/C ratio is 1.04 with LOS E; 2040 PM peak hour under No Build Alternative projected D/C ratio is 1.03 with LOS E and under Alternative 2 projected D/C ratio is 1.07 with LOS E)
- 7th Street and Bellflower Boulevard (2040 AM peak hour under No Build Alternative projected D/C ratio is 1.13 with LOS F and under Alternative 2 projected D/C ratio is 1.18 with LOS F)
- 7th Street and Channel Drive (2040 PM peak hour under No Build Alternative projected D/C ratio is 1.02 with LOS D and under Alternative 2 projected D/C ratio is 1.04 with LOS E)
- 7th Street and West Campus Drive (2040 AM peak hour under No Build Alternative projected D/C ratio is 0.85 with LOS D and under Alternative 2 projected D/C ratio is 0.89 with LOS E; 2040 PM peak hour under No Build Alternative projected D/C ratio is 0.87 with LOS E and under Alternative 2 projected D/C ratio is 0.90 with LOS E)
- 7th Street and East Campus Drive (2040 AM peak hour under No Build Alternative projected D/C ratio is 1.12 with LOS E and under Alternative 2 projected D/C ratio is 1.17 with LOS E)

Table 3-10 shows that the project also contributes to adverse cumulative effects under Alternative 2 on the five study intersections listed below in 2020:

Table 3-10: Years 2020 and 2040 Peak-Hour Intersections LOS and Adverse Effect Determination for Alternative 2

Interchange Location	Intersection #	Intersection Location		Traffic Control	Year 2009						Year 2020													Year 2040												
					Existing Traffic						No Build Traffic on No Build Geometry						Alternative 2 Traffic on No Build Geometry						No Build-Alternative 2 Adverse Effect	No Build Traffic on No Build Geometry						Alternative 2 Traffic on No Build Geometry						No Build-Alternative 2 Adverse Effect
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			
		East/West Street	North/South Street		V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS		D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	
Carson Street at I-605	1	Carson Street	I-605 SB Off-Ramp	Sig	0.58	21.9	C	0.61	17.8	B	0.57	22.3	C	0.68	23.8	C	0.58	19.1	B	0.67	20.3	C	N	0.62	22.4	C	0.73	24.5	C	0.63	19.3	B	0.73	21.0	C	N
	2	Carson Street	I-605 SB Direct On-Ramp	None	0.15	--	--	0.25	--	--	0.22	--	--	0.33	--	--	0.24	--	--	0.32	--	--	--	0.24	--	--	0.36	--	--	0.26	--	--	0.34	--	--	--
		Carson Street	I-605 SB Loop On-Ramp	None	0.24	--	--	0.20	--	--	0.33	--	--	0.33	--	--	0.37	--	--	0.36	--	--	--	0.35	--	--	0.36	--	--	0.40	--	--	0.39	--	--	--
	3	Carson Street	I-605 NB Off-Ramp	Sig	0.55	14.8	B	0.66	12.4	B	0.59	21.8	C	0.76	20.6	C	0.60	20.1	C	0.75	16.5	B	N	0.63	23.6	C	0.82	23.2	C	0.65	21.9	C	0.81	18.1	B	N
		Carson Street	I-605 NB Loop On-Ramp	None	0.23	--	--	0.45	--	--	0.31	--	--	0.35	--	--	0.33	--	--	0.36	--	--	--	0.33	--	--	0.37	--	--	0.35	--	--	0.39	--	--	--
		Carson Street	I-605 NB Direct On-Ramp	None	0.40	--	--	0.32	--	--	0.52	--	--	0.49	--	--	0.51	--	--	0.46	--	--	--	0.56	--	--	0.53	--	--	0.55	--	--	0.49	--	--	--
	4	Carson Street	Pioneer Boulevard	Sig	0.76	48.1	D	0.76	35.1	D	0.79	31.1	C	0.84	33.7	C	0.78	34.4	C	0.84	31.2	C	N	0.86	35.1	D	0.92	43.9	D	0.86	41.9	D	0.93	39.0	D	N
Spring Street/ Cerritos Avenue at I-605	5	Spring Street/Cerritos Avenue	I-605 SB Off-Ramp	Sig	0.79	26.2	C	0.60	18.4	B	0.68	14.2	B	0.65	10.9	B	0.68	14.5	B	0.57	9.8	A	N	0.74	15.4	B	0.71	12.0	B	0.74	15.7	B	0.62	10.8	B	N
	6	Spring Street/Cerritos Avenue	I-605 NB On-Ramp	Sig	0.84	13.5	B	0.81	11.1	B	0.76	10.5	B	0.79	8.2	A	0.69	7.9	A	0.74	7.7	A	N	0.82	11.6	B	0.86	9.8	A	0.75	8.7	A	0.81	8.6	A	N
Lakewood Boulevard/ Willow Street at I-405	7	I-405 NB Direct Off-Ramp	Lakewood Boulevard	None	0.35	--	--	0.34	--	--	0.38	--	--	0.38	--	--	0.42	--	--	0.42	--	--	--	0.41	--	--	0.41	--	--	0.46	--	--	0.45	--	--	--
		I-405 NB Direct On-Ramp	Lakewood Boulevard	None	0.22	--	--	0.21	--	--	0.38	--	--	0.23	--	--	0.39	--	--	0.20	--	--	--	0.41	--	--	0.25	--	--	0.43	--	--	0.21	--	--	--
		I-405 NB Loop Off-Ramp	Lakewood Boulevard	None	0.19	--	--	0.18	--	--	0.23	--	--	0.22	--	--	0.23	--	--	0.23	--	--	--	0.25	--	--	0.23	--	--	0.25	--	--	0.25	--	--	--
		I-405 NB Loop On-Ramp	Lakewood Boulevard	None	0.50	--	--	0.38	--	--	0.53	--	--	0.41	--	--	0.54	--	--	0.41	--	--	--	0.57	--	--	0.44	--	--	0.58	--	--	0.44	--	--	--
	8	I-405 SB Loop On-Ramp	Lakewood Boulevard	None	0.19	--	--	0.23	--	--	0.22	--	--	0.25	--	--	0.22	--	--	0.25	--	--	--	0.24	--	--	0.27	--	--	0.24	--	--	0.27	--	--	--
		I-405 SB Direct Off-Ramp	Lakewood Boulevard	None	0.40	--	--	0.31	--	--	0.43	--	--	0.48	--	--	0.42	--	--	0.47	--	--	--	0.46	--	--	0.52	--	--	0.45	--	--	0.51	--	--	--
	9	Willow Street	Lakewood Boulevard	Sig	0.76	31.1	C	**0.92**	**66.2**	**E**	0.75	31.2	C	0.89	43.0	D	0.75	28.3	C	0.90	44.3	D	N	0.81	33.6	C	0.93	48.4	D	0.79	32.2	C	1.02	52.0	D	N
	10	Willow Street	I-405 SB Loop Off-Ramp	None	0.32	--	--	0.30	--	--	0.35	--	--	0.46	--	--	0.33	--	--	0.45	--	--	--	0.37	--	--	0.50	--	--	0.36	--	--	0.49	--	--	--
		Willow Street	I-405 SB Direct On-Ramp	None	0.26	--	--	0.38	--	--	0.28	--	--	0.41	--	--	0.31	--	--	0.43	--	--	--	0.31	--	--	0.44	--	--	0.34	--	--	0.46	--	--	--
Bellflower Boulevard/ Los Coyotes Diagonal at I-405	11	I-405 NB Off-Ramp	Bellflower Boulevard	Sig	0.41	9.3	A	0.48	11.9	B	0.51	10.8	B	0.53	10.6	B	0.52	10.5	B	0.53	11.6	B	N	0.55	11.6	B	0.58	11.3	B	0.57	11.3	B	0.58	12.2	B	N
		I-405 NB Loop On-Ramp	Bellflower Boulevard	None	0.49	--	--	0.35	--	--	0.53	--	--	0.37	--	--	0.51	--	--	0.36	--	--	N	0.57	--	--	0.40	--	--	0.56	--	--	0.39	--	--	--
		I-405 NB Direct On-Ramp	Bellflower Boulevard	None	0.28	--	--	0.18	--	--	0.31	--	--	0.19	--	--	0.30	--	--	0.18	--	--	N	0.33	--	--	0.20	--	--	0.32	--	--	0.19	--	--	--
	12	Willow Street	Bellflower Boulevard	Sig	**0.84**	**81.2**	**F**	0.92	40.1	D	1.01	48.8	D	1.01	54.4	D	0.98	39.0	D	**1.16**	**78.7**	**E**	Y	**1.09**	**67.3**	**E**	**1.09**	**70.6**	**E**	1.05	55.0	D	**1.25**	**106.3**	**F**	Y
	13	Los Coyotes Diagonal	Bellflower Boulevard	Sig	0.63	31.3	C	**0.97**	**72.8**	**E**	0.65	26.4	C	1.00	42.1	D	0.62	27.4	C	1.03	41.2	D	N	0.70	26.9	C	**1.13**	**56.8**	**E**	0.67	27.7	C	1.13	54.2	D	N
		Los Coyotes Diagonal	I-405 SB Direct On-Ramp	None	0.06	--	--	0.09	--	--	0.06	--	--	0.12	--	--	0.08	--	--	0.14	--	--	--	0.07	--	--	0.13	--	--	0.08	--	--	0.15	--	--	--
	14	I-405 SB Loop Off-Ramp	Bellflower Boulevard	None	0.12	--	--	0.26	--	--	0.12	--	--	0.32	--	--	0.12	--	--	0.25	--	--	--	0.13	--	--	0.34	--	--	0.13	--	--	0.27	--	--	--
	15	Los Coyotes Diagonal	I-405 SB Direct Off-Ramp	Sig	0.44	14.4	B	0.45	13.4	B	0.52	10.0	B	0.47	16.0	B	0.52	10.4	B	0.48	14.1	B	N	0.56	10.6	B	0.51	16.8	B	0.56	11.0	B	0.52	14.8	B	N
		Los Coyotes Diagonal	I-405 SB Loop On-Ramp	None	0.14	--	--	0.13	--	--	0.16	--	--	0.17	--	--	0.31	--	--	0.20	--	--	--	0.18	--	--	0.18	--	--	0.33	--	--	0.21	--	--	--
	16	Willow Street	Los Coyotes Diagonal	Sig	0.72	51.5	D	**0.74**	**102.8**	**F**	0.78	44.4	D	1.02	35.1	D	0.88	54.7	D	**1.25**	**79.6**	**E**	Y	0.87	48.8	D	1.18	45.4	D	**0.99**	**60.7**	**E**	**1.41**	**101.4**	**F**	Y
Woodruff Avenue at I-405	17	Willow Street	Woodruff Avenue	Sig	**1.07**	**86.8**	**F**	0.77	30.4	C	**1.33**	**147.9**	**F**	0.87	40.4	D	**1.41**	**203.6**	**F**	0.88	54.3	D	Y	**1.44**	**180.5**	**F**	0.94	51.5	D	**1.53**	**242.2**	**F**	**0.95**	**81.3**	**F**	Y
	18	I-405 NB Direct Off-Ramp	Woodruff Avenue	None	0.15	--	--	0.17	--	--	0.39	--	--	0.19	--	--	0.44	--	--	0.23	--	--	--	0.42	--	--	0.20	--	--	0.47	--	--	0.25	--	--	--
		I-405 NB Direct On-Ramp	Woodruff Avenue	None	0.25	--	--	0.20	--	--	0.31	--	--	0.21	--	--	0.29	--	--	0.21	--	--	--	0.34	--	--	0.23	--	--	0.31	--	--	0.23	--	--	--
	19	I-405 SB Direct Off-Ramp	Woodruff Avenue	None	0.48	--	--	0.38	--	--	0.52	--	--	0.47	--	--	0.51	--	--	0.46	--	--	--	0.56	--	--	0.51	--	--	0.55	--	--	0.50	--	--	--
		I-405 SB Direct On-Ramp	Woodruff Avenue	None	0.27	--	--	0.19	--	--	0.41	--	--	0.23	--	--	0.44	--	--	0.26	--	--	--	0.45	--	--	0.25	--	--	0.47	--	--	0.28	--	--	--
Palo Verde Avenue / Stearns Street at I-405	20	I-405 NB Direct Off-Ramp	Palo Verde Avenue	Sig	0.54	11.3	B	0.45	13.7	B	0.78	17.7	B	0.61	11.8	B	0.69	15.3	B	0.59	11.8	B	N	0.95	21.2	C	0.70	12.6	B	0.82	17.4	B	0.72	13.3	B	N
		I-405 NB Loop On-Ramp	Palo Verde Avenue	None	0.11	--	--	0.20	--	--	0.13	--	--	0.22	--	--	0.10	--	--	0.19	--	--	--	0.14	--	--	0.23	--	--	0.11	--	--	0.20	--	--	--
	21	Woodruff Avenue	Palo Verde Avenue	Sig	**0.87**	**86.6**	**F**	0.59	21.3	C	0.84	13.6	B	0.66	10.3	B	0.82	13.8	B	0.70	11.3	B	N	0.91	15.9	B	0.72	11.3	B	0.89	15.9	B	0.76	12.1	B	N
	22	Stearns Street	Palo Verde Avenue	Sig	0.73	19.4	B	0.75	25.2	C	0.86	18.9	B	0.83	20.5	C	0.83	17.9	B	0.83	20.2	C	N	0.94	22.0	C	0.92	24.4	C	0.91	20.3	C	0.92	23.9	C	N
	23	Stearns Street	I-405 SB Direct On-Ramp	None	0.28	--	--	0.39	--	--	0.30	--	--	0.46	--	--	0.29	--	--	0.40	--	--	--	0.33	--	--	0.50	--	--	0.31	--	--	0.43	--	--	--

Table 3-10: Years 2020 and 2040 Peak-Hour Intersections LOS and Adverse Effect Determination for Alternative 2

Interchange Location	Intersection #	Intersection Location: East/West Street	Intersection Location: North/South Street	Traffic Control	Year 2009						Year 2020													Year 2040												
					Existing Traffic						No Build Traffic on No Build Geometry						Alternative 2 Traffic on No Build Geometry						No Build-Alternative 2 Adverse Effect	No Build Traffic on No Build Geometry						Alternative 2 Traffic on No Build Geometry						No Build-Alternative 2 Adverse Effect
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			
					V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS		D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	
Studebaker Road at I-405	24	I-405 NB Direct On-Ramp	Studebaker Road	Sig	0.50	4.0	A	0.55	4.3	A	0.51	2.6	A	0.47	4.7	A	0.54	3.3	A	0.52	2.7	A	N	0.55	2.8	A	0.51	4.9	A	0.58	3.6	A	0.56	2.8	A	N
	25	I-405 SB Direct Off-Ramp	Studebaker Road	Stop	0.15	13.8	B	0.04	10.8	B	**0.86**	**68.4**	**F**	0.34	16.2	C	**0.90**	**61.5**	**F**	0.61	31.4	D	N	**1.02**	**98.3**	**F**	0.33	15.7	C	**1.04**	**81.3**	**F**	0.65	33.1	D	N
				*Sig**	*N/A*						*0.65*	*8.4*	*A*	*0.66*	*5.8*	*A*	*0.65*	*8.9*	*A*	*0.65*	*6.1*	*A*		*0.71*	*9.1*	*A*	*0.72*	*7.0*	*A*	*0.71*	*9.7*	*A*	*0.72*	*7.0*	*A*	
	26	Atherton Street	Studebaker Road	Sig	0.46	9.2	A	0.74	23.3	C	0.54	9.3	A	0.78	13.8	B	0.59	8.5	A	0.79	15.0	B	N	0.60	10.7	B	0.85	15.7	B	0.65	9.5	A	0.86	17.1	B	N
Studebaker Road at SR-22/ 7th Street	27	SR-22 WB On-/Off-Ramp	Studebaker Road	Sig	0.49	16.0	B	0.74	22.1	C	0.46	12.8	B	0.79	28.0	C	0.49	13.0	B	0.83	28.9	C	N	0.50	13.1	B	0.86	30.4	C	0.54	13.4	B	0.89	31.8	C	N
	28	SR-22 EB On-/Off-Ramp	Studebaker Road	Sig	0.72	17.6	B	0.82	17.1	B	0.91	21.3	C	0.93	25.8	C	0.97	30.9	C	0.98	30.1	C	N	0.99	30.4	C	1.03	37.1	D	1.06	45.2	D	1.09	43.9	D	N
	29	SR-22 WB On-/Off-Ramp	College Park Drive	Stop	0.39	18.8	C	**0.65**	**59.9**	**F**	0.43	21.3	C	**0.61**	**88.7**	**F**	0.62	28.6	D	**1.14**	**172.9**	**F**	Y	0.51	25.3	D	**0.84**	**152.1**	**F**	**0.75**	**38.1**	**E**	**1.59**	**311.8**	**F**	Y
				*Sig**	*N/A*						*0.65*	*14.1*	*B*	***1.07****	***110.1***	***F****	*0.73*	*16.0*	*B*	***1.15****	***131.2***	***F****		*0.71*	*15.5*	*B*	***1.16****	***147.2***	***F****	*0.79*	*19.0*	*B*	***1.24****	***167.4***	***F****	
7th Street	30	7th Street	Pacific Coast Highway	Sig	**0.95**	**92.9**	**F**	**1.03**	**82.6**	**F**	0.94	49.2	D	0.95	35.9	D	0.96	51.2	D	0.99	39.9	D	N	**1.02**	**65.8**	**E**	**1.03**	**58.7**	**E**	**1.04**	**70.0**	**E**	**1.07**	**64.9**	**E**	Y
	31	7th Street	Bellflower Boulevard	Sig	**1.01**	**73.6**	**E**	**0.91**	**90.3**	**F**	**1.04**	**68.9**	**E**	0.98	47.9	D	**1.09**	**74.9**	**E**	0.98	46.3	D	Y	**1.13**	**82.4**	**F**	**1.06**	**63.0**	**E**	**1.18**	**92.7**	**F**	**1.06**	**60.9**	**E**	Y
	32	Pacific Coast Highway	Bellflower Boulevard	Sig	0.47	22.3	C	0.73	22.5	C	0.53	38.8	D	0.70	20.4	C	0.51	39.7	D	0.64	19.3	B	N	0.57	39.1	D	0.82	32.1	C	0.55	40.2	D	0.74	31.4	C	N
	33	7th Street	Channel Drive	Sig	0.72	32.9	C	0.88	30.3	C	0.71	24.5	C	0.94	22.7	C	0.73	24.0	C	0.96	24.8	C	N	0.77	25.7	C	1.02	50.8	D	0.79	25.4	C	**1.04**	**55.7**	**E**	Y
	34	7th Street	W. Campus Drive	Sig	**0.83**	**112.9**	**F**	0.72	31.1	C	0.79	31.2	C	0.81	32.0	C	0.82	45.2	D	0.83	41.7	D	N	0.85	53.1	D	**0.87**	**58.5**	**E**	**0.89**	**68.4**	**E**	**0.90**	**66.0**	**E**	Y
	35	7th Street	E. Campus Drive	Sig	0.97	23.1	C	0.73	24.7	C	1.03	35.8	D	0.87	14.6	B	1.07	46.4	D	0.90	16.1	B	N	**1.12**	**55.8**	**E**	0.96	16.7	B	**1.17**	**68.7**	**E**	0.99	19.0	B	Y
	36	7th Street	Park Avenue	Sig	0.68	12.2	B	0.74	15.7	B	0.69	14.8	B	0.81	19.2	B	0.71	15.8	B	0.81	19.2	B	N	0.82	17.1	B	0.86	23.7	C	0.77	18.0	B	0.86	23.4	C	N

Notes:

1. LOS – Level of Service; V/C – Volume-to- Capacity Ratio; D/C – Demand Volume-to-Capacity Ratio; N/A – Not Applicable (see Note 2)
2. * = Intersection is not signalized under existing or No Build conditions. The signalized row is included only to determine if there is an adverse effect at the intersection. If a stop-controlled intersection has an LOS E or F under future conditions, then the intersection is reanalyzed as a signalized intersection to identify any adverse effects, because stop-controlled analysis does not provide an overall intersection metric. The number of LOS E or F locations and the number of locations with V/C or D/C greater than 1.00 identified in the text does not include the signalized row because the existing and no-build operation is based on the current stop control.
3. Bold indicates an intersection forecast to operate at LOS E or F.
4. Shaded cells indicate an adverse effect.
5. -- = LOS and average delay are not calculated for intersections without traffic control. The adverse effect determination applies only to controlled intersections.
6. Intersection numbers correspond to the intersection numbers shown on the intersection traffic volumes figures.
7. For future conditions, the D/C ratio is used instead of the V/C ratio.

- Willow Street and Bellflower Boulevard
- Willow Street and Los Coyotes Diagonal
- Willow Street and Woodruff Avenue
- SR-22 Westbound Ramp and College Park Drive
- 7th Street and Bellflower Boulevard

Measures to Lessen Traffic Impacts at Intersections

The measures listed in Section 3.1.3 of this Supplemental Draft EIR/EIS are proposed to address the project's contributions to adverse cumulative effects at the intersections identified above.

Table 3-11 provides a summary of the LOS analysis and v/c ratios for all of the study intersections during AM and PM peak hours anticipated in 2020 under Alternative 2 with all improvements, including the proposed traffic measures identified in Section 3.1.3 of this Supplemental Draft EIR/EIS. LOS and v/c ratios with all improvements, including proposed traffic measures, appear in the table under the heading "Alternative 2 Traffic on Alternative 2 Geometry including Traffic Measures." Table 3-11 shows that, with all improvements including proposed traffic measures, Alternative 2 does not contribute to adverse cumulative effects on any study intersection in 2020.

Table 3-11 provides a summary of the LOS analysis and v/c ratios for all of the study intersections during AM and PM peak hours anticipated in 2040 under Alternative 2 with all improvements, including the proposed traffic measures identified in Section 3.1.3 of this Supplemental Draft EIR/EIS. Table 3-11 shows that, with all improvements including proposed traffic measures, Alternative 2 does not contribute to adverse cumulative effects on any study intersection in 2040.

No additional ROW is anticipated to implement the proposed measures. Noise and air quality impacts of construction would be temporary and not anticipated to be an adverse effect. It is anticipated that all of the proposed measures could be implemented without the necessity of closing travel lanes during weekday peak hours. It may be necessary to narrow lanes. Short-term off-peak, nighttime, and weekend lane closures may be necessary. As noted in the traffic measures listed in Section 3.1.3, the agencies implementing the measures would bear responsibility for necessary clearances and permits.

Alternative 3

Freeway Mainline

The Opening Year (2020) and Design Year (2040) Alternative 3 AM/PM peak-hour traffic volumes for the freeway mainline and all interchange ramps within the Long Beach study area are presented in Figures 3-9 and 3-13, respectively. The freeway mainline and all interchange ramps are assumed to be unchanged from the existing conditions.

V/C Ratio and LOS. Table 3-2 presents the LOS and v/c ratios for peak hours of Alternative 3 in 2020 for the GP lanes of the freeway mainline. Under Alternative 3 in year 2020, the freeway mainline between I-605 and Lakewood Boulevard is anticipated to operate at LOS F in the AM peak hour in the northbound direction and LOS D and F in the southbound direction. In the PM peak hour, the I-405 freeway mainline is anticipated to operate at LOS F in the northbound direction and LOS E and F in the southbound direction. The range of v/c ratios in the GP lanes of the I-405 freeway mainline during the AM peak hour is **0.95 to 1.23** and **1.02 to 1.42** during the PM peak hour.

The I-605 mainline is anticipated to operate at LOS C in the AM peak hour in the northbound direction and LOS E in the southbound direction in 2020. In the PM peak hour, the I-605 freeway mainline is anticipated to operate at LOS D in the northbound direction and LOS E in the southbound direction. The v/c ratios in the GP lanes of the I-605 freeway mainline during the AM peak hour are **0.78** in the northbound direction and **1.04** in the southbound direction. During the PM peak hour, the v/c ratios are **0.88** in the northbound direction and **1.03** in the southbound direction.

The SR-22/7th Street freeway mainline is anticipated to operate at LOS E in the AM peak hour in both directions in 2020. In the PM peak hour, the SR-22/7th Street freeway mainline is LOS D in the eastbound direction and LOS F in the westbound direction. The v/c ratios in the GP lanes of the SR-22/7th Street freeway mainline during the AM peak hour are **1.12** in the eastbound direction and **1.11** in the westbound direction. During the PM peak hour, the v/c ratios are **0.96** in the eastbound direction and **1.31** in the westbound direction.

Table 3-3 presents the v/c ratios for peak hours of Alternative 3 in 2020 for the HOV (carpool) lanes. The range of v/c ratios in the HOV lanes during the AM peak hour is **0.81 to 1.12** and **0.76 to 1.24** during the PM peak hour.

Table 3-6 presents the LOS and v/c ratios for peak hours of Alternative 3 in 2040 for the GP lanes of the freeway mainline. Under Alternative 3 conditions in year 2040, the freeway mainline between I-605 and Lakewood Boulevard is anticipated to operate at LOS F in the AM peak hour in the northbound direction and LOS E and F in the southbound direction. In the PM peak hour,

Table 3-11: Years 2020 and 2040 Peak-Hour Intersections LOS and Adverse Effect Determination after Traffic Measures for Alternative 2

Interchange Location	Intersection #	Intersection Location		Traffic Control	Year 2009						Year 2020													Year 2040												
					Existing Traffic						No Build Traffic on No Build Geometry						Alternative 2 Traffic on Alternative 2 Geometry including Traffic Measures						No Build-Alternative 2 Adverse Effect	No Build Traffic on No Build Geometry						Alternative 2 Traffic on Alternative 2 Geometry including Traffic Measures						No Build-Alternative 2 Adverse Effect
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			
		East/West Street	North/South Street		V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS		D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	
Carson Street at I-605	1	Carson Street	I-605 SB Off-Ramp	Sig	0.58	21.9	C	0.61	17.8	B	0.57	22.3	C	0.68	23.8	C	0.58	19.1	B	0.67	20.3	C	N	0.62	22.4	C	0.73	24.5	C	0.63	19.3	B	0.73	21.0	C	N
	2	Carson Street	I-605 SB Direct On-Ramp	None	0.15	--	--	0.25	--	--	0.22	--	--	0.33	--	--	0.24	--	--	0.32	--	--	--	0.24	--	--	0.36	--	--	0.26	--	--	0.34	--	--	--
		Carson Street	I-605 SB Loop On-Ramp	None	0.24	--	--	0.20	--	--	0.33	--	--	0.33	--	--	0.37	--	--	0.36	--	--	--	0.35	--	--	0.36	--	--	0.40	--	--	0.39	--	--	--
	3	Carson Street	I-605 NB Off-Ramp	Sig	0.55	14.8	B	0.66	12.4	B	0.59	21.8	C	0.76	20.6	C	0.60	20.1	C	0.75	16.5	B	N	0.63	23.6	C	0.82	23.2	C	0.65	21.9	C	0.81	18.1	B	N
		Carson Street	I-605 NB Loop On-Ramp	None	0.23	--	--	0.45	--	--	0.31	--	--	0.35	--	--	0.33	--	--	0.36	--	--	--	0.33	--	--	0.37	--	--	0.35	--	--	0.39	--	--	--
		Carson Street	I-605 NB Direct On-Ramp	None	0.40	--	--	0.32	--	--	0.52	--	--	0.49	--	--	0.51	--	--	0.46	--	--	--	0.56	--	--	0.53	--	--	0.55	--	--	0.49	--	--	--
	4	Carson Street	Pioneer Boulevard	Sig	0.76	48.1	D	0.76	35.1	D	0.79	31.1	C	0.84	33.7	C	0.78	34.4	C	0.84	31.2	C	N	0.86	35.1	D	0.92	43.9	D	0.86	41.9	D	0.93	39.0	D	N
Spring Street/ Cerritos Avenue at I-605	5	Spring Street/Cerritos Avenue	I-605 SB Off-Ramp	Sig	0.79	26.2	C	0.60	18.4	B	0.68	14.2	B	0.65	10.9	B	0.68	14.5	B	0.57	9.8	A	N	0.74	15.4	B	0.71	12.0	B	0.74	15.7	B	0.62	10.8	B	N
	6	Spring Street/Cerritos Avenue	I-605 NB On-Ramp	Sig	0.84	13.5	B	0.81	11.1	B	0.76	10.5	B	0.79	8.2	A	0.69	7.9	A	0.74	7.7	A	N	0.82	11.6	B	0.86	9.8	A	0.75	8.7	A	0.81	8.6	A	N
Lakewood Boulevard/ Willow Street at I-405	7	I-405 NB Direct Off-Ramp	Lakewood Boulevard	None	0.35	--	--	0.34	--	--	0.38	--	--	0.38	--	--	0.42	--	--	0.42	--	--	--	0.41	--	--	0.41	--	--	0.46	--	--	0.45	--	--	--
		I-405 NB Direct On-Ramp	Lakewood Boulevard	None	0.22	--	--	0.21	--	--	0.38	--	--	0.23	--	--	0.39	--	--	0.20	--	--	--	0.41	--	--	0.25	--	--	0.43	--	--	0.21	--	--	--
		I-405 NB Loop Off-Ramp	Lakewood Boulevard	None	0.19	--	--	0.18	--	--	0.23	--	--	0.22	--	--	0.23	--	--	0.23	--	--	--	0.25	--	--	0.23	--	--	0.25	--	--	0.25	--	--	--
		I-405 NB Loop On-Ramp	Lakewood Boulevard	None	0.50	--	--	0.38	--	--	0.53	--	--	0.41	--	--	0.54	--	--	0.41	--	--	--	0.57	--	--	0.44	--	--	0.58	--	--	0.44	--	--	--
	8	I-405 SB Loop On-Ramp	Lakewood Boulevard	None	0.19	--	--	0.23	--	--	0.22	--	--	0.25	--	--	0.22	--	--	0.25	--	--	--	0.24	--	--	0.27	--	--	0.24	--	--	0.27	--	--	--
		I-405 SB Direct Off-Ramp	Lakewood Boulevard	None	0.40	--	--	0.31	--	--	0.43	--	--	0.48	--	--	0.42	--	--	0.47	--	--	--	0.46	--	--	0.52	--	--	0.45	--	--	0.51	--	--	--
	9	Willow Street	Lakewood Boulevard	Sig	0.76	31.1	C	**0.92**	**66.2**	**E**	0.75	31.2	C	0.89	43.0	D	0.75	28.3	C	0.90	44.3	D	N	0.81	33.6	C	0.93	48.4	D	0.79	32.2	C	1.02	52.0	D	N
	10	Willow Street	I-405 SB Loop Off-Ramp	None	0.32	--	--	0.30	--	--	0.35	--	--	0.46	--	--	0.33	--	--	0.45	--	--	--	0.37	--	--	0.50	--	--	0.36	--	--	0.49	--	--	--
		Willow Street	I-405 SB Direct On-Ramp	None	0.26	--	--	0.38	--	--	0.28	--	--	0.41	--	--	0.31	--	--	0.43	--	--	--	0.31	--	--	0.44	--	--	0.34	--	--	0.46	--	--	--
Bellflower Boulevard/ Los Coyotes Diagonal at I-405	11	I-405 NB Off-Ramp	Bellflower Boulevard	Sig	0.41	9.3	A	0.48	11.9	B	0.51	10.8	B	0.53	10.6	B	0.52	10.5	B	0.53	11.6	B	N	0.55	11.6	B	0.58	11.3	B	0.57	11.3	B	0.58	12.2	B	N
		I-405 NB Loop On-Ramp	Bellflower Boulevard	None	0.49	--	--	0.35	--	--	0.53	--	--	0.37	--	--	0.51	--	--	0.36	--	--	N	0.57	--	--	0.40	--	--	0.56	--	--	0.39	--	--	--
		I-405 NB Direct On-Ramp	Bellflower Boulevard	None	0.28	--	--	0.18	--	--	0.31	--	--	0.19	--	--	0.30	--	--	0.18	--	--	N	0.33	--	--	0.20	--	--	0.32	--	--	0.19	--	--	--
	12	Willow Street	Bellflower Boulevard	Sig	**0.84**	**81.2**	**F**	0.92	40.1	D	1.01	48.8	D	1.01	54.4	D	**1.02**	**78.0**	**E**	0.99	43.8	D	N	**1.09**	**67.3**	**E**	**1.09**	**70.6**	**E**	**1.07**	**56.6**	**E**	1.08	53.1	D	N
	13	Los Coyotes Diagonal	Bellflower Boulevard	Sig	0.63	31.3	C	**0.97**	**72.8**	**E**	0.65	26.4	C	1.00	42.1	D	0.62	27.4	C	1.03	41.2	D	N	0.70	26.9	C	**1.13**	**56.8**	**E**	0.67	27.7	C	1.13	54.2	D	N
		Los Coyotes Diagonal	I-405 SB Direct On-Ramp	None	0.06	--	--	0.09	--	--	0.06	--	--	0.12	--	--	0.08	--	--	0.14	--	--	--	0.07	--	--	0.13	--	--	0.08	--	--	0.15	--	--	--
	14	I-405 SB Loop Off-Ramp	Bellflower Boulevard	None	0.12	--	--	0.26	--	--	0.12	--	--	0.32	--	--	0.12	--	--	0.25	--	--	--	0.13	--	--	0.34	--	--	0.13	--	--	0.27	--	--	--
	15	Los Coyotes Diagonal	I-405 SB Direct Off-Ramp	Sig	0.44	14.4	B	0.45	13.4	B	0.52	10.0	B	0.47	16.0	B	0.52	10.4	B	0.48	14.1	B	N	0.56	10.6	B	0.51	16.8	B	0.56	11.0	B	0.52	14.8	B	N
		Los Coyotes Diagonal	I-405 SB Loop On-Ramp	None	0.14	--	--	0.13	--	--	0.16	--	--	0.17	--	--	0.31	--	--	0.20	--	--	--	0.18	--	--	0.18	--	--	0.33	--	--	0.21	--	--	--
	16	Willow Street	Los Coyotes Diagonal	Sig	0.72	51.5	D	**0.74**	**102.8**	**F**	0.78	44.4	D	1.02	35.1	D	0.86	30.7	C	1.09	44.1	D	N	0.87	48.8	D	1.18	45.4	D	0.86	46.1	D	**1.17**	**71.7**	**E**	N
Woodruff Avenue at I-405	17	Willow Street	Woodruff Avenue	Sig	**1.07**	**86.8**	**F**	0.77	30.4	C	**1.33**	**147.9**	**F**	0.87	40.4	D	**1.22**	**136.3**	**F**	0.77	37.4	D	N	**1.44**	**180.5**	**F**	0.94	51.5	D	**1.38**	**167.9**	**F**	**0.85**	**64.1**	**E**	N
	18	I-405 NB Direct Off-Ramp	Woodruff Avenue	None	0.15	--	--	0.17	--	--	0.39	--	--	0.19	--	--	0.44	--	--	0.23	--	--	--	0.42	--	--	0.20	--	--	0.47	--	--	0.25	--	--	--
		I-405 NB Direct On-Ramp	Woodruff Avenue	None	0.25	--	--	0.20	--	--	0.31	--	--	0.21	--	--	0.29	--	--	0.21	--	--	--	0.34	--	--	0.23	--	--	0.31	--	--	0.23	--	--	--
	19	I-405 SB Direct Off-Ramp	Woodruff Avenue	None	0.48	--	--	0.38	--	--	0.52	--	--	0.47	--	--	0.51	--	--	0.46	--	--	--	0.56	--	--	0.51	--	--	0.55	--	--	0.50	--	--	--
		I-405 SB Direct On-Ramp	Woodruff Avenue	None	0.27	--	--	0.19	--	--	0.41	--	--	0.23	--	--	0.44	--	--	0.26	--	--	--	0.45	--	--	0.25	--	--	0.47	--	--	0.28	--	--	--
Palo Verde Avenue/ Stearns Street at I-405	20	I-405 NB Direct Off-Ramp	Palo Verde Avenue	Sig	0.54	11.3	B	0.45	13.7	B	0.78	17.7	B	0.61	11.8	B	0.69	15.3	B	0.59	11.8	B	N	0.95	21.2	C	0.70	12.6	B	0.82	17.4	B	0.72	13.3	B	N
		I-405 NB Loop On-Ramp	Palo Verde Avenue	None	0.11	--	--	0.20	--	--	0.13	--	--	0.22	--	--	0.10	--	--	0.19	--	--	--	0.14	--	--	0.23	--	--	0.11	--	--	0.20	--	--	--
	21	Woodruff Avenue	Palo Verde Avenue	Sig	**0.87**	**86.6**	**F**	0.59	21.3	C	0.84	13.6	B	0.66	10.3	B	0.82	13.8	B	0.70	11.3	B	N	0.91	15.9	B	0.72	11.3	B	0.89	15.9	B	0.76	12.1	B	N
	22	Stearns Street	Palo Verde Avenue	Sig	0.73	19.4	B	0.75	25.2	C	0.86	18.9	B	0.83	20.5	C	0.83	17.9	B	0.83	20.2	C	N	0.94	22.0	C	0.92	24.4	C	0.91	20.3	C	0.92	23.9	C	N
	23	Stearns Street	I-405 SB Direct On-Ramp	None	0.28	--	--	0.39	--	--	0.30	--	--	0.46	--	--	0.29	--	--	0.40	--	--	--	0.33	--	--	0.50	--	--	0.31	--	--	0.43	--	--	--

Table 3-11: Years 2020 and 2040 Peak-Hour Intersections LOS and Adverse Effect Determination after Traffic Measures for Alternative 2

Interchange Location	Intersection #	Intersection Location		Traffic Control	Year 2009						Year 2020													Year 2040												
					Existing Traffic						No Build Traffic on No Build Geometry						Alternative 2 Traffic on Alternative 2 Geometry including Traffic Measures						No Build-Alternative 2 Adverse Effect	No Build Traffic on No Build Geometry						Alternative 2 Traffic on Alternative 2 Geometry including Traffic Measures						No Build-Alternative 2 Adverse Effect
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			
		East/West Street	North/South Street		V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS		D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	
Studebaker Road at I-405	24	I-405 NB Direct On-Ramp	Studebaker Road	Sig	0.50	4.0	A	0.55	4.3	A	0.51	2.6	A	0.47	4.7	A	0.54	3.3	A	0.52	2.7	A	N	0.55	2.8	A	0.51	4.9	A	0.58	3.6	A	0.56	2.8	A	N
	25	I-405 SB Direct Off-Ramp	Studebaker Road	Stop	0.15	13.8	B	0.04	10.8	B	**0.86**	**68.4**	**F**	0.34	16.2	C	**0.90**	**61.5**	**F**	0.61	31.4	D	N	**1.02**	**98.3**	**F**	0.33	15.7	C	**1.04**	**81.3**	**F**	0.65	33.1	D	N
				*Sig**	*N/A*						*0.65*	*8.4*	*A*	*0.66*	*5.8*	*A*	*0.65*	*8.9*	*A*	*0.65*	*6.1*	*A*		*0.71*	*9.1*	*A*	*0.72*	*7.0*	*A*	*0.71*	*9.7*	*A*	*0.72*	*7.0*	*A*	
	26	Atherton Street	Studebaker Road	Sig	0.46	9.2	A	0.74	23.3	C	0.54	9.3	A	0.78	13.8	B	0.59	8.5	A	0.79	15.0	B	N	0.60	10.7	B	0.85	15.7	B	0.65	9.5	A	0.86	17.1	B	N
Studebaker Road at SR-22/7th Street	27	SR-22 WB On-/Off-Ramp	Studebaker Road	Sig	0.49	16.0	B	0.74	22.1	C	0.46	12.8	B	0.79	28.0	C	0.49	13.0	B	0.83	28.9	C	N	0.50	13.1	B	0.86	30.4	C	0.54	13.4	B	0.89	31.8	C	N
	28	SR-22 EB On-/Off-Ramp	Studebaker Road	Sig	0.72	17.6	B	0.82	17.1	B	0.91	21.3	C	0.93	25.8	C	0.97	30.9	C	0.98	30.1	C	N	0.99	30.4	C	1.03	37.1	D	1.06	45.2	D	1.09	43.9	D	N
	29	SR-22 WB On-/Off-Ramp	College Park Drive	Stop	0.39	18.8	C	**0.65**	**59.9**	**F**	N/A						N/A						N	N/A						N/A						N
				*Sig**	**N/A**						0.65	14.1	B	**1.07**	**110.1**	**F**	0.46	10.8	B	0.73	12.5	B		0.71	15.5	B	**1.16**	**147.2**	**F**	0.48	12.6	B	0.70	30.1	C	
7th Street	30	7th Street	Pacific Coast Highway	Sig	**0.95**	**92.9**	**F**	**1.03**	**82.6**	**F**	0.94	49.2	D	0.95	35.9	D	0.94	37.9	D	0.96	39.4	D	N	**1.02**	**65.8**	**E**	**1.03**	**58.7**	**E**	1.02	42.9	D	1.04	48.5	D	N
	31	7th Street	Bellflower Boulevard	Sig	**1.01**	**73.6**	**E**	**0.91**	**90.3**	**F**	**1.04**	**68.9**	**E**	0.98	47.9	D	0.93	32.9	C	0.87	32.8	C	N	**1.13**	**82.4**	**F**	**1.06**	**63.0**	**E**	1.01	42.8	D	0.95	39.3	D	N
	32	Pacific Coast Highway	Bellflower Boulevard	Sig	0.47	22.3	C	0.73	22.5	C	0.53	38.8	D	0.70	20.4	C	0.54	34.3	C	0.58	25.7	C	N	0.57	39.1	D	0.82	32.1	C	0.58	36.7	D	0.63	30.9	C	N
	33	7th Street	Channel Drive	Sig	0.72	32.9	C	0.88	30.3	C	0.71	24.5	C	0.94	22.7	C	0.75	10.0	B	0.82	15.2	B	N	0.77	25.7	C	1.02	50.8	D	0.81	14.1	B	0.88	18.8	B	N
	34	7th Street	W. Campus Drive	Sig	**0.83**	**112.9**	**F**	0.72	31.1	C	0.79	31.2	C	0.81	32.0	C	0.76	15.3	B	0.78	35.0	C	N	0.85	53.1	D	**0.87**	**58.5**	**E**	0.77	7.8	A	0.83	8.3	A	N
	35	7th Street	E. Campus Drive	Sig	0.97	23.1	C	0.73	24.7	C	1.03	35.8	D	0.87	14.6	B	1.02	35.6	D	0.88	16.3	B	N	**1.12**	**55.8**	**E**	0.96	16.7	B	1.11	51.8	D	0.97	25.8	C	N
	36	7th Street	Park Avenue	Sig	0.68	12.2	B	0.74	15.7	B	0.69	14.8	B	0.81	19.2	B	0.71	15.8	B	0.81	19.2	B	N	0.82	17.1	B	0.86	23.7	C	0.77	18.0	B	0.86	23.4	C	N

Notes:

1. LOS – Level of Service; V/C – Volume-to- Capacity Ratio; D/C – Demand Volume-to-Capacity Ratio
2. * = Intersection is not signalized under existing or No Build conditions.
   - At the I-405 SB Direct Off-Ramp intersection with Studebaker Road, the signalized row is included only to determine if there is an adverse effect at the intersection. If a stop-controlled intersection has an LOS E or F under future conditions, then the intersection is reanalyzed as a signalized intersection to identify any adverse effects, because stop-controlled analysis does not provide an overall intersection metric.
   - The proposed traffic measure includes installation of a signal at the SR-22 WB On-/Off-Ramp intersection with College Park Drive. To determine if the measure addresses the adverse effect, a comparison is made between the proposed signalized intersection and the no-build condition assuming a traffic signal. The traffic signal is assumed for the no-build condition because stop-controlled analysis does not provide an overall intersection metric to determine if the adverse effect at the intersection has been addressed.
3. Bold indicates an intersection forecast to operate at LOS E or F.
4. Shaded cells indicate an adverse effect.
5. -- = LOS and average delay are not calculated for intersections without traffic control. The adverse effect determination applies only to controlled intersections.
6. Intersection numbers correspond to the intersection numbers shown on the intersection traffic volumes figures.
7. For future conditions, the D/C ratio is used instead of the V/C ratio.

the I-405 freeway mainline is anticipated to operate at LOS F in both directions. The range of v/c ratios in the GP lanes of the I-405 freeway mainline during the AM peak hour is **1.03 to 1.33** and **1.11 to 1.53** during the PM peak hour.

The I-605 mainline is anticipated to operate at LOS D in the AM peak hour in the northbound direction and LOS F in the southbound direction in 2040. In the PM peak hour, the I-605 freeway mainline is anticipated to operate at LOS D in the northbound direction and LOS F in the southbound direction. The v/c ratios in the GP lanes of the I-605 freeway mainline during the AM peak hour are **0.84** in the northbound direction and **1.13** in the southbound direction. During the PM peak hour, the v/c ratios are **0.95** in the northbound direction and **1.11** in the southbound direction.

The SR-22/7th Street freeway mainline is anticipated to operate at LOS E in both directions during the AM peak hour in 2040. In the PM peak hour, the SR-22/7th Street freeway mainline is anticipated to operate at LOS D in the eastbound direction and LOS F in the westbound direction. The v/c ratios in the GP lanes of the SR-22/7th Street freeway mainline during the AM peak hour are **1.12** in the eastbound direction and **1.11** in the westbound direction. During the PM peak hour, the v/c ratios are **0.96** in the eastbound direction and **1.31** in the westbound direction.

Table 3-7 presents the v/c ratios for peak hours of Alternative 3 in 2040 for the HOV (carpool) lanes. The range of v/c ratios in the HOV lanes during the AM peak hour is **0.88 to 1.21** and **0.82 to 1.34** during the PM peak hour.

A more-detailed link-by-link presentation of Alternative 3 traffic conditions in 2020 and 2040 for GP and HOV lanes is included in Appendix B.1.

Freeway Connector Volumes

Tables 3-4 and 3-8, respectively, provide the 2020 and 2040 forecast for Alternative 3, respectively, of branch connector volumes and v/c ratios on ramps within the I-405/I-605/SR-22/ 7th Street interchange not presented in the Draft EIR/EIS. Branch connectors are forecast to operate with v/c ratios ranging from **0.24 to 1.12** in 2020 and from **0.26 to 1.12** in 2040 under Alternative 3. The branch connector from I-605 southbound/I-405 southbound to 7th Street is anticipated to operate with a v/c ratio in excess of 1.00 in 2040 during the AM peak hour.

In no instance would additional lanes on branch connectors be feasible. Ramp metering was considered as a means to improve connector operations, but it was not included in the project because it would further reduce the capacity of the branch connectors.

Arterials, Intersections, and Interchanges

Alternative 3 AM and PM peak-hour traffic volumes for arterial and interchange study locations within the study area in 2020 and 2040 are illustrated in Figures 3-17 and 3-21, respectively. A summary of the LOS analysis and v/c ratios for AM and PM peak hours for 2020 Alternative 3 conditions is provided in Table 3-12 for all of the study intersections. Alternative 3 conditions appear in Table 3-12 under the "Alternative 3 Traffic on No Build Geometry" heading, where forecast Alternative 3 traffic is evaluated on no-build lanes and traffic control. In Table 3-12 for 2020 under Alternative 3, the study intersections are anticipated to operate at LOS D or better, except for six intersections (as shown in bold) that are anticipated to operate at LOS E or F during either the AM or PM peak hour or both. These six intersections include the four intersections that are anticipated to operate at LOS E or F under no-build conditions in 2020.

Table 3-12 shows that the study intersections are anticipated to operate under capacity (i.e., v/c less than or equal to 1.00) in 2020 under Alternative 3 during peak hours, except for seven intersections that are anticipated to operate over capacity during either the AM or PM peak hour or both. These seven intersections include the five intersections that are anticipated to operate over capacity under the no-build condition in 2020.

A summary of the LOS analysis and v/c ratios for AM and PM peak hours for 2040 Alternative 3 conditions is provided in Table 3-12 for all of the study intersections. In Table 3-12 for 2040 under Alternative 3, the study intersections are anticipated to operate at LOS D or better, except for 10 intersections (as shown in bold) that are anticipated to operate at LOS E or F during either the AM or PM peak hour or both. Nine of these 10 intersections are anticipated to operate at LOS E or F under no-build conditions in 2040.

Table 3-12 shows that the study intersections are anticipated to operate under capacity (i.e., v/c less than or equal to 1.00) in 2040 under Alternative 3 during peak hours, except for 12 intersections that are anticipated to operate over capacity during either the AM or PM peak hour or both. These 12 intersections include the 10 intersections that are anticipated to operate over capacity under the no-build condition in 2040.

As highlighted in Table 3-12, the project contributions to adverse cumulative effects on the following seven study intersections under Alternative 3 in 2040 are discussed below:

- Willow Street and Bellflower Boulevard (2040 PM peak hour under No Build Alternative projected D/C ratio is 1.09 with LOS E and under Alternative 3 projected D/C ratio is 1.25 with LOS F)

Table 3-12: Years 2020 and 2040 Peak-Hour Intersections LOS and Adverse Effect Determination for Alternative 3

Interchange Location	Intersection #	Intersection Location		Traffic Control	Year 2009						Year 2020													Year 2040												
					Existing Traffic						No Build Traffic on No Build Geometry						Alternative 3 Traffic on No Build Geometry						No Build-Alternative 3 Adverse Effect	No Build Traffic on No Build Geometry						Alternative 3 Traffic on No Build Geometry						No Build-Alternative 3 Adverse Effect
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			
		East/West Street	North/South Street		V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS		D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	
Carson Street at I-605	1	Carson Street	I-605 SB Off-Ramp	Sig	0.58	21.9	C	0.61	17.8	B	0.57	22.3	C	0.68	23.8	C	0.64	11.1	B	0.74	13.0	B	N	0.62	22.4	C	0.73	24.5	C	0.69	11.7	B	0.80	14.1	B	N
	2	Carson Street	I-605 SB Direct On-Ramp	None	0.15	--	--	0.25	--	--	0.22	--	--	0.33	--	--	0.24	--	--	0.32	--	--	--	0.24	--	--	0.36	--	--	0.26	--	--	0.34	--	--	--
		Carson Street	I-605 SB Loop On-Ramp	None	0.24	--	--	0.20	--	--	0.33	--	--	0.33	--	--	0.33	--	--	0.37	--	--	--	0.35	--	--	0.36	--	--	0.36	--	--	0.39	--	--	--
	3	Carson Street	I-605 NB Off-Ramp	Sig	0.55	14.8	B	0.66	12.4	B	0.59	21.8	C	0.76	20.6	C	0.61	20.9	C	0.75	17.6	B	N	0.63	23.6	C	0.82	23.2	C	0.66	22.9	C	0.81	19.4	B	N
		Carson Street	I-605 NB Loop On-Ramp	None	0.23	--	--	0.45	--	--	0.31	--	--	0.35	--	--	0.28	--	--	0.30	--	--	--	0.33	--	--	0.37	--	--	0.31	--	--	0.33	--	--	--
		Carson Street	I-605 NB Direct On-Ramp	None	0.40	--	--	0.32	--	--	0.52	--	--	0.49	--	--	0.51	--	--	0.46	--	--	--	0.56	--	--	0.53	--	--	0.55	--	--	0.49	--	--	--
	4	Carson Street	Pioneer Boulevard	Sig	0.76	48.1	D	0.76	35.1	D	0.79	31.1	C	0.84	33.7	C	0.76	31.7	C	0.83	31.8	C	N	0.86	35.1	D	0.92	43.9	D	0.84	37.3	D	0.92	44.5	D	N
Spring Street/ Cerritos Avenue at I-605	5	Spring Street/Cerritos Avenue	I-605 SB Off-Ramp	Sig	0.79	26.2	C	0.60	18.4	B	0.68	14.2	B	0.65	10.9	B	0.70	14.4	B	0.60	9.8	A	N	0.74	15.4	B	0.71	12.0	B	0.75	15.5	B	0.64	10.7	B	N
	6	Spring Street/Cerritos Avenue	I-605 NB On-Ramp	Sig	0.84	13.5	B	0.81	11.1	B	0.76	10.5	B	0.79	8.2	A	0.74	6.1	A	0.75	4.9	A	N	0.82	11.6	B	0.86	9.8	A	0.80	7.1	A	0.81	6.0	A	N
Lakewood Boulevard/ Willow Street at I-405	7	I-405 NB Direct Off-Ramp	Lakewood Boulevard	None	0.35	--	--	0.34	--	--	0.38	--	--	0.38	--	--	0.44	--	--	0.43	--	--	--	0.41	--	--	0.41	--	--	0.47	--	--	0.46	--	--	--
		I-405 NB Direct On-Ramp	Lakewood Boulevard	None	0.22	--	--	0.21	--	--	0.38	--	--	0.23	--	--	0.38	--	--	0.23	--	--	--	0.41	--	--	0.25	--	--	0.41	--	--	0.25	--	--	--
		I-405 NB Loop Off-Ramp	Lakewood Boulevard	None	0.19	--	--	0.18	--	--	0.23	--	--	0.22	--	--	0.28	--	--	0.26	--	--	--	0.25	--	--	0.23	--	--	0.30	--	--	0.28	--	--	--
		I-405 NB Loop On-Ramp	Lakewood Boulevard	None	0.50	--	--	0.38	--	--	0.53	--	--	0.41	--	--	0.52	--	--	0.41	--	--	--	0.57	--	--	0.44	--	--	0.57	--	--	0.45	--	--	--
	8	I-405 SB Loop On-Ramp	Lakewood Boulevard	None	0.19	--	--	0.23	--	--	0.22	--	--	0.25	--	--	0.23	--	--	0.27	--	--	--	0.24	--	--	0.27	--	--	0.25	--	--	0.29	--	--	--
		I-405 SB Direct Off-Ramp	Lakewood Boulevard	None	0.40	--	--	0.31	--	--	0.43	--	--	0.48	--	--	0.44	--	--	0.46	--	--	--	0.46	--	--	0.52	--	--	0.48	--	--	0.50	--	--	--
	9	Willow Street	Lakewood Boulevard	Sig	0.76	31.1	C	**0.92**	**66.2**	**E**	0.75	31.2	C	0.89	43.0	D	0.72	31.1	C	0.96	44.3	D	N	0.81	33.6	C	0.93	48.4	D	0.77	32.4	C	1.02	52.0	D	N
	10	Willow Street	I-405 SB Loop Off-Ramp	None	0.32	--	--	0.30	--	--	0.35	--	--	0.46	--	--	0.36	--	--	0.45	--	--	--	0.37	--	--	0.50	--	--	0.38	--	--	0.49	--	--	--
		Willow Street	I-405 SB Direct On-Ramp	None	0.26	--	--	0.38	--	--	0.28	--	--	0.41	--	--	0.30	--	--	0.43	--	--	--	0.31	--	--	0.44	--	--	0.33	--	--	0.46	--	--	--
Bellflower Boulevard/ Los Coyotes Diagonal at I-405	11	I-405 NB Off-Ramp	Bellflower Boulevard	Sig	0.41	9.3	A	0.48	11.9	B	0.51	10.8	B	0.53	10.6	B	0.41	9.1	A	0.53	11.1	B	N	0.55	11.6	B	0.58	11.3	B	0.45	9.7	A	0.58	11.7	B	N
		I-405 NB Loop On-Ramp	Bellflower Boulevard	None	0.49	--	--	0.35	--	--	0.53	--	--	0.37	--	--	0.54	--	--	0.36	--	--	--	0.57	--	--	0.40	--	--	0.59	--	--	0.39	--	--	--
		I-405 NB Direct On-Ramp	Bellflower Boulevard	None	0.28	--	--	0.18	--	--	0.31	--	--	0.19	--	--	0.32	--	--	0.18	--	--	--	0.33	--	--	0.20	--	--	0.34	--	--	0.19	--	--	--
	12	Willow Street	Bellflower Boulevard	Sig	**0.84**	**81.2**	**F**	0.92	40.1	D	1.01	48.8	D	1.01	54.4	D	0.86	32.9	C	**1.15**	**76.5**	**E**	Y	**1.09**	**67.3**	**E**	**1.09**	**70.6**	**E**	0.93	37.7	D	**1.25**	**105.9**	**F**	Y
	13	Los Coyotes Diagonal	Bellflower Boulevard	Sig	0.63	31.3	C	**0.97**	**72.8**	**E**	0.65	26.4	C	1.00	42.1	D	0.64	25.8	C	1.12	50.2	D	N	0.70	26.9	C	**1.13**	**56.8**	**E**	0.69	26.0	C	**1.22**	**65.5**	**E**	Y
		Los Coyotes Diagonal	I-405 SB Direct On-Ramp	None	0.06	--	--	0.09	--	--	0.06	--	--	0.12	--	--	0.09	--	--	0.12	--	--	--	0.07	--	--	0.13	--	--	0.09	--	--	0.13	--	--	--
	14	I-405 SB Loop Off-Ramp	Bellflower Boulevard	None	0.12	--	--	0.26	--	--	0.12	--	--	0.32	--	--	0.12	--	--	0.37	--	--	--	0.13	--	--	0.34	--	--	0.13	--	--	0.40	--	--	--
	15	Los Coyotes Diagonal	I-405 SB Direct Off-Ramp	Sig	0.44	14.4	B	0.45	13.4	B	0.52	10.0	B	0.47	16.0	B	0.53	10.2	B	0.52	9.8	A	N	0.56	10.6	B	0.51	16.8	B	0.58	11.4	B	0.56	10.2	B	N
		Los Coyotes Diagonal	I-405 SB Loop On-Ramp	None	0.14	--	--	0.13	--	--	0.16	--	--	0.17	--	--	0.32	--	--	0.17	--	--	--	0.18	--	--	0.18	--	--	0.35	--	--	0.19	--	--	--
	16	Willow Street	Los Coyotes Diagonal	Sig	0.72	51.5	D	**0.74**	**102.8**	**F**	0.78	44.4	D	1.02	35.1	D	0.75	40.9	D	**1.26**	**66.5**	**E**	Y	0.87	48.8	D	1.18	45.4	D	0.86	42.0	D	**1.41**	**92.7**	**F**	Y
Woodruff Avenue at I-405	17	Willow Street	Woodruff Avenue	Sig	**1.07**	**86.8**	**F**	0.77	30.4	C	**1.33**	**147.9**	**F**	0.87	40.4	D	**1.30**	**137.0**	**F**	0.87	37.1	D	N	**1.44**	**180.5**	**F**	0.94	51.5	D	**1.40**	**166.5**	**F**	0.88	42.2	D	N
	18	I-405 NB Direct Off-Ramp	Woodruff Avenue	None	0.15	--	--	0.17	--	--	0.39	--	--	0.19	--	--	0.40	--	--	0.22	--	--	--	0.42	--	--	0.20	--	--	0.43	--	--	0.24	--	--	--
		I-405 NB Direct On-Ramp	Woodruff Avenue	None	0.25	--	--	0.20	--	--	0.31	--	--	0.21	--	--	0.31	--	--	0.22	--	--	--	0.34	--	--	0.23	--	--	0.34	--	--	0.23	--	--	--
	19	I-405 SB Direct Off-Ramp	Woodruff Avenue	None	0.48	--	--	0.38	--	--	0.52	--	--	0.47	--	--	0.52	--	--	0.41	--	--	--	0.56	--	--	0.51	--	--	0.56	--	--	0.45	--	--	--
		I-405 SB Direct On-Ramp	Woodruff Avenue	None	0.27	--	--	0.19	--	--	0.41	--	--	0.23	--	--	0.43	--	--	0.24	--	--	--	0.45	--	--	0.25	--	--	0.46	--	--	0.26	--	--	--
Palo Verde Avenue / Stearns Street at I-405	20	I-405 NB Direct Off-Ramp	Palo Verde Avenue	Sig	0.54	11.3	B	0.45	13.7	B	0.78	17.7	B	0.61	11.8	B	0.84	17.0	B	0.69	11.8	B	N	0.95	21.2	C	0.70	12.6	B	1.02	22.9	C	0.80	14.0	B	N
		I-405 NB Loop On-Ramp	Palo Verde Avenue	None	0.11	--	--	0.20	--	--	0.13	--	--	0.22	--	--	0.14	--	--	0.22	--	--	--	0.14	--	--	0.23	--	--	0.15	--	--	0.23	--	--	--
	21	Woodruff Avenue	Palo Verde Avenue	Sig	**0.87**	**86.6**	**F**	0.59	21.3	C	0.84	13.6	B	0.66	10.3	B	0.84	13.8	B	0.69	9.7	A	N	0.91	15.9	B	0.72	11.3	B	0.92	16.9	B	0.75	10.3	B	N
	22	Stearns Street	Palo Verde Avenue	Sig	0.73	19.4	B	0.75	25.2	C	0.86	18.9	B	0.83	20.5	C	0.94	22.1	C	0.92	22.9	C	N	0.94	22.0	C	0.92	24.4	C	1.02	30.8	C	1.02	29.9	C	N
	23	Stearns Street	I-405 SB Direct On-Ramp	None	0.28	--	--	0.39	--	--	0.30	--	--	0.46	--	--	0.35	--	--	0.46	--	--	--	0.33	--	--	0.50	--	--	0.38	--	--	0.50	--	--	--

Table 3-12: Years 2020 and 2040 Peak-Hour Intersections LOS and Adverse Effect Determination for Alternative 3

Interchange Location	Intersection #	Intersection Location: East/West Street	Intersection Location: North/South Street	Traffic Control	Year 2009 Existing Traffic AM Peak Hour V/C	Year 2009 Existing Traffic AM Peak Hour Avg Delay (sec)	Year 2009 Existing Traffic AM Peak Hour LOS	Year 2009 Existing Traffic PM Peak Hour V/C	Year 2009 Existing Traffic PM Peak Hour Avg Delay (sec)	Year 2009 Existing Traffic PM Peak Hour LOS	Year 2020 No Build Traffic on No Build Geometry AM Peak Hour D/C	Year 2020 No Build Traffic on No Build Geometry AM Peak Hour Avg Delay (sec)	Year 2020 No Build Traffic on No Build Geometry AM Peak Hour LOS	Year 2020 No Build Traffic on No Build Geometry PM Peak Hour D/C	Year 2020 No Build Traffic on No Build Geometry PM Peak Hour Avg Delay (sec)	Year 2020 No Build Traffic on No Build Geometry PM Peak Hour LOS	Year 2020 Alternative 3 Traffic on No Build Geometry AM Peak Hour D/C	Year 2020 Alternative 3 Traffic on No Build Geometry AM Peak Hour Avg Delay (sec)	Year 2020 Alternative 3 Traffic on No Build Geometry AM Peak Hour LOS	Year 2020 Alternative 3 Traffic on No Build Geometry PM Peak Hour D/C	Year 2020 Alternative 3 Traffic on No Build Geometry PM Peak Hour Avg Delay (sec)	Year 2020 Alternative 3 Traffic on No Build Geometry PM Peak Hour LOS	Year 2020 No Build-Alternative 3 Adverse Effect	Year 2040 No Build Traffic on No Build Geometry AM Peak Hour D/C	Year 2040 No Build Traffic on No Build Geometry AM Peak Hour Avg Delay (sec)	Year 2040 No Build Traffic on No Build Geometry AM Peak Hour LOS	Year 2040 No Build Traffic on No Build Geometry PM Peak Hour D/C	Year 2040 No Build Traffic on No Build Geometry PM Peak Hour Avg Delay (sec)	Year 2040 No Build Traffic on No Build Geometry PM Peak Hour LOS	Year 2040 Alternative 3 Traffic on No Build Geometry AM Peak Hour D/C	Year 2040 Alternative 3 Traffic on No Build Geometry AM Peak Hour Avg Delay (sec)	Year 2040 Alternative 3 Traffic on No Build Geometry AM Peak Hour LOS	Year 2040 Alternative 3 Traffic on No Build Geometry PM Peak Hour D/C	Year 2040 Alternative 3 Traffic on No Build Geometry PM Peak Hour Avg Delay (sec)	Year 2040 Alternative 3 Traffic on No Build Geometry PM Peak Hour LOS	Year 2040 No Build-Alternative 3 Adverse Effect
Studebaker Road at I-405	24	I-405 NB Direct On-Ramp	Studebaker Road	Sig	0.50	4.0	A	0.55	4.3	A	0.51	2.6	A	0.47	4.7	A	0.63	4.1	A	0.52	4.0	A	N	0.55	2.8	A	0.51	4.9	A	0.68	4.5	A	0.56	3.9	A	N
	25	I-405 SB Direct Off-Ramp	Studebaker Road	Stop	0.15	13.8	B	0.04	10.8	B	**0.86**	**68.4**	**F**	0.34	16.2	C	**1.04**	**80.0**	**F**	0.44	20.4	C	N	**1.02**	**98.3**	**F**	0.33	15.7	C	**1.20**	**116.8**	**F**	0.45	20.1	C	N
				*Sig**	*N/A*						*0.65*	*8.4*	*A*	*0.66*	*5.8*	*A*	*0.69*	*9.3*	*A*	*0.67*	*4.6*	*A*		*0.71*	*9.1*	*A*	*0.72*	*7.0*	*A*	*0.74*	*7.0*	*A*	*0.73*	*5.5*	*A*	
	26	Atherton St	Studebaker Road	Sig	0.46	9.2	A	0.74	23.3	C	0.54	9.3	A	0.78	13.8	B	0.57	8.8	A	0.81	14.6	B	N	0.60	10.7	B	0.85	15.7	B	0.62	9.7	A	0.88	17.1	B	N
Studebaker Road at SR-22/ 7th Street	27	SR-22 WB On-/Off-Ramp	Studebaker Road	Sig	0.49	16.0	B	0.74	22.1	C	0.46	12.8	B	0.79	28.0	C	0.51	12.8	B	0.87	30.2	C	N	0.50	13.1	B	0.86	30.4	C	0.55	13.2	B	0.94	35.2	D	N
	28	SR-22 EB On-/Off-Ramp	Studebaker Road	Sig	0.72	17.6	B	0.82	17.1	B	0.91	21.3	C	0.93	25.8	C	0.93	25.8	C	0.97	29.0	C	N	0.99	30.4	C	1.03	37.1	D	1.02	37.5	D	1.10	44.4	D	N
	29	SR-22 WB On-/Off-Ramp	College Park Drive	Stop	0.39	18.8	C	**0.65**	**59.9**	**F**	0.43	21.3	C	**0.61**	**88.7**	**F**	0.12	19.7	C	**0.32**	**92.6**	**F**	N	0.51	25.3	D	**0.84**	**152.1**	**F**	0.15	22.8	C	**0.45**	**158.2**	**F**	N
				*Sig**	*N/A*						*0.65*	*14.1*	*B*	***1.07****	***110.1***	***F****	*0.61*	*12.1*	*B*	***1.08****	***125.8***	***F****		*0.71*	*15.5*	*B*	***1.16****	***147.2***	***F****	*0.66*	*13.3*	*B*	***1.17****	***88.0***	***F****	
7th Street	30	7th Street	Pacific Coast Highway	Sig	**0.95**	**92.9**	**F**	**1.03**	**82.6**	**F**	0.94	49.2	D	0.95	35.9	D	0.92	35.7	D	0.96	36.9	D	N	**1.02**	**65.8**	**E**	**1.03**	**58.7**	**E**	**1.04**	**55.9**	**E**	1.04	49.7	D	Y
	31	7th Street	Bellflower Boulevard	Sig	**1.01**	**73.6**	**E**	**0.91**	**90.3**	**F**	**1.04**	**68.9**	**E**	0.98	47.9	D	**1.09**	**66.4**	**E**	1.01	49.6	D	Y	**1.13**	**82.4**	**F**	**1.06**	**63.0**	**E**	**1.17**	**72.3**	**E**	**1.10**	**57.0**	**E**	Y
	32	Pacific Coast Highway	Bellflower Boulevard	Sig	0.47	22.3	C	0.73	22.5	C	0.53	38.8	D	0.70	20.4	C	0.54	30.2	C	0.75	22.1	C	N	0.57	39.1	D	0.82	32.1	C	0.58	26.9	C	0.88	26.8	C	N
	33	7th Street	Channel Drive	Sig	0.72	32.9	C	0.88	30.3	C	0.71	24.5	C	0.94	22.7	C	0.75	8.2	A	0.95	25.4	C	N	0.77	25.7	C	1.02	50.8	D	0.77	10.2	B	1.04	39.1	D	N
	34	7th Street	W. Campus Drive	Sig	**0.83**	**112.9**	**F**	0.72	31.1	C	0.79	31.2	C	0.81	32.0	C	0.80	34.6	C	0.86	47.4	D	N	0.85	53.1	D	**0.87**	**58.5**	**E**	**0.87**	**60.0**	**E**	**0.93**	**71.3**	**E**	Y
	35	7th Street	E. Campus Drive	Sig	0.97	23.1	C	0.73	24.7	C	1.03	35.8	D	0.87	14.6	B	1.05	45.2	D	0.90	16.0	B	N	**1.12**	**55.8**	**E**	0.96	16.7	B	**1.14**	**59.3**	**E**	0.99	18.9	B	Y
	36	7th Street	Park Avenue	Sig	0.68	12.2	B	0.74	15.7	B	0.69	14.8	B	0.81	19.2	B	0.77	15.1	B	0.85	21.6	C	N	0.82	17.1	B	0.86	23.7	C	0.84	17.5	B	0.85	27.6	C	N

Notes:

1. LOS – Level of Service; V/C – Volume-to- Capacity Ratio; D/C – Demand Volume-to-Capacity Ratio; N/A – Not Applicable (see Note 2)
2. * = Intersection is not signalized under existing or No Build conditions. The signalized row is included only to determine if there is an adverse effect at the intersection. If a stop-controlled intersection has an LOS E or F under future conditions, then the intersection is reanalyzed as a signalized intersection to identify any adverse effects, because stop-controlled analysis does not provide an overall intersection metric. The number of LOS E or F locations and the number of locations with V/C or D/C greater than 1.00 identified in the text does not include the signalized row because the existing and no-build operation is based on the current stop control.
3. Bold indicates an intersection forecast to operate at LOS E or F.
4. Shaded cells indicate an adverse effect.
5. -- = LOS and average delay are not calculated for intersections without traffic control. The adverse effect determination applies only to controlled intersections.
6. Intersection numbers correspond to the intersection numbers shown on the intersection traffic volumes figures.
7. For future conditions, the D/C ratio is used instead of the V/C ratio.

- Los Coyotes Diagonal and Bellflower Boulevard (2040 PM peak hour under No Build Alternative projected D/C ratio is 1.13 with LOS E and under Alternative 3 projected D/C ratio is 1.22 with LOS E)
- Willow Street and Los Coyotes Diagonal (2040 PM peak hour under No Build Alternative projected D/C ratio is 1.18 with LOS D and under Alternative 3 projected D/C ratio is 1.41 with LOS F)
- 7th Street and Pacific Coast Highway (2040 AM peak hour under No Build Alterative projected D/C ratio is 1.02 with LOS E and under Alternative 3 projected D/C ratio is 1.04 with LOS E)
- 7th Street and Bellflower Boulevard (2040 AM peak hour under No Build Alternative projected D/C ratio is 1.13 with LOS F and under Alternative 3 projected D/C ratio is 1.17 with LOS E; 2040 PM peak hour under No Build Alternative projected D/C ratio is 1.06 with LOS E and under Alternative 3 projected D/C ratio is 1.10 with LOS E)
- 7th Street and West Campus Drive (2040 AM peak hour under No Build Alternative projected D/C ratio is 0.85 with LOS D and under Alternative 3 projected D/C ratio is 0.87 with LOS E; 2040 PM peak hour under No Build Alternative projected D/C ratio is 0.87 with LOS E and under Alternative 3 projected D/C ratio is 0.93 with LOS E)
- 7th Street and East Campus Drive (2040 AM peak hour under No Build Alternative projected D/C ratio is 1.12 with LOS E and under Alternative 3 projected D/C ratio is 1.14 with LOS E)

Table 3-12 shows that the project would also contribute to adverse cumulative effects under Alternative 3 on the three study intersections listed below in 2020:

- Willow Street and Bellflower Boulevard
- Willow Street and Los Coyotes Diagonal
- 7th Street and Bellflower Boulevard

Measures to Lessen Traffic Impacts at Intersections

The measures listed in Section 3.1.3 of this Supplemental Draft EIR/EIS are proposed to address the project contributions to adverse cumulative effects at the intersections identified above.

Table 3-13 provides a summary of the LOS analysis and v/c ratios for all of the study intersections during AM and PM peak hours anticipated in 2020 under Alternative 3 with all improvements, including the proposed traffic measures identified in Section 3.1.3 of this Supplemental Draft EIR/EIS. LOS and v/c ratios with all improvements, including proposed traffic measures, appear in the table under the heading “Alternative 3 Traffic on Alternative 3 Geometry including Traffic Measures.” Table 3-13 shows that, with all improvements including

proposed traffic measures, Alternative 3 does not contribute to adverse cumulative effects on any study intersection in 2020.

Table 3-13 provides a summary of the LOS analysis and v/c ratios for all of the study intersections during AM and PM peak hours anticipated in 2040 under Alternative 3 with all improvements, including the proposed traffic measures identified in Section 3.1.3 of this Supplemental Draft EIR/EIS. Table 3-13 shows that, with all improvements including proposed traffic measures, Alternative 3 does not contribute to adverse cumulative effects on any study intersection in 2040.

No additional ROW is anticipated to implement the proposed measures. Noise and air quality impacts of construction would be temporary and not anticipated to be an adverse effect. It is anticipated that all of the proposed measures could be implemented without the necessity of closing travel lanes during weekday peak hours. It may be necessary to narrow lanes. Short-term off-peak, nighttime, and weekend lane closures may be necessary. As noted in the traffic measures listed in Section 3.1.3, the agencies implementing the measures would bear responsibility for necessary clearances and permits.

3.1.3 Avoidance, Minimization, and/or Mitigation Measures

Proposed traffic measures are presented below for each of the project contributions to adverse cumulative effects in Long Beach identified above. Figures illustrating recommended improvements are included in Appendix B.2. Tables 3-9, 3-11 and 3-13 present v/c and LOS information with proposed traffic measures under Alternatives 1, 2, and 3 conditions, respectively. The tables provide comparisons of the no-build conditions and the project condition with the proposed traffic measures. The tables show that there are no project contributions to adverse cumulative effects in Long Beach with implementation of the proposed traffic measures identified below.

The proposed measures include fair share contributions. The Orange County Transportation Authority (OCTA) is the project sponsor for the project. As the project sponsor, OCTA will provide a fair share amount of funding for the measures that have been identified as part of this Supplemental DEIR/EIS to address significant cumulative impacts to traffic. This funding will be provided to the City of Long Beach and to the State of California Department of Transportation.

Appendix B-3 presents the data on which the fair share contribution percentages are based. The project's fair share percentage is calculated for each of the intersections identified with an adverse cumulative effect for Alternatives 1, 2, and 3. The fair share percentage calculation is

Table 3-13: Years 2020 and 2040 Peak-Hour Intersections LOS and Adverse Effect Determination after Traffic Measures for Alternative 3

Interchange Location	Intersection #	Intersection Location		Traffic Control	Year 2009						Year 2020													Year 2040												
					Existing Traffic						No Build Traffic on No Build Geometry						Alternative 3 Traffic on Alternative 3 Geometry including Traffic Measures						No Build-Alternative 3 Adverse Effect	No Build Traffic on No Build Geometry						Alternative 3 Traffic on Alternative 3 Geometry including Traffic Measures						No Build-Alternative 3 Adverse Effect
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			
		East/West Street	North/South Street		V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS		D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	
Carson Street at I-605	1	Carson Street	I-605 SB Off-Ramp	Sig	0.58	21.9	C	0.61	17.8	B	0.57	22.3	C	0.68	23.8	C	0.64	11.1	B	0.74	13.0	B	N	0.62	22.4	C	0.73	24.5	C	0.69	11.7	B	0.80	14.1	B	N
	2	Carson Street	I-605 SB Direct On-Ramp	None	0.15	--	--	0.25	--	--	0.22	--	--	0.33	--	--	0.24	--	--	0.32	--	--	--	0.24	--	--	0.36	--	--	0.26	--	--	0.34	--	--	--
		Carson Street	I-605 SB Loop On-Ramp	None	0.24	--	--	0.20	--	--	0.33	--	--	0.33	--	--	0.33	--	--	0.37	--	--	--	0.35	--	--	0.36	--	--	0.36	--	--	0.39	--	--	--
	3	Carson Street	I-605 NB Off-Ramp	Sig	0.55	14.8	B	0.66	12.4	B	0.59	21.8	C	0.76	20.6	C	0.61	20.9	C	0.75	17.6	B	N	0.63	23.6	C	0.82	23.2	C	0.66	22.9	C	0.81	19.4	B	N
		Carson Street	I-605 NB Loop On-Ramp	None	0.23	--	--	0.45	--	--	0.31	--	--	0.35	--	--	0.28	--	--	0.30	--	--	--	0.33	--	--	0.37	--	--	0.31	--	--	0.33	--	--	--
		Carson Street	I-605 NB Direct On-Ramp	None	0.40	--	--	0.32	--	--	0.52	--	--	0.49	--	--	0.51	--	--	0.46	--	--	--	0.56	--	--	0.53	--	--	0.55	--	--	0.49	--	--	--
	4	Carson Street	Pioneer Boulevard	Sig	0.76	48.1	D	0.76	35.1	D	0.79	31.1	C	0.84	33.7	C	0.76	31.7	C	0.83	31.8	C	N	0.86	35.1	D	0.92	43.9	D	0.84	37.3	D	0.92	44.5	D	N
Spring Street/ Cerritos Avenue at I-605	5	Spring Street/Cerritos Avenue	I-605 SB Off-Ramp	Sig	0.79	26.2	C	0.60	18.4	B	0.68	14.2	B	0.65	10.9	B	0.70	14.4	B	0.60	9.8	A	N	0.74	15.4	B	0.71	12.0	B	0.75	15.5	B	0.64	10.7	B	N
	6	Spring Street/Cerritos Avenue	I-605 NB On-Ramp	Sig	0.84	13.5	B	0.81	11.1	B	0.76	10.5	B	0.79	8.2	A	0.74	6.1	A	0.75	4.9	A	N	0.82	11.6	B	0.86	9.8	A	0.80	7.1	A	0.81	6.0	A	N
Lakewood Boulevard/ Willow Street at I-405	7	I-405 NB Direct Off-Ramp	Lakewood Boulevard	None	0.35	--	--	0.34	--	--	0.38	--	--	0.38	--	--	0.44	--	--	0.43	--	--	--	0.41	--	--	0.41	--	--	0.47	--	--	0.46	--	--	--
		I-405 NB Direct On-Ramp	Lakewood Boulevard	None	0.22	--	--	0.21	--	--	0.38	--	--	0.23	--	--	0.38	--	--	0.23	--	--	--	0.41	--	--	0.25	--	--	0.41	--	--	0.25	--	--	--
		I-405 NB Loop Off-Ramp	Lakewood Boulevard	None	0.19	--	--	0.18	--	--	0.23	--	--	0.22	--	--	0.28	--	--	0.26	--	--	--	0.25	--	--	0.23	--	--	0.30	--	--	0.28	--	--	--
		I-405 NB Loop On-Ramp	Lakewood Boulevard	None	0.50	--	--	0.38	--	--	0.53	--	--	0.41	--	--	0.52	--	--	0.41	--	--	--	0.57	--	--	0.44	--	--	0.57	--	--	0.45	--	--	--
	8	I-405 SB Loop On-Ramp	Lakewood Boulevard	None	0.19	--	--	0.23	--	--	0.22	--	--	0.25	--	--	0.23	--	--	0.27	--	--	--	0.24	--	--	0.27	--	--	0.25	--	--	0.29	--	--	--
		I-405 SB Direct Off-Ramp	Lakewood Boulevard	None	0.40	--	--	0.31	--	--	0.43	--	--	0.48	--	--	0.44	--	--	0.46	--	--	--	0.46	--	--	0.52	--	--	0.48	--	--	0.50	--	--	--
	9	Willow Street	Lakewood Boulevard	Sig	0.76	31.1	C	**0.92**	**66.2**	**E**	0.75	31.2	C	0.89	43.0	D	0.72	31.1	C	0.96	44.3	D	N	0.81	33.6	C	0.93	48.4	D	0.77	32.4	C	1.02	52.0	D	N
	10	Willow Street	I-405 SB Loop Off-Ramp	None	0.32	--	--	0.30	--	--	0.35	--	--	0.46	--	--	0.36	--	--	0.45	--	--	--	0.37	--	--	0.50	--	--	0.38	--	--	0.49	--	--	--
		Willow Street	I-405 SB Direct On-Ramp	None	0.26	--	--	0.38	--	--	0.28	--	--	0.41	--	--	0.30	--	--	0.43	--	--	--	0.31	--	--	0.44	--	--	0.33	--	--	0.46	--	--	--
Bellflower Boulevard/ Los Coyotes Diagonal at I-405	11	I-405 NB Off-Ramp	Bellflower Boulevard	Sig	0.41	9.3	A	0.48	11.9	B	0.51	10.8	B	0.53	10.6	B	0.41	9.1	A	0.53	11.1	B	N	0.55	11.6	B	0.58	11.3	B	0.45	9.7	A	0.58	11.7	B	N
		I-405 NB Loop On-Ramp	Bellflower Boulevard	None	0.49	--	--	0.35	--	--	0.53	--	--	0.37	--	--	0.54	--	--	0.36	--	--	--	0.57	--	--	0.40	--	--	0.59	--	--	0.39	--	--	--
		I-405 NB Direct On-Ramp	Bellflower Boulevard	None	0.28	--	--	0.18	--	--	0.31	--	--	0.19	--	--	0.32	--	--	0.18	--	--	--	0.33	--	--	0.20	--	--	0.34	--	--	0.19	--	--	--
	12	Willow Street	Bellflower Boulevard	Sig	**0.84**	**81.2**	**F**	0.92	40.1	D	1.01	48.8	D	1.01	54.4	D	0.92	33.2	C	1.10	48.8	D	N	**1.09**	**67.3**	**E**	**1.09**	**70.6**	**E**	0.99	45.9	D	1.08	54.1	D	N
	13	Los Coyotes Diagonal	Bellflower Boulevard	Sig	0.63	31.3	C	**0.97**	**72.8**	**E**	0.65	26.4	C	1.00	42.1	D	0.64	25.8	C	1.12	50.2	D	N	0.70	26.9	C	**1.13**	**56.8**	**E**	0.70	22.8	C	1.10	53.5	D	N
		Los Coyotes Diagonal	I-405 SB Direct On-Ramp	None	0.06	--	--	0.09	--	--	0.06	--	--	0.12	--	--	0.09	--	--	0.12	--	--	--	0.07	--	--	0.13	--	--	0.09	--	--	0.13	--	--	--
	14	I-405 SB Loop Off-Ramp	Bellflower Boulevard	None	0.12	--	--	0.26	--	--	0.12	--	--	0.32	--	--	0.12	--	--	0.37	--	--	--	0.13	--	--	0.34	--	--	0.13	--	--	0.40	--	--	--
	15	Los Coyotes Diagonal	I-405 SB Direct Off-Ramp	Sig	0.44	14.4	B	0.45	13.4	B	0.52	10.0	B	0.47	16.0	B	0.53	10.2	B	0.52	9.8	A	N	0.56	10.6	B	0.51	16.8	B	0.58	11.4	B	0.56	10.2	B	N
		Los Coyotes Diagonal	I-405 SB Loop On-Ramp	None	0.14	--	--	0.13	--	--	0.16	--	--	0.17	--	--	0.32	--	--	0.17	--	--	--	0.18	--	--	0.18	--	--	0.35	--	--	0.19	--	--	--
	16	Willow Street	Los Coyotes Diagonal	Sig	0.72	51.5	D	**0.74**	**102.8**	**F**	0.78	44.4	D	1.02	35.1	D	0.71	32.5	C	0.96	25.4	C	N	0.87	48.8	D	1.18	45.4	D	0.73	42.2	D	**1.19**	**62.2**	**E**	N
Woodruff Avenue at I-405	17	Willow Street	Woodruff Avenue	Sig	**1.07**	**86.8**	**F**	0.77	30.4	C	**1.33**	**147.9**	**F**	0.87	40.4	D	**1.30**	**137.0**	**F**	0.87	37.1	D	N	**1.44**	**180.5**	**F**	0.94	51.5	D	**1.40**	**166.5**	**F**	0.88	42.2	D	--
	18	I-405 NB Direct Off-Ramp	Woodruff Avenue	None	0.15	--	--	0.17	--	--	0.39	--	--	0.19	--	--	0.40	--	--	0.22	--	--	--	0.42	--	--	0.20	--	--	0.43	--	--	0.24	--	--	--
		I-405 NB Direct On-Ramp	Woodruff Avenue	None	0.25	--	--	0.20	--	--	0.31	--	--	0.21	--	--	0.31	--	--	0.22	--	--	--	0.34	--	--	0.23	--	--	0.34	--	--	0.23	--	--	--
	19	I-405 SB Direct Off-Ramp	Woodruff Avenue	None	0.48	--	--	0.38	--	--	0.52	--	--	0.47	--	--	0.52	--	--	0.41	--	--	--	0.56	--	--	0.51	--	--	0.56	--	--	0.45	--	--	--
		I-405 SB Direct On-Ramp	Woodruff Avenue	None	0.27	--	--	0.19	--	--	0.41	--	--	0.23	--	--	0.43	--	--	0.24	--	--	--	0.45	--	--	0.25	--	--	0.46	--	--	0.26	--	--	--
Palo Verde Avenue / Stearns Street at I-405	20	I-405 NB Direct Off-Ramp	Palo Verde Avenue	Sig	0.54	11.3	B	0.45	13.7	B	0.78	17.7	B	0.61	11.8	B	0.84	17.0	B	0.69	11.8	B	N	0.95	21.2	C	0.70	12.6	B	1.02	22.9	C	0.80	14.0	B	N
		I-405 NB Loop On-Ramp	Palo Verde Avenue	None	0.11	--	--	0.20	--	--	0.13	--	--	0.22	--	--	0.14	--	--	0.22	--	--	--	0.14	--	--	0.23	--	--	0.15	--	--	0.23	--	--	--
	21	Woodruff Avenue	Palo Verde Avenue	Sig	**0.87**	**86.6**	**F**	0.59	21.3	C	0.84	13.6	B	0.66	10.3	B	0.84	13.8	B	0.69	9.7	A	N	0.91	15.9	B	0.72	11.3	B	0.92	16.9	B	0.75	10.3	B	N
	22	Stearns Street	Palo Verde Avenue	Sig	0.73	19.4	B	0.75	25.2	C	0.86	18.9	B	0.83	20.5	C	0.94	22.1	C	0.92	22.9	C	N	0.94	22.0	C	0.92	24.4	C	1.02	30.8	C	1.02	29.9	C	N
	23	Stearns Street	I-405 SB Direct On-Ramp	None	0.28	--	--	0.39	--	--	0.30	--	--	0.46	--	--	0.35	--	--	0.46	--	--	--	0.33	--	--	0.50	--	--	0.38	--	--	0.50	--	--	--

Table 3-13: Years 2020 and 2040 Peak-Hour Intersections LOS and Adverse Effect Determination after Traffic Measures for Alternative 3

Interchange Location	Intersection #	Intersection Location		Traffic Control	Year 2009						Year 2020													Year 2040												
					Existing Traffic						No Build Traffic on No Build Geometry						Alternative 3 Traffic on Alternative 3 Geometry including Traffic Measures						No Build-Alternative 3 Adverse Effect	No Build Traffic on No Build Geometry						Alternative 3 Traffic on Alternative 3 Geometry including Traffic Measures						No Build-Alternative 3 Adverse Effect
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			
		East/West Street	North/South Street		V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS		D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	
Studebaker Road at I-405	24	I-405 NB Direct On-Ramp	Studebaker Road	Sig	0.50	4.0	A	0.55	4.3	A	0.51	2.6	A	0.47	4.7	A	0.63	4.1	A	0.52	4.0	A	N	0.55	2.8	A	0.51	4.9	A	0.68	4.5	A	0.56	3.9	A	N
	25	I-405 SB Direct Off-Ramp	Studebaker Road	Stop	0.15	13.8	B	0.04	10.8	B	**0.86**	**68.4**	**F**	0.34	16.2	C	**1.04**	**80.0**	**F**	0.44	20.4	C	N	**1.02**	**98.3**	**F**	0.33	15.7	C	**1.20**	**116.8**	**F**	0.45	20.1	C	N
				*Sig**	*N/A*						*0.65*	*8.4*	*A*	*0.66*	*5.8*	*A*	*0.69*	*9.3*	*A*	*0.67*	*4.6*	*A*		*0.71*	*9.1*	*A*	*0.72*	*7.0*	*A*	*0.74*	*7.0*	*A*	*0.73*	*5.5*	*A*	
	26	Atherton Street	Studebaker Road	Sig	0.46	9.2	A	0.74	23.3	C	0.54	9.3	A	0.78	13.8	B	0.57	8.8	A	0.81	14.6	B	N	0.60	10.7	B	0.85	15.7	B	0.62	9.7	A	0.88	17.1	B	N
Studebaker Road at SR-22/ 7th Street	27	SR-22 WB On-/Off-Ramp	Studebaker Road	Sig	0.49	16.0	B	0.74	22.1	C	0.46	12.8	B	0.79	28.0	C	0.51	12.8	B	0.87	30.2	C	N	0.50	13.1	B	0.86	30.4	C	0.55	13.2	B	0.94	35.2	D	N
	28	SR-22 EB On-/Off-Ramp	Studebaker Road	Sig	0.72	17.6	B	0.82	17.1	B	0.91	21.3	C	0.93	25.8	C	0.93	25.8	C	0.97	29.0	C	N	0.99	30.4	C	1.03	37.1	D	1.02	37.5	D	1.10	44.4	D	N
	29	SR-22 WB On-/Off-Ramp	College Park Drive	Stop	0.39	18.8	C	**0.65**	**59.9**	**F**	N/A						**N/A**						N	N/A						**N/A**						N
				Sig*	**N/A**						0.65	14.1	B	**1.07**	**110.1**	**F**	0.61	12.1	B	**1.08**	**125.8**	**F**		0.71	15.5	B	**1.16**	**147.2**	**F**	0.66	13.3	B	**1.17**	**88.0**	**F**	
7th Street	30	7th Street	Pacific Coast Highway	Sig	**0.95**	**92.9**	**F**	**1.03**	**82.6**	**F**	0.94	49.2	D	0.95	35.9	D	0.91	34.8	C	0.95	38.6	D	N	**1.02**	**65.8**	**E**	**1.03**	**58.7**	**E**	0.99	51.8	D	0.99	50.3	D	N
	31	7th Street	Bellflower Boulevard	Sig	**1.01**	**73.6**	**E**	**0.91**	**90.3**	**F**	**1.04**	**68.9**	**E**	0.98	47.9	D	0.93	27.1	C	0.89	33.3	C	N	**1.13**	**82.4**	**F**	**1.06**	**63.0**	**E**	1.01	40.8	D	0.92	37.8	D	N
	32	Pacific Coast Highway	Bellflower Boulevard	Sig	0.47	22.3	C	0.73	22.5	C	0.53	38.8	D	0.70	20.4	C	0.59	32.1	C	0.60	27.7	C	--	0.57	39.1	D	0.82	32.1	C	0.64	34.8	C	0.66	28.4	C	N
	33	7th Street	Channel Drive	Sig	0.72	32.9	C	0.88	30.3	C	0.71	24.5	C	0.94	22.7	C	0.73	15.0	B	0.82	13.2	B	--	0.77	25.7	C	1.02	50.8	D	0.79	11.5	B	0.88	17.1	B	N
	34	7th Street	W. Campus Drive	Sig	**0.83**	**112.9**	**F**	0.72	31.1	C	0.79	31.2	C	0.81	32.0	C	0.67	13.9	B	0.76	24.2	C	--	0.85	53.1	D	**0.87**	**58.5**	**E**	0.81	15.2	B	0.82	39.2	D	N
	35	7th Street	E. Campus Drive	Sig	0.97	23.1	C	0.73	24.7	C	1.03	35.8	D	0.87	14.6	B	0.99	30.8	C	0.88	16.8	B	--	**1.12**	**55.8**	**E**	0.96	16.7	B	1.08	49.7	D	0.97	19.5	B	N
	36	7th Street	Park Avenue	Sig	0.68	12.2	B	0.74	15.7	B	0.69	14.8	B	0.81	19.2	B	0.77	15.1	B	0.85	21.6	C	--	0.82	17.1	B	0.86	23.7	C	0.84	17.5	B	0.85	27.6	C	N

Notes:

1. LOS – Level of Service; V/C – Volume-to- Capacity Ratio; D/C – Demand Volume-to-Capacity Ratio; N/A – Not Applicable (see Note 2)
2. * = Intersection is not signalized under existing or No Build conditions.
   - At the I-405 SB Direct Off-Ramp intersection with Studebaker Road, the signalized row is included only to determine if there is an adverse effect at the intersection. If a stop-controlled intersection has an LOS E or F under future conditions, then the intersection is reanalyzed as a signalized intersection to identify any adverse effects, because stop-controlled analysis does not provide an overall intersection metric.
   - The proposed traffic measure includes installation of a signal at the SR-22 WB On-/Off-Ramp intersection with College Park Drive. To determine if the measure addresses the adverse effect, a comparison is made between the proposed signalized intersection and the no-build condition assuming a traffic signal. The traffic signal is assumed for the no-build condition because stop-controlled analysis does not provide an overall intersection metric to determine if the adverse effect at the intersection has been addressed.
3. Bold indicates an intersection forecast to operate at LOS E or F.
4. Shaded cells indicate an adverse effect.
5. -- = LOS and average delay are not calculated for intersections without traffic control. The adverse effect determination applies only to controlled intersections.
6. Intersection numbers correspond to the intersection numbers shown on the intersection traffic volumes figures.
7. For future conditions, the D/C ratio is used instead of the V/C ratio.

adapted from the equitable share responsibility method included in the Caltrans Guide for the Preparation of Traffic Impact Studies, Appendix B. Because the Caltrans method is intended for land development projects, the equation has been modified to be used for a roadway improvement project. The fair share percentage equation is as follows:

$$P = \frac{T}{T_B - T_E}$$

P = The equitable share for the proposed project's cumulative traffic impact expressed as a percentage.

T = Additional traffic volume entering the intersection during the peak hour assuming the project compared to the No Build Alternative in vehicles per hour, vph.

T_B = The forecasted volume with the project entering the intersection during the peak hour assuming the project, vph.

T_E = The existing traffic volume entering the intersection during the peak hour, vph.

For those intersections with an adverse cumulative effect in both the morning and evening peak hour, the larger T value is from the two periods and determines which period is used in the calculation. The T value for the 7th Street/Bellflower Boulevard intersection is negative for Alternative 1, rendering the calculation ineffective; therefore the P value from the closest intersection (#30) is used as a reasonable substitute. Fair Share percentage calculations are shown in Appendix B.3.

City of Long Beach Intersections

T-10 A payment shall be made by OCTA to the City of Long Beach based on a Cooperative Agreement to be negotiated and executed between OCTA and the City of Long Beach. The Cooperative Agreement shall identify the project's fair share of the costs for the improvements at intersections owned by the City of Long Beach based on the Preferred Alternative (PA) and in accordance with the fair share percentages for each location identified below. The Cooperative Agreement shall provide:

- That the City of Long Beach's Transportation Mitigation Program will be revised to include the locations listed below under A, B, or C for the PA;
- That the payment made by OCTA shall be placed into the City of Long Beach Transportation Mitigation Program and shall only be used to provide improvements to remedy impacts of the PA at the intersections listed below under A, B, or C for the PA;

- The amount of the total payment to be applied to each location; and
- That the proposed improvements shall be implemented by the City of Long Beach, with the City of Long Beach bearing responsibility for necessary clearances and permits.

A. If PA is Alternative 1:
   - Los Coyotes Diagonal and Bellflower Boulevard intersection:
     - Add a second left-turn lane to eastbound approach.
     - Fair Share Percentage: 4.45%. (estimated total construction cost in 2013 dollars is $250,000)

B. If PA is Alternative 2:
   - Willow Street and Bellflower Boulevard intersection:
     - Add an exclusive right-turn lane to eastbound approach;
     - Add a second left-turn lane to westbound approach; and
     - Add a second left-turn lane to southbound approach.
     - Fair Share Percentage: 10.41%. (estimated total construction cost in 2013 dollars is $810,000)
   - Willow Street and Los Coyotes Diagonal intersection:
     - Add a second left-turn lane to eastbound approach; and
     - Add a second left-turn lane to southbound approach.
     - Fair Share Percentage: 31.57%. (estimated total construction cost in 2013 dollars is $440,000)
   - Willow Street and Woodruff Avenue intersection:
     - Add a second left-turn lane to northbound approach.
     - Fair Share Percentage: 10.40%. (estimated total construction cost in 2013 dollars is $240,000)

C. If PA is Alternative 3:
   - Willow Street and Bellflower Boulevard intersection:
     - Add an exclusive right-turn lane to eastbound approach;
     - Add a second left-turn lane to westbound approach; and
     - Add a second left-turn lane to southbound approach.

  - Fair Share Percentage: 10.41%. (estimated total construction cost in 2013 dollars is $810,000)
- Los Coyotes Diagonal and Bellflower Boulevard intersection:
  - Add a second left-turn lane to eastbound approach.
  - Fair Share Percentage: 8.32%. (estimated total construction cost in 2013 dollars is $250,000)
- Willow Street and Los Coyotes Diagonal intersection:
  - Add a second left-turn lane to eastbound approach; and
  - Add a second left-turn lane to southbound approach.
  - Fair Share Percentage: 30.03%. (estimated total construction cost in 2013 dollars is $440,000)

State of California Intersections

T-11 A payment shall be made by OCTA to Caltrans based on a Traffic Mitigation Agreement Fair Share Deferment to be negotiated and executed between OCTA and Caltrans. The Traffic Mitigation Agreement Fair Share Deferment shall identify the project's fair share of the costs for the improvements at intersections owned by the State of California based on the PA and in accordance with the fair share percentages for each location identified below. The Traffic Mitigation Agreement Fair Share Deferment shall provide:

- That Caltrans will establish separate accounts for each of the locations listed below under A, B, or C for the PA;
- That the payment made by OCTA shall be held by Caltrans and shall only be used to provide improvements to remedy impacts of the PA at the intersections listed below under A, B, or C for the PA;
- The amount of the total payment to be applied to each location;
- That the amounts for different locations shall not be commingled; and
- That the proposed improvements shall be implemented by Caltrans, with Caltrans bearing responsibility for necessary clearances and permits.

It should be noted that the State of California would implement a project only when enough funds have been collectively received for that specific mitigation measure.

A. If PA is Alternative 1:

- SR-22 westbound on-/off-ramp and College Park Drive intersection:
  - Add a second northbound through lane to the off-ramp approach to College Park Drive starting approximately 300 feet (ft) south of their intersection; and
  - Replace existing traffic control with a traffic signal.
  - Fair Share Percentage: 12.11%. (estimated total construction cost in 2013 dollars is $1,570,000)
- 7th Street and Pacific Coast Highway intersection:
  - Add protected/permitted signal phasing to the eastbound and westbound approaches of Pacific Coast Highway to Bellflower Boulevard.
  - Fair Share Percentage: 11.70%. (estimated total construction cost in 2013 dollars is $450,000)
- 7th Street and West Campus Drive intersection:
  - Add an exclusive right-turn lane to westbound approach, modifying traffic signals as needed.
  - Fair Share Percentage: 9.16%. (estimated total construction cost in 2013 dollars is $300,000)
- 7th Street and Bellflower Boulevard intersection:
  - Add a second left-turn lane to eastbound approach, modifying signals and adjusting sidewalk as necessary.
  - Fair Share Percentage: 11.70%. (estimated total construction cost in 2013 dollars is $640,000)

B. If PA is Alternative 2:

- SR-22 westbound on-/off-ramp and College Park Drive intersection:
  - Add a second northbound through lane to the off-ramp approach to College Park Drive starting approximately 300 ft south of their intersection; and
  - Replace existing traffic control with a traffic signal.
  - Fair Share Percentage: 33.25%. (estimated total construction cost in 2013 dollars is $1,570,000)
- 7th Street and Pacific Coast Highway intersection:

  - Add protected/permitted signal phasing to the eastbound and westbound approaches of Pacific Coast Highway to Bellflower Boulevard.
  - Fair Share Percentage: 7.84%. (estimated total construction cost in 2013 dollars is $450,000)
- 7th Street and Bellflower Boulevard intersection:
  - Add a second left-turn lane to eastbound approach, modifying signals and adjusting sidewalk as necessary.
  - Fair Share Percentage: 16.92%. (estimated total construction cost in 2013 dollars is $640,000)
- 7th Street and Channel Drive intersection:
  - Add a second left-turn lane to westbound approach, modifying signals as necessary; and
  - Provide dual southbound exclusive left-turn lanes.
  - Fair Share Percentage: 13.59%. (estimated total construction cost in 2013 dollars is $240,000)
- 7th Street and West Campus Drive intersection:
  - Add an exclusive right-turn lane to westbound approach, modifying traffic signals as necessary.
  - Fair Share Percentage: 27.34%. (estimated total construction cost in 2013 dollars is $300,000)
- 7th Street and East Campus Drive intersection:
  - Add a right-turn lane to westbound approach, modifying traffic signals as necessary and maximizing eastbound and westbound left-turn pocket lengths.
  - Fair Share Percentage: 21.30%. (estimated total construction cost in 2013 dollars is $450,000)

C. If PA is Alternative 3:

- 7th Street and Pacific Coast Highway intersection:
  - Add protected/permitted signal phasing to the eastbound and westbound approaches of Pacific Coast Highway to Bellflower Boulevard.
  - Fair Share Percentage: 8.08%. (estimated total construction cost in 2013 dollars is $450,000)

- 7th Street and Bellflower Boulevard intersection:
  - Add a second left-turn lane to eastbound approach, modifying signals and adjusting sidewalk as necessary.
  - Fair Share Percentage: 17.64%. (estimated total construction cost in 2013 dollars is $640,000)
- 7th Street and Channel Drive intersection:
  - Add a second left-turn lane to westbound approach, modifying signals as necessary; and
  - Provide dual southbound exclusive left-turn lanes.
  - Fair Share Percentage: 14.01%. (estimated total construction cost in 2013 dollars is $240,000)
- 7th Street and West Campus Drive intersection:
  - Add an exclusive right-turn lane to westbound approach, modifying traffic signals as necessary.
  - Fair Share Percentage: 25.02%. (estimated total construction cost in 2013 dollars is $300,000)
- 7th Street and East Campus Drive intersection:
  - Add a right-turn lane to westbound approach, modifying traffic signals as necessary and maximizing eastbound and westbound left-turn pocket lengths.
  - Fair Share Percentage: 7.39%. (estimated total construction cost in 2013 dollars is $450,000)

3.2 Cumulative Impacts

The following is additional information for Draft EIR/EIS Section 3.6, Cumulative Impacts under Subsection 3.6.5.7, Traffic and Transportation/Pedestrian and Bicycle Facilities. This information will be added to Section 3.6.5.7 of the Final EIR/EIS.

Traffic forecasts for the Long Beach area were developed for each of the alternatives within the Supplemental Draft EIR/EIS study area using Orange County Transportation Analysis Model (OCTAM) Version 3.3. Cumulative traffic effects were considered and include the mainline, ramp arterial intersections, and nearby arterial intersections, as discussed above. The traffic network used in the traffic forecasting process consists of the existing transportation system and those transportation facilities in the constrained portion of the Regional Transportation Plan

(RTP) and projects with an approved environmental document. As a result, the forecasting network includes not only facilities and services in place today, but also those facilities and services funded and committed for implementation through the horizon year (2040). Land development projects are accounted for in the traffic analysis zone (TAZ) socioeconomic forecast data used within the traffic forecasting model. The analysis described above includes cumulative traffic impacts from all state and local projects within the Supplemental Draft EIR/EIS study area.

With implementation of the project and inclusion of proposed traffic measures T-10 and T-11, traffic conditions within the Supplemental Draft EIR/EIS study area would not be adversely affected by the project. Based on the information and analysis above, traffic or transportation-related direct or indirect cumulative impacts are not anticipated, and no further cumulative impact analysis or additional measures are required. With implementation of the fair share agreement within 90 days of publication of the project's Record of Decision (ROD) and payment of related funding prior to construction, as described in proposed traffic measures T-10 and T-11, the project's contribution to adverse cumulative effects within the Supplemental Draft EIR/EIS study area at the affected locations would be minimized. The ROD is the NEPA approval of the project.

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Chapter 4 California Environmental Quality Act (CEQA) Evaluation

The following is additional information for Draft EIR/EIS Section 4.2.3, Significant Environmental Effects of the Proposed Project, under Subsection 4.2.3.5, Transportation/Traffic Checklist Questions a) – b). This information will be added to Section 4.2.3.5 of the Final EIR/EIS.

4.1 Transportation/Traffic Checklist Questions a) – b):

This section identifies the potential significant impacts of the proposed build alternatives (Alternatives 1, 2, and 3) to the performance of the roadways within the Long Beach Area traffic study limits, based on the information provided in Chapter 3 of this Supplemental Draft EIR/EIS. Each build alternative is covered separately below. For each build alternative, there is the following:

- A comparison to the existing condition, including an identification of potentially significant cumulative impacts
- A reference to the comparison of the build alternative to the No Build Alternative (as presented in Chapter 3 of this Supplemental Draft EIR/EIS) identifying the contribution of the build alternative to the cumulative impacts, along with mitigations for contributions that are determined to be project contributions to significant cumulative impacts
- An identification of the difference between the build alternative and the No Build Alternative, related back to the existing condition

The existing condition is the "CEQA Baseline" condition.

Alternative 1

Future Build Alternative Compared to Existing Condition. A comparison of Alternative 1 in 2020 and 2040 to the existing condition reveals the following information. The data used to make the comparison are presented in the tables in Chapter 3 of this Supplemental Draft EIR/EIS. Impacts identified through the comparison are cumulative impacts resulting from the combination of the proposed I-405 project and other land development and roadway improvement projects in the corridor and region. The inclusion of other land development and roadway improvement projects in the traffic forecasts is summarized in Draft EIR/EIS Section 3.6.5.7, Traffic and Transportation/Pedestrian and Bicycle Facilities (Resources not Subject to Cumulative Analysis), and more fully explained in the Traffic Study in Section 2.2.2.

1. Under Alternative 1 on I-405 north of I-605 to Lakewood Boulevard, GP lane volumes during peak hours in 2020 and 2040 are expected to be greater than in the existing condition. For example, between Palo Verde Avenue and Woodruff Avenue, peak-hour GP volumes by direction range from 7,175 to 8,546 under existing conditions. The volumes anticipated for Alternative 1 in 2020 range from 8,610 to 10,160 and in 2040 from 9,310 to 10,980. (See Figures 3-4, 3-7, and 3-11.)
2. Under Alternative 1 on I-405 north of I-605 to Lakewood Boulevard, HOV lane volumes during peak hours in 2020 and 2040 are expected to be greater than in the existing condition. For example, between Palo Verde Avenue and Woodruff Avenue, peak-hour HOV volumes by direction range from 793 to 1,720 under existing conditions. The volumes anticipated for Alternative 1 in 2020 range from 2,020 to 2,180 and in 2040 from 2,180 to 2,240. (See Figures 3-4, 3-7, and 3-11.)
3. Under Alternative 1 on I-405 north of I-605 to Lakewood Boulevard in 2020, LOS F conditions are anticipated during peak hours in the GP lanes, except for LOS D and E in the southbound direction between I-605 and Studebaker Road during the AM and PM peak hours, respectively. In 2040, LOS F conditions are anticipated during peak hours in the GP lanes, except for LOS E in the southbound direction during the AM and PM peak hours. Under the existing condition, LOS D to F conditions occur during peak hours in the GP lanes. Under Alternative 1 in 2020, v/c ratios in the GP lanes range from 0.02 lower than under existing conditions to 0.59 greater. In 2040, v/c ratios range from 0.05 to 0.71 greater than under existing conditions. (See Tables 3-2 and 3-6.)
4. Under Alternative 1 on I-405 north of I-605 to Lakewood Boulevard, HOV lanes are anticipated to operate at LOS F during peak hours because v/c ratios are all forecast to be over capacity ranging from 1.08 to 1.30 in 2020 and from 1.16 to 1.41 in 2040. Under the existing condition, v/c ratios range from 0.50 to 1.06. In 2020, Alternative 1 v/c ratios in the HOV lanes range from 0.06 to 0.71 greater than under existing conditions. In 2040, v/c ratios range from 0.15 to 0.81 greater than under existing conditions. (See Tables 3-3 and 3-7.)
5. Under Alternative 1, branch connectors in the I-405/I-605/SR-22 interchange serving movements to and from Long Beach are anticipated to operate with v/c ratios ranging from 0.24 to 1.19 in 2020 and from 0.26 to 1.19 in 2040, compared to the existing range of 0.36 to 0.97. (See Tables 3-4 and 3-8.)
6. Under Alternative 1 with all proposed mitigations in 2020, there is one Long Beach area study intersection anticipated to operate at LOS E or F, and four to have v/c ratios greater than 1.00 during peak hours, compared to ten intersections operating at LOS E or F and three with v/c ratios over 1.00 under existing conditions. In 2040, there are three intersections anticipated to operate at LOS E or F and eight to have v/c ratios greater than 1.00 during peak hours, compared to ten intersections operating at LOS E or F and three with v/c ratios over 1.00 under existing conditions. (See Table 4-1).

7. Under Alternative 1 in 2040 within the Long Beach traffic study area, the percentage of off-ramps with adequate storage at their arterial terminal is anticipated to be 90 percent, compared to 100 percent under existing conditions. (See Table 3-5.)
8. Under Alternative 1 in 2040 within the Long Beach traffic study area, the percentage of arterials with adequate storage at their intersections with freeway ramps is anticipated to be 73 percent, compared to 82 percent under existing conditions. (See Table 3-5.)
9. Under Alternative 1 in 2040 within the Long Beach traffic study area, the percentage of arterial/arterial intersections with adequate storage is anticipated to be 45 percent, compared to 54 percent under existing conditions. (See Table 3-5.)

Table 4-2 shows that, under Alternative 1 in 2020, there are three intersections in the Long Beach traffic study area with project contributions to significant cumulative impacts. Those intersections are designated on the table with a "Y" (Yes) in the column labeled "Cumulative Significant Impact." Table 4-2 also shows that, under Alternative 1 in 2040, there are nine intersections where the proposed project would contribute to significant cumulative impacts.

An increase in the v/c ratio of a freeway segment is an indication of a cumulative impact on the freeway mainline. Based on the increases in freeway GP and HOV lane v/c ratios cited above in Items 3 and 4, there is a cumulative impact on the I-405 freeway mainline.

Future Build Alternative Compared to Future No Build. Chapter 3 of this Supplemental Draft EIR/EIS provides a comparison of Alternative 1 to the No Build Alternative in 2020 and 2040. That comparison identifies the contribution of Alternative 1 to cumulative impacts. As shown in Tables 3-2 and 3-6, v/c ratios for the I-405 freeway mainline under Alternative 1 are 0.00 to 0.11 higher than under the No Build Alternative in 2020 and 0.00 to 0.12 higher in 2040. Because Tables 3-2 and 3-6 show that, for segments of I-405 north of I-605 to Lakewood Boulevard, LOS is F under the No Build Alternative or the maximum increase in v/c ratios is 0.02, the contribution of Alternative 1 to the cumulative impact on the freeway mainline is less than significant.

Table 4-2 shows (with a "Y" in the columns labeled "Project Contribution to Significant Impact") that there are five intersections under Alternative 1 with project contributions to significant cumulative impacts. Measures T-10 and T-11 presented in Section 3.3 of this Supplemental Draft EIR/EIS are proposed to mitigate those project contributions to significant cumulative impacts. Table 4-1 shows that, with all improvements including the mitigations, three intersections are anticipated to have significant cumulative impacts in either 2020 or 2040. Table 4-1 also shows that there are no intersections where the contribution of Alternative 1 to the cumulative impacts is significant with the proposed mitigations in place.

In summary, there are no significant impacts of Alternative 1 on performance or the LOS of the circulation system.

Difference between Alternative 1 and No Build Alternative Related to Existing Condition. A comparison of the existing condition and the difference between Alternative 1 and the No Build Alternative reveals the following information. The data used to make the comparison are presented in the tables indicated in Chapter 3 of this Supplemental Draft EIR/EIS.

1. Under Alternative 1 on I-405 north of I-605 to Lakewood Boulevard, GP lane volumes during peak hours in 2020 and 2040 are expected to be greater than under the no-build condition. In 2020 between Palo Verde Avenue and Woodruff Avenue, peak-hour GP volumes by direction range from 20 to 740 greater under Alternative 1 than under no-build conditions compared to 7,175 to 8,546 under the existing condition. (See Figures 3-4, 3-6, and 3-7.) In 2040 between Palo Verde Avenue and Woodruff Avenue, peak-hour GP volumes by direction range from 30 to 800 greater under Alternative 1 than under no-build conditions compared to 7,175 to 8,546 under the existing condition. (See Figures 3-4, 3-10, and 3-11.)
2. Under Alternative 1 on I-405 north of I-605 to Lakewood Boulevard, HOV lane volumes during peak hours in 2020 and 2040 are expected to be greater than under the existing condition. In 2020 between Palo Verde Avenue and Woodruff Avenue, peak-hour HOV volumes by direction range from 20 lower to 340 greater under Alternative 1 than under no-build conditions compared to 793 to 1,720 under the existing condition. (See Figures 3-4, 3-6, and 3-7.) In 2040 between Palo Verde Avenue and Woodruff Avenue, peak-hour HOV volumes by direction range from 50 lower to 370 greater under Alternative 1 than under no-build conditions compared to 793 to 1,720 under the existing condition. (See Figures 3-4, 3-10, and 3-11.)
3. Under Alternative 1 and the No Build Alternative on I-405 north of I-605 to Lakewood Boulevard in 2020, LOS F conditions are anticipated during peak hours in the GP lanes, except for LOS D and E in the southbound direction between I-605 and Studebaker Road during the AM and PM peak hours, respectively. Under the existing condition, LOS ranges from D to F depending on the time of day and direction of travel. In 2040, LOS F conditions are anticipated under Alternative 1 during peak hours in the GP lanes, except for LOS E in the southbound direction between I-605 and Studebaker Road during the AM and PM peak hours; the same LOS conditions are anticipated under the No Build Alternative, except that LOS D is anticipated southbound between I-605 and Studebaker Road during the AM peak hour. Under Alternative 1 in 2020, v/c ratios in the GP lanes range from the same as under the No Build Alternative to 0.11 higher. Under the existing condition, v/c ratios range from 0.81 to 0.98. Under Alternative 1 in 2040, v/c ratios in the GP lanes range from the same as under the No Build Alternative to 0.12 higher. (See Tables 3-2 and 3-6.).

Table 4-1: Years 2020 and 2040 Peak-Hour Intersections LOS after Mitigation with Cumulative and Project Contribution Impact Determinations for Alternative 1

Interchange Location	Intersection #	Intersection Location		Traffic Control	Year 2009						Year 2020														Year 2040													
					Existing Traffic						No Build Traffic on No Build Geometry						Alternative 1 Traffic on Alternative 1 Geometry including Mitigations						Cumulative Significant Impact	Project Contribution to Significant Impact	No Build Traffic on No Build Geometry						Alternative 1 Traffic on Alternative 1 Geometry including Mitigations						Cumulative Significant Impact	Project Contribution to Significant Impact
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour				
		East/West Street	North/South Street		V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS			D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS		
Carson Street at I-605	1	Carson Street	I-605 SB Off-Ramp	Sig	0.58	21.9	C	0.61	17.8	B	0.57	22.3	C	0.68	23.8	C	0.56	18.7	B	0.67	20.1	C	N	N	0.62	22.4	C	0.73	24.5	C	0.61	18.8	B	0.73	20.8	C	N	N
	2	Carson Street	I-605 SB Direct On-Ramp	None	0.15	--	--	0.25	--	--	0.22	--	--	0.33	--	--	0.24	--	--	0.38	--	--	--	--	0.24	--	--	0.36	--	--	0.26	--	--	0.41	--	--	--	--
		Carson Street	I-605 SB Loop On-Ramp	None	0.24	--	--	0.20	--	--	0.33	--	--	0.33	--	--	0.35	--	--	0.36	--	--	--	--	0.35	--	--	0.36	--	--	0.38	--	--	0.39	--	--	--	--
	3	Carson Street	I-605 NB Off-Ramp	Sig	0.55	14.8	B	0.66	12.4	B	0.59	21.8	C	0.76	20.6	C	0.59	20.3	C	0.76	16.6	B	N	N	0.63	23.6	C	0.82	23.2	C	0.63	21.8	C	0.82	18.4	B	N	N
		Carson Street	I-605 NB Loop On-Ramp	None	0.23	--	--	0.45	--	--	0.31	--	--	0.35	--	--	0.30	--	--	0.35	--	--	--	--	0.33	--	--	0.37	--	--	0.33	--	--	0.37	--	--	--	--
		Carson Street	I-605 NB Direct On-Ramp	None	0.40	--	--	0.32	--	--	0.52	--	--	0.49	--	--	0.51	--	--	0.46	--	--	--	--	0.56	--	--	0.53	--	--	0.55	--	--	0.49	--	--	--	--
	4	Carson Street	Pioneer Boulevard	Sig	0.76	48.1	D	0.76	35.1	D	0.79	31.1	C	0.84	33.7	C	0.79	30.7	C	0.87	31.6	C	N	N	0.86	35.1	D	0.92	43.9	D	0.87	34.7	C	0.90	41.4	D	N	N
Spring Street/ Cerritos Avenue at I-605	5	Spring Street/ Cerritos Avenue	I-605 SB Off-Ramp	Sig	0.79	26.2	C	0.60	18.4	B	0.68	14.2	B	0.65	10.9	B	0.68	14.0	B	0.64	10.3	B	N	N	0.74	15.4	B	0.71	12.0	B	0.73	15.2	B	0.70	11.4	B	N	N
	6	Spring Street/ Cerritos Avenue	I-605 NB On-Ramp	Sig	0.84	13.5	B	0.81	11.1	B	0.76	10.5	B	0.79	8.2	A	0.73	9.3	A	0.78	8.1	A	N	N	0.82	11.6	B	0.86	9.8	A	0.79	10.3	B	0.85	9.5	A	N	N
Lakewood Boulevard/ Willow Street at I-405	7	I-405 NB Direct Off-Ramp	Lakewood Boulevard	None	0.35	--	--	0.34	--	--	0.38	--	--	0.38	--	--	0.43	--	--	0.41	--	--	--	--	0.41	--	--	0.41	--	--	0.47	--	--	0.44	--	--	--	--
		I-405 NB Direct On-Ramp	Lakewood Boulevard	None	0.22	--	--	0.21	--	--	0.38	--	--	0.23	--	--	0.38	--	--	0.22	--	--	--	--	0.41	--	--	0.25	--	--	0.41	--	--	0.24	--	--	--	--
		I-405 NB Loop Off-Ramp	Lakewood Boulevard	None	0.19	--	--	0.18	--	--	0.23	--	--	0.22	--	--	0.26	--	--	0.22	--	--	--	--	0.25	--	--	0.23	--	--	0.28	--	--	0.24	--	--	--	--
		I-405 NB Loop On-Ramp	Lakewood Boulevard	None	0.50	--	--	0.38	--	--	0.53	--	--	0.41	--	--	0.53	--	--	0.41	--	--	--	--	0.57	--	--	0.44	--	--	0.57	--	--	0.44	--	--	--	--
	8	I-405 SB Loop On-Ramp	Lakewood Boulevard	None	0.19	--	--	0.23	--	--	0.22	--	--	0.25	--	--	0.23	--	--	0.25	--	--	--	--	0.24	--	--	0.27	--	--	0.25	--	--	0.27	--	--	--	--
		I-405 SB Direct Off-Ramp	Lakewood Boulevard	None	0.40	--	--	0.31	--	--	0.43	--	--	0.48	--	--	0.41	--	--	0.46	--	--	--	--	0.46	--	--	0.52	--	--	0.44	--	--	0.50	--	--	--	--
	9	Willow St	Lakewood Boulevard	Sig	0.76	31.1	C	**0.92**	**66.2**	**E**	0.75	31.2	C	0.89	43.0	D	0.74	28.9	C	0.96	46.5	D	N	N	0.81	33.6	C	0.93	48.4	D	0.79	33.1	C	0.93	48.7	D	N	N
	10	Willow St	I-405 SB Loop Off-Ramp	None	0.32	--	--	0.30	--	--	0.35	--	--	0.46	--	--	0.33	--	--	0.45	--	--	--	--	0.37	--	--	0.50	--	--	0.36	--	--	0.48	--	--	--	--
		Willow St	I-405 SB Direct On-Ramp	None	0.26	--	--	0.38	--	--	0.28	--	--	0.41	--	--	0.28	--	--	0.41	--	--	--	--	0.31	--	--	0.44	--	--	0.31	--	--	0.44	--	--	--	--
Bellflower Boulevard/ Los Coyotes Diagonal at I-405	11	I-405 NB Off-Ramp	Bellflower Boulevard	Sig	0.41	9.3	A	0.48	11.9	B	0.51	10.8	B	0.53	10.6	B	0.51	10.4	B	0.53	10.9	B	N	N	0.55	11.6	B	0.58	11.3	B	0.55	11.3	B	0.58	11.3	B	N	N
		I-405 NB Loop On-Ramp	Bellflower Boulevard	None	0.49	--	--	0.35	--	--	0.53	--	--	0.37	--	--	0.51	--	--	0.37	--	--	--	--	0.57	--	--	0.40	--	--	0.55	--	--	0.40	--	--	--	--
		I-405 NB Direct On-Ramp	Bellflower Boulevard	None	0.28	--	--	0.18	--	--	0.31	--	--	0.19	--	--	0.29	--	--	0.19	--	--	--	--	0.33	--	--	0.20	--	--	0.32	--	--	0.20	--	--	--	--
	12	Willow Street	Bellflower Boulevard	Sig	**0.84**	**81.2**	**F**	0.92	40.1	D	1.01	48.8	D	1.01	54.4	D	1.00	50.1	D	1.00	51.2	D	N	N	**1.09**	**67.3**	**E**	**1.09**	**70.6**	**E**	**1.09**	**68.2**	**E**	**1.10**	**68.1**	**E**	Y	N
	13	Los Coyotes Diagonal	Bellflower Boulevard	Sig	0.63	31.3	C	**0.97**	**72.8**	**E**	0.65	26.4	C	1.00	42.1	D	0.64	27.5	C	1.06	44.6	D	N	N	0.70	26.9	C	**1.13**	**56.8**	**E**	0.71	25.7	C	1.14	53.7	D	N	N
		Los Coyotes Diagonal	I-405 SB Direct On-Ramp	None	0.06	--	--	0.09	--	--	0.06	--	--	0.12	--	--	0.08	--	--	0.12	--	--	--	--	0.07	--	--	0.13	--	--	0.08	--	--	0.13	--	--	--	--
	14	I-405 SB Loop Off-Ramp	Bellflower Boulevard	None	0.12	--	--	0.26	--	--	0.12	--	--	0.32	--	--	0.12	--	--	0.29	--	--	--	--	0.13	--	--	0.34	--	--	0.13	--	--	0.32	--	--	--	--
	15	Los Coyotes Diagonal	I-405 SB Direct Off-Ramp	Sig	0.44	14.4	B	0.45	13.4	B	0.52	10.0	B	0.47	16.0	B	0.52	10.3	B	0.47	14.0	B	N	N	0.56	10.6	B	0.51	16.8	B	0.56	10.8	B	0.51	14.7	B	N	N
		Los Coyotes Diagonal	I-405 SB Loop On-Ramp	None	0.14	--	--	0.13	--	--	0.16	--	--	0.17	--	--	0.25	--	--	0.17	--	--	--	--	0.18	--	--	0.18	--	--	0.27	--	--	0.18	--	--	--	--
	16	Willow Street	Los Coyotes Diagonal	Sig	0.72	51.5	D	**0.74**	**102.8**	**F**	0.78	44.4	D	1.02	35.1	D	0.77	31.7	C	1.04	36.7	D	N	N	0.87	48.8	D	1.18	45.4	D	0.86	36.4	D	1.20	50.4	D	N	N

Table 4-1: Years 2020 and 2040 Peak-Hour Intersections LOS after Mitigation with Cumulative and Project Contribution Impact Determinations for Alternative 1

Interchange Location	Intersection #	Intersection Location: East/West Street	Intersection Location: North/South Street	Traffic Control	Year 2009 Existing Traffic AM Peak Hour V/C	Year 2009 Existing Traffic AM Peak Hour Avg Delay (sec)	Year 2009 Existing Traffic AM Peak Hour LOS	Year 2009 Existing Traffic PM Peak Hour V/C	Year 2009 Existing Traffic PM Peak Hour Avg Delay (sec)	Year 2009 Existing Traffic PM Peak Hour LOS	Year 2020 No Build Traffic on No Build Geometry AM Peak Hour D/C	Year 2020 No Build Traffic on No Build Geometry AM Peak Hour Avg Delay (sec)	Year 2020 No Build Traffic on No Build Geometry AM Peak Hour LOS	Year 2020 No Build Traffic on No Build Geometry PM Peak Hour D/C	Year 2020 No Build Traffic on No Build Geometry PM Peak Hour Avg Delay (sec)	Year 2020 No Build Traffic on No Build Geometry PM Peak Hour LOS	Year 2020 Alternative 1 Traffic on Alternative 1 Geometry including Mitigations AM Peak Hour D/C	Year 2020 Alternative 1 Traffic on Alternative 1 Geometry including Mitigations AM Peak Hour Avg Delay (sec)	Year 2020 Alternative 1 Traffic on Alternative 1 Geometry including Mitigations AM Peak Hour LOS	Year 2020 Alternative 1 Traffic on Alternative 1 Geometry including Mitigations PM Peak Hour D/C	Year 2020 Alternative 1 Traffic on Alternative 1 Geometry including Mitigations PM Peak Hour Avg Delay (sec)	Year 2020 Alternative 1 Traffic on Alternative 1 Geometry including Mitigations PM Peak Hour LOS	Year 2020 Cumulative Significant Impact	Year 2020 Project Contribution to Significant Impact	Year 2040 No Build Traffic on No Build Geometry AM Peak Hour D/C	Year 2040 No Build Traffic on No Build Geometry AM Peak Hour Avg Delay (sec)	Year 2040 No Build Traffic on No Build Geometry AM Peak Hour LOS	Year 2040 No Build Traffic on No Build Geometry PM Peak Hour D/C	Year 2040 No Build Traffic on No Build Geometry PM Peak Hour Avg Delay (sec)	Year 2040 No Build Traffic on No Build Geometry PM Peak Hour LOS	Year 2040 Alternative 1 Traffic on Alternative 1 Geometry including Mitigations AM Peak Hour D/C	Year 2040 Alternative 1 Traffic on Alternative 1 Geometry including Mitigations AM Peak Hour Avg Delay (sec)	Year 2040 Alternative 1 Traffic on Alternative 1 Geometry including Mitigations AM Peak Hour LOS	Year 2040 Alternative 1 Traffic on Alternative 1 Geometry including Mitigations PM Peak Hour D/C	Year 2040 Alternative 1 Traffic on Alternative 1 Geometry including Mitigations PM Peak Hour Avg Delay (sec)	Year 2040 Alternative 1 Traffic on Alternative 1 Geometry including Mitigations PM Peak Hour LOS	Year 2040 Cumulative Significant Impact	Year 2040 Project Contribution to Significant Impact
Woodruff Avenue at I-405	17	Willow Street	Woodruff Avenue	Sig	**1.07**	**86.8**	**F**	0.77	30.4	C	**1.33**	**147.9**	**F**	0.87	40.4	D	**1.32**	**146.2**	**F**	0.88	40.9	D	Y	N	**1.44**	**180.5**	**F**	0.94	51.5	D	**1.43**	**179.2**	**F**	0.94	53.1	D	Y	N
	18	I-405 NB Direct Off-Ramp	Woodruff Avenue	None	0.15	--	--	0.17	--	--	0.39	--	--	0.19	--	--	0.39	--	--	0.20	--	--	--	--	0.42	--	--	0.20	--	--	0.43	--	--	0.22	--	--	--	--
		I-405 NB Direct On-Ramp	Woodruff Avenue	None	0.25	--	--	0.20	--	--	0.31	--	--	0.21	--	--	0.31	--	--	0.21	--	--	--	--	0.34	--	--	0.23	--	--	0.34	--	--	0.23	--	--	--	--
	19	I-405 SB Direct Off-Ramp	Woodruff Avenue	None	0.48	--	--	0.38	--	--	0.52	--	--	0.47	--	--	0.51	--	--	0.45	--	--	--	--	0.56	--	--	0.51	--	--	0.55	--	--	0.49	--	--	--	--
		I-405 SB Direct On-Ramp	Woodruff Avenue	None	0.27	--	--	0.19	--	--	0.41	--	--	0.23	--	--	0.43	--	--	0.23	--	--	--	--	0.45	--	--	0.25	--	--	0.47	--	--	0.25	--	--	--	--
Palo Verde Avenue / Stearns Street at I-405	20	I-405 NB Direct Off-Ramp	Palo Verde Avenue	Sig	0.54	11.3	B	0.45	13.7	B	0.78	17.7	B	0.61	11.8	B	0.78	17.0	B	0.63	12.0	B	N	N	0.95	21.2	C	0.70	12.6	B	0.96	20.6	C	0.73	13.1	B	N	N
		I-405 NB Loop On-Ramp	Palo Verde Avenue	None	0.11	--	--	0.20	--	--	0.13	--	--	0.22	--	--	0.15	--	--	0.20	--	--	--	--	0.14	--	--	0.23	--	--	0.17	--	--	0.21	--	--	--	--
	21	Woodruff Avenue	Palo Verde Avenue	Sig	**0.87**	**86.6**	**F**	0.59	21.3	C	0.84	13.6	B	0.66	10.3	B	0.84	12.9	B	0.68	10.2	B	N	N	0.91	15.9	B	0.72	11.3	B	0.91	15.4	B	0.74	11.2	B	N	N
	22	Stearns Street	Palo Verde Avenue	Sig	0.73	19.4	B	0.75	25.2	C	0.86	18.9	B	0.83	20.5	C	0.86	18.5	B	0.85	21.0	C	N	N	0.94	22.0	C	0.92	24.4	C	0.94	21.7	C	0.93	25.1	C	N	N
	23	Stearns Street	I-405 SB Direct On-Ramp	None	0.28	--	--	0.39	--	--	0.30	--	--	0.46	--	--	0.33	--	--	0.44	--	--	--	--	0.33	--	--	0.50	--	--	0.35	--	--	0.48	--	--	--	--
Studebaker Road at I-405	24	I-405 NB Direct On-Ramp	Studebaker Road	Sig	0.50	4.0	A	0.55	4.3	A	0.51	2.6	A	0.47	4.7	A	0.51	1.2	A	0.50	3.1	A	N	N	0.55	2.8	A	0.51	4.9	A	0.55	1.4	A	0.54	3.2	A	N	N
	25	I-405 SB Direct Off-Ramp	Studebaker Road	Stop	0.15	13.8	B	0.04	10.8	B	**0.86**	**68.4**	**F**	0.34	16.2	C	**1.03**	**113.3**	**F**	0.51	24.8	C	N	N	**1.02**	**98.3**	**F**	0.33	15.7	C	**1.24**	**170.6**	**F**	0.53	25.2	D	N	N
				*Sig**	*N/A*						*0.65*	*8.4*	*A*	*0.66*	*5.8*	*A*	*0.66*	*8.9*	*A*	*0.65*	*6.2*	*A*			*0.71*	*9.1*	*A*	*0.72*	*7.0*	*A*	*0.72*	*9.8*	*A*	*0.72*	*7.1*	*A*		
	26	Atherton Street	Studebaker Road	Sig	0.46	9.2	A	0.74	23.3	C	0.54	9.3	A	0.78	13.8	B	0.54	10.3	B	0.79	14.8	B	N	N	0.60	10.7	B	0.85	15.7	B	0.58	11.1		0.86	16.9	B	N	N
Studebaker Road at SR-22/ 7th Street	27	SR-22 WB On-/Off-Ramp	Studebaker Road	Sig	0.49	16.0	B	0.74	22.1	C	0.46	12.8	B	0.79	28.0	C	0.53	13.0	B	0.76	27.3	C	N	N	0.50	13.1	B	0.86	30.4	C	0.52	13.5	B	0.82	29.1	C	N	N
	28	SR-22 EB On-/Off-Ramp	Studebaker Road	Sig	0.72	17.6	B	0.82	17.1	B	0.91	21.3	C	0.93	25.8	C	0.97	28.9	C	0.96	28.6	C	N	N	0.99	30.4	C	1.03	37.1	D	1.05	43.5	D	1.06	40.4	D	N	N
	29	SR-22 WB On-/Off-Ramp	College Park Drive	Stop	0.39	18.8	C	**0.65**	**59.9**	**F**	N/A						N/A						N	N	N/A						N/A						N	N
				Sig*	N/A						0.65	14.1	B	**1.07**	**110.1**	**F**	0.43	10.6	B	0.69	10.8	B			0.71	15.5	B	**1.16**	**147.2**	**F**	0.47	11.2	B	0.67	20.2	C		
7th Street	30	7th Street	Pacific Coast Highway	Sig	**0.95**	**92.9**	**F**	**1.03**	**82.6**	**F**	0.94	49.2	D	0.95	35.9	D	0.96	36.7	D	0.95	38.7	D	N	N	**1.02**	**65.8**	**E**	**1.03**	**58.7**	**E**	1.09	54.9	D	1.00	52.3	D	N	N
	31	7th Street	Bellflower Boulevard	Sig	**1.01**	**73.6**	**E**	**0.91**	**90.3**	**F**	**1.04**	**68.9**	**E**	0.98	47.9	D	0.90	31.3	C	0.80	33.7	C	N	N	**1.13**	**82.4**	**F**	**1.06**	**63.0**	**E**	0.98	37.5	D	0.91	33.0	C	N	N
	32	Pacific Coast Highway	Bellflower Boulevard	Sig	0.47	22.3	C	0.73	22.5	C	0.53	38.8	D	0.70	20.4	C	0.52	33.5	C	0.56	30.5	C	N	N	0.57	39.1	D	0.82	32.1	C	0.56	35.4	D	0.61	31.1	C	N	N
	33	7th Street	Channel Drive	Sig	0.72	32.9	C	0.88	30.3	C	0.71	24.5	C	0.94	22.7	C	0.71	10.8	B	0.94	29.2	C	N	N	0.77	25.7	C	1.02	50.8	D	0.77	11.5	B	1.01	48.2	D	N	N
	34	7th Street	W. Campus Drive	Sig	**0.83**	**112.9**	**F**	0.72	31.1	C	0.79	31.2	C	0.81	32.0	C	0.74	18.3	B	0.77	24.5	C	N	N	0.85	53.1	D	**0.87**	**58.5**	**E**	0.80	15.4	B	0.83	39.2	D	N	N
	35	7th Street	E. Campus Drive	Sig	0.97	23.1	C	0.73	24.7	C	1.03	35.8	D	0.87	14.6	B	1.04	39.7	D	0.87	16.6	B	N	N	**1.12**	**55.8**	**E**	0.96	16.7	B	**1.13**	**60.6**	**E**	0.95	19.2	B	Y	N
	36	7th Street	Park Avenue	Sig	0.68	12.2	B	0.74	15.7	B	0.69	14.8	B	0.81	19.2	B	0.76	14.4	B	0.83	20.0	B	N	N	0.82	17.1	B	0.86	23.7	C	0.82	16.4	B	0.87	24.8	C	N	N

Notes:
1. LOS – Level of Service; V/C – Volume-to-Capacity Ratio; D/C – Demand Volume-to-Capacity Ratio; N/A – Not Applicable (see Note 2)
2. * = Intersection is not signalized under existing or No Build conditions.
   – At the I-405 SB Direct Off-Ramp intersection with Studebaker Road, the signalized row is included only to determine if there is an adverse effect at the intersection. If a stop-controlled intersection has an LOS E or F under future conditions, then the intersection is reanalyzed as a signalized intersection to identify any adverse effects, because stop-controlled analysis does not provide an overall intersection metric.
   – The proposed mitigation includes installation of a signal at the SR-22 WB On-/Off-Ramp intersection with College Park Drive. To determine if the mitigation addresses the adverse effect, a comparison is made between the proposed signalized intersection and the no-build condition assuming a traffic signal. The traffic signal is assumed for the no-build condition because stop-controlled analysis does not provide an overall intersection metric to determine if the adverse effect at the intersection has been addressed.
3. Bold indicates an intersection forecast to operate at LOS E or F.
4. Shaded cells indicate a cumulative significant impact.
5. -- = LOS and average delay are not calculated for intersections without traffic control. The cumulative significant impact determination applies only to controlled intersections.
6. Intersection numbers correspond to the intersection numbers shown on the intersection traffic volumes figures.
7. For future conditions, the D/C ratio is used instead of the V/C ratio.

Table 4-2: Years 2020 and 2040 Peak-Hour Intersections LOS with Cumulative and Project Contribution Impact Determinations for Alternative 1

Interchange Location	Intersection #	Intersection Location		Traffic Control	Year 2009						Year 2020														Year 2040													
					Existing Traffic						No Build Traffic on No Build Geometry						Alternative 1 Traffic on No Build Geometry						Cumulative Significant Impact	Project Contribution to Significant Impact	No Build Traffic on No Build Geometry						Alternative 1 Traffic on No Build Geometry						Cumulative Significant Impact	Project Contribution to Significant Impact
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour				
		East/West Street	North/South Street		V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS			D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS		
Carson Street at I-605	1	Carson Street	I-605 SB Off-Ramp	Sig	0.58	21.9	C	0.61	17.8	B	0.57	22.3	C	0.68	23.8	C	0.56	18.7	B	0.67	20.1	C	N	N	0.62	22.4	C	0.73	24.5	C	0.61	18.8	B	0.73	20.8	C	N	N
	2	Carson Street	I-605 SB Direct On-Ramp	None	0.15	--	--	0.25	--	--	0.22	--	--	0.33	--	--	0.24	--	--	0.38	--	--	--	--	0.24	--	--	0.36	--	--	0.26	--	--	0.41	--	--	--	--
		Carson Street	I-605 SB Loop On-Ramp	None	0.24	--	--	0.20	--	--	0.33	--	--	0.33	--	--	0.35	--	--	0.36	--	--	--	--	0.35	--	--	0.36	--	--	0.38	--	--	0.39	--	--	--	--
	3	Carson Street	I-605 NB Off-Ramp	Sig	0.55	14.8	B	0.66	12.4	B	0.59	21.8	C	0.76	20.6	C	0.59	20.3	C	0.76	16.6	B	N	N	0.63	23.6	C	0.82	23.2	C	0.63	21.8	C	0.82	18.4	B	N	N
		Carson Street	I-605 NB Loop On-Ramp	None	0.23	--	--	0.45	--	--	0.31	--	--	0.35	--	--	0.30	--	--	0.35	--	--	--	--	0.33	--	--	0.37	--	--	0.33	--	--	0.37	--	--	--	--
		Carson Street	I-605 NB Direct On-Ramp	None	0.40	--	--	0.32	--	--	0.52	--	--	0.49	--	--	0.51	--	--	0.46	--	--	--	--	0.56	--	--	0.53	--	--	0.55	--	--	0.49	--	--	--	--
	4	Carson Street	Pioneer Boulevard	Sig	0.76	48.1	D	0.76	35.1	D	0.79	31.1	C	0.84	33.7	C	0.79	30.7	C	0.87	31.6	C	N	N	0.86	35.1	D	0.92	43.9	D	0.87	34.7	C	0.90	41.4	D	N	N
Spring Street/ Cerritos Avenue at I-605	5	Spring Street/ Cerritos Avenue	I-605 SB Off-Ramp	Sig	0.79	26.2	C	0.60	18.4	B	0.68	14.2	B	0.65	10.9	B	0.68	14.0	B	0.64	10.3	B	N	N	0.74	15.4	B	0.71	12.0	B	0.73	15.2	B	0.70	11.4	B	N	N
	6	Spring Street/ Cerritos Avenue	I-605 NB On-Ramp	Sig	0.84	13.5	B	0.81	11.1	B	0.76	10.5	B	0.79	8.2	A	0.73	9.3	A	0.78	8.1	A	N	N	0.82	11.6	B	0.86	9.8	A	0.79	10.3	B	0.85	9.5	A	N	N
Lakewood Boulevard/ Willow Street at I-405	7	I-405 NB Direct Off-Ramp	Lakewood Boulevard	None	0.35	--	--	0.34	--	--	0.38	--	--	0.38	--	--	0.43	--	--	0.41	--	--	--	--	0.41	--	--	0.41	--	--	0.47	--	--	0.44	--	--	--	--
		I-405 NB Direct On-Ramp	Lakewood Boulevard	None	0.22	--	--	0.21	--	--	0.38	--	--	0.23	--	--	0.38	--	--	0.22	--	--	--	--	0.41	--	--	0.25	--	--	0.41	--	--	0.24	--	--	--	--
		I-405 NB Loop Off-Ramp	Lakewood Boulevard	None	0.19	--	--	0.18	--	--	0.23	--	--	0.22	--	--	0.26	--	--	0.22	--	--	--	--	0.25	--	--	0.23	--	--	0.28	--	--	0.24	--	--	--	--
		I-405 NB Loop On-Ramp	Lakewood Boulevard	None	0.50	--	--	0.38	--	--	0.53	--	--	0.41	--	--	0.53	--	--	0.41	--	--	--	--	0.57	--	--	0.44	--	--	0.57	--	--	0.44	--	--	--	--
	8	I-405 SB Loop On-Ramp	Lakewood Boulevard	None	0.19	--	--	0.23	--	--	0.22	--	--	0.25	--	--	0.23	--	--	0.25	--	--	--	--	0.24	--	--	0.27	--	--	0.25	--	--	0.27	--	--	--	--
		I-405 SB Direct Off-Ramp	Lakewood Boulevard	None	0.40	--	--	0.31	--	--	0.43	--	--	0.48	--	--	0.41	--	--	0.46	--	--	--	--	0.46	--	--	0.52	--	--	0.44	--	--	0.50	--	--	--	--
	9	Willow Street	Lakewood Boulevard	Sig	0.76	31.1	C	**0.92**	**66.2**	**E**	0.75	31.2	C	0.89	43.0	D	0.74	28.9	C	0.96	46.5	D	N	N	0.81	33.6	C	0.93	48.4	D	0.79	33.1	C	0.93	48.7	D	N	N
	10	Willow Street	I-405 SB Loop Off-Ramp	None	0.32	--	--	0.30	--	--	0.35	--	--	0.46	--	--	0.33	--	--	0.45	--	--	--	--	0.37	--	--	0.50	--	--	0.36	--	--	0.48	--	--	--	--
		Willow Street	I-405 SB Direct On-Ramp	None	0.26	--	--	0.38	--	--	0.28	--	--	0.41	--	--	0.28	--	--	0.41	--	--	--	--	0.31	--	--	0.44	--	--	0.31	--	--	0.44	--	--	--	--
Bellflower Boulevard/ Los Coyotes Diagonal at I-405	11	I-405 NB Off-Ramp	Bellflower Boulevard	Sig	0.41	9.3	A	0.48	11.9	B	0.51	10.8	B	0.53	10.6	B	0.51	10.4	B	0.53	10.9	B	N	N	0.55	11.6	B	0.58	11.3	B	0.55	11.3	B	0.58	11.3	B	N	N
		I-405 NB Loop On-Ramp	Bellflower Boulevard	None	0.49	--	--	0.35	--	--	0.53	--	--	0.37	--	--	0.51	--	--	0.37	--	--	--	--	0.57	--	--	0.40	--	--	0.55	--	--	0.40	--	--	--	--
		I-405 NB Direct On-Ramp	Bellflower Boulevard	None	0.28	--	--	0.18	--	--	0.31	--	--	0.19	--	--	0.29	--	--	0.19	--	--	--	--	0.33	--	--	0.20	--	--	0.32	--	--	0.20	--	--	--	--
	12	Willow Street	Bellflower Boulevard	Sig	**0.84**	**81.2**	**F**	0.92	40.1	D	1.01	48.8	D	1.01	54.4	D	1.00	50.1	D	1.00	51.2	D	N	N	**1.09**	**67.3**	**E**	**1.09**	**70.6**	**E**	**1.09**	**68.2**	**E**	**1.10**	**68.1**	**E**	Y	N
	13	Los Coyotes Diagonal	Bellflower Boulevard	Sig	0.63	31.3	C	**0.97**	**72.8**	**E**	0.65	26.4	C	1.00	42.1	D	0.64	27.5	C	1.06	44.6	D	N	N	0.70	26.9	C	**1.13**	**56.8**	**E**	0.70	28.1	C	**1.15**	**59.4**	**E**	Y	Y
		Los Coyotes Diagonal	I-405 SB Direct On-Ramp	None	0.06	--	--	0.09	--	--	0.06	--	--	0.12	--	--	0.08	--	--	0.12	--	--	--	--	0.07	--	--	0.13	--	--	0.08	--	--	0.13	--	--	--	--
	14	I-405 SB Loop Off-Ramp	Bellflower Boulevard	None	0.12	--	--	0.26	--	--	0.12	--	--	0.32	--	--	0.12	--	--	0.29	--	--	--	--	0.13	--	--	0.34	--	--	0.13	--	--	0.32	--	--	--	--
	15	Los Coyotes Diagonal	I-405 SB Direct Off-Ramp	Sig	0.44	14.4	B	0.45	13.4	B	0.52	10.0	B	0.47	16.0	B	0.52	10.3	B	0.47	14.0	B	N	N	0.56	10.6	B	0.51	16.8	B	0.56	10.8	B	0.51	14.7	B	N	N
		Los Coyotes Diagonal	I-405 SB Loop On-Ramp	None	0.14	--	--	0.13	--	--	0.16	--	--	0.17	--	--	0.25	--	--	0.17	--	--	--	--	0.18	--	--	0.18	--	--	0.27	--	--	0.18	--	--	--	--
	16	Willow Street	Los Coyotes Diagonal	Sig	0.72	51.5	D	**0.74**	**102.8**	**F**	0.78	44.4	D	1.02	35.1	D	0.77	31.7	C	1.04	36.7	D	N	N	0.87	48.8	D	1.18	45.4	D	0.86	36.4	D	1.20	50.4	D	N	N

Table 4-2: Years 2020 and 2040 Peak-Hour Intersections LOS with Cumulative and Project Contribution Impact Determinations for Alternative 1

Interchange Location	Intersection #	Intersection Location: East/West Street	Intersection Location: North/South Street	Traffic Control	Year 2009 Existing Traffic AM Peak Hour V/C	Year 2009 Existing Traffic AM Peak Hour Avg Delay (sec)	Year 2009 Existing Traffic AM Peak Hour LOS	Year 2009 Existing Traffic PM Peak Hour V/C	Year 2009 Existing Traffic PM Peak Hour Avg Delay (sec)	Year 2009 Existing Traffic PM Peak Hour LOS	Year 2020 No Build Traffic on No Build Geometry AM Peak Hour D/C	Year 2020 No Build Traffic on No Build Geometry AM Peak Hour Avg Delay (sec)	Year 2020 No Build Traffic on No Build Geometry AM Peak Hour LOS	Year 2020 No Build Traffic on No Build Geometry PM Peak Hour D/C	Year 2020 No Build Traffic on No Build Geometry PM Peak Hour Avg Delay (sec)	Year 2020 No Build Traffic on No Build Geometry PM Peak Hour LOS	Year 2020 Alternative 1 Traffic on No Build Geometry AM Peak Hour D/C	Year 2020 Alternative 1 Traffic on No Build Geometry AM Peak Hour Avg Delay (sec)	Year 2020 Alternative 1 Traffic on No Build Geometry AM Peak Hour LOS	Year 2020 Alternative 1 Traffic on No Build Geometry PM Peak Hour D/C	Year 2020 Alternative 1 Traffic on No Build Geometry PM Peak Hour Avg Delay (sec)	Year 2020 Alternative 1 Traffic on No Build Geometry PM Peak Hour LOS	Year 2020 Cumulative Significant Impact	Year 2020 Project Contribution to Significant Impact	Year 2040 No Build Traffic on No Build Geometry AM Peak Hour D/C	Year 2040 No Build Traffic on No Build Geometry AM Peak Hour Avg Delay (sec)	Year 2040 No Build Traffic on No Build Geometry AM Peak Hour LOS	Year 2040 No Build Traffic on No Build Geometry PM Peak Hour D/C	Year 2040 No Build Traffic on No Build Geometry PM Peak Hour Avg Delay (sec)	Year 2040 No Build Traffic on No Build Geometry PM Peak Hour LOS	Year 2040 Alternative 1 Traffic on No Build Geometry AM Peak Hour D/C	Year 2040 Alternative 1 Traffic on No Build Geometry AM Peak Hour Avg Delay (sec)	Year 2040 Alternative 1 Traffic on No Build Geometry AM Peak Hour LOS	Year 2040 Alternative 1 Traffic on No Build Geometry PM Peak Hour D/C	Year 2040 Alternative 1 Traffic on No Build Geometry PM Peak Hour Avg Delay (sec)	Year 2040 Alternative 1 Traffic on No Build Geometry PM Peak Hour LOS	Year 2040 Cumulative Significant Impact	Year 2040 Project Contribution to Significant Impact
Woodruff Avenue at I-405	17	Willow Street	Woodruff Avenue	Sig	**1.07**	**86.8**	**F**	0.77	30.4	C	**1.33**	**147.9**	**F**	0.87	40.4	D	**1.32**	**146.2**	**F**	0.88	40.9	D	Y	N	**1.44**	**180.5**	**F**	0.94	51.5	D	**1.43**	**179.2**	**F**	0.94	53.1	D	Y	N
	18	I-405 NB Direct Off-Ramp	Woodruff Avenue	None	0.15	--	--	0.17	--	--	0.39	--	--	0.19	--	--	0.39	--	--	0.20	--	--	--	--	0.42	--	--	0.20	--	--	0.43	--	--	0.22	--	--	--	--
		I-405 NB Direct On-Ramp	Woodruff Avenue	None	0.25	--	--	0.20	--	--	0.31	--	--	0.21	--	--	0.31	--	--	0.21	--	--	--	--	0.34	--	--	0.23	--	--	0.34	--	--	0.23	--	--	--	--
	19	I-405 SB Direct Off-Ramp	Woodruff Avenue	None	0.48	--	--	0.38	--	--	0.52	--	--	0.47	--	--	0.51	--	--	0.45	--	--	--	--	0.56	--	--	0.51	--	--	0.55	--	--	0.49	--	--	--	--
		I-405 SB Direct On-Ramp	Woodruff Avenue	None	0.27	--	--	0.19	--	--	0.41	--	--	0.23	--	--	0.43	--	--	0.23	--	--	--	--	0.45	--	--	0.25	--	--	0.47	--	--	0.25	--	--	--	--
Palo Verde Avenue / Stearns Street at I-405	20	I-405 NB Direct Off-Ramp	Palo Verde Avenue	Sig	0.54	11.3	B	0.45	13.7	B	0.78	17.7	B	0.61	11.8	B	0.78	17.0	B	0.63	12.0	B	N	N	0.95	21.2	C	0.70	12.6	B	0.96	20.6	C	0.73	13.1	B	N	N
		I-405 NB Loop On-Ramp	Palo Verde Avenue	None	0.11	--	--	0.20	--	--	0.13	--	--	0.22	--	--	0.15	--	--	0.20	--	--	--	--	0.14	--	--	0.23	--	--	0.17	--	--	0.21	--	--	--	--
	21	Woodruff Avenue	Palo Verde Avenue	Sig	**0.87**	**86.6**	**F**	0.59	21.3	C	0.84	13.6	B	0.66	10.3	B	0.84	12.9	B	0.68	10.2	B	N	N	0.91	15.9	B	0.72	11.3	B	0.91	15.4	B	0.74	11.2	B	N	N
	22	Stearns Street	Palo Verde Avenue	Sig	0.73	19.4	B	0.75	25.2	C	0.86	18.9	B	0.83	20.5	C	0.86	18.5	B	0.85	21.0	C	N	N	0.94	22.0	C	0.92	24.4	C	0.94	21.7	C	0.93	25.1	C	N	N
	23	Stearns Street	I-405 SB Direct On-Ramp	None	0.28	--	--	0.39	--	--	0.30	--	--	0.46	--	--	0.33	--	--	0.44	--	--	--	--	0.33	--	--	0.50	--	--	0.35	--	--	0.48	--	--	--	--
Studebaker Road at I-405	24	I-405 NB Direct On-Ramp	Studebaker Road	Sig	0.50	4.0	A	0.55	4.3	A	0.51	2.6	A	0.47	4.7	A	0.51	1.2	A	0.50	3.1	A	N	N	0.55	2.8	A	0.51	4.9	A	0.55	1.4	A	0.54	3.2	A	N	N
	25	I-405 SB Direct Off-Ramp	Studebaker Road	Stop	0.15	13.8	B	0.04	10.8	B	**0.86**	**68.4**	**F**	0.34	16.2	C	**1.03**	**113.3**	**F**	0.51	24.8	C	N	N	**1.02**	**98.3**	**F**	0.33	15.7	C	**1.24**	**170.6**	**F**	0.53	25.2	D	N	N
				*Sig**	*N/A*						*0.65*	*8.4*	*A*	*0.66*	*5.8*	*A*	*0.66*	*8.9*	*A*	*0.65*	*6.2*	*A*			*0.71*	*9.1*	*A*	*0.72*	*7.0*	*A*	*0.72*	*9.8*	*A*	*0.72*	*7.1*	*A*		
	26	Atherton Street	Studebaker Road	Sig	0.46	9.2	A	0.74	23.3	C	0.54	9.3	A	0.78	13.8	B	0.54	10.3	B	0.79	14.8	B	N	N	0.60	10.7	B	0.85	15.7	B	0.58	11.1	B	0.86	16.9	B	N	N
Studebaker Road at SR-22/ 7th Street	27	SR-22 WB On/Off-Ramp	Studebaker Road	Sig	0.49	16.0	B	0.74	22.1	C	0.46	12.8	B	0.79	28.0	C	0.53	13.0	B	0.76	27.3	C	N	N	0.50	13.1	B	0.86	30.4	C	0.52	13.5	B	0.82	29.1	C	N	N
	28	SR-22 EB On/Off-Ramp	Studebaker Road	Sig	0.72	17.6	B	0.82	17.1	B	0.91	21.3	C	0.93	25.8	C	0.97	28.9	C	0.96	28.6	C	N	N	0.99	30.4	C	1.03	37.1	D	1.05	43.5	D	1.06	40.4	D	N	N
	29	SR-22 WB On/Off-Ramp	College Park Drive	Stop	0.39	18.8	C	**0.65**	**59.9**	**F**	0.43	21.3	C	**0.61**	**88.7**	**F**	0.51	24.3	C	**0.73**	**104.8**	**F**	Y	Y	0.51	25.3	D	**0.84**	**152.1**	**F**	0.61	30.2	D	**1.00**	**184.2**	**F**	Y	Y
				*Sig**	*N/A*						*0.65*	*14.1*	*B*	***1.07****	***110.1***	***F****	*0.70*	*15.1*	*B*	***1.10****	***119.9***	***F****			*0.71*	*15.5*	*B*	***1.16****	***147.2***	***F****	*0.75*	*17.3*	*B*	***1.19****	***156.9***	***F****		
7th Street	30	7th Street	Pacific Coast Highway	Sig	**0.95**	**92.9**	**F**	**1.03**	**82.6**	**F**	0.94	49.2	D	0.95	35.9	D	0.96	53.2	D	0.96	37.4	D	N	N	**1.02**	**65.8**	**E**	**1.03**	**58.7**	**E**	**1.04**	**71.5**	**E**	**1.04**	**62.4**	**E**	Y	Y
	31	7th Street	Bellflower Boulevard	Sig	**1.01**	**73.6**	**E**	**0.91**	**90.3**	**F**	**1.04**	**68.9**	**E**	0.98	47.9	D	**1.06**	**71.4**	**E**	0.96	42.8	D	Y	Y	**1.13**	**82.4**	**F**	**1.06**	**63.0**	**E**	**1.14**	**84.9**	**F**	**1.04**	**57.2**	**E**	Y	N
	32	Pacific Coast Highway	Bellflower Boulevard	Sig	0.47	22.3	C	0.73	22.5	C	0.53	38.8	D	0.70	20.4	C	0.50	36.6	D	0.69	19.5	B	N	N	0.57	39.1	D	0.82	32.1	C	0.54	36.9	D	0.81	32.0	C	N	N
	33	7th Street	Channel Drive	Sig	0.72	32.9	C	0.88	30.3	C	0.71	24.5	C	0.94	22.7	C	0.74	23.2	C	0.95	25.6	C	N	N	0.77	25.7	C	1.02	50.8	D	0.80	24.3	C	**1.03**	**55.3**	**E**	Y	N
	34	7th Street	W. Campus Drive	Sig	**0.83**	**112.9**	**F**	0.72	31.1	C	0.79	31.2	C	0.81	32.0	C	0.79	33.2	C	0.82	35.6	D	N	N	0.85	53.1	D	**0.87**	**58.5**	**E**	**0.86**	**55.3**	**E**	**0.89**	**64.3**	**E**	Y	Y
	35	7th Street	E. Campus Drive	Sig	0.97	23.1	C	0.73	24.7	C	1.03	35.8	D	0.87	14.6	B	1.03	38.0	D	0.88	14.9	B	N	N	**1.12**	**55.8**	**E**	0.96	16.7	B	**1.13**	**58.6**	**E**	0.97	17.2	B	Y	N
	36	7th Street	Park Avenue	Sig	0.68	12.2	B	0.74	15.7	B	0.69	14.8	B	0.81	19.2	B	0.76	14.4	B	0.83	20	B	N	N	0.82	17.1	B	0.86	23.7	C	0.82	16.4	B	0.87	24.8	C	N	N

Notes:

1. LOS – Level of Service; V/C – Volume-to-Capacity Ratio; D/C – Demand Volume-to-Capacity Ratio; N/A – Not Applicable (see Note 2)
2. * = Intersection is not signalized under existing or No Build conditions. The signalized row is included only to determine if there is an adverse effect at the intersection. If a stop-controlled intersection has an LOS E or F under future conditions, then the intersection is reanalyzed as a signalized intersection to identify any adverse effects, because stop-controlled analysis does not provide an overall intersection metric. The number of LOS E or F locations and the number of locations with V/C or D/C greater than 1.00 identified in the text does not include the signalized row because the existing and no-build operation is based on the current stop control.
3. Bold indicates an intersection forecast to operate at LOS E or F.
4. Shaded cells indicate a cumulative significant impact.
5. -- = LOS and average delay are not calculated for intersections without traffic control. The cumulative significant impact determination applies only to controlled intersections.
6. Intersection numbers correspond to the intersection numbers shown on the intersection traffic volumes figures.
7. For future conditions, the D/C ratio is used instead of the V/C ratio.

4. Under Alternative 1 and the No Build Alternative in 2020, HOV lanes on I-405 north of I-605 to Lakewood Boulevard are anticipated to operate at LOS F during peak hours because v/c ratios are all forecast to be over capacity. Under the existing condition, v/c ratios range from 0.50 to 1.06, indicating a range of LOS from A to F depending on time of day and direction of travel. Under Alternative 1 and the No Build Alternative in 2040, HOV lanes on I-405 north of I-605 to Lakewood Boulevard are anticipated to operate at LOS F during peak hours because v/c ratios are all forecast to be over capacity. (See Tables 3-3 and 3-7.)
5. Under Alternative 1 in 2020, branch connectors in the I-405/I-605/SR-22 interchange serving movements to and from Long Beach are anticipated to operate with v/c ratios ranging from 0.14 less than to 0.06 greater than under the No Build Alternative compared to the existing range of 0.36 to 0.97. Under Alternative 1 in 2040, branch connectors in the I-405/I-605/ SR-22 interchange serving movements to and from Long Beach are anticipated to operate with v/c ratios ranging from 0.20 less than to 0.05 greater than under the No Build Alternative compared to the existing range of 0.36 to 0.97. (See Tables 3-4 and 3-8.)
6. Under Alternative 1 with all proposed mitigation in 2020, there are three fewer intersections anticipated to operate at LOS E or F than under the No Build Alternative compared to ten such intersections in the existing condition. Under Alternative 1 in 2020, there is one fewer intersection anticipated to operate with v/c ratios greater than 1.00 than under the No Build Alternative compared to three such intersections in the existing condition. Under Alternative 1 in 2040, there are six fewer intersections anticipated to operate at LOS E or F than under the No Build Alternative compared to ten such intersections in the existing condition. Under Alternative 1 in 2040, there are two fewer intersection anticipated to operate with v/c ratios greater than 1.00 than under the No Build Alternative compared to three such intersections in the existing condition. (See Table 4-1.)
7. Under Alternative 1 and the No Build Alternative in 2040 within the Long Beach traffic study area, 90 percent of off-ramps are anticipated to have adequate storage at their arterial terminal, compared to 100 percent under existing conditions. (See Table 3-5.)
8. In 2040 under Alternative 1 within the Long Beach traffic study area, the percentage of arterials with adequate storage at their intersections with freeway ramps is anticipated to be 9 percent higher than under the No Build Alternative, compared to 82 percent under existing conditions. (See Table 3-5.)
9. Under Alternative 1 and the No Build Alternative in 2040 within the Long Beach traffic study area, 45 percent of arterial/arterial intersections are anticipated to have adequate storage, compared to 54 percent under existing conditions. (See Table 3-5.)

Alternative 2

Future Build Alternative Compared to Existing Condition. A comparison of Alternative 2 in 2020 and 2040 to the existing condition reveals the following information. The data used to make the comparison are presented in the tables in Chapter 3 of this Supplemental Draft EIR/EIS. Impacts identified through the comparison are cumulative impacts resulting from the combination of the proposed I-405 project and other land development and roadway improvement projects in the corridor and region. The inclusion of other land development and roadway improvement projects in the traffic forecasts is summarized in Draft EIR/EIS Section 3.6.5.7, Traffic and Transportation/Pedestrian and Bicycle Facilities (Resources not Subject to Cumulative Analysis), and more fully explained in the Traffic Study in Section 2.2.2.

1. Under Alternative 2 on I-405 north of I-605 to Lakewood Boulevard, GP lane volumes during peak hours in 2020 and 2040 are expected to be greater than in the existing condition. For example, between Palo Verde Avenue and Woodruff Avenue, peak-hour GP volumes by direction range from 7,175 to 8,546 under existing conditions. The volumes anticipated for Alternative 2 in 2020 range from 8,690 to 9,930 and in 2040 from 9,400 to 10,740. (See Figures 3-4, 3-8, and 3-12.)
2. Under Alternative 2 on I-405 north of I-605 to Lakewood Boulevard, HOV lane volumes during peak hours in 2020 and 2040 are expected to be greater than in the existing condition. For example, between Palo Verde Avenue and Woodruff Avenue, peak-hour HOV volumes by direction range from 793 to 1,720 under existing conditions. The volumes anticipated for Alternative 2 in 2020 range from 2,020 to 2,160 and in 2040 from 2,180 to 2,330. (See Figures 3-4, 3-8, and 3-12.)
3. Under Alternative 2 on I-405 north of I-605 to Lakewood Boulevard in 2020, LOS F conditions are anticipated during peak hours in the GP lanes, except for LOS D and E in the southbound direction between I-605 and Studebaker Road during the AM and PM peak hours, respectively. In 2040, LOS F conditions are anticipated during peak hours in the GP lanes, except for LOS E in the southbound direction between I-605 and Studebaker Road during the AM and PM peak hours. Under the existing condition, LOS D to F conditions occur during peak hours in the GP lanes. Under Alternative 2 in 2020, v/c ratios in the GP lanes range from 0.02 lower than under existing conditions to 0.56 greater. In 2040, v/c ratios range from 0.05 to 0.67 greater than under existing conditions. (See Tables 3-2 and 3-6.)
4. Under Alternative 2 on I-405 north of I-605 to Lakewood Boulevard, HOV lanes are anticipated to operate at LOS F during peak hours because v/c ratios are all forecast to be over capacity ranging from 1.09 to 1.46 in 2020 and from 1.17 to 1.58 in 2040. Under the existing condition, v/c ratios range from 0.50 to 1.06. In 2020, Alternative 2 v/c ratios in the

HOV lanes range from 0.05 to 0.69 greater than under existing conditions. In 2040, v/c ratios range from 0.14 to 0.79 greater than under existing conditions. (See Tables 3-3 and 3-7.)

5. Under Alternative 2, branch connectors in the I-405/I-605/SR-22 interchange serving movements to and from Long Beach are anticipated to operate with v/c ratios ranging from 0.23 to 1.14 in 2020 and from 0.11 to 1.14 in 2040, compared to the existing range of 0.36 to 0.97. (See Tables 3-4 and 3-8.)
6. Under Alternative 2 with all proposed mitigations in 2020, there are two Long Beach area study intersections anticipated to operate at LOS E or F, and five to have v/c ratios greater than 1.00 during peak hours, compared to ten intersections operating at LOS E or F and three with v/c ratios over 1.00 under existing conditions. In 2040, there are three intersections anticipated to operate at LOS E or F and nine to have v/c ratios greater than 1.00 during peak hours, compared to ten intersections operating at LOS E or F and three with v/c ratios over 1.00 under existing conditions. (See Table 4-3).
7. Under Alternative 2 in 2040 within the Long Beach traffic study area, the percentage of off-ramps with adequate storage at their arterial terminal is anticipated to be 90 percent, compared to 100 percent under existing conditions. (See Table 3-5.)
8. Under Alternative 2 in 2040 within the Long Beach traffic study area, the percentage of arterials with adequate storage at their intersections with freeway ramps is anticipated to be 64 percent, compared to 82 percent under existing conditions. (See Table 3-5.)
9. Under Alternative 2 in 2040 within the Long Beach traffic study area, the percentage of arterial/arterial intersections with adequate storage is anticipated to be 49 percent, compared to 54 percent under existing conditions. (See Table 3-5.)

Table 4-4 shows that, under Alternative 2 in 2020, there are five intersections in the Long Beach traffic study area with a significant cumulative impact. The intersections are designated on the table with a "Y" (Yes) in the column labeled "Cumulative Significant Impact." Table 4-4 also shows that, under Alternative 2 in 2040, there are nine intersections with a significant cumulative impact.

An increase in the v/c ratio of a freeway segment is an indication of a cumulative impact on the freeway mainline. Based on the increases in freeway GP and HOV lane v/c ratios cited above in Items 3 and 4, there is a cumulative impact on the I-405 freeway mainline.

Future Build Alternative Compared to Future No Build. Chapter 3 of this Supplemental Draft EIR/EIS provides a comparison of Alternative 2 to the No Build Alternative in 2020 and 2040. That comparison identifies the contribution of Alternative 2 to cumulative impacts. As shown in Tables 3-2 and 3-6, v/c ratios for the I-405 freeway mainline under Alternative 2 are 0.01 lower to 0.08 higher than under the No Build Alternative in 2020 and 0.00 to 0.08 higher in 2040.

Because Tables 3-2 and 3-6 show that, for segments of I-405 north of I-605 to Lakewood Boulevard, LOS is F under the No Build Alternative or the maximum increase in v/c ratios is 0.02, the contribution of Alternative 2 to the cumulative impact on the freeway mainline is less than significant.

Table 4-4 shows (with a "Y" in the columns labeled "Project Contribution to Significant Impact") that there are nine intersections under Alternative 2 with project contributions to cumulative impacts that are significant. Measures T-10 and T-11 presented in Section 3.3 of this Supplemental Draft EIR/EIS are proposed to mitigate those significant impacts. Table 4-3 shows that, with all improvements including the mitigations, three intersections are anticipated to have significant cumulative impacts in either 2020 or 2040. Table 4-3 also shows that there are no intersections where the contribution of Alternative 2 to the cumulative impacts is significant with the proposed mitigations in place.

In summary, there are no significant impacts of Alternative 2 on performance or the LOS of the circulation system.

Difference between Alternative 2 and No Build Alternative Related to Existing Condition. A comparison of the existing condition and the difference between Alternative 2 and the No Build Alternative reveals the following information. The data used to make the comparison are presented in the tables indicated in Chapter 3 of this Supplemental Draft EIR/EIS.

1. Under Alternative 2 on I-405 north of I-605 to Lakewood Boulevard, GP lane volumes during peak hours in 2020 and 2040 are expected to be greater than under the no-build condition. In 2020 between Palo Verde Avenue and Woodruff Avenue, peak-hour GP volumes by direction range from 130 to 510 greater under Alternative 2 than under no-build conditions compared to 7,175 to 8,546 under the existing condition. (See Figures 3-4, 3-6, and 3-8.) In 2040 between Palo Verde Avenue and Woodruff Avenue, peak-hour GP volumes by direction range from 140 to 560 greater under Alternative 2 than under no-build conditions compared to 7,175 to 8,546 under the existing condition. (See Figures 3-4, 3-10, and 3-12.)
2. Under Alternative 2 on I-405 north of I-605 to Lakewood Boulevard, HOV lane volumes during peak hours in 2020 and 2040 are expected to be greater than under the no-build condition. In 2020 between Palo Verde Avenue and Woodruff Avenue, peak-hour HOV volumes by direction range from 20 lower to 300 greater under Alternative 2 than under no-build conditions compared to 793 to 1,720 under the existing condition. (See Figures 3-4, 3-6, and 3-8). In 2040 between Palo Verde Avenue and Woodruff Avenue, peak-hour HOV volumes by direction range from 30 lower to 320 greater under Alternative 2 than under no-build conditions compared to 793 to 1,720 under the existing condition. (See Figures 3-4, 3-10, and 3-12.)

Table 4-3: Years 2020 and 2040 Peak-Hour Intersections LOS after Mitigation with Cumulative and Project Contribution Impact Determinations for Alternative 2

Interchange Location	Intersection #	Intersection Location		Traffic Control	Year 2009						Year 2020														Year 2040													
					Existing Traffic						No Build Traffic on No Build Geometry						Alternative 2 Traffic on Alternative 2 Geometry including Mitigations						Cumulative Significant Impact	Project Contribution to Significant Impact	No Build Traffic on No Build Geometry						Alternative 2 Traffic on Alternative 2 Geometry including Mitigations						Cumulative Significant Impact	Project Contribution to Significant Impact
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour				
		East/West Street	North/South Street		V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS			D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS		
Carson Street at I-605	1	Carson Street	I-605 SB Off-Ramp	Sig	0.58	21.9	C	0.61	17.8	B	0.57	22.3	C	0.68	23.8	C	0.58	19.1	B	0.67	20.3	C	N	N	0.62	22.4	C	0.73	24.5	C	0.63	19.3	B	0.73	21.0	C	N	N
	2	Carson Street	I-605 SB Direct On-Ramp	None	0.15	--	--	0.25	--	--	0.22	--	--	0.33	--	--	0.24	--	--	0.32	--	--	--	--	0.24	--	--	0.36	--	--	0.26	--	--	0.34	--	--	--	--
		Carson Street	I-605 SB Loop On-Ramp	None	0.24	--	--	0.20	--	--	0.33	--	--	0.33	--	--	0.37	--	--	0.36	--	--	--	--	0.35	--	--	0.36	--	--	0.40	--	--	0.39	--	--	--	--
	3	Carson Street	I-605 NB Off-Ramp	Sig	0.55	14.8	B	0.66	12.4	B	0.59	21.8	C	0.76	20.6	C	0.60	20.1	C	0.75	16.5	B	N	N	0.63	23.6	C	0.82	23.2	C	0.65	21.9	C	0.81	18.1	B	N	N
		Carson Street	I-605 NB Loop On-Ramp	None	0.23	--	--	0.45	--	--	0.31	--	--	0.35	--	--	0.33	--	--	0.36	--	--	--	--	0.33	--	--	0.37	--	--	0.35	--	--	0.39	--	--	--	--
		Carson Street	I-605 NB Direct On-Ramp	None	0.40	--	--	0.32	--	--	0.52	--	--	0.49	--	--	0.51	--	--	0.46	--	--	--	--	0.56	--	--	0.53	--	--	0.55	--	--	0.49	--	--	--	--
	4	Carson Street	Pioneer Boulevard	Sig	0.76	48.1	D	0.76	35.1	D	0.79	31.1	C	0.84	33.7	C	0.78	34.4	C	0.84	31.2	C	N	N	0.86	35.1	D	0.92	43.9	D	0.86	41.9	D	0.93	39.0	D	N	N
Spring Street/ Cerritos Avenue at I-605	5	Spring Street/ Cerritos Avenue	I-605 SB Off-Ramp	Sig	0.79	26.2	C	0.60	18.4	B	0.68	14.2	B	0.65	10.9	B	0.68	14.5	B	0.57	9.8	A	N	N	0.74	15.4	B	0.71	12.0	B	0.74	15.7	B	0.62	10.8	B	N	N
	6	Spring Street/ Cerritos Avenue	I-605 NB On-Ramp	Sig	0.84	13.5	B	0.81	11.1	B	0.76	10.5	B	0.79	8.2	A	0.69	7.9	A	0.74	7.7	A	N	N	0.82	11.6	B	0.86	9.8	A	0.75	8.7	A	0.81	8.6	A	N	N
Lakewood Boulevard/ Willow Street at I-405	7	I-405 NB Direct Off-Ramp	Lakewood Boulevard	None	0.35	--	--	0.34	--	--	0.38	--	--	0.38	--	--	0.42	--	--	0.42	--	--	--	--	0.41	--	--	0.41	--	--	0.46	--	--	0.45	--	--	--	--
		I-405 NB Direct On-Ramp	Lakewood Boulevard	None	0.22	--	--	0.21	--	--	0.38	--	--	0.23	--	--	0.39	--	--	0.20	--	--	--	--	0.41	--	--	0.25	--	--	0.43	--	--	0.21	--	--	--	--
		I-405 NB Loop Off-Ramp	Lakewood Boulevard	None	0.19	--	--	0.18	--	--	0.23	--	--	0.22	--	--	0.23	--	--	0.23	--	--	--	--	0.25	--	--	0.23	--	--	0.25	--	--	0.25	--	--	--	--
		I-405 NB Loop On-Ramp	Lakewood Boulevard	None	0.50	--	--	0.38	--	--	0.53	--	--	0.41	--	--	0.54	--	--	0.41	--	--	--	--	0.57	--	--	0.44	--	--	0.58	--	--	0.44	--	--	--	--
	8	I-405 SB Loop On-Ramp	Lakewood Boulevard	None	0.19	--	--	0.23	--	--	0.22	--	--	0.25	--	--	0.22	--	--	0.25	--	--	--	--	0.24	--	--	0.27	--	--	0.24	--	--	0.27	--	--	--	--
		I-405 SB Direct Off-Ramp	Lakewood Boulevard	None	0.40	--	--	0.31	--	--	0.43	--	--	0.48	--	--	0.42	--	--	0.47	--	--	--	--	0.46	--	--	0.52	--	--	0.45	--	--	0.51	--	--	--	--
	9	Willow Street	Lakewood Boulevard	Sig	0.76	31.1	C	**0.92**	**66.2**	**E**	0.75	31.2	C	0.89	43.0	D	0.75	28.3	C	0.90	44.3	D	N	N	0.81	33.6	C	0.93	48.4	D	0.79	32.2	C	1.02	52.0	D	N	N
	10	Willow Street	I-405 SB Loop Off-Ramp	None	0.32	--	--	0.30	--	--	0.35	--	--	0.46	--	--	0.33	--	--	0.45	--	--	--	--	0.37	--	--	0.50	--	--	0.36	--	--	0.49	--	--	--	--
		Willow Street	I-405 SB Direct On-Ramp	None	0.26	--	--	0.38	--	--	0.28	--	--	0.41	--	--	0.31	--	--	0.43	--	--	--	--	0.31	--	--	0.44	--	--	0.34	--	--	0.46	--	--	--	--
Bellflower Boulevard/ Los Coyotes Diagonal at I-405	11	I-405 NB Off-Ramp	Bellflower Boulevard	Sig	0.41	9.3	A	0.48	11.9	B	0.51	10.8	B	0.53	10.6	B	0.52	10.5	B	0.53	11.6	B	N	N	0.55	11.6	B	0.58	11.3	B	0.57	11.3	B	0.58	12.2	B	N	N
		I-405 NB Loop On-Ramp	Bellflower Boulevard	None	0.49	--	--	0.35	--	--	0.53	--	--	0.37	--	--	0.51	--	--	0.36	--	--	--	--	0.57	--	--	0.40	--	--	0.56	--	--	0.39	--	--	--	--
		I-405 NB Direct On-Ramp	Bellflower Boulevard	None	0.28	--	--	0.18	--	--	0.31	--	--	0.19	--	--	0.30	--	--	0.18	--	--	--	--	0.33	--	--	0.20	--	--	0.32	--	--	0.19	--	--	--	--
	12	Willow Street	Bellflower Boulevard	Sig	**0.84**	**81.2**	**F**	0.92	40.1	D	1.01	48.8	D	1.01	54.4	D	**1.02**	**78.0**	**E**	0.99	43.8	D	Y	N	**1.09**	**67.3**	**E**	**1.09**	**70.6**	**E**	**1.07**	**56.6**	**E**	1.08	53.1	D	Y	N
	13	Los Coyotes Diagonal	Bellflower Boulevard	Sig	0.63	31.3	C	**0.97**	**72.8**	**E**	0.65	26.4	C	1.00	42.1	D	0.62	27.4	C	1.03	41.2	D	N	N	0.70	26.9	C	**1.13**	**56.8**	**E**	0.67	27.7	C	1.13	54.2	D	N	N
		Los Coyotes Diagonal	I-405 SB Direct On-Ramp	None	0.06	--	--	0.09	--	--	0.06	--	--	0.12	--	--	0.08	--	--	0.14	--	--	--	--	0.07	--	--	0.13	--	--	0.08	--	--	0.15	--	--	--	--
	14	I-405 SB Loop Off-Ramp	Bellflower Boulevard	None	0.12	--	--	0.26	--	--	0.12	--	--	0.32	--	--	0.12	--	--	0.25	--	--	--	--	0.13	--	--	0.34	--	--	0.13	--	--	0.27	--	--	--	--
	15	Los Coyotes Diagonal	I-405 SB Direct Off-Ramp	Sig	0.44	14.4	B	0.45	13.4	B	0.52	10.0	B	0.47	16.0	B	0.52	10.4	B	0.48	14.1	B	N	N	0.56	10.6	B	0.51	16.8	B	0.56	11.0	B	0.52	14.8	B	N	N
		Los Coyotes Diagonal	I-405 SB Loop On-Ramp	None	0.14	--	--	0.13	--	--	0.16	--	--	0.17	--	--	0.31	--	--	0.20	--	--	--	--	0.18	--	--	0.18	--	--	0.33	--	--	0.21	--	--	--	--
	16	Willow Street	Los Coyotes Diagonal	Sig	0.72	51.5	D	**0.74**	**102.8**	**F**	0.78	44.4	D	1.02	35.1	D	0.86	30.7	C	1.09	44.1	D	N	N	0.87	48.8	D	1.18	45.4	D	0.86	46.1	D	**1.17**	**71.7**	**E**	Y	N

Table 4-3: Years 2020 and 2040 Peak-Hour Intersections LOS after Mitigation with Cumulative and Project Contribution Impact Determinations for Alternative 2

Interchange Location	Intersection #	Intersection Location: East/West Street	Intersection Location: North/South Street	Traffic Control	Year 2009 Existing Traffic AM Peak Hour V/C	Year 2009 Existing Traffic AM Peak Hour Avg Delay (sec)	Year 2009 Existing Traffic AM Peak Hour LOS	Year 2009 Existing Traffic PM Peak Hour V/C	Year 2009 Existing Traffic PM Peak Hour Avg Delay (sec)	Year 2009 Existing Traffic PM Peak Hour LOS	Year 2020 No Build Traffic on No Build Geometry AM Peak Hour D/C	Year 2020 No Build Traffic on No Build Geometry AM Peak Hour Avg Delay (sec)	Year 2020 No Build Traffic on No Build Geometry AM Peak Hour LOS	Year 2020 No Build Traffic on No Build Geometry PM Peak Hour D/C	Year 2020 No Build Traffic on No Build Geometry PM Peak Hour Avg Delay (sec)	Year 2020 No Build Traffic on No Build Geometry PM Peak Hour LOS	Year 2020 Alternative 2 Traffic on Alternative 2 Geometry including Mitigations AM Peak Hour D/C	Year 2020 Alternative 2 Traffic on Alternative 2 Geometry including Mitigations AM Peak Hour Avg Delay (sec)	Year 2020 Alternative 2 Traffic on Alternative 2 Geometry including Mitigations AM Peak Hour LOS	Year 2020 Alternative 2 Traffic on Alternative 2 Geometry including Mitigations PM Peak Hour D/C	Year 2020 Alternative 2 Traffic on Alternative 2 Geometry including Mitigations PM Peak Hour Avg Delay (sec)	Year 2020 Alternative 2 Traffic on Alternative 2 Geometry including Mitigations PM Peak Hour LOS	Year 2020 Cumulative Significant Impact	Year 2020 Project Contribution to Significant Impact	Year 2040 No Build Traffic on No Build Geometry AM Peak Hour D/C	Year 2040 No Build Traffic on No Build Geometry AM Peak Hour Avg Delay (sec)	Year 2040 No Build Traffic on No Build Geometry AM Peak Hour LOS	Year 2040 No Build Traffic on No Build Geometry PM Peak Hour D/C	Year 2040 No Build Traffic on No Build Geometry PM Peak Hour Avg Delay (sec)	Year 2040 No Build Traffic on No Build Geometry PM Peak Hour LOS	Year 2040 Alternative 2 Traffic on Alternative 2 Geometry including Mitigations AM Peak Hour D/C	Year 2040 Alternative 2 Traffic on Alternative 2 Geometry including Mitigations AM Peak Hour Avg Delay (sec)	Year 2040 Alternative 2 Traffic on Alternative 2 Geometry including Mitigations AM Peak Hour LOS	Year 2040 Alternative 2 Traffic on Alternative 2 Geometry including Mitigations PM Peak Hour D/C	Year 2040 Alternative 2 Traffic on Alternative 2 Geometry including Mitigations PM Peak Hour Avg Delay (sec)	Year 2040 Alternative 2 Traffic on Alternative 2 Geometry including Mitigations PM Peak Hour LOS	Year 2040 Cumulative Significant Impact	Year 2040 Project Contribution to Significant Impact
Woodruff Avenue at I-405	17	Willow Street	Woodruff Avenue	Sig	**1.07**	**86.8**	**F**	0.77	30.4	C	**1.33**	**147.9**	**F**	0.87	40.4	D	**1.22**	**136.3**	**F**	0.77	37.4	D	Y	N	**1.44**	**180.5**	**F**	0.94	51.5	D	**1.38**	**167.9**	**F**	**0.85**	**64.1**	**E**	Y	N
	18	I-405 NB Direct Off-Ramp	Woodruff Avenue	None	0.15	--	--	0.17	--	--	0.39	--	--	0.19	--	--	0.44	--	--	0.23	--	--	--	--	0.42	--	--	0.20	--	--	0.47	--	--	0.25	--	--	--	--
		I-405 NB Direct On-Ramp	Woodruff Avenue	None	0.25	--	--	0.20	--	--	0.31	--	--	0.21	--	--	0.29	--	--	0.21	--	--	--	--	0.34	--	--	0.23	--	--	0.31	--	--	0.23	--	--	--	--
	19	I-405 SB Direct Off-Ramp	Woodruff Avenue	None	0.48	--	--	0.38	--	--	0.52	--	--	0.47	--	--	0.51	--	--	0.46	--	--	--	--	0.56	--	--	0.51	--	--	0.55	--	--	0.50	--	--	--	--
		I-405 SB Direct On-Ramp	Woodruff Avenue	None	0.27	--	--	0.19	--	--	0.41	--	--	0.23	--	--	0.44	--	--	0.26	--	--	--	--	0.45	--	--	0.25	--	--	0.47	--	--	0.28	--	--	--	--
Palo Verde Avenue / Stearns Street at I-405	20	I-405 NB Direct Off-Ramp	Palo Verde Avenue	Sig	0.54	11.3	B	0.45	13.7	B	0.78	17.7	B	0.61	11.8	B	0.69	15.3	B	0.59	11.8	B	N	N	0.95	21.2	C	0.70	12.6	B	0.82	17.4	B	0.72	13.3	B	N	N
		I-405 NB Loop On-Ramp	Palo Verde Avenue	None	0.11	--	--	0.20	--	--	0.13	--	--	0.22	--	--	0.10	--	--	0.19	--	--	--	--	0.14	--	--	0.23	--	--	0.11	--	--	0.20	--	--	--	--
	21	Woodruff Avenue	Palo Verde Avenue	Sig	**0.87**	**86.6**	**F**	0.59	21.3	C	0.84	13.6	B	0.66	10.3	B	0.82	13.8	B	0.70	11.3	B	N	N	0.91	15.9	B	0.72	11.3	B	0.89	15.9	B	0.76	12.1	B	N	N
	22	Stearns Street	Palo Verde Avenue	Sig	0.73	19.4	B	0.75	25.2	C	0.86	18.9	B	0.83	20.5	C	0.83	17.9	B	0.83	20.2	C	N	N	0.94	22.0	C	0.92	24.4	C	0.91	20.3	C	0.92	23.9	C	N	N
	23	Stearns Street	I-405 SB Direct On-Ramp	None	0.28	--	--	0.39	--	--	0.30	--	--	0.46	--	--	0.29	--	--	0.40	--	--	--	--	0.33	--	--	0.50	--	--	0.31	--	--	0.43	--	--	--	--
Studebaker Road at I-405	24	I-405 NB Direct On-Ramp	Studebaker Road	Sig	0.50	4.0	A	0.55	4.3	A	0.51	2.6	A	0.47	4.7	A	0.54	3.3	A	0.52	2.7	A	N	N	0.55	2.8	A	0.51	4.9	A	0.58	3.6	A	0.56	2.8	A	N	N
	25	I-405 SB Direct Off-Ramp	Studebaker Road	Stop	0.15	13.8	B	0.04	10.8	B	**0.86**	**68.4**	**F**	0.34	16.2	C	**0.90**	**61.5**	**F**	0.61	31.4	D	N	N	**1.02**	**98.3**	**F**	0.33	15.7	C	**1.04**	**81.3**	**F**	0.65	33.1	D	N	N
				*Sig**	*N/A*						*0.65*	*8.4*	*A*	*0.66*	*5.8*	*A*	*0.65*	*8.9*	*A*	*0.65*	*6.1*	*A*			*0.71*	*9.1*	*A*	*0.72*	*7.0*	*A*	*0.71*	*9.7*	*A*	*0.72*	*7.0*	*A*		
	26	Atherton Street	Studebaker Road	Sig	0.46	9.2	A	0.74	23.3	C	0.54	9.3	A	0.78	13.8	B	0.59	8.5	A	0.79	15.0	B	N	N	0.60	10.7	B	0.85	15.7	B	0.65	9.5	A	0.86	17.1	B	N	N
Studebaker Road at SR-22/ 7th Street	27	SR-22 WB On-/Off-Ramp	Studebaker Road	Sig	0.49	16.0	B	0.74	22.1	C	0.46	12.8	B	0.79	28.0	C	0.49	13.0	B	0.83	28.9	C	N	N	0.50	13.1	B	0.86	30.4	C	0.54	13.4	B	0.89	31.8	C	N	N
	28	SR-22 EB On-/Off-Ramp	Studebaker Road	Sig	0.72	17.6	B	0.82	17.1	B	0.91	21.3	C	0.93	25.8	C	0.97	30.9	C	0.98	30.1	C	N	N	0.99	30.4	C	1.03	37.1	D	1.06	45.2	D	1.09	43.9	D	N	N
	29	SR-22 WB On-/Off-Ramp	College Park Drive	Stop	0.39	18.8	C	**0.65**	**59.9**	**F**	N/A						N/A						N	N	N/A						N/A						N	N
				Sig*	N/A						0.65	14.1	B	**1.07**	**110.1**	**F**	0.46	10.8	B	0.73	12.5	B			0.71	15.5	B	**1.16**	**147.2**	**F**	0.48	12.6	B	0.70	30.1	C		
7th Street	30	7th Street	Pacific Coast Highway	Sig	**0.95**	**92.9**	**F**	**1.03**	**82.6**	**F**	0.94	49.2	D	0.95	35.9	D	0.94	37.9	D	0.96	39.4	D	N	N	**1.02**	**65.8**	**E**	**1.03**	**58.7**	**E**	1.02	42.9	D	1.04	48.5	D	N	N
	31	7th Street	Bellflower Boulevard	Sig	**1.01**	**73.6**	**E**	**0.91**	**90.3**	**F**	**1.04**	**68.9**	**E**	0.98	47.9	D	0.93	32.9	C	0.87	32.8	C	N	N	**1.13**	**82.4**	**F**	**1.06**	**63.0**	**E**	1.01	42.8	D	0.95	39.3	D	N	N
	32	Pacific Coast Highway	Bellflower Boulevard	Sig	0.47	22.3	C	0.73	22.5	C	0.53	38.8	D	0.70	20.4	C	0.54	34.3	C	0.58	25.7	C	N	N	0.57	39.1	D	0.82	32.1	C	0.58	36.7	D	0.63	30.9	C	N	N
	33	7th Street	Channel Drive	Sig	0.72	32.9	C	0.88	30.3	C	0.71	24.5	C	0.94	22.7	C	0.75	10.0	B	0.82	15.2	B	N	N	0.77	25.7	C	1.02	50.8	D	0.81	14.1	B	0.88	18.8	B	N	N
	34	7th Street	W. Campus Drive	Sig	**0.83**	**112.9**	**F**	0.72	31.1	C	0.79	31.2	C	0.81	32.0	C	0.76	15.3	B	0.78	35.0	C	N	N	0.85	53.1	D	**0.87**	**58.5**	**E**	0.77	7.8	A	0.83	8.3	A	N	N
	35	7th Street	E. Campus Drive	Sig	0.97	23.1	C	0.73	24.7	C	1.03	35.8	D	0.87	14.6	B	1.02	35.6	D	0.88	16.3	B	N	N	**1.12**	**55.8**	**E**	0.96	16.7	B	1.11	51.8	D	0.97	25.8	C	N	N
	36	7th Street	Park Avenue	Sig	0.68	12.2	B	0.74	15.7	B	0.69	14.8	B	0.81	19.2	B	0.71	15.8	B	0.81	19.2	B	N	N	0.82	17.1	B	0.86	23.7	C	0.77	18.0	B	0.86	23.4	C	N	N

Notes:

1. LOS – Level of Service; V/C – Volume-to-Capacity Ratio; D/C – Demand Volume-to-Capacity Ratio; N/A – Not Applicable (see Note 2)
2. * = Intersection is not signalized under existing or No Build conditions.
   - At the I-405 SB Direct Off-Ramp intersection with Studebaker Road, the signalized row is included only to determine if there is an adverse effect at the intersection. If a stop-controlled intersection has an LOS E or F under future conditions, then the intersection is reanalyzed as a signalized intersection to identify any adverse effects, because stop-controlled analysis does not provide an overall intersection metric.
   - The proposed mitigation includes installation of a signal at the SR-22 WB On-/Off-Ramp intersection with College Park Drive. To determine if the mitigation addresses the adverse effect, a comparison is made between the proposed signalized intersection and the no-build condition assuming a traffic signal. The traffic signal is assumed for the no-build condition because stop-controlled analysis does not provide an overall intersection metric to determine if the adverse effect at the intersection has been addressed.
3. Bold indicates an intersection forecast to operate at LOS E or F.
4. Shaded cells indicate a cumulative significant impact.
5. -- = LOS and average delay are not calculated for intersections without traffic control. The cumulative significant impact determination applies only to controlled intersections.
6. Intersection numbers correspond to the intersection numbers shown on the intersection traffic volumes figures.
7. For future conditions, the D/C ratio is used instead of the V/C ratio.

Table 4-4: Years 2020 and 2040 Peak-Hour Intersections LOS with Cumulative and Project Contribution Impact Determinations for Alternative 2

Interchange Location	Intersection #	Intersection Location		Traffic Control	Year 2009						Year 2020														Year 2040													
					Existing Traffic						No Build Traffic on No Build Geometry						Alternative 2 Traffic on No Build Geometry								No Build Traffic on No Build Geometry						Alternative 2 Traffic on No Build Geometry							
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour				
		East/West Street	North/South Street		V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	Cumulative Significant Impact	Project Contribution to Significant Impact	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	Cumulative Significant Impact	Project Contribution to Significant Impact
Carson Street at I-605	1	Carson Street	I-605 SB Off-Ramp	Sig	0.58	21.9	C	0.61	17.8	B	0.57	22.3	C	0.68	23.8	C	0.58	19.1	B	0.67	20.3	C	N	N	0.62	22.4	C	0.73	24.5	C	0.63	19.3	B	0.73	21.0	C	N	N
	2	Carson Street	I-605 SB Direct On-Ramp	None	0.15	--	--	0.25	--	--	0.22	--	--	0.33	--	--	0.24	--	--	0.32	--	--	--	--	0.24	--	--	0.36	--	--	0.26	--	--	0.34	--	--	--	--
		Carson Street	I-605 SB Loop On-Ramp	None	0.24	--	--	0.20	--	--	0.33	--	--	0.33	--	--	0.37	--	--	0.36	--	--	--	--	0.35	--	--	0.36	--	--	0.40	--	--	0.39	--	--	--	--
	3	Carson Street	I-605 NB Off-Ramp	Sig	0.55	14.8	B	0.66	12.4	B	0.59	21.8	C	0.76	20.6	C	0.60	20.1	C	0.75	16.5	B	N	N	0.63	23.6	C	0.82	23.2	C	0.65	21.9	C	0.81	18.1	B	N	N
		Carson Street	I-605 NB Loop On-Ramp	None	0.23	--	--	0.45	--	--	0.31	--	--	0.35	--	--	0.33	--	--	0.36	--	--	--	--	0.33	--	--	0.37	--	--	0.35	--	--	0.39	--	--	--	--
		Carson Street	I-605 NB Direct On-Ramp	None	0.40	--	--	0.32	--	--	0.52	--	--	0.49	--	--	0.51	--	--	0.46	--	--	--	--	0.56	--	--	0.53	--	--	0.55	--	--	0.49	--	--	--	--
	4	Carson Street	Pioneer Boulevard	Sig	0.76	48.1	D	0.76	35.1	D	0.79	31.1	C	0.84	33.7	C	0.78	34.4	C	0.84	31.2	C	N	N	0.86	35.1	D	0.92	43.9	D	0.86	41.9	D	0.93	39.0	D	N	N
Spring Street/ Cerritos Avenue at I-605	5	Spring Street/ Cerritos Avenue	I-605 SB Off-Ramp	Sig	0.79	26.2	C	0.60	18.4	B	0.68	14.2	B	0.65	10.9	B	0.68	14.5	B	0.57	9.8	A	N	N	0.74	15.4	B	0.71	12.0	B	0.74	15.7	B	0.62	10.8	B	N	N
	6	Spring Street/ Cerritos Avenue	I-605 NB On-Ramp	Sig	0.84	13.5	B	0.81	11.1	B	0.76	10.5	B	0.79	8.2	A	0.69	7.9	A	0.74	7.7	A	N	N	0.82	11.6	B	0.86	9.8	A	0.75	8.7	A	0.81	8.6	A	N	N
Lakewood Boulevard/ Willow Street at I-405	7	I-405 NB Direct Off-Ramp	Lakewood Boulevard	None	0.35	--	--	0.34	--	--	0.38	--	--	0.38	--	--	0.42	--	--	0.42	--	--	--	--	0.41	--	--	0.41	--	--	0.46	--	--	0.45	--	--	--	--
		I-405 NB Direct On-Ramp	Lakewood Boulevard	None	0.22	--	--	0.21	--	--	0.38	--	--	0.23	--	--	0.39	--	--	0.20	--	--	--	--	0.41	--	--	0.25	--	--	0.43	--	--	0.21	--	--	--	--
		I-405 NB Loop Off-Ramp	Lakewood Boulevard	None	0.19	--	--	0.18	--	--	0.23	--	--	0.22	--	--	0.23	--	--	0.23	--	--	--	--	0.25	--	--	0.23	--	--	0.25	--	--	0.25	--	--	--	--
		I-405 NB Loop On-Ramp	Lakewood Boulevard	None	0.50	--	--	0.38	--	--	0.53	--	--	0.41	--	--	0.54	--	--	0.41	--	--	--	--	0.57	--	--	0.44	--	--	0.58	--	--	0.44	--	--	--	--
	8	I-405 SB Loop On-Ramp	Lakewood Boulevard	None	0.19	--	--	0.23	--	--	0.22	--	--	0.25	--	--	0.22	--	--	0.25	--	--	--	--	0.24	--	--	0.27	--	--	0.24	--	--	0.27	--	--	--	--
		I-405 SB Direct Off-Ramp	Lakewood Boulevard	None	0.40	--	--	0.31	--	--	0.43	--	--	0.48	--	--	0.42	--	--	0.47	--	--	--	--	0.46	--	--	0.52	--	--	0.45	--	--	0.51	--	--	--	--
	9	Willow Street	Lakewood Boulevard	Sig	0.76	31.1	C	**0.92**	**66.2**	**E**	0.75	31.2	C	0.89	43.0	D	0.75	28.3	C	0.90	44.3	D	N	N	0.81	33.6	C	0.93	48.4	D	0.79	32.2	C	1.02	52.0	D	N	N
	10	Willow Street	I-405 SB Loop Off-Ramp	None	0.32	--	--	0.30	--	--	0.35	--	--	0.46	--	--	0.33	--	--	0.45	--	--	--	--	0.37	--	--	0.50	--	--	0.36	--	--	0.49	--	--	--	--
		Willow Street	I-405 SB Direct On-Ramp	None	0.26	--	--	0.38	--	--	0.28	--	--	0.41	--	--	0.31	--	--	0.43	--	--	--	--	0.31	--	--	0.44	--	--	0.34	--	--	0.46	--	--	--	--
Bellflower Boulevard/ Los Coyotes Diagonal at I-405	11	I-405 NB Off-Ramp	Bellflower Boulevard	Sig	0.41	9.3	A	0.48	11.9	B	0.51	10.8	B	0.53	10.6	B	0.52	10.5	B	0.53	11.6	B	N	N	0.55	11.6	B	0.58	11.3	B	0.57	11.3	B	0.58	12.2	B	N	N
		I-405 NB Loop On-Ramp	Bellflower Boulevard	None	0.49	--	--	0.35	--	--	0.53	--	--	0.37	--	--	0.51	--	--	0.36	--	--	--	--	0.57	--	--	0.40	--	--	0.56	--	--	0.39	--	--	--	--
		I-405 NB Direct On-Ramp	Bellflower Boulevard	None	0.28	--	--	0.18	--	--	0.31	--	--	0.19	--	--	0.30	--	--	0.18	--	--	--	--	0.33	--	--	0.20	--	--	0.32	--	--	0.19	--	--	--	--
	12	Willow Street	Bellflower Boulevard	Sig	**0.84**	**81.2**	**F**	0.92	40.1	D	1.01	48.8	D	1.01	54.4	D	0.98	39.0	D	**1.16**	**78.7**	**E**	Y	Y	**1.09**	**67.3**	**E**	**1.09**	**70.6**	**E**	1.05	55.0	D	**1.25**	**106.3**	**F**	Y	Y
	13	Los Coyotes Diagonal	Bellflower Boulevard	Sig	0.63	31.3	C	**0.97**	**72.8**	**E**	0.65	26.4	C	1.00	42.1	D	0.62	27.4	C	1.03	41.2	D	N	N	0.70	26.9	C	**1.13**	**56.8**	**E**	0.67	27.7	C	1.13	54.2	D	N	N
		Los Coyotes Diagonal	I-405 SB Direct On-Ramp	None	0.06	--	--	0.09	--	--	0.06	--	--	0.12	--	--	0.08	--	--	0.14	--	--	--	--	0.07	--	--	0.13	--	--	0.08	--	--	0.15	--	--	--	--
	14	I-405 SB Loop Off-Ramp	Bellflower Boulevard	None	0.12	--	--	0.26	--	--	0.12	--	--	0.32	--	--	0.12	--	--	0.25	--	--	--	--	0.13	--	--	0.34	--	--	0.13	--	--	0.27	--	--	--	--
	15	Los Coyotes Diagonal	I-405 SB Direct Off-Ramp	Sig	0.44	14.4	B	0.45	13.4	B	0.52	10.0	B	0.47	16.0	B	0.52	10.4	B	0.48	14.1	B	N	N	0.56	10.6	B	0.51	16.8	B	0.56	11.0	B	0.52	14.8	B	N	N
		Los Coyotes Diagonal	I-405 SB Loop On-Ramp	None	0.14	--	--	0.13	--	--	0.16	--	--	0.17	--	--	0.31	--	--	0.20	--	--	--	--	0.18	--	--	0.18	--	--	0.33	--	--	0.21	--	--	--	--
	16	Willow Street	Los Coyotes Diagonal	Sig	0.72	51.5	D	**0.74**	**102.8**	**F**	0.78	44.4	D	1.02	35.1	D	0.88	54.7	D	**1.25**	**79.6**	**E**	Y	Y	0.87	48.8	D	1.18	45.4	D	**0.99**	**60.7**	**E**	**1.41**	**101.4**	**F**	Y	Y

Table 4-4: Years 2020 and 2040 Peak-Hour Intersections LOS with Cumulative and Project Contribution Impact Determinations for Alternative 2

Interchange Location	Intersection #	Intersection Location: East/West Street	Intersection Location: North/South Street	Traffic Control	Year 2009 Existing Traffic AM Peak Hour V/C	Year 2009 Existing Traffic AM Peak Hour Avg Delay (sec)	Year 2009 Existing Traffic AM Peak Hour LOS	Year 2009 Existing Traffic PM Peak Hour V/C	Year 2009 Existing Traffic PM Peak Hour Avg Delay (sec)	Year 2009 Existing Traffic PM Peak Hour LOS	Year 2020 No Build Traffic on No Build Geometry AM Peak Hour D/C	Year 2020 No Build Traffic on No Build Geometry AM Peak Hour Avg Delay (sec)	Year 2020 No Build Traffic on No Build Geometry AM Peak Hour LOS	Year 2020 No Build Traffic on No Build Geometry PM Peak Hour D/C	Year 2020 No Build Traffic on No Build Geometry PM Peak Hour Avg Delay (sec)	Year 2020 No Build Traffic on No Build Geometry PM Peak Hour LOS	Year 2020 Alternative 2 Traffic on No Build Geometry AM Peak Hour D/C	Year 2020 Alternative 2 Traffic on No Build Geometry AM Peak Hour Avg Delay (sec)	Year 2020 Alternative 2 Traffic on No Build Geometry AM Peak Hour LOS	Year 2020 Alternative 2 Traffic on No Build Geometry PM Peak Hour D/C	Year 2020 Alternative 2 Traffic on No Build Geometry PM Peak Hour Avg Delay (sec)	Year 2020 Alternative 2 Traffic on No Build Geometry PM Peak Hour LOS	Year 2020 Cumulative Significant Impact	Year 2020 Project Contribution to Significant Impact	Year 2040 No Build Traffic on No Build Geometry AM Peak Hour D/C	Year 2040 No Build Traffic on No Build Geometry AM Peak Hour Avg Delay (sec)	Year 2040 No Build Traffic on No Build Geometry AM Peak Hour LOS	Year 2040 No Build Traffic on No Build Geometry PM Peak Hour D/C	Year 2040 No Build Traffic on No Build Geometry PM Peak Hour Avg Delay (sec)	Year 2040 No Build Traffic on No Build Geometry PM Peak Hour LOS	Year 2040 Alternative 2 Traffic on No Build Geometry AM Peak Hour D/C	Year 2040 Alternative 2 Traffic on No Build Geometry AM Peak Hour Avg Delay (sec)	Year 2040 Alternative 2 Traffic on No Build Geometry AM Peak Hour LOS	Year 2040 Alternative 2 Traffic on No Build Geometry PM Peak Hour D/C	Year 2040 Alternative 2 Traffic on No Build Geometry PM Peak Hour Avg Delay (sec)	Year 2040 Alternative 2 Traffic on No Build Geometry PM Peak Hour LOS	Year 2040 Cumulative Significant Impact	Year 2040 Project Contribution to Significant Impact
Woodruff Avenue at I-405	17	Willow Street	Woodruff Avenue	Sig	**1.07**	**86.8**	**F**	0.77	30.4	C	**1.33**	**147.9**	**F**	0.87	40.4	D	**1.41**	**203.6**	**F**	0.88	54.3	D	Y	Y	**1.44**	**180.5**	**F**	0.94	51.5	D	**1.53**	**242.2**	**F**	**0.95**	**81.3**	**F**	Y	Y
	18	I-405 NB Direct Off-Ramp	Woodruff Avenue	None	0.15	--	--	0.17	--	--	0.39	--	--	0.19	--	--	0.44	--	--	0.23	--	--	--	--	0.42	--	--	0.20	--	--	0.47	--	--	0.25	--	--	--	--
		I-405 NB Direct On-Ramp	Woodruff Avenue	None	0.25	--	--	0.20	--	--	0.31	--	--	0.21	--	--	0.29	--	--	0.21	--	--	--	--	0.34	--	--	0.23	--	--	0.31	--	--	0.23	--	--	--	--
	19	I-405 SB Direct Off-Ramp	Woodruff Avenue	None	0.48	--	--	0.38	--	--	0.52	--	--	0.47	--	--	0.51	--	--	0.46	--	--	--	--	0.56	--	--	0.51	--	--	0.55	--	--	0.50	--	--	--	--
		I-405 SB Direct On-Ramp	Woodruff Avenue	None	0.27	--	--	0.19	--	--	0.41	--	--	0.23	--	--	0.44	--	--	0.26	--	--	--	--	0.45	--	--	0.25	--	--	0.47	--	--	0.28	--	--	--	--
Palo Verde Avenue / Stearns Street at I-405	20	I-405 NB Direct Off-Ramp	Palo Verde Avenue	Sig	0.54	11.3	B	0.45	13.7	B	0.78	17.7	B	0.61	11.8	B	0.69	15.3	B	0.59	11.8	B	N	N	0.95	21.2	C	0.70	12.6	B	0.82	17.4	B	0.72	13.3	B	N	N
		I-405 NB Loop On-Ramp	Palo Verde Avenue	None	0.11	--	--	0.20	--	--	0.13	--	--	0.22	--	--	0.10	--	--	0.19	--	--	--	--	0.14	--	--	0.23	--	--	0.11	--	--	0.20	--	--	--	--
	21	Woodruff Avenue	Palo Verde Avenue	Sig	**0.87**	**86.6**	**F**	0.59	21.3	C	0.84	13.6	B	0.66	10.3	B	0.82	13.8	B	0.70	11.3	B	N	N	0.91	15.9	B	0.72	11.3	B	0.89	15.9	B	0.76	12.1	B	N	N
	22	Stearns Street	Palo Verde Avenue	Sig	0.73	19.4	B	0.75	25.2	C	0.86	18.9	B	0.83	20.5	C	0.83	17.9	B	0.83	20.2	C	N	N	0.94	22.0	C	0.92	24.4	C	0.91	20.3	C	0.92	23.9	C	N	N
	23	Stearns Street	I-405 SB Direct On-Ramp	None	0.28	--	--	0.39	--	--	0.30	--	--	0.46	--	--	0.29	--	--	0.40	--	--	--	--	0.33	--	--	0.50	--	--	0.31	--	--	0.43	--	--	--	--
Studebaker Road at I-405	24	I-405 NB Direct On-Ramp	Studebaker Road	Sig	0.50	4.0	A	0.55	4.3	A	0.51	2.6	A	0.47	4.7	A	0.54	3.3	A	0.52	2.7	A	N	N	0.55	2.8	A	0.51	4.9	A	0.58	3.6	A	0.56	2.8	A	N	N
	25	I-405 SB Direct Off-Ramp	Studebaker Road	Stop	0.15	13.8	B	0.04	10.8	B	**0.86**	**68.4**	**F**	0.34	16.2	C	**0.90**	**61.5**	**F**	0.61	31.4	D	N	N	**1.02**	**98.3**	**F**	0.33	15.7	C	**1.04**	**81.3**	**F**	0.65	33.1	D	N	N
				*Sig**	*N/A*						*0.65*	*8.4*	*A*	*0.66*	*5.8*	*A*	*0.65*	*8.9*	*A*	*0.65*	*6.1*	*A*			*0.71*	*9.1*	*A*	*0.72*	*7.0*	*A*	*0.71*	*9.7*	*A*	*0.72*	*7.0*	*A*		
	26	Atherton Street	Studebaker Road	Sig	0.46	9.2	A	0.74	23.3	C	0.54	9.3	A	0.78	13.8	B	0.59	8.5	A	0.79	15.0	B	N	N	0.60	10.7	B	0.85	15.7	B	0.65	9.5	A	0.86	17.1	B	N	N
Studebaker Road at SR-22/ 7th Street	27	SR-22 WB On/Off-Ramp	Studebaker Road	Sig	0.49	16.0	B	0.74	22.1	C	0.46	12.8	B	0.79	28.0	C	0.49	13.0	B	0.83	28.9	C	N	N	0.50	13.1	B	0.86	30.4	C	0.54	13.4	B	0.89	31.8	C	N	N
	28	SR-22 EB On/Off-Ramp	Studebaker Road	Sig	0.72	17.6	B	0.82	17.1	B	0.91	21.3	C	0.93	25.8	C	0.97	30.9	C	0.98	30.1	C	N	N	0.99	30.4	C	1.03	37.1	D	1.06	45.2	D	1.09	43.9	D	N	N
	29	SR-22 WB On/Off-Ramp	College Park Drive	Stop	0.39	18.8	C	**0.65**	**59.9**	**F**	0.43	21.3	C	**0.61**	**88.7**	**F**	0.62	28.6	D	**1.14**	**172.9**	**F**	Y	Y	0.51	25.3	D	**0.84**	**152.1**	**F**	0.75	38.1	E	**1.59**	**311.8**	**F**	Y	Y
				*Sig**	*N/A*						*0.65*	*14.1*	*B*	***1.07****	***110.1***	***F****	*0.73*	*16.0*	*B*	***1.15****	***131.2***	***F****			*0.71*	*15.5*	*B*	***1.16****	***147.2***	***F****	*0.79*	*19.0*	*B*	***1.24****	***167.4***	***F****		
7th Street	30	7th Street	Pacific Coast Highway	Sig	**0.95**	**92.9**	**F**	**1.03**	**82.6**	**F**	0.94	49.2	D	0.95	35.9	D	0.96	51.2	D	0.99	39.9	D	N	N	**1.02**	**65.8**	**E**	**1.03**	**58.7**	**E**	**1.04**	**70.0**	**E**	**1.07**	**64.9**	**E**	Y	Y
	31	7th Street	Bellflower Boulevard	Sig	**1.01**	**73.6**	**E**	**0.91**	**90.3**	**F**	**1.04**	**68.9**	**E**	0.98	47.9	D	**1.09**	**74.9**	**E**	0.98	46.3	D	Y	Y	**1.13**	**82.4**	**F**	**1.06**	**63.0**	**E**	**1.18**	**92.7**	**F**	**1.06**	**60.9**	**E**	Y	Y
	32	Pacific Coast Highway	Bellflower Boulevard	Sig	0.47	22.3	C	0.73	22.5	C	0.53	38.8	D	0.70	20.4	C	0.51	39.7	D	0.64	19.3	B	N	N	0.57	39.1	D	0.82	32.1	C	0.55	40.2	D	0.74	31.4	C	N	N
	33	7th Street	Channel Drive	Sig	0.72	32.9	C	0.88	30.3	C	0.71	24.5	C	0.94	22.7	C	0.73	24.0	C	0.96	24.8	C	N	N	0.77	25.7	C	1.02	50.8	D	0.79	25.4	C	**1.04**	**55.7**	**E**	Y	Y
	34	7th Street	W. Campus Drive	Sig	**0.83**	**112.9**	**F**	0.72	31.1	C	0.79	31.2	C	0.81	32.0	C	0.82	45.2	D	0.83	41.7	D	N	N	0.85	53.1	D	**0.87**	**58.5**	**E**	**0.89**	**68.4**	**E**	**0.90**	**66.0**	**E**	Y	Y
	35	7th Street	E. Campus Drive	Sig	0.97	23.1	C	0.73	24.7	C	1.03	35.8	D	0.87	14.6	B	1.07	46.4	D	0.90	16.1	B	N	N	**1.12**	**55.8**	**E**	0.96	16.7	B	**1.17**	**68.7**	**E**	0.99	19.0	B	Y	Y
	36	7th Street	Park Avenue	Sig	0.68	12.2	B	0.74	15.7	B	0.69	14.8	B	0.81	19.2	B	0.71	15.8	B	0.81	19.2	B	N	N	0.82	17.1	B	0.86	23.7	C	0.77	18.0	B	0.86	23.4	C	N	N

Notes:

1. LOS – Level of Service; V/C – Volume-to-Capacity Ratio; D/C – Demand Volume-to-Capacity Ratio; N/A – Not Applicable (see Note 2)
2. * = Intersection is not signalized under existing or No Build conditions. The signalized row is included only to determine if there is an adverse effect at the intersection. If a stop-controlled intersection has an LOS E or F under future conditions, then the intersection is reanalyzed as a signalized intersection to identify any adverse effects, because stop-controlled analysis does not provide an overall intersection metric. The number of LOS E or F locations and the number of locations with V/C or D/C greater than 1.00 identified in the text does not include the signalized row because the existing and no-build operation is based on the current stop control.
3. Bold indicates an intersection forecast to operate at LOS E or F.
4. Shaded cells indicate a cumulative significant impact.
5. -- = LOS and average delay are not calculated for intersections without traffic control. The cumulative significant impact determination applies only to controlled intersections.
6. Intersection numbers correspond to the intersection numbers shown on the intersection traffic volumes figures.
7. For future conditions, the D/C ratio is used instead of the V/C ratio.

3. Under Alternative 2 and the No Build Alternative on I-405 north of I-605 to Lakewood Boulevard in 2020, LOS F conditions are anticipated during peak hours in the GP lanes, except for LOS D and E in the southbound direction between I-605 and Studebaker Road during the AM and PM peak hours, respectively. Under the existing condition, LOS ranges from D to F depending on the time of day and direction of travel. In 2040, LOS F conditions are anticipated under Alternative 2 during peak hours in the GP lanes, except for LOS E in the southbound direction between I-605 and Studebaker Road during the AM and PM peak hours; the same LOS conditions are anticipated under the No Build Alternative, except that LOS D is anticipated southbound between I-605 and Studebaker Road during the AM peak hour. Under Alternative 2 in 2020, v/c ratios in the GP lanes range from 0.01 lower than the No Build Alternative to 0.08 higher. Under the existing condition, v/c ratios range from 0.81 to 0.98. Under Alternative 2 in 2040, v/c ratios in the GP lanes range from the same as under the No Build Alternative to 0.08 higher. (See Tables 3-2 and 3-6.).
4. Under Alternative 2 and the No Build Alternative in 2020, HOV lanes on I-405 north of I-605 to Lakewood Boulevard are anticipated to operate at LOS F during peak hours because v/c ratios are all forecast to be over capacity. Under the existing condition, v/c ratios range from 0.50 to 1.06, indicating a range of LOS from A to F depending on time of day and direction of travel. Under Alternative 2 and the No Build Alternative in 2040, HOV lanes on I-405 north of I-605 to Lakewood Boulevard are anticipated to operate at LOS F during peak hours because v/c ratios are all forecast to be over capacity. (See Tables 3-3 and 3-7.)
5. Under Alternative 2 in 2020, branch connectors in the I-405/I-605/SR-22 interchange serving movements to and from Long Beach are anticipated to operate with v/c ratios ranging from 0.18 less than to 0.01 greater than under the No Build Alternative compared to the existing range of 0.36 to 0.97. Under Alternative 2 in 2040, branch connectors in the I-405/I-605/ SR-22 interchange serving movements to and from Long Beach are anticipated to operate with v/c ratios ranging from 0.29 less than to 0.01 less than under the No Build Alternative compared to the existing range of 0.36 to 0.97. (See Tables 3-4 and 3-8.)
6. Under Alternative 2 with all proposed mitigation in 2020, there are two fewer intersections anticipated to operate at LOS E or F than under the No Build Alternative compared to ten such intersections in the existing condition. Under Alternative 2 in 2020, the same number of intersections is anticipated to operate with v/c ratios greater than 1.00 as the No Build Alternative compared to three such intersections in the existing condition. Under Alternative 2 in 2040, there are six fewer intersections anticipated to operate at LOS E or F than under the No Build Alternative compared to ten such intersections in the existing condition. Under Alternative 2 in 2040, there is one fewer intersection anticipated to operate with v/c ratios

greater than 1.00 than under the No Build Alternative compared to three such intersections in the existing condition. (See Table 4-3.)

7. Under Alternative 2 and the No Build Alternative in 2040 within the Long Beach traffic study area, 90 percent of off-ramps are anticipated to have adequate storage at their arterial terminal, compared to 100 percent under existing conditions. (See Table 3-5.)
8. Under Alternative 2 and the No Build Alternative in 2040 within the Long Beach traffic study area, 64 percent of arterials are anticipated to have adequate storage at their intersections with freeway ramps, compared to 82 percent under existing conditions. (See Table 3-5.)
9. In 2040 under Alternative 2 within the Long Beach traffic study area, the percentage of arterial/arterial intersections with adequate storage is anticipated to be 4 percent higher than under the No Build Alternative, compared to 54 percent under existing conditions. (See Table 3-5.)

Alternative 3

Future Build Alternative Compared to Existing Condition. A comparison of Alternative 3 in 2020 and 2040 to the existing condition reveals the following information. The data used to make the comparison are presented in the tables in Chapter 3 of this Supplemental Draft EIR/EIS. Impacts identified through the comparison are cumulative impacts resulting from the combination of the proposed I-405 project and other land development and roadway improvement projects in the corridor and region. The inclusion of other land development and roadway improvement projects in the traffic forecasts is summarized in Draft EIR/EIS Section 3.6.5.7, Traffic and Transportation/Pedestrian and Bicycle Facilities (Resources not Subject to Cumulative Analysis), and more fully explained in the Traffic Study in Section 2.2.2.

1. Under Alternative 3 on I-405 north of I-605 to Lakewood Boulevard, GP lane volumes during peak hours in 2020 and 2040 are expected to be greater than in the existing condition. For example, between Palo Verde Avenue and Woodruff Avenue, peak-hour GP volumes by direction range from 7,175 to 8,546 under existing conditions. The volumes anticipated for Alternative 3 in 2020 range from 8,890 to 10,310 and in 2040 from 9,610 to 11,150. (See Figures 3-4, 3-9, and 3-13.)
2. Under Alternative 3 on I-405 north of I-605 to Lakewood Boulevard, HOV lane volumes during peak hours in 2020 and 2040 are expected to be greater than in the existing condition. For example, between Palo Verde Avenue and Woodruff Avenue, peak-hour HOV volumes by direction range from 793 to 1,720 under existing conditions. The volumes anticipated for

Alternative 3 in 2020 range from 1,740 to 2,130 and in 2040 from 1,880 to 2,300. (See Figures 3-4, 3-9, and 3-13.)

3. Under Alternative 3 on I-405 north of I-605 to Lakewood Boulevard in 2020, LOS F conditions are anticipated during peak hours in the GP lanes, except for LOS D and E in the southbound direction between I-605 and Studebaker Road during the AM and PM peak hours, respectively. In 2040, LOS F conditions are anticipated during peak hours in the GP lanes, except for LOS E in the southbound direction between I-605 and Studebaker Road during the AM peak hour. Under the existing condition, LOS D to F conditions occur during peak hours in the GP lanes. Under Alternative 3 in 2020, v/c ratios in the GP lanes range from 0.01 to 0.61 greater than under existing conditions. In 2040, v/c ratios range from 0.09 to 0.72 greater than under existing conditions. (See Tables 3-2 and 3-6.)
4. Under Alternative 3 on I-405 north of I-605 to Lakewood Boulevard, HOV lanes are anticipated to operate at LOS F during peak hours in 2020 with v/c ratios in excess of 1.00, except southbound during the AM peak hour; the 2020 v/c ratios in the I-405 HOV lanes range from 0.96 to 1.24 in 2020. Under the existing condition, v/c ratios range from 0.50 to 1.06. In 2040, HOV lanes are anticipated to operate at LOS F during peak hours because v/c ratios are all forecast to be over capacity ranging from 1.02 to 1.34. In 2020, Alternative 3 v/c ratios in the HOV lanes range from 0.05 lower to 0.46 greater than under existing conditions. In 2040, v/c ratios range from 0.03 to 0.53 greater than under existing conditions. (See Tables 3-3 and 3-7.)
5. Under Alternative 3, branch connectors in the I-405/I-605/SR-22 interchange serving movements to and from Long Beach are anticipated to operate with v/c ratios ranging from 0.24 to 1.12 in 2020 and from 0.26 to 1.12 in 2040, compared to the existing range of 0.36 to 0.97. (See Tables 3-4 and 3-8.)
6. Under Alternative 3 with all proposed mitigations in 2020, there are two Long Beach area study intersections anticipated to operate at LOS E or F, and four to have v/c ratios greater than 1.00 during peak hours, compared to ten intersections operating at LOS E or F and three with v/c ratios over 1.00 under existing conditions. In 2040, there are three intersections anticipated to operate at LOS E or F and 11 to have v/c ratios greater than 1.00 during peak hours, compared to ten intersections operating at LOS E or F and three with v/c ratios over 1.00 under existing conditions. (See Table 4-5).
7. Under Alternative 3 in 2040 and the existing condition within the Long Beach traffic study area, the percentage of off-ramps with adequate storage at their arterial terminal is anticipated to be 100 percent. (See Table 3-5.)

8. Under Alternative 3 in 2040 within the Long Beach traffic study area, the percentage of arterials with adequate storage at their intersections with freeway ramps is anticipated to be 73 percent, compared to 82 percent under existing conditions. (See Table 3-5.)
9. Under Alternative 3 in 2040 within the Long Beach traffic study area, the percentage of arterial/arterial intersections with adequate storage is anticipated to be 51 percent, compared to 54 percent under existing conditions. (See Table 3-5.)

Table 4-6 shows that, under Alternative 3 in 2020, there are five intersections in the Long Beach traffic study area with a significant cumulative impact. The intersections are designated on the table with a "Y" (Yes) in the column labeled "Cumulative Significant Impact." Table 4-6 also shows that, under Alternative 3 in 2040, there are nine intersections with a significant cumulative impact.

An increase in the v/c ratio of a freeway segment is an indication of a cumulative impact on the freeway mainline. Based on the increases in freeway GP and HOV lane v/c ratios cited above in Items 3 and 4, there is a cumulative impact on the I-405 freeway mainline.

Future Build Alternative Compared to Future No Build. Chapter 3 of this Supplemental Draft EIR/EIS provides a comparison of Alternative 3 to the No Build Alternative in 2020 and 2040. That comparison identifies the contribution of Alternative 3 to cumulative impacts. As shown in Tables 3-2 and 3-6, v/c ratios for the I-405 freeway mainline under Alternative 3 are 0.03 to 0.13 higher than under the No Build Alternative in 2020 and 0.02 to 0.13 higher in 2040. Because Tables 3-2 and 3-6 show that, for segments of I-405 north of I-605 to Lakewood Boulevard, LOS is F under the No Build Alternative or the maximum increase in v/c ratios is 0.05, the contribution of Alternative 3 to the cumulative impact on the freeway mainline is less than significant.

Table 4-6 shows (with a "Y" in the columns labeled "Project Contribution to Significant Impact") that there are seven intersections under Alternative 3 with project contributions to cumulative impacts that are significant. Measures T-10 and T-11 presented in Section 3.3 of this Supplemental Draft EIR/EIS are proposed to mitigate those significant impacts. Table 4-5 shows that, with all improvements including the mitigations, three intersections are anticipated to have significant cumulative impacts in either 2020 or 2040. Table 4-5 also shows that there are no intersections where the contribution of Alternative 3 to the cumulative impacts is significant with the proposed mitigations in place.

In summary, there are no significant impacts of Alternative 3 on performance or the LOS of the circulation system.

Table 4-5: Years 2020 and 2040 Peak-Hour Intersections LOS after Mitigation with Cumulative and Project Contribution Impact Determinations for Alternative 3

Interchange Location	Intersection #	Intersection Location: East/West Street	Intersection Location: North/South Street	Traffic Control	Year 2009 Existing Traffic AM Peak Hour V/C	Year 2009 Existing Traffic AM Peak Hour Avg Delay (sec)	Year 2009 Existing Traffic AM Peak Hour LOS	Year 2009 Existing Traffic PM Peak Hour V/C	Year 2009 Existing Traffic PM Peak Hour Avg Delay (sec)	Year 2009 Existing Traffic PM Peak Hour LOS	Year 2020 No Build Traffic on No Build Geometry AM Peak Hour D/C	Year 2020 No Build AM Peak Hour Avg Delay (sec)	Year 2020 No Build AM Peak Hour LOS	Year 2020 No Build PM Peak Hour D/C	Year 2020 No Build PM Peak Hour Avg Delay (sec)	Year 2020 No Build PM Peak Hour LOS	Year 2020 Alternative 3 Traffic on Alternative 3 Geometry including Mitigations AM Peak Hour D/C	Year 2020 Alternative 3 AM Peak Hour Avg Delay (sec)	Year 2020 Alternative 3 AM Peak Hour LOS	Year 2020 Alternative 3 PM Peak Hour D/C	Year 2020 Alternative 3 PM Peak Hour Avg Delay (sec)	Year 2020 Alternative 3 PM Peak Hour LOS	Year 2020 Cumulative Significant Impact	Year 2020 Project Contribution to Significant Impact	Year 2040 No Build Traffic on No Build Geometry AM Peak Hour D/C	Year 2040 No Build AM Peak Hour Avg Delay (sec)	Year 2040 No Build AM Peak Hour LOS	Year 2040 No Build PM Peak Hour D/C	Year 2040 No Build PM Peak Hour Avg Delay (sec)	Year 2040 No Build PM Peak Hour LOS	Year 2040 Alternative 3 Traffic on Alternative 3 Geometry including Mitigations AM Peak Hour D/C	Year 2040 Alternative 3 AM Peak Hour Avg Delay (sec)	Year 2040 Alternative 3 AM Peak Hour LOS	Year 2040 Alternative 3 PM Peak Hour D/C	Year 2040 Alternative 3 PM Peak Hour Avg Delay (sec)	Year 2040 Alternative 3 PM Peak Hour LOS	Year 2040 Cumulative Significant Impact	Year 2040 Project Contribution to Significant Impact
Carson Street at I-605	1	Carson Street	I-605 SB Off-Ramp	Sig	0.58	21.9	C	0.61	17.8	B	0.57	22.3	C	0.68	23.8	C	0.64	11.1	B	0.74	13.0	B	N	N	0.62	22.4	C	0.73	24.5	C	0.69	11.7	B	0.80	14.1	B	N	N
	2	Carson Street	I-605 SB Direct On-Ramp	None	0.15	--	--	0.25	--	--	0.22	--	--	0.33	--	--	0.24	--	--	0.32	--	--	--	--	0.24	--	--	0.36	--	--	0.26	--	--	0.34	--	--	--	--
		Carson Street	I-605 SB Loop On-Ramp	None	0.24	--	--	0.20	--	--	0.33	--	--	0.33	--	--	0.33	--	--	0.37	--	--	--	--	0.35	--	--	0.36	--	--	0.36	--	--	0.39	--	--	--	--
	3	Carson Street	I-605 NB Off-Ramp	Sig	0.55	14.8	B	0.66	12.4	B	0.59	21.8	C	0.76	20.6	C	0.61	20.9	C	0.75	17.6	B	N	N	0.63	23.6	C	0.82	23.2	C	0.66	22.9	C	0.81	19.4	B	N	N
		Carson Street	I-605 NB Loop On-Ramp	None	0.23	--	--	0.45	--	--	0.31	--	--	0.35	--	--	0.28	--	--	0.30	--	--	--	--	0.33	--	--	0.37	--	--	0.31	--	--	0.33	--	--	--	--
		Carson Street	I-605 NB Direct On-Ramp	None	0.40	--	--	0.32	--	--	0.52	--	--	0.49	--	--	0.51	--	--	0.46	--	--	--	--	0.56	--	--	0.53	--	--	0.55	--	--	0.49	--	--	--	--
	4	Carson Street	Pioneer Boulevard	Sig	0.76	48.1	D	0.76	35.1	D	0.79	31.1	C	0.84	33.7	C	0.76	31.7	C	0.83	31.8	C	N	N	0.86	35.1	D	0.92	43.9	D	0.84	37.3	D	0.92	44.5	D	N	N
Spring Street/ Cerritos Avenue at I-605	5	Spring Street/ Cerritos Avenue	I-605 SB Off-Ramp	Sig	0.79	26.2	C	0.60	18.4	B	0.68	14.2	B	0.65	10.9	B	0.70	14.4	B	0.60	9.8	A	N	N	0.74	15.4	B	0.71	12.0	B	0.75	15.5	B	0.64	10.7	B	N	N
	6	Spring Street/ Cerritos Avenue	I-605 NB On-Ramp	Sig	0.84	13.5	B	0.81	11.1	B	0.76	10.5	B	0.79	8.2	A	0.74	6.1	A	0.75	4.9	A	N	N	0.82	11.6	B	0.86	9.8	A	0.80	7.1	A	0.81	6.0	A	N	N
Lakewood Boulevard/ Willow Street at I-405	7	I-405 NB Direct Off-Ramp	Lakewood Boulevard	None	0.35	--	--	0.34	--	--	0.38	--	--	0.38	--	--	0.44	--	--	0.43	--	--	--	--	0.41	--	--	0.41	--	--	0.47	--	--	0.46	--	--	--	--
		I-405 NB Direct On-Ramp	Lakewood Boulevard	None	0.22	--	--	0.21	--	--	0.38	--	--	0.23	--	--	0.38	--	--	0.23	--	--	--	--	0.41	--	--	0.25	--	--	0.41	--	--	0.25	--	--	--	--
		I-405 NB Loop Off-Ramp	Lakewood Boulevard	None	0.19	--	--	0.18	--	--	0.23	--	--	0.22	--	--	0.28	--	--	0.26	--	--	--	--	0.25	--	--	0.23	--	--	0.30	--	--	0.28	--	--	--	--
		I-405 NB Loop On-Ramp	Lakewood Boulevard	None	0.50	--	--	0.38	--	--	0.53	--	--	0.41	--	--	0.52	--	--	0.41	--	--	--	--	0.57	--	--	0.44	--	--	0.57	--	--	0.45	--	--	--	--
	8	I-405 SB Loop On-Ramp	Lakewood Boulevard	None	0.19	--	--	0.23	--	--	0.22	--	--	0.25	--	--	0.23	--	--	0.27	--	--	--	--	0.24	--	--	0.27	--	--	0.25	--	--	0.29	--	--	--	--
		I-405 SB Direct Off-Ramp	Lakewood Boulevard	None	0.40	--	--	0.31	--	--	0.43	--	--	0.48	--	--	0.44	--	--	0.46	--	--	--	--	0.46	--	--	0.52	--	--	0.48	--	--	0.50	--	--	--	--
	9	Willow Street	Lakewood Boulevard	Sig	0.76	31.1	C	**0.92**	**66.2**	**E**	0.75	31.2	C	0.89	43.0	D	0.72	31.1	C	0.96	44.3	D	N	N	0.81	33.6	C	0.93	48.4	D	0.77	32.4	C	1.02	52.0	D	N	N
	10	Willow Street	I-405 SB Loop Off-Ramp	None	0.32	--	--	0.30	--	--	0.35	--	--	0.46	--	--	0.36	--	--	0.45	--	--	--	--	0.37	--	--	0.50	--	--	0.38	--	--	0.49	--	--	--	--
		Willow Street	I-405 SB Direct On-Ramp	None	0.26	--	--	0.38	--	--	0.28	--	--	0.41	--	--	0.30	--	--	0.43	--	--	--	--	0.31	--	--	0.44	--	--	0.33	--	--	0.46	--	--	--	--
Bellflower Boulevard/ Los Coyotes Diagonal at I-405	11	I-405 NB Off-Ramp	Bellflower Boulevard	Sig	0.41	9.3	A	0.48	11.9	B	0.51	10.8	B	0.53	10.6	B	0.41	9.1	A	0.53	11.1	B	N	N	0.55	11.6	B	0.58	11.3	B	0.45	9.7	A	0.58	11.7	B	N	N
		I-405 NB Loop On-Ramp	Bellflower Boulevard	None	0.49	--	--	0.35	--	--	0.53	--	--	0.37	--	--	0.54	--	--	0.36	--	--	--	--	0.57	--	--	0.40	--	--	0.59	--	--	0.39	--	--	--	--
		I-405 NB Direct On-Ramp	Bellflower Boulevard	None	0.28	--	--	0.18	--	--	0.31	--	--	0.19	--	--	0.32	--	--	0.18	--	--	--	--	0.33	--	--	0.20	--	--	0.34	--	--	0.19	--	--	--	--
	12	Willow Street	Bellflower Boulevard	Sig	**0.84**	**81.2**	**F**	0.92	40.1	D	1.01	48.8	D	1.01	54.4	D	0.92	33.2	C	1.10	48.8	D	N	N	**1.09**	**67.3**	**E**	**1.09**	**70.6**	**E**	0.99	45.9	D	1.08	54.1	D	N	N
	13	Los Coyotes Diagonal	Bellflower Boulevard	Sig	0.63	31.3	C	**0.97**	**72.8**	**E**	0.65	26.4	C	1.00	42.1	D	0.64	25.8	C	1.12	50.2	D	N	N	0.70	26.9	C	**1.13**	**56.8**	**E**	0.70	22.8	C	1.10	53.5	D	N	N
		Los Coyotes Diagonal	I-405 SB Direct On-Ramp	None	0.06	--	--	0.09	--	--	0.06	--	--	0.12	--	--	0.09	--	--	0.12	--	--	--	--	0.07	--	--	0.13	--	--	0.09	--	--	0.13	--	--	--	--
	14	I-405 SB Loop Off-Ramp	Bellflower Boulevard	None	0.12	--	--	0.26	--	--	0.12	--	--	0.32	--	--	0.12	--	--	0.37	--	--	--	--	0.13	--	--	0.34	--	--	0.13	--	--	0.40	--	--	--	--
	15	Los Coyotes Diagonal	I-405 SB Direct Off-Ramp	Sig	0.44	14.4	B	0.45	13.4	B	0.52	10.0	B	0.47	16.0	B	0.53	10.2	B	0.52	9.8	A	N	N	0.56	10.6	B	0.51	16.8	B	0.58	11.4	B	0.56	10.2	B	N	N
		Los Coyotes Diagonal	I-405 SB Loop On-Ramp	None	0.14	--	--	0.13	--	--	0.16	--	--	0.17	--	--	0.32	--	--	0.17	--	--	--	--	0.18	--	--	0.18	--	--	0.35	--	--	0.19	--	--	--	--
	16	Willow Street	Los Coyotes Diagonal	Sig	0.72	51.5	D	**0.74**	**102.8**	**F**	0.78	44.4	D	1.02	35.1	D	0.71	32.5	C	0.96	25.4	C	N	N	0.87	48.8	D	1.18	45.4	D	0.73	42.2	D	**1.19**	**62.2**	**E**	Y	N
Woodruff Avenue at I-405	17	Willow Street	Woodruff Avenue	Sig	**1.07**	**86.8**	**F**	0.77	30.4	C	**1.33**	**147.9**	**F**	0.87	40.4	D	**1.30**	**137.0**	**F**	0.87	37.1	D	Y	N	**1.44**	**180.5**	**F**	0.94	51.5	D	**1.40**	**166.5**	**F**	0.88	42.2	D	Y	N
	18	I-405 NB Direct Off-Ramp	Woodruff Avenue	None	0.15	--	--	0.17	--	--	0.39	--	--	0.19	--	--	0.40	--	--	0.22	--	--	--	--	0.42	--	--	0.20	--	--	0.43	--	--	0.24	--	--	--	--
		I-405 NB Direct On-Ramp	Woodruff Avenue	None	0.25	--	--	0.20	--	--	0.31	--	--	0.21	--	--	0.31	--	--	0.22	--	--	--	--	0.34	--	--	0.23	--	--	0.34	--	--	0.23	--	--	--	--
	19	I-405 SB Direct Off-Ramp	Woodruff Avenue	None	0.48	--	--	0.38	--	--	0.52	--	--	0.47	--	--	0.52	--	--	0.41	--	--	--	--	0.56	--	--	0.51	--	--	0.56	--	--	0.45	--	--	--	--
		I-405 SB Direct On-Ramp	Woodruff Avenue	None	0.27	--	--	0.19	--	--	0.41	--	--	0.23	--	--	0.43	--	--	0.24	--	--	--	--	0.45	--	--	0.25	--	--	0.46	--	--	0.26	--	--	--	--

Table 4-5: Years 2020 and 2040 Peak-Hour Intersections LOS after Mitigation with Cumulative and Project Contribution Impact Determinations for Alternative 3

Interchange Location	Intersection #	Intersection Location: East/West Street	Intersection Location: North/South Street	Traffic Control	Year 2009 Existing Traffic AM Peak Hour V/C	Year 2009 Existing Traffic AM Peak Hour Avg Delay (sec)	Year 2009 Existing Traffic AM Peak Hour LOS	Year 2009 Existing Traffic PM Peak Hour V/C	Year 2009 Existing Traffic PM Peak Hour Avg Delay (sec)	Year 2009 Existing Traffic PM Peak Hour LOS	Year 2020 No Build Traffic on No Build Geometry AM Peak Hour D/C	Year 2020 No Build AM Peak Hour Avg Delay (sec)	Year 2020 No Build AM Peak Hour LOS	Year 2020 No Build PM Peak Hour D/C	Year 2020 No Build PM Peak Hour Avg Delay (sec)	Year 2020 No Build PM Peak Hour LOS	Year 2020 Alternative 3 Traffic on Alternative 3 Geometry including Mitigations AM Peak Hour D/C	Year 2020 Alternative 3 AM Peak Hour Avg Delay (sec)	Year 2020 Alternative 3 AM Peak Hour LOS	Year 2020 Alternative 3 PM Peak Hour D/C	Year 2020 Alternative 3 PM Peak Hour Avg Delay (sec)	Year 2020 Alternative 3 PM Peak Hour LOS	Cumulative Significant Impact	Project Contribution to Significant Impact	Year 2040 No Build Traffic on No Build Geometry AM Peak Hour D/C	Year 2040 No Build AM Peak Hour Avg Delay (sec)	Year 2040 No Build AM Peak Hour LOS	Year 2040 No Build PM Peak Hour D/C	Year 2040 No Build PM Peak Hour Avg Delay (sec)	Year 2040 No Build PM Peak Hour LOS	Year 2040 Alternative 3 Traffic on Alternative 3 Geometry including Mitigations AM Peak Hour D/C	Year 2040 Alternative 3 AM Peak Hour Avg Delay (sec)	Year 2040 Alternative 3 AM Peak Hour LOS	Year 2040 Alternative 3 PM Peak Hour D/C	Year 2040 Alternative 3 PM Peak Hour Avg Delay (sec)	Year 2040 Alternative 3 PM Peak Hour LOS	Cumulative Significant Impact	Project Contribution to Significant Impact
Palo Verde Avenue / Stearns Street at I-405	20	I-405 NB Direct Off-Ramp	Palo Verde Avenue	Sig	0.54	11.3	B	0.45	13.7	B	0.78	17.7	B	0.61	11.8	B	0.84	17.0	B	0.69	11.8	B	N	N	0.95	21.2	C	0.70	12.6	B	1.02	22.9	C	0.80	14.0	B	N	N
		I-405 NB Loop On-Ramp	Palo Verde Avenue	None	0.11	--	--	0.20	--	--	0.13	--	--	0.22	--	--	0.14	--	--	0.22	--	--	--	--	0.14	--	--	0.23	--	--	0.15	--	--	0.23	--	--	--	--
	21	Woodruff Avenue	Palo Verde Avenue	Sig	**0.87**	**86.6**	**F**	0.59	21.3	C	0.84	13.6	B	0.66	10.3	B	0.84	13.8	B	0.69	9.7	A	N	N	0.91	15.9	B	0.72	11.3	B	0.92	16.9	B	0.75	10.3	B	N	N
	22	Stearns Street	Palo Verde Avenue	Sig	0.73	19.4	B	0.75	25.2	C	0.86	18.9	B	0.83	20.5	C	0.94	22.1	C	0.92	22.9	C	N	N	0.94	22.0	C	0.92	24.4	C	1.02	30.8	C	1.02	29.9	C	N	N
	23	Stearns Street	I-405 SB Direct On-Ramp	None	0.28	--	--	0.39	--	--	0.30	--	--	0.46	--	--	0.35	--	--	0.46	--	--	--	--	0.33	--	--	0.50	--	--	0.38	--	--	0.50	--	--	--	--
Studebaker Road at I-405	24	I-405 NB Direct On-Ramp	Studebaker Road	Sig	0.50	4.0	A	0.55	4.3	A	0.51	2.6	A	0.47	4.7	A	0.63	4.1	A	0.52	4.0	A	N	N	0.55	2.8	A	0.51	4.9	A	0.68	4.5	A	0.56	3.9	A	N	N
	25	I-405 SB Direct Off-Ramp	Studebaker Road	Stop	0.15	13.8	B	0.04	10.8	B	**0.86**	**68.4**	**F**	0.34	16.2	C	**1.04**	**80.0**	**F**	0.44	20.4	C	N	N	**1.02**	**98.3**	**F**	0.33	15.7	C	**1.20**	**116.8**	**F**	0.45	20.1	C	N	N
				*Sig**	*N/A*						*0.65*	*8.4*	*A*	*0.66*	*5.8*	*A*	*0.69*	*9.3*	*A*	*0.67*	*4.6*	*A*			*0.71*	*9.1*	*A*	*0.72*	*7.0*	*A*	*0.74*	*7.0*	*A*	*0.73*	*5.5*	*A*		
	26	Atherton Street	Studebaker Road	Sig	0.46	9.2	A	0.74	23.3	C	0.54	9.3	A	0.78	13.8	B	0.57	8.8	A	0.81	14.6	B	N	N	0.60	10.7	B	0.85	15.7	B	0.62	9.7	A	0.88	17.1	B	N	N
Studebaker Road at SR-22/ 7th Street	27	SR-22 WB On-/Off-Ramp	Studebaker Road	Sig	0.49	16.0	B	0.74	22.1	C	0.46	12.8	B	0.79	28.0	C	0.51	12.8	B	0.87	30.2	C	N	N	0.50	13.1	B	0.86	30.4	C	0.55	13.2	B	0.94	35.2	D	N	N
	28	SR-22 EB On-/Off-Ramp	Studebaker Road	Sig	0.72	17.6	B	0.82	17.1	B	0.91	21.3	C	0.93	25.8	C	0.93	25.8	C	0.97	29.0	C	N	N	0.99	30.4	C	1.03	37.1	D	1.02	37.5	D	1.10	44.4	D	N	N
	29	SR-22 WB On-/Off-Ramp	College Park Drive	Stop	0.39	18.8	C	**0.65**	**59.9**	**F**	N/A						N/A						Y	N	N/A						N/A						Y	N
				*Sig**	N/A						0.65	14.1	B	**1.07**	**110.1**	**F**	0.61	12.1	B	**1.08**	**125.8**	**F**			0.71	15.5	B	**1.16**	**147.2**	**F**	0.66	13.3	B	**1.17**	**88.0**	**F**		
7th Street	30	7th Street	Pacific Coast Highway	Sig	**0.95**	**92.9**	**F**	**1.03**	**82.6**	**F**	0.94	49.2	D	0.95	35.9	D	0.91	34.8	C	0.95	38.6	D	N	N	**1.02**	**65.8**	**E**	**1.03**	**58.7**	**E**	0.99	51.8	D	0.99	50.3	D	N	N
	31	7th Street	Bellflower Boulevard	Sig	**1.01**	**73.6**	**E**	**0.91**	**90.3**	**F**	**1.04**	**68.9**	**E**	0.98	47.9	D	0.93	27.1	C	0.89	33.3	C	N	N	**1.13**	**82.4**	**F**	**1.06**	**63.0**	**E**	1.01	40.8	D	0.92	37.8	D	N	N
	32	Pacific Coast Highway	Bellflower Boulevard	Sig	0.47	22.3	C	0.73	22.5	C	0.53	38.8	D	0.70	20.4	C	0.59	32.1	C	0.60	27.7	C	N	N	0.57	39.1	D	0.82	32.1	C	0.64	34.8	C	0.66	28.4	C	N	N
	33	7th Street	Channel Drive	Sig	0.72	32.9	C	0.88	30.3	C	0.71	24.5	C	0.94	22.7	C	0.73	15.0	B	0.82	13.2	B	N	N	0.77	25.7	C	1.02	50.8	D	0.79	11.5	B	0.88	17.1	B	N	N
	34	7th Street	W. Campus Drive	Sig	**0.83**	**112.9**	**F**	0.72	31.1	C	0.79	31.2	C	0.81	32.0	C	0.67	13.9	B	0.76	24.2	C	N	N	0.85	53.1	D	**0.87**	**58.5**	**E**	0.81	15.2	B	0.82	39.2	D	N	N
	35	7th Street	E. Campus Drive	Sig	0.97	23.1	C	0.73	24.7	C	1.03	35.8	D	0.87	14.6	B	0.99	30.8	C	0.88	16.8	B	N	N	**1.12**	**55.8**	**E**	0.96	16.7	B	1.08	49.7	D	0.97	19.5	B	N	N
	36	7th Street	Park Avenue	Sig	0.68	12.2	B	0.74	15.7	B	0.69	14.8	B	0.81	19.2	B	0.77	15.1	B	0.85	21.6	C	N	N	0.82	17.1	B	0.86	23.7	C	0.84	17.5	B	0.85	27.6	C	N	N

Notes:

1. LOS – Level of Service; V/C – Volume-to-Capacity Ratio; D/C – Demand Volume-to-Capacity Ratio; N/A – Not Applicable (see Note 2)
2. * = Intersection is not signalized under existing or No Build conditions.
   - At the I-405 SB Direct Off-Ramp intersection with Studebaker Road, the signalized row is included only to determine if there is an adverse effect at the intersection. If a stop-controlled intersection has an LOS E or F under future conditions, then the intersection is reanalyzed as a signalized intersection to identify any adverse effects, because stop-controlled analysis does not provide an overall intersection metric.
   - The proposed mitigation includes installation of a signal at the SR-22 WB On-/Off-Ramp intersection with College Park Drive. To determine if the mitigation addresses the adverse effect, a comparison is made between the proposed signalized intersection and the no-build condition assuming a traffic signal. The traffic signal is assumed for the no-build condition because stop-controlled analysis does not provide an overall intersection metric to determine if the adverse effect at the intersection has been addressed.
3. Bold indicates an intersection forecast to operate at LOS E or F.
4. Shaded cells indicate a cumulative significant impact.
5. -- = LOS and average delay are not calculated for intersections without traffic control. The cumulative significant impact determination applies only to controlled intersections.
6. Intersection numbers correspond to the intersection numbers shown on the intersection traffic volumes figures.
7. For future conditions, the D/C ratio is used instead of the V/C ratio.

Table 4-6: Years 2020 and 2040 Peak-Hour Intersections LOS with Cumulative and Project Contribution Impact Determinations for Alternative 3

Interchange Location	Intersection #	Intersection Location		Traffic Control	Year 2009						Year 2020														Year 2040													
					Existing Traffic						No Build Traffic on No Build Geometry						Alternative 3 Traffic on No Build Geometry						Cumulative Significant Impact	Project Contribution to Significant Impact	No Build Traffic on No Build Geometry						Alternative 3 Traffic on No Build Geometry						Cumulative Significant Impact	Project Contribution to Significant Impact
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour				
		East/West Street	North/South Street		V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS			D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS		
Carson Street at I-605	1	Carson Street	I-605 SB Off-Ramp	Sig	0.58	21.9	C	0.61	17.8	B	0.57	22.3	C	0.68	23.8	C	0.64	11.1	B	0.74	13.0	B	N	N	0.62	22.4	C	0.73	24.5	C	0.69	11.7	B	0.80	14.1	B	N	N
	2	Carson Street	I-605 SB Direct On-Ramp	None	0.15	--	--	0.25	--	--	0.22	--	--	0.33	--	--	0.24	--	--	0.32	--	--	--	--	0.24	--	--	0.36	--	--	0.26	--	--	0.34	--	--	--	--
		Carson Street	I-605 SB Loop On-Ramp	None	0.24	--	--	0.20	--	--	0.33	--	--	0.33	--	--	0.33	--	--	0.37	--	--	--	--	0.35	--	--	0.36	--	--	0.36	--	--	0.39	--	--	--	--
	3	Carson Street	I-605 NB Off-Ramp	Sig	0.55	14.8	B	0.66	12.4	B	0.59	21.8	C	0.76	20.6	C	0.61	20.9	C	0.75	17.6	B	N	N	0.63	23.6	C	0.82	23.2	C	0.66	22.9	C	0.81	19.4	B	N	N
		Carson Street	I-605 NB Loop On-Ramp	None	0.23	--	--	0.45	--	--	0.31	--	--	0.35	--	--	0.28	--	--	0.30	--	--	--	--	0.33	--	--	0.37	--	--	0.31	--	--	0.33	--	--	--	--
		Carson Street	I-605 NB Direct On-Ramp	None	0.40	--	--	0.32	--	--	0.52	--	--	0.49	--	--	0.51	--	--	0.46	--	--	--	--	0.56	--	--	0.53	--	--	0.55	--	--	0.49	--	--	--	--
	4	Carson Street	Pioneer Boulevard	Sig	0.76	48.1	D	0.76	35.1	D	0.79	31.1	C	0.84	33.7	C	0.76	31.7	C	0.83	31.8	C	N	N	0.86	35.1	D	0.92	43.9	D	0.84	37.3	D	0.92	44.5	D	N	N
Spring Street/ Cerritos Avenue at I-605	5	Spring Street/ Cerritos Avenue	I-605 SB Off-Ramp	Sig	0.79	26.2	C	0.60	18.4	B	0.68	14.2	B	0.65	10.9	B	0.70	14.4	B	0.60	9.8	A	N	N	0.74	15.4	B	0.71	12.0	B	0.75	15.5	B	0.64	10.7	B	N	N
	6	Spring Street/ Cerritos Avenue	I-605 NB On-Ramp	Sig	0.84	13.5	B	0.81	11.1	B	0.76	10.5	B	0.79	8.2	A	0.74	6.1	A	0.75	4.9	A	N	N	0.82	11.6	B	0.86	9.8	A	0.80	7.1	A	0.81	6.0	A	N	N
Lakewood Boulevard/ Willow Street at I-405	7	I-405 NB Direct Off-Ramp	Lakewood Boulevard	None	0.35	--	--	0.34	--	--	0.38	--	--	0.38	--	--	0.44	--	--	0.43	--	--	--	--	0.41	--	--	0.41	--	--	0.47	--	--	0.46	--	--	--	--
		I-405 NB Direct On-Ramp	Lakewood Boulevard	None	0.22	--	--	0.21	--	--	0.38	--	--	0.23	--	--	0.38	--	--	0.23	--	--	--	--	0.41	--	--	0.25	--	--	0.41	--	--	0.25	--	--	--	--
		I-405 NB Loop Off-Ramp	Lakewood Boulevard	None	0.19	--	--	0.18	--	--	0.23	--	--	0.22	--	--	0.28	--	--	0.26	--	--	--	--	0.25	--	--	0.23	--	--	0.30	--	--	0.28	--	--	--	--
		I-405 NB Loop On-Ramp	Lakewood Boulevard	None	0.50	--	--	0.38	--	--	0.53	--	--	0.41	--	--	0.52	--	--	0.41	--	--	--	--	0.57	--	--	0.44	--	--	0.57	--	--	0.45	--	--	--	--
	8	I-405 SB Loop On-Ramp	Lakewood Boulevard	None	0.19	--	--	0.23	--	--	0.22	--	--	0.25	--	--	0.23	--	--	0.27	--	--	--	--	0.24	--	--	0.27	--	--	0.25	--	--	0.29	--	--	--	--
		I-405 SB Direct Off-Ramp	Lakewood Boulevard	None	0.40	--	--	0.31	--	--	0.43	--	--	0.48	--	--	0.44	--	--	0.46	--	--	--	--	0.46	--	--	0.52	--	--	0.48	--	--	0.50	--	--	--	--
	9	Willow Street	Lakewood Boulevard	Sig	0.76	31.1	C	**0.92**	**66.2**	**E**	0.75	31.2	C	0.89	43.0	D	0.72	31.1	C	0.96	44.3	D	N	N	0.81	33.6	C	0.93	48.4	D	0.77	32.4	C	1.02	52.0	D	N	N
	10	Willow Street	I-405 SB Loop Off-Ramp	None	0.32	--	--	0.30	--	--	0.35	--	--	0.46	--	--	0.36	--	--	0.45	--	--	--	--	0.37	--	--	0.50	--	--	0.38	--	--	0.49	--	--	--	--
		Willow Street	I-405 SB Direct On-Ramp	None	0.26	--	--	0.38	--	--	0.28	--	--	0.41	--	--	0.30	--	--	0.43	--	--	--	--	0.31	--	--	0.44	--	--	0.33	--	--	0.46	--	--	--	--
Bellflower Boulevard/ Los Coyotes Diagonal at I-405	11	I-405 NB Off-Ramp	Bellflower Boulevard	Sig	0.41	9.3	A	0.48	11.9	B	0.51	10.8	B	0.53	10.6	B	0.41	9.1	A	0.53	11.1	B	N	N	0.55	11.6	B	0.58	11.3	B	0.45	9.7	A	0.58	11.7	B	N	N
		I-405 NB Loop On-Ramp	Bellflower Boulevard	None	0.49	--	--	0.35	--	--	0.53	--	--	0.37	--	--	0.54	--	--	0.36	--	--	--	--	0.57	--	--	0.40	--	--	0.59	--	--	0.39	--	--	--	--
		I-405 NB Direct On-Ramp	Bellflower Boulevard	None	0.28	--	--	0.18	--	--	0.31	--	--	0.19	--	--	0.32	--	--	0.18	--	--	--	--	0.33	--	--	0.20	--	--	0.34	--	--	0.19	--	--	--	--
	12	Willow Street	Bellflower Boulevard	Sig	**0.84**	**81.2**	**F**	0.92	40.1	D	1.01	48.8	D	1.01	54.4	D	0.86	32.9	C	**1.15**	**76.5**	**E**	Y	Y	**1.09**	**67.3**	**E**	**1.09**	**70.6**	**E**	0.93	37.7	D	**1.25**	**105.9**	**F**	Y	Y
	13	Los Coyotes Diagonal	Bellflower Boulevard	Sig	0.63	31.3	C	**0.97**	**72.8**	**E**	0.65	26.4	C	1.00	42.1	D	0.64	25.8	C	1.12	50.2	D	N	N	0.70	26.9	C	**1.13**	**56.8**	**E**	0.69	26.0	C	**1.22**	**65.5**	**E**	Y	Y
		Los Coyotes Diagonal	I-405 SB Direct On-Ramp	None	0.06	--	--	0.09	--	--	0.06	--	--	0.12	--	--	0.09	--	--	0.12	--	--	--	--	0.07	--	--	0.13	--	--	0.09	--	--	0.13	--	--	--	--
	14	I-405 SB Loop Off-Ramp	Bellflower Boulevard	None	0.12	--	--	0.26	--	--	0.12	--	--	0.32	--	--	0.12	--	--	0.37	--	--	--	--	0.13	--	--	0.34	--	--	0.13	--	--	0.40	--	--	--	--
	15	Los Coyotes Diagonal	I-405 SB Direct Off-Ramp	Sig	0.44	14.4	B	0.45	13.4	B	0.52	10.0	B	0.47	16.0	B	0.53	10.2	B	0.52	9.8	A	N	N	0.56	10.6	B	0.51	16.8	B	0.58	11.4	B	0.56	10.2	B	N	N
		Los Coyotes Diagonal	I-405 SB Loop On-Ramp	None	0.14	--	--	0.13	--	--	0.16	--	--	0.17	--	--	0.32	--	--	0.17	--	--	--	--	0.18	--	--	0.18	--	--	0.35	--	--	0.19	--	--	--	--
	16	Willow Street	Los Coyotes Diagonal	Sig	0.72	51.5	D	**0.74**	**102.8**	**F**	0.78	44.4	D	1.02	35.1	D	0.75	40.9	D	**1.26**	**66.5**	**E**	Y	Y	0.87	48.8	D	1.18	45.4	D	0.86	42.0	D	**1.41**	**92.7**	**F**	Y	Y
Woodruff Avenue at I-405	17	Willow Street	Woodruff Avenue	Sig	**1.07**	**86.8**	**F**	0.77	30.4	C	**1.33**	**147.9**	**F**	0.87	40.4	D	**1.30**	**137.0**	**F**	0.87	37.1	D	Y	N	**1.44**	**180.5**	**F**	0.94	51.5	D	**1.40**	**166.5**	**F**	0.88	42.2	D	Y	N
	18	I-405 NB Direct Off-Ramp	Woodruff Avenue	None	0.15	--	--	0.17	--	--	0.39	--	--	0.19	--	--	0.40	--	--	0.22	--	--	--	--	0.42	--	--	0.20	--	--	0.43	--	--	0.24	--	--	--	--
		I-405 NB Direct On-Ramp	Woodruff Avenue	None	0.25	--	--	0.20	--	--	0.31	--	--	0.21	--	--	0.31	--	--	0.22	--	--	--	--	0.34	--	--	0.23	--	--	0.34	--	--	0.23	--	--	--	--
	19	I-405 SB Direct Off-Ramp	Woodruff Avenue	None	0.48	--	--	0.38	--	--	0.52	--	--	0.47	--	--	0.52	--	--	0.41	--	--	--	--	0.56	--	--	0.51	--	--	0.56	--	--	0.45	--	--	--	--
		I-405 SB Direct On-Ramp	Woodruff Avenue	None	0.27	--	--	0.19	--	--	0.41	--	--	0.23	--	--	0.43	--	--	0.24	--	--	--	--	0.45	--	--	0.25	--	--	0.46	--	--	0.26	--	--	--	--

Table 4-6: Years 2020 and 2040 Peak-Hour Intersections LOS with Cumulative and Project Contribution Impact Determinations for Alternative 3

Interchange Location	Intersection #	Intersection Location: East/West Street	Intersection Location: North/South Street	Traffic Control	Year 2009 Existing Traffic AM Peak Hour V/C	Year 2009 Existing Traffic AM Peak Hour Avg Delay (sec)	Year 2009 Existing Traffic AM Peak Hour LOS	Year 2009 Existing Traffic PM Peak Hour V/C	Year 2009 Existing Traffic PM Peak Hour Avg Delay (sec)	Year 2009 Existing Traffic PM Peak Hour LOS	Year 2020 No Build Traffic on No Build Geometry AM Peak Hour D/C	Year 2020 No Build Traffic on No Build Geometry AM Peak Hour Avg Delay (sec)	Year 2020 No Build Traffic on No Build Geometry AM Peak Hour LOS	Year 2020 No Build Traffic on No Build Geometry PM Peak Hour D/C	Year 2020 No Build Traffic on No Build Geometry PM Peak Hour Avg Delay (sec)	Year 2020 No Build Traffic on No Build Geometry PM Peak Hour LOS	Year 2020 Alternative 3 Traffic on No Build Geometry AM Peak Hour D/C	Year 2020 Alternative 3 Traffic on No Build Geometry AM Peak Hour Avg Delay (sec)	Year 2020 Alternative 3 Traffic on No Build Geometry AM Peak Hour LOS	Year 2020 Alternative 3 Traffic on No Build Geometry PM Peak Hour D/C	Year 2020 Alternative 3 Traffic on No Build Geometry PM Peak Hour Avg Delay (sec)	Year 2020 Alternative 3 Traffic on No Build Geometry PM Peak Hour LOS	Year 2020 Cumulative Significant Impact	Year 2020 Project Contribution to Significant Impact	Year 2040 No Build Traffic on No Build Geometry AM Peak Hour D/C	Year 2040 No Build Traffic on No Build Geometry AM Peak Hour Avg Delay (sec)	Year 2040 No Build Traffic on No Build Geometry AM Peak Hour LOS	Year 2040 No Build Traffic on No Build Geometry PM Peak Hour D/C	Year 2040 No Build Traffic on No Build Geometry PM Peak Hour Avg Delay (sec)	Year 2040 No Build Traffic on No Build Geometry PM Peak Hour LOS	Year 2040 Alternative 3 Traffic on No Build Geometry AM Peak Hour D/C	Year 2040 Alternative 3 Traffic on No Build Geometry AM Peak Hour Avg Delay (sec)	Year 2040 Alternative 3 Traffic on No Build Geometry AM Peak Hour LOS	Year 2040 Alternative 3 Traffic on No Build Geometry PM Peak Hour D/C	Year 2040 Alternative 3 Traffic on No Build Geometry PM Peak Hour Avg Delay (sec)	Year 2040 Alternative 3 Traffic on No Build Geometry PM Peak Hour LOS	Year 2040 Cumulative Significant Impact	Year 2040 Project Contribution to Significant Impact
Palo Verde Avenue / Stearns Street at I-405	20	I-405 NB Direct Off-Ramp	Palo Verde Avenue	Sig	0.54	11.3	B	0.45	13.7	B	0.78	17.7	B	0.61	11.8	B	0.84	17.0	B	0.69	11.8	B	N	N	0.95	21.2	C	0.70	12.6	B	1.02	22.9	C	0.80	14.0	B	N	N
		I-405 NB Loop On-Ramp	Palo Verde Avenue	None	0.11	--	--	0.20	--	--	0.13	--	--	0.22	--	--	0.14	--	--	0.22	--	--	--	--	0.14	--	--	0.23	--	--	0.15	--	--	0.23	--	--	--	--
	21	Woodruff Avenue	Palo Verde Avenue	Sig	**0.87**	**86.6**	**F**	0.59	21.3	C	0.84	13.6	B	0.66	10.3	B	0.84	13.8	B	0.69	9.7	A	N	N	0.91	15.9	B	0.72	11.3	B	0.92	16.9	B	0.75	10.3	B	N	N
	22	Stearns Street	Palo Verde Avenue	Sig	0.73	19.4	B	0.75	25.2	C	0.86	18.9	B	0.83	20.5	C	0.94	22.1	C	0.92	22.9	C	N	N	0.94	22.0	C	0.92	24.4	C	1.02	30.8	C	1.02	29.9	C	N	N
	23	Stearns Street	I-405 SB Direct On-Ramp	None	0.28	--	--	0.39	--	--	0.30	--	--	0.46	--	--	0.35	--	--	0.46	--	--	--	--	0.33	--	--	0.50	--	--	0.38	--	--	0.50	--	--	--	--
Studebaker Road at I-405	24	I-405 NB Direct On-Ramp	Studebaker Road	Sig	0.50	4.0	A	0.55	4.3	A	0.51	2.6	A	0.47	4.7	A	0.63	4.1	A	0.52	4.0	A	N	N	0.55	2.8	A	0.51	4.9	A	0.68	4.5	A	0.56	3.9	A	N	N
	25	I-405 SB Direct Off-Ramp	Studebaker Road	Stop	0.15	13.8	B	0.04	10.8	B	**0.86**	**68.4**	**F**	0.34	16.2	C	**1.04**	**80.0**	**F**	0.44	20.4	C	N	N	**1.02**	**98.3**	**F**	0.33	15.7	C	**1.20**	**116.8**	**F**	0.45	20.1	C	N	N
				*Sig**	*N/A*						*0.65*	*8.4*	*A*	*0.66*	*5.8*	*A*	*0.69*	*9.3*	*A*	*0.67*	*4.6*	*A*			*0.71*	*9.1*	*A*	*0.72*	*7.0*	*A*	*0.74*	*7.0*	*A*	*0.73*	*5.5*	*A*		
	26	Atherton Street	Studebaker Road	Sig	0.46	9.2	A	0.74	23.3	C	0.54	9.3	A	0.78	13.8	B	0.57	8.8	A	0.81	14.6	B	N	N	0.60	10.7	B	0.85	15.7	B	0.62	9.7	A	0.88	17.1	B	N	N
Studebaker Rd at SR-22/ 7th Street	27	SR-22 WB On-/Off-Ramp	Studebaker Road	Sig	0.49	16.0	B	0.74	22.1	C	0.46	12.8	B	0.79	28.0	C	0.51	12.8	B	0.87	30.2	C	N	N	0.50	13.1	B	0.86	30.4	C	0.55	13.2	B	0.94	35.2	D	N	N
	28	SR-22 EB On-/Off-Ramp	Studebaker Road	Sig	0.72	17.6	B	0.82	17.1	B	0.91	21.3	C	0.93	25.8	C	0.93	25.8	C	0.97	29.0	C	N	N	0.99	30.4	C	1.03	37.1	D	1.02	37.5	D	1.10	44.4	D	N	N
	29	SR-22 WB On-/Off-Ramp	College Park Drive	Stop	0.39	18.8	C	**0.65**	**59.9**	**F**	0.43	21.3	C	**0.61**	**88.7**	**F**	0.12	19.7	C	**0.32**	**92.6**	**F**	Y	N	0.51	25.3	D	**0.84**	**152.1**	**F**	0.15	22.8	C	**0.45**	**158.2**	**F**	Y	N
				*Sig**	*N/A*						*0.65*	*14.1*	*B*	***1.07****	***110.1***	***F****	*0.61*	*12.1*	*B*	***1.08****	***125.8***	***F****			*0.71*	*15.5*	*B*	***1.16****	***147.2***	***F****	*0.66*	*13.3*	*B*	***1.17****	***88.0***	***F****		
7th Street	30	7th Street	Pacific Coast Highway	Sig	**0.95**	**92.9**	**F**	**1.03**	**82.6**	**F**	0.94	49.2	D	0.95	35.9	D	0.92	35.7	D	0.96	36.9	D	N	N	**1.02**	**65.8**	**E**	**1.03**	**58.7**	**E**	**1.04**	**55.9**	**E**	1.04	49.7	D	Y	Y
	31	7th Street	Bellflower Boulevard	Sig	**1.01**	**73.6**	**E**	**0.91**	**90.3**	**F**	**1.04**	**68.9**	**E**	0.98	47.9	D	**1.09**	**66.4**	**E**	1.01	49.6	D	Y	Y	**1.13**	**82.4**	**F**	**1.06**	**63.0**	**E**	**1.17**	**72.3**	**E**	**1.10**	**57.0**	**E**	Y	Y
	32	Pacific Coast Highway	Bellflower Boulevard	Sig	0.47	22.3	C	0.73	22.5	C	0.53	38.8	D	0.70	20.4	C	0.54	30.2	C	0.75	22.1	C	N	N	0.57	39.1	D	0.82	32.1	C	0.58	26.9	C	0.88	26.8	C	N	-N
	33	7th Street	Channel Drive	Sig	0.72	32.9	C	0.88	30.3	C	0.71	24.5	C	0.94	22.7	C	0.75	8.2	A	0.95	25.4	C	N	N	0.77	25.7	C	1.02	50.8	D	0.77	10.2	B	1.04	39.1	D	N	N
	34	7th Street	W. Campus Drive	Sig	**0.83**	**112.9**	**F**	0.72	31.1	C	0.79	31.2	C	0.81	32.0	C	0.80	34.6	C	0.86	47.4	D	N	N	0.85	53.1	D	**0.87**	**58.5**	**E**	**0.87**	**60.0**	**E**	**0.93**	**71.3**	**E**	Y	Y
	35	7th Street	E. Campus Drive	Sig	0.97	23.1	C	0.73	24.7	C	1.03	35.8	D	0.87	14.6	B	1.05	45.2	D	0.90	16.0	B	N	N	**1.12**	**55.8**	**E**	0.96	16.7	B	**1.14**	**59.3**	**E**	0.99	18.9	B	Y	Y
	36	7th Street	Park Avenue	Sig	0.68	12.2	B	0.74	15.7	B	0.69	14.8	B	0.81	19.2	B	0.77	15.1	B	0.85	21.6	C	N	N	0.82	17.1	B	0.86	23.7	C	0.84	17.5	B	0.85	27.6	C	N	N

Notes:

1. LOS – Level of Service; V/C – Volume-to-Capacity Ratio; D/C – Demand Volume-to-Capacity Ratio; N/A – Not Applicable (see Note 2)
2. * = Intersection is not signalized under existing or No Build conditions. The signalized row is included only to determine if there is an adverse effect at the intersection. If a stop-controlled intersection has an LOS E or F under future conditions, then the intersection is reanalyzed as a signalized intersection to identify any adverse effects, because stop-controlled analysis does not provide an overall intersection metric. The number of LOS E or F locations and the number of locations with V/C or D/C greater than 1.00 identified in the text does not include the signalized row because the existing and no-build operation is based on the current stop control.
3. Bold indicates an intersection forecast to operate at LOS E or F.
4. Shaded cells indicate a cumulative significant impact.
5. -- = LOS and average delay are not calculated for intersections without traffic control. The cumulative significant impact determination applies only to controlled intersections.
6. Intersection numbers correspond to the intersection numbers shown on the intersection traffic volumes figures.
7. For future conditions, the D/C ratio is used instead of the V/C ratio.

Difference between Alternative 3 and No Build Alternative Related to Existing Condition. A comparison of the existing condition and the difference between Alternative 3 and the No Build Alternative reveals the following information. The data used to make the comparison are presented in the tables indicated in Chapter 3 of this Supplemental Draft EIR/EIS.

1. Under Alternative 3 on I-405 north of I-605 to Lakewood Boulevard, GP lane volumes during peak hours in 2020 and 2040 are expected to be greater than under the no-build condition. In 2020 between Palo Verde Avenue and Woodruff Avenue, peak-hour GP volumes by direction range from 320 to 890 greater under Alternative 3 than under no-build conditions compared to 7,175 to 8,546 under the existing condition. (See Figures 3-4, 3-6, and 3-9.) In 2040 between Palo Verde Avenue and Woodruff Avenue, peak-hour GP volumes by direction range from 350 to 970 greater under Alternative 3 than under no-build conditions compared to 7,175 to 8,546 under the existing condition. (See Figures 3-4, 3-10, and 3-13.)
2. Under Alternative 3 on I-405 north of I-605 to Lakewood Boulevard, HOV lane volumes during peak hours in 2020 and 2040 are expected to be greater than under the existing condition. In 2020 between Palo Verde Avenue and Woodruff Avenue, peak-hour HOV volumes by direction range from 320 lower to 140 greater under Alternative 3 than under no-build conditions compared to 793 to 1,720 under the existing condition. (See Figures 3-4, 3-6, and 3-9.) In 2040 between Palo Verde Avenue and Woodruff Avenue, peak-hour HOV volumes by direction range from 350 lower to 150 greater under Alternative 3 than under no-build conditions compared to 793 to 1,720 under the existing condition. (See Figures 3-4, 3-8, and 3-13.)
3. Under Alternative 3 and the No Build Alternative on I-405 north of I-605 to Lakewood Boulevard in 2020, LOS F conditions are anticipated during peak hours in the GP lanes, except for LOS D and E in the southbound direction between I-605 and Studebaker Road during the AM and PM peak hours, respectively. Under the existing condition, LOS ranges from D to F depending on the time of day and direction of travel. In 2040, LOS F conditions are anticipated under Alternative 3 during peak hours in the GP lanes, except for LOS D and E in the southbound direction between I-605 and Studebaker Road during the AM and PM peak hours, respectively, under the No Build Alternative and LOS E and F under Alternative 3. Under Alternative 3 in 2020, v/c ratios in the GP lanes range from 0.03 to 0.13 higher than the No Build Alternative. Under the existing condition, v/c ratios range from 0.81 to 0.98. Under Alternative 3 in 2040, v/c ratios in the GP lanes range from 0.02 to 0.13 higher than under the No Build Alternative. (See Tables 3-2 and 3-6.).
4. Under Alternative 3 and the No Build Alternative in 2020, HOV lanes on I-405 north of I-605 to Lakewood Boulevard are anticipated to operate at LOS F with v/c ratios in excess of 1.00 during peak hours, except for southbound during the AM peak hour under Alternative 3.

Under the existing condition, v/c ratios range from 0.50 to 1.06 indicating a range of LOS from A to F depending on time of day and direction of travel. Under Alternative 3 and the No Build Alternative in 2040, HOV lanes on I-405 north of I-605 to Lakewood Boulevard are anticipated to operate at LOS F during peak hours because v/c ratios are all forecast to be over capacity. (See Tables 3-3 and 3-7.)

5. Under Alternative 3 in 2020, branch connectors in the I-405/I-605/SR-22 interchange serving movements to and from Long Beach are anticipated to operate with v/c ratios ranging from 0.07 less than to 0.31 greater than under the No Build Alternative compared to the existing range of 0.36 to 0.97. Under Alternative 2 in 2040, branch connectors in the I-405/I-605/ SR-22 interchange serving movements to and from Long Beach are anticipated to operate with v/c ratios ranging from 0.10 less than to 0.25 greater than under the No Build Alternative compared to the existing range of 0.36 to 0.97. (See Tables 3-4 and 3-8.)
6. Under Alternative 3 with all proposed mitigation in 2020, there are two fewer intersections anticipated to operate at LOS E or F than under the No Build Alternative compared to ten such intersections in the existing condition. Under Alternative 3 in 2020, there is one fewer intersection anticipated to operate with v/c ratios greater than 1.00 than under the No Build Alternative compared to three such intersections in the existing condition. Under Alternative 3 in 2040, there are six fewer intersections anticipated to operate at LOS E or F than under the No Build Alternative compared to ten such intersections in the existing condition. Under Alternative 3 in 2040, there is one more intersection anticipated to operate with v/c ratios greater than 1.00 than under the No Build Alternative compared to three such intersections in the existing condition. (See Table 4-5.)
7. In 2040 under Alternative 3 within the Long Beach traffic study area, the percentage of off-ramps with adequate storage is anticipated to be 10 percent higher than under the No Build Alternative, compared to 100 percent under existing conditions. (See Table 3-5.)
8. In 2040 under Alternative 3 within the Long Beach traffic study area, the percentage of arterial at ramp intersections with adequate storage is anticipated to be 9 percent higher than under the No Build Alternative, compared to 82 percent under existing conditions. (See Table 3-5.)
9. In 2040 under Alternative 3 within the Long Beach traffic study area, the percentage of arterial/arterial intersections with adequate storage is anticipated to be 6 percent higher than under the No Build Alternative, compared to 54 percent under existing conditions. (See Table 3-5.)

4.2 Mitigation Measures for Significant Impacts under CEQA

The following is additional information for Draft EIR/EIS Section 4.2.8, Mitigation Measures for Significant Impacts under CEQA. This information will be added to Section 4.2.8 in the Final

EIR/EIS. With implementation of the proposed traffic measures below, the project contribution to significant cumulative impacts would be mitigated.

Measures T-10 and T-11 have been identified to mitigate impacts to roads in Los Angeles County owned by the City of Long Beach and the State of California, respectively. Per the measures, Cooperative Agreements will be entered into, one between OCTA and the City of Long Beach and the other between OCTA and the State of California, to provide fair share funding for the implementation of Measures T-10 and T-11. The fair share percentages are presented below in Measures T-10 and T-11. Appendix B-3 presents the data on which the fair share contribution percentages are based.

Funding from additional sources will be required to fully fund implementation of each of the improvements proposed in Measures T-10 and T-11. It is unsure at this time if and when 100 percent of the funding will be available to implement each intersection identified in Mitigation Measures T-10 and T-11 because they are dependent on mitigation funds from future developments and projects in the area. The Department is committed to the fair share funding percentages as stated below. However, if the City of Long Beach and the State of California are unable to get 100 percent of the remaining funds, then Measure T-10 and/or Measure T-11 will be deemed infeasible due to impacts identified as significant and not fully mitigable; consequently, Findings and a Statement of Overriding Considerations would be prepared for inclusion in the Final EIR/EIS to comply with State CEQA Guidelines (Title 14 California Code of Regulations, Chapter 3, Section 15903), and the Department of Transportation and California Transportation Commission Environmental Regulations (Title 21 California Code of Regulations, Chapter 11, Section 1501).

No additional ROW is anticipated to implement the proposed measures. Noise and air quality impacts of construction would be temporary and not anticipated to be a significant impact. It is anticipated that all of the proposed measures could be implemented without the necessity of closing travel lanes during weekday peak hours. It may be necessary to narrow lanes. Short-term off-peak, nighttime, and weekend lane closures may be necessary. As noted in the measures below, the agencies implementing the measures would bear responsibility for necessary clearances and permits.

City of Long Beach Intersections

T-10 A payment shall be made by OCTA to the City of Long Beach based on a Cooperative Agreement to be negotiated and executed between OCTA and the City of Long Beach. The Cooperative Agreement shall identify the project's fair share of the costs for the improvements at intersections owned by the City of Long Beach based on the PA and

in accordance with the fair share percentages for each location identified below. The Cooperative Agreement shall provide:

- That the City of Long Beach's Transportation Mitigation Program will be revised to include the locations listed below under A, B, or C for the PA;
- That the payment made by OCTA shall be placed into the City of Long Beach Transportation Mitigation Program and shall only be used to provide improvements to remedy impacts of the PA at the intersections listed below under A, B, or C for the PA;
- The amount of the total payment to be applied to each location; and
- That the proposed improvements shall be implemented by the City of Long Beach, with the City of Long Beach bearing responsibility for necessary clearances and permits.

A. If PA is Alternative 1:
   - Los Coyotes Diagonal and Bellflower Boulevard intersection:
     - Add a second left-turn lane to eastbound approach.
     - Fair Share Percentage: 4.45%. (estimated total construction cost in 2013 dollars is $250,000)

B. If PA is Alternative 2:
   - Willow Street and Bellflower Boulevard intersection:
     - Add an exclusive right-turn lane to eastbound approach;
     - Add a second left-turn lane to westbound approach; and
     - Add a second left-turn lane to southbound approach.
     - Fair Share Percentage: 10.41%. (estimated total construction cost in 2013 dollars is $810,000)
   - Willow Street and Los Coyotes Diagonal intersection:
     - Add a second left-turn lane to eastbound approach; and
     - Add a second left-turn lane to southbound approach.
     - Fair Share Percentage: 31.57%. (estimated total construction cost in 2013 dollars is $440,000)
   - Willow Street and Woodruff Avenue intersection:
     - Add a second left-turn lane to northbound approach.

  - Fair Share Percentage: 10.40%. (estimated total construction cost in 2013 dollars is $240,000)

C. If PA is Alternative 3:

- Willow Street and Bellflower Boulevard intersection:
  - Add an exclusive right-turn lane to eastbound approach;
  - Add a second left-turn lane to westbound approach; and
  - Add a second left-turn lane to southbound approach.
  - Fair Share Percentage: 10.41%. (estimated total construction cost in 2013 dollars is $810,000)
- Los Coyotes Diagonal and Bellflower Boulevard intersection:
  - Add a second left-turn lane to eastbound approach.
  - Fair Share Percentage: 8.32%. (estimated total construction cost in 2013 dollars is $250,000)
- Willow Street and Los Coyotes Diagonal intersection:
  - Add a second left-turn lane to eastbound approach; and
  - Add a second left-turn lane to southbound approach.
  - Fair Share Percentage: 30.03%. (estimated total construction cost in 2013 dollars is $440,000)

State of California Intersections

T-11 A payment shall be made by OCTA to Caltrans based on a Traffic Mitigation Agreement Fair Share Deferment to be negotiated and executed between OCTA and Caltrans. The Traffic Mitigation Agreement Fair Share Deferment shall identify the project's fair share of the costs for the improvements at intersections owned by the State of California based on the PA and in accordance with the fair share percentages for each location identified below. The Traffic Mitigation Agreement Fair Share Deferment shall provide:

- That Caltrans will establish separate accounts for each of the locations listed below under A, B, or C for the PA;
- That the payment made by OCTA shall be held by Caltrans and shall only be used to provide improvements to remedy impacts of the PA at the intersections listed below under A, B, or C for the PA;
- The amount of the total payment to be applied to each location;

- That the amounts for different locations shall not be commingled; and
- That the proposed improvements shall be implemented by Caltrans, with Caltrans bearing responsibility for necessary clearances and permits.

It should be noted that the State of California would implement a project only when enough funds have been collectively received for that specific mitigation measure.

A. If PA is Alternative 1:
   - SR-22 westbound on-/off-ramp and College Park Drive intersection:
     - Add a second northbound through lane to the off-ramp approach to College Park Drive starting approximately 300 feet (ft) south of their intersection; and
     - Replace existing traffic control with a traffic signal.
     - Fair Share Percentage: 12.11%. (estimated total construction cost in 2013 dollars is $1,570,000)
   - 7th Street and Pacific Coast Highway intersection:
     - Add protected/permitted signal phasing to the eastbound and westbound approaches of Pacific Coast Highway to Bellflower Boulevard.
     - Fair Share Percentage: 11.70%.(estimated total construction cost in 2013 dollars is $450,000)
   - 7th Street and West Campus Drive intersection:
     - Add an exclusive right-turn lane to westbound approach, modifying traffic signals as needed.
     - Fair Share Percentage: 9.16%. (estimated total construction cost in 2013 dollars is $300,000)
   - 7th Street and Bellflower Boulevard intersection:
     - Add a second left-turn lane to eastbound approach, modifying signals and adjusting sidewalk as necessary.
     - Fair Share Percentage: 11.70%. (estimated total construction cost in 2013 dollars is $640,000)

B. If PA is Alternative 2:
   - SR-22 westbound on-/off-ramp and College Park Drive intersection:
     - Add a second northbound through lane to the off-ramp approach to College Park Drive starting approximately 300 ft south of their intersection; and

  - Replace existing traffic control with a traffic signal.
  - Fair Share Percentage: 33.25%. (estimated total construction cost in 2013 dollars is $1,570,000)
- 7th Street and Pacific Coast Highway intersection:
  - Add protected/permitted signal phasing to the eastbound and westbound approaches of Pacific Coast Highway to Bellflower Boulevard.
  - Fair Share Percentage: 7.84%. (estimated total construction cost in 2013 dollars is $450,000)
- 7th Street and Bellflower Boulevard intersection:
  - Add a second left-turn lane to eastbound approach, modifying signals and adjusting sidewalk as necessary.
  - Fair Share Percentage: 16.92%. (estimated total construction cost in 2013 dollars is $640,000)
- 7th Street and Channel Drive intersection:
  - Add a second left-turn lane to westbound approach, modifying signals as necessary; and
  - Provide dual southbound exclusive left-turn lanes.
  - Fair Share Percentage: 13.59%. (estimated total construction cost in 2013 dollars is $240,000)
- 7th Street and West Campus Drive intersection:
  - Add an exclusive right-turn lane to westbound approach, modifying traffic signals as necessary.
  - Fair Share Percentage: 27.34%. (estimated total construction cost in 2013 dollars is $300,000)
- 7th Street and East Campus Drive intersection:
  - Add a right-turn lane to westbound approach, modifying traffic signals as necessary and maximizing eastbound and westbound left-turn pocket lengths.
  - Fair Share Percentage: 21.30%. (estimated total construction cost in 2013 dollars is $450,000)

C. If PA is Alternative 3:

- 7th Street and Pacific Coast Highway intersection:

  - Add protected/permitted signal phasing to the eastbound and westbound approaches of Pacific Coast Highway to Bellflower Boulevard.
  - Fair Share Percentage: 8.08%. (estimated total construction cost in 2013 dollars is $450,000)
- 7th Street and Bellflower Boulevard intersection:
  - Add a second left-turn lane to eastbound approach, modifying signals and adjusting sidewalk as necessary.
  - Fair Share Percentage: 17.64%. (estimated total construction cost in 2013 dollars is $640,000)
- 7th Street and Channel Drive intersection:
  - Add a second left-turn lane to westbound approach, modifying signals as necessary; and
  - Provide dual southbound exclusive left-turn lanes.
  - Fair Share Percentage: 14.01%. (estimated total construction cost in 2013 dollars is $240,000)
- 7th Street and West Campus Drive intersection:
  - Add an exclusive right-turn lane to westbound approach, modifying traffic signals as necessary.
  - Fair Share Percentage: 25.02%. (estimated total construction cost in 2013 dollars is $300,000)
- 7th Street and East Campus Drive intersection:
  - Add a right-turn lane to westbound approach, modifying traffic signals as necessary and maximizing eastbound and westbound left-turn pocket lengths.
  - Fair Share Percentage: 7.39%. (estimated total construction cost in 2013 dollars is $450,000)

Chapter 5 Comments and Coordination

After the Draft EIR/EIS was circulated and during preparation of the Supplemental Traffic Study, Caltrans and OCTA coordinated with the technical representatives of the City of Long Beach, Gateway Cities Council of Governments (COG), Caltrans – District 7, and the Los Angeles County Metropolitan Transportation Authority (Metro) regarding potential effects to traffic and circulation in the Long Beach area. The following reflects those technical meetings that were held:

- City of Long Beach on July 3 and November 30, 2012;
- Gateway Cities COG on July 12 and October 5, 2012; and
- Long Beach Area Traffic Study Technical Working Group on September 11, October 17, November 14, and December 12, 2012, and January 8 and February 13, 2013.

The City of Long Beach hired a consultant to provide technical assistance regarding potential effects to traffic and circulation in the Long Beach area; that consultant also participated in the meetings. Detailed traffic forecasting information used in preparation of the Supplemental Traffic Study was provided by OCTA to the City of Long Beach consultant for their review.

A meeting was held in the field on March 15, 2012, to review potential impacts and avoidance and minimization/mitigation along 7th Street (SR-22) in the City of Long Beach. The field review was attended by representatives of OCTA, Caltrans District 7, and OCTA's consultant.

As part of the coordination process, the initial draft of the Supplemental Traffic Study Report – Long Beach Area was submitted to members of the Technical Working Group in early December 2012 for review and comment. The report was discussed at the January and February meetings of the Technical Working Group, and the City of Long Beach provided written comments on the report by letter dated January 31, 2013.

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Chapter 6 References

Supplemental Traffic Study Report – Long Beach Area. February 2013.

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Appendix A City of Long Beach Letter

CITY OF LONG BEACH

DEPARTMENT OF PUBLIC WORKS

333 WEST OCEAN BOULEVARD • LONG BEACH, CA 90802 • (562) 570-6383 • FAX (562) 570-6012

January 31, 2013

Smita Deshpande
Caltrans District 12, Branch Chief
Caltrans District 12
3347 Michelson Drive
Irvine, CA 92612

Subject: Draft Supplemental Traffic Study, Draft Environmental Impact Report / Environmental Impact Statement for the San Diego Freeway (I-405) Improvement Project

Dear Ms. Deshpande:

The City of Long Beach appreciates the opportunity to review the Draft Supplemental Traffic Study for the Draft Environmental Impact Report / Environmental Impact Statement for the San Diego Freeway (I-405) Improvement Project. The City respectfully submits the comments provided in this letter and attachments for consideration.

As a Participating Agency of the Project, the City is disappointed that many of the comments and issues identified and submitted in writing by the City in response to the Notice of Preparation for the project were not addressed in the draft EIR/S document or made available to the public for review and comment.

The City is pleased a supplemental traffic study was conducted in accordance with our original request. City traffic engineers and our consultants have reviewed the supplemental traffic study and have determined that the traffic impacts identified in the study are significant and exceed level of service significance thresholds established by the City.

The supplemental traffic study has revealed additional information the City considers significant new information. State law requires recirculation of an EIR when significant new information is added to the EIR after public notice is given of the availability of the draft EIR for public review but before certification. It's understood recirculation of the EIR includes public notice, new public hearing(s) and an additional 45-day review period, and that all comments received during the second review period will be responded to in the final EIR/S.

At the Orange County Transportation Authority (OCTA) Technical Working Group meeting January 8, 2013, City representatives requested recirculation of the draft EIR/S, including the supplemental traffic study. This letter shall serve as the City's formal request for recirculation of the draft EIR/S.

Thank you again for the opportunity to review the draft supplemental traffic study for the draft EIR/S for the San Diego Freeway (I-405) Improvement Project. The City of Long Beach continues to look forward to working with Caltrans and OCTA staff to resolve the outstanding issues identified in this comment letter.

Sincerely,

David Roseman
City Traffic Engineer

Attachments:
(1) Review of Draft Supplemental Traffic Study Report, December 2012.
(2) Figure 1, AM and PM Peak Hour Significant Impacts – 2040 Alternative 1.
(3) Figure 2, AM and PM Peak Hour Significant Impacts – 2040 Alternative 2.
(4) Figure 3, AM and PM Peak Hour Significant Impacts – 2040 Alternative 3.

cc: Michael Conway, Director of Public Works
Amy Bodek, Director of Development Services
Michael Mais, Assistant City Attorney
Niall Barrett, OCTA

Review of Draft Supplemental Traffic Study Report, December 2012

The City of Long Beach (the "City") has reviewed the "Draft Supplemental Traffic Study Report; San Diego Freeway (I-405) Improvement SR-73 to I-605," dated December 2012. The City has reviewed the data presented in the Supplemental Traffic Study Report, along with the overall methodology that was employed to assess City facilities. In addition, City standards, methodology and criteria were assessed as part of the review.

Our review has included the following key areas:

- Overall methodology applied to City intersections and roadways.
- Traffic model findings (OCTAM Model) and diverted traffic estimates.
- Intersection level of service analysis.
- Ramp and freeway level of service analysis.
- Significant impact findings and conclusions.

Methodology and Determination of Significant Impacts

The City threshold for determining significant intersection impacts was not adhered to within the study report and thus the City does not agree with the findings. On page 4-2 it is stated, "For arterial intersections the City of Long Beach criteria are applied using the Highway Capacity Manual operation intersection analysis method for signalized and unsignalized intersections. A signalized intersection operating with a LOS E or F and whose D/C ratio increased by more than 0.02 under "with project" condition compared to No Build Alternative is considered exceeds the City of Long Beach criteria."

The City disagrees with this methodology and the resultant findings, as follows:

- The City's threshold for determining a significant environmental impact on an intersection is as follows: Any increase in volume/capacity ratio of 0.02 or more (not "more than 0.02"), where the final resulting level of service is either E or F.
- The City has traditionally applied the "Intersection Capacity Utilization" (ICU) method of intersection operations. This method does not take signal timing into account for intersection evaluation, nor allow for adjustments in signal timing for future scenarios. The City feels this is the most appropriate methodology for long term planning and analysis, such as for the project's year 2040 analysis. We also find the ICU method to be more reasonably conservative than the Highway Capacity Manual methodology, thus the analysis presented in the Draft Supplemental Traffic Study Report under estimates intersection impacts.
- When a location is found to have a V/C difference of 0.02 or greater due to a project, the City declares that to be a "significant impact" with respect to CEQA findings. The report does not present such findings as significant impacts; referring to them as only as "exceed." We do not

understand the meaning of "exceed" in the context of the overall Draft EIR for the project, and assert that all locations that meet or exceed the City's threshold of significance must be declared as significant impacts.

Technical Findings Related to Draft Supplemental Traffic Study Report

The Supplemental Traffic Study included analysis of 50 intersections (including all on/off-ramp intersections) within the City (35 ramp intersection locations and 15 roadway intersections), and 13 freeway mainline locations on I-605, I-405, and SR-22/7th Street that are on Caltrans facilities and that fall within the City's boundaries.

Three maps have been prepared that summarize the locations that were studied within City jurisdiction, as well as locations that are shown by the Supplemental Study to "Exceed Evaluation" for Alternatives 1, 2 and 3. Note, the correct City impact criteria was applied for purposes of developing the "impact locations" that are shown in the graphics.

Figure 1 shows the locations that are shown in the Supplemental Traffic Study to "Exceed" criteria under Alternative 1 in 2040 plus other locations that may not have been called out as "Exceed" in the Draft but that otherwise do meet the City's threshold to be considered a significant impact. As shown, "exceed" and impacted locations include two intersections along 7th Street, one location on Bellflower Boulevard, one ramp location at the SR-22 WB On/Off Ramp and College Park Drive, one freeway location on I-405 southbound, and one freeway location on I-605 northbound.

Figure 2 shows the locations that are shown in the Supplemental Traffic Study to "Exceed" criteria under Alternative 2 in 2040 plus other locations that may not have been called out as "Exceed" in the Draft but that otherwise do meet the City's threshold to be considered a significant impact. As shown, "exceed" and impacted locations include four intersections along 7th Street, three locations on Willow Street, one ramp location at the SR-22 WB On/Off Ramp and College Park Drive, and one freeway location on I-405 southbound.

Figure 3 shows the locations that are shown in the Supplemental Traffic Study to "Exceed" criteria under Alternative 3 in 2040 plus other locations that may not have been called out as "Exceed" in the Draft but that otherwise do meet the City's threshold to be considered a significant impact. As shown, "exceed" and impacted locations include four intersections along 7th Street, two locations on Willow Street, one location on Bellflower Boulevard, one freeway location on I-405 southbound, two locations on I-405 freeway northbound, one location on SR-22/7th Street westbound, and one location on I-605 northbound.

A review of the findings of the Supplemental Traffic Study clearly indicates the following:

- The project will cause significant traffic diversion from I-405 onto City streets.
- The traffic diversion will result in significant impacts along the 7th Street corridor leading into the City and from the City towards SR-22.

- The traffic diversion will result in significant impacts along Willow Street.
- The impacts are under-represented based on the City's review of other information including the Gateway Cities traffic model information (further discussed in this letter).
- Based on the fact that the Supplemental Traffic Study reveals significant impacts and the fact that the Gateway Cities model shows that the Supplemental Traffic Study impacts are under-represented, the study area is inadequate. The significant impacts likely go further than the area that was studied, based on the analysis conducted by the City.
- There is no detailed analysis of the I-405/I-605 interchange as a whole. This is a flaw in the overall EIR traffic study because the project and EIR ignore impacts to the interchange and do not demonstrate that the interchange can operate acceptably with the project.

OCTAM Difference Results vs. Gateway Cities/Metro Model Difference Results

The OCTAM modeling results conducted for the Draft Supplemental Traffic Study Report were compared to the Gateway Cities/Metro modeling results conducted for the SR-91/I-605/I-405 Transportation Strategic Plan. The Gateway Cities model was derived from the I-710 Major Project Study model, with additional level of detail in the study area including the City. The model was validated for use in Gateway Cities and is considered to be a more accurate forecasting tool in the City than the OCTAM model (which was developed for use in Orange County and validated primarily for application within Orange County). Since the PM peak hour volumes are traditionally higher than the AM peak hour, model difference plots for the PM peak hour were evaluated and compared between the two models.

Overall Modeling "Difference" Summary – Both models show an increase in volumes on some roadways in the City due to the Alternatives, and both models also show decreases in volumes along some roadways in the City. This is due to "shifting" that the model predicts due to the implementation of the added capacity in Orange County. In most, but not all cases, the two models have similar directionality of volume increases and decreases. In some especially sensitive locations, the Gateway Cities model shows a significantly greater increase in traffic volumes due to the project implementation, such as along 7th Street. To conduct our analysis, the City conducted model runs using the Gateway Cities model, with the No Build as well as Alternative 1 and Alternative 2 scenarios. This was done for purposes of comparing and critically assessing the OCTAM model results in the City.

Alternative 1 – No Build Model Comparison - Arterials

One key difference between OCTAM and Gateway Cities/Metro modeling results that should be noted is at the intersections of Pacific Coast Highway/7th Street and Bellflower Boulevard/7th Street. The 7th Street corridor is one of the major corridors connecting the City to Orange County via SR-22, and is the likely corridor of impact due to spillover traffic from I-405. It is the closest parallel regional route to I-405 in the study area. 7th Street in this area also is highly congested today and carries very high levels of traffic for an urban arterial roadway.

Based on Alternative 1 OCTAM model results shown in **Table 1**, 7th Street west of Pacific Coast Highway is projected to experience a net decrease of approximately 18 PM peak hour trips, 7th Street between Pacific Coast Highway and Bellflower Boulevard is projected to experience a net increase of 52 PM peak hour trips, and 7th Street east of Bellflower Boulevard is projected to experience a net increase of 61 PM peak hour trips. Based on the Alternative 1 Metro/Gateway Cities model results, the same locations are projected to experience a net increase of 24, 157, and 91 PM peak hour trips, respectively. Because this is an especially heavily traveled and congested corridor in the City (and a gateway route in and out of the City), these differences could be significant in terms of findings of significant impacts and ultimately for what mitigation measures are recommended.

Table 1 – Projected PM Peak Hour Added Trips on 7th Street – Alternative 1

Location	OCTAM Model PM Peak Hr Added Trips			Metro/Gateway Cities Model PM Peak Hr Added Trips		
	EB	WB	Total	EB	WB	Total
7th Street west of Pacific Coast Highway	15	-33	-18	19	5	24
7th Street b/w Pacific Coast Highway and Bellflower Boulevard	66	-14	52	116	41	157
7th Street east of Bellflower Boulevard	31	30	61	77	14	91

As shown in **Table 2**, using the OCTAM PM peak hour added trips along 7th Street, the 2040 volume/capacity (V/C) ratio at 7th Street/Pacific Coast Highway is expected to increase from 1.03 to 1.04, an increase of 0.01. Similarly, using the OCTAM PM peak hour added trips the PM peak hour V/C ratio at 7th Street/Bellflower Boulevard is expected to *decrease* from 1.06 without the project, to 1.04 with the project, a *decrease* of 0.02 (no significant impact). Due to the higher volume of PM peak hour trips along 7th Street (east of Pacific Coast Highway) calculated using the Alternative 1 Metro/Gateway Cities model, it seems unlikely that the V/C at 7th Street/Bellflower Boulevard would improve with the proposed I-405 project. Due to their close proximity to one another, the level of service at 7th Street/Pacific Coast Highway and 7th Street/Bellflower Boulevard may warrant further consideration. Both models show net decreases in all directional volumes at the third intersection in the "Iron Triangle" – Pacific Coast Highway/Bellflower Boulevard. The three locations are so closely spaced that typically they are analyzed as a system because the signal timing patterns must be coordinated to prevent queue spillover impacts.

Table 2 – Supplemental Study Peak Hour Alternative 1 vs. No Build 2040 Level of Service

East/West Street	North/South Street	2040 No Build Alternative Level of Service						2040 Alternative 1 Level of Service						Alternative 1 vs. No-Build		
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			V/C Ratio Difference Comparison		
		V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	AM	PM	Evaluation
7th St	Pacific Coast Highway	1.02	62.2	E	1.03	48.3	D	1.04	68.8	E	1.04	51.6	D	0.020	0.010	No Impact
7th St	Bellflower Blvd	1.13	82.4	F	1.06	63.0	E	1.14	84.9	F	1.04	57.2	E	0.010	(0.020)	No Impact

Alternative 2 – 2040 No Build Model Comparison- Arterials

Based on the Alternative 2 OCTAM model results shown in **Table 3**, 7th Street between Pacific Coast Highway and Studebaker Road is projected to experience a net increase of between 62 and 173 PM peak hour trips. Based on the Metro/Gateway Cities model results, 7th Street between Pacific Coast Highway and Studebaker Road is projected to experience a net increase of between 243 and 292 PM peak hour trips.

Table 3 – Projected PM Peak Hour Added Trips on 7th Street – Alternative 2

Location	OCTAM Model PM Peak Hr Added Trips			Metro/Gateway Cities Model PM Peak Hr Added Trips		
	EB	WB	Total	EB	WB	Total
7th Street b/w Pacific Coast Highway and Bellflower Boulevard	105	68	173	139	117	256
7th Street b/w Bellflower Boulevard and W. Campus Drive	71	-9	62	163	80	243
7th Street b/w East Campus Drive and Studebaker Road	62	10	72	177	115	292

As shown in **Table 4**, using the OCTAM PM peak hour added trips along 7th Street, the 2040 volume/capacity (V/C) ratio at 7th Street/Pacific Coast Highway is expected to increase from 1.03 to 1.07, an increase of 0.04 (no significant impact because the future with project LOS is LOS D). Similarly, using the OCTAM PM peak hour added trips, no change in V/C is expected at 7th Street/Bellflower Boulevard during the PM peak hour (1.06 without and with the project). Again, due to the high volume of PM peak hour trips along 7th Street (east of Pacific Coast Highway) calculated using the Alternative 2 Metro/Gateway Cities model, it seems unlikely that the V/C at 7th Street/Bellflower Boulevard would not change with the proposed I-405 project. Due to their close proximity to one another, and the PM peak hour significant impact found at the adjacent intersection of West Campus Drive/7th Street, the level of service at 7th Street/Pacific Coast Highway and 7th Street/Bellflower Boulevard warrants further analysis.

Table 4 – Supplemental Peak Hour Alternative 2 vs. No Build 2040 Level of Service

East/West Street	North/South Street	2040 No Build Alternative Level of Service						2040 Alternative 2 Level of Service						Alternative 1 vs. No-Build		
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			V/C Ratio Difference Comparison		
		V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	AM	PM	Evaluation
7th St	Pacific Coast Highway	1.02	62.2	E	1.03	48.3	D	1.04	66.8	E	1.07	54.7	D	0.020	0.040	No Impact
7th St	Bellflower Blvd	1.13	82.4	F	1.06	63.0	E	1.18	92.7	F	1.06	60.9	E	0.050	0.000	AM Impact

In addition to 7th Street east of Pacific Coast Highway, another segment that warrants further evaluation is Willow Street between Los Coyotes Diagonal and Studebaker Road. As shown in **Table 5**, the Alternative 2 OCTAM model results show a net increase of 374 PM peak hour trips along Willow Street between Los Coyotes Diagonal and Woodruff Avenue, and a net increase of 89 PM peak hour trips between Palo Verde Avenue and Studebaker Road.

Table 5 – Projected PM Peak Hour Added Trips on Willow Street – Alternative 2

Location	OCTAM Model PM Peak Hr Added Trips		
	EB	WB	Total
Willow Street b/w Los Coyotes Diagonal and Woodruff Avenue	306	68	374
Willow Street b/w Palo Verde Avenue and Studebaker Road	81	8	89

Due to their close proximity to one another, the high volume of PM peak hour trips along Willow Street (between Los Coyotes Diagonal and Studebaker Road) associated with the Alternative 2 OCTAM model, and the PM peak hour significant impacts found at Bellflower Boulevard/Willow Street and Los Coyotes Diagonal/Willow Street (shown in **Table 6**), the level of service at Willow Street/Woodruff Avenue (no PM peak hour impact expected) warrants further analysis. In addition, the intersection of Willow Street/Studebaker Road should also be evaluated.

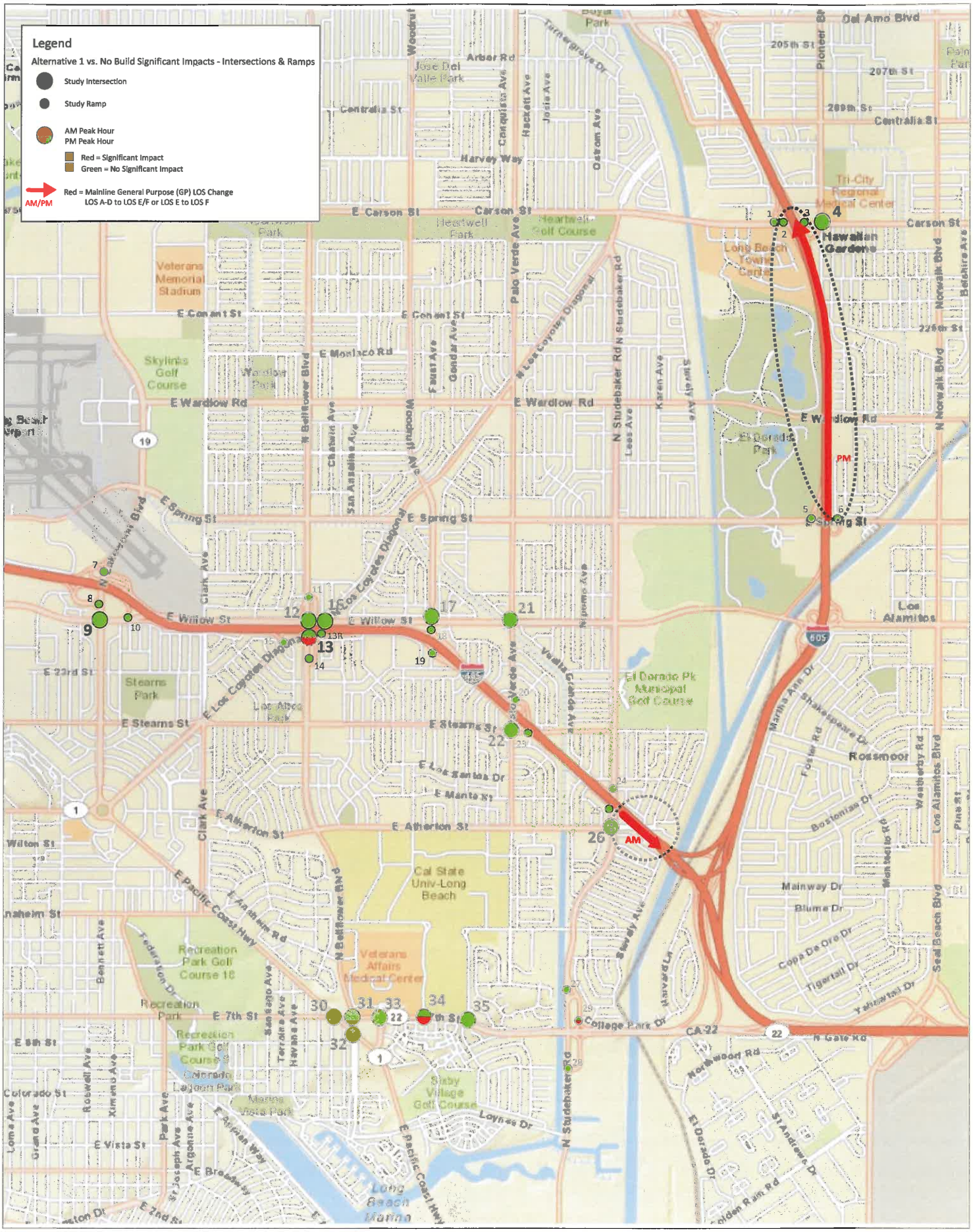
Table 6 – Supplemental Study Peak Hour Alternative 2 vs. No Build 2040 Level of Service

East/West Street	North/South Street	2040 No Build Alternative Level of Service						2040 Alternative 2 Level of Service						Alternative 1 vs. No-Build		
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			V/C Ratio Difference Comparison		
		V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS	AM	PM	Evaluation
Willow Street	Bellflower Boulevard	1.09	67.3	E	1.09	70.6	E	1.05	55.0	D	1.25	106.3	E	(0.040)	0.160	PM Impact
Willow Street	Los Coyotes Diagonal	0.87	46.7	D	1.18	45.0	D	0.99	60.7	E	1.41	101.4	F	0.120	0.230	AM/PM Impact
Willow Street	Woodruff Avenue	1.44	180.5	F	0.94	51.5	D	1.53	242.2	F	0.95	81.3	F	0.090	0.010	AM Impact

Review of Recommended Improvements/Mitigation Measures

The Draft Supplemental Traffic Study Report lists a series of "Proposed Roadway Improvements" for various locations including intersections in the City. The City is in the process of reviewing the proposed roadway improvements and will provide additional comments at a later date.

Example 1: 7th Street at Bellflower Boulevard intersection – the proposed improvement would require significant right-of-way from Federal Government property and it would require significant and high cost modifications to structures and utilities in this location. These important details are not mentioned in the Draft Report.



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San Diego Freeway (I-405) Improvement Project
SR-73 to I-605 Supplemental Review

FIGURE 1
AM and PM Peak Hour Significant Impacts - 2040 Alternative 1

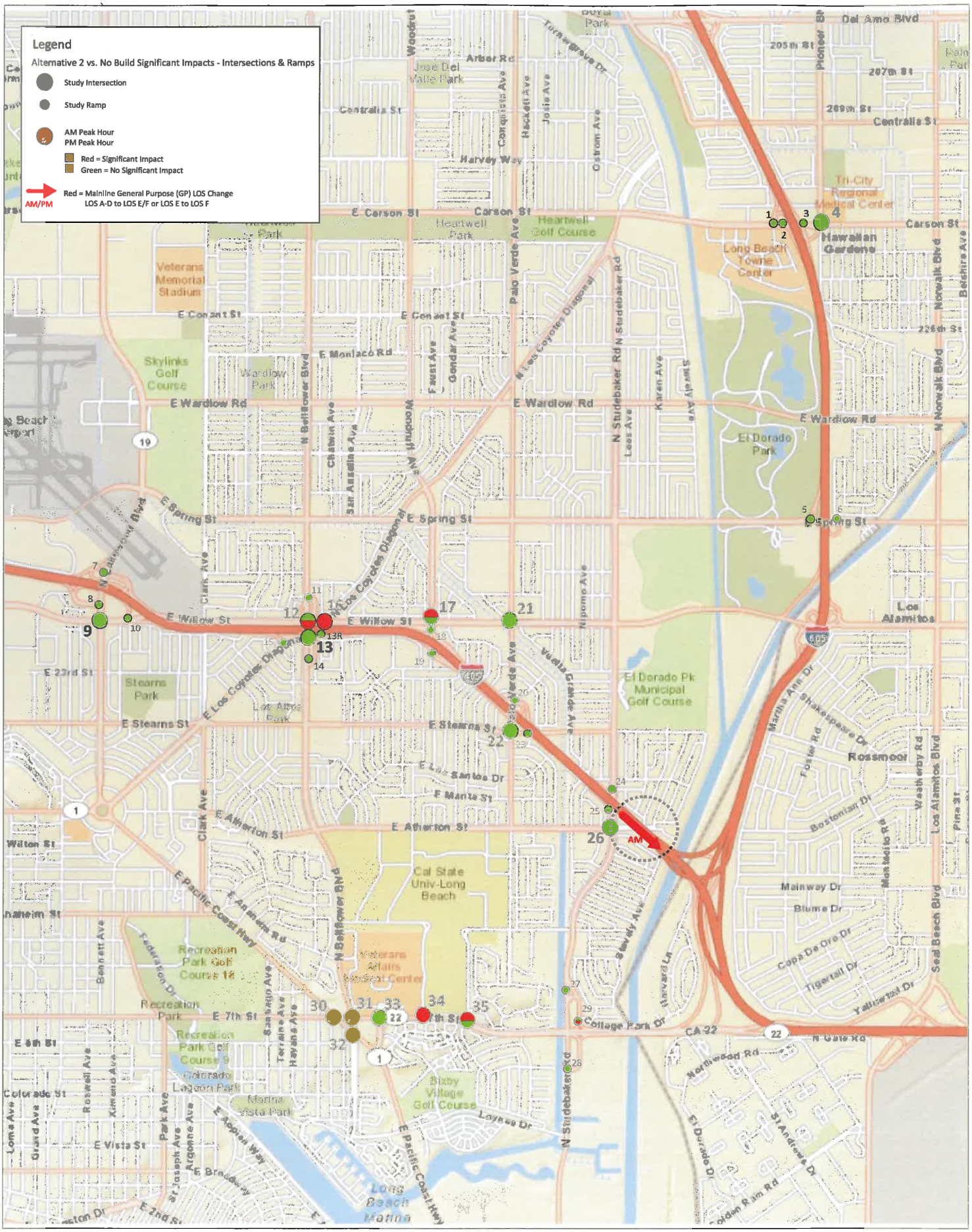

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FIGURE 2
AM and PM Peak Hour Significant Impacts - 2040 Alternative 2

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FIGURE 3
AM and PM Peak Hour Significant Impacts - 2040 Alternative 3

Appendix B Traffic Data

Appendix B1: Traffic Tables
Appendix B2: Recommended Improvements
Appendix B3: Fair Share Calculations

Appendix B1: Traffic Tables

Table 2-3: Year 2009 Existing Mainline Peak Hour Level of Service

Location	Lane Type	Direction	Mainline		Year 2009 Existing Conditions							
					AM Peak Hour				PM Peak Hour			
			Lanes	Capacity[1,4]	Traffic Demand Volume[1]	V/C	Density[2,5]	LOS[3]	Traffic Demand Volume[1]	V/C	Density[2,5]	LOS[3]
I-405 Mainline												
Temple Avenue to Lakewood Boulevard/Willow Street	GP	NB	5	9,250	9,795	1.06	43.7	E	8,666	0.94	33.3	D
		SB	5	9,250	9,199	0.99	32.6	D	8,322	0.90	34.4	D
	HOV	NB	1	1,650	1,746	1.06	--	--	1,222	0.74	--	--
		SB	1	1,650	778	0.47	--	--	1,599	0.97	--	--
Lakewood Boulevard/Willow Street to Bellflower Boulevard	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,650	1,746	1.06	--	--	1,222	0.74	--	--
		SB	1	1,650	778	0.47	--	--	1,599	0.97	--	--
Bellflower Boulevard to Woodruff Avenue	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,650	1,720	1.04	--	--	1,182	0.72	--	--
		SB	1	1,650	783	0.47	--	--	1,570	0.95	--	--
Woodruff Avenue to Palo Verde Avenue/Stearns Street	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	4	7,400	7,907	1.07	38.7	E	7,175	0.97	37.7	E
	HOV	NB	1	1,650	1,720	1.04	--	--	1,182	0.72	--	--
		SB	1	1,650	793	0.48	--	--	1,710	1.04	--	--
Palo Verde Avenue/Stearns Street to Studebaker Road	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,650	1,720	1.04	--	--	1,182	0.72	--	--
		SB	1	1,650	830	0.50	--	--	1,560	0.95	--	--
Studebaker Road to I-605 NB Off Ramp	GP	NB	4	7,400	7,240	0.98	38.2	E	6,030	0.81	26.9	D
		SB	5	9,250	7,884	0.85	26.6	D	7,733	0.84	31.9	D
	HOV	NB	1	1,650	1,380	0.84	--	--	1,440	0.87	--	--
		SB	1	1,650	830	0.50	--	--	1,560	0.95	--	--
I-605 NB Off Ramp to 7th St Off Ramp	GP	NB	4	7,400	7,240	0.98	38.2	E	6,030	0.81	26.9	D
		SB	4	7,400	6,508	0.88	27.7	D	6,428	0.87	33.1	D
	HOV	NB	1	1,650	1,380	0.84	--	--	1,440	0.87	--	--
		SB	1	1,650	830	0.50	--	--	1,560	0.95	--	--
7th St Off Ramp to I-605 SB On Ramp	GP	NB	4	7,400	7,240	0.98	38.2	E	6,030	0.81	26.9	D
		SB	4	7,400	6,420	0.87	27.2	D	6,300	0.85	32.5	D
	HOV	NB	1	1,650	1,380	0.84	--	--	1,440	0.87	--	--
		SB	1	1,650	830	0.50	--	--	1,560	0.95	--	--
I-605 Mainline												
Carson Steet to HOV Transition	GP	NB	4	7,400	5,997	0.81	26.3	D	7,162	0.97	35.7	E
		SB	4	7,400	8,066	1.09	41.1	E	7,417	1.00	36.1	E
	HOV	NB	1	1,650	737	0.45	--	--	633	0.38	--	--
		SB	1	1,650	1,039	0.63	--	--	707	0.43	--	--
HOV Transition to Spring Street	GP	NB	4	7,400	5,997	0.81	26.3	D	7,162	0.97	35.7	E
		SB	5	9,250	8,066	0.87	27.9	D	7,417	0.80	26.6	D
	HOV	NB	1	1,650	737	0.45	--	--	633	0.38	--	--
		SB	--	--	--	--	--	--	--	--	--	--
Spring Street to Willow Street/Katella Avenue	GP	NB	4	7,400	5,353	0.72	21.9	C	6,453	0.87	27.2	D
		SB	4	7,400	7,442	1.01	34.0	D	6,787	0.92	29.2	D
	HOV	NB	1	1,650	737	0.45	--	--	633	0.38	--	--
		SB	--	--	--	--	--	--	--	--	--	--
Willow Street/Katella Avenue CD Road On Ramp to I-405	GP	NB	5	9,250	6,250	0.68	20.7	C	6,540	0.71	23.7	C
		SB	4	7,400	6,290	0.85	27.5	D	5,880	0.79	28.0	D
	HOV	NB	1	1,650	422	0.26	--	--	694	0.42	--	--
		SB	--	--	--	--	--	--	--	--	--	--
7th Street Mainline												
Pepper Tree Lane to Studebaker Road	GP	EB	2	3,700	3,353	0.91	17.9	D	3,875	1.05	20.7	C
		WB	3	5,550	3,407	0.61	18.2	C	1,980	0.36	10.6	A
Studebaker Road to I-605	GP	EB	2	3,700	4,598	1.24	--*	F	5,121	1.38	--*	F
		WB	2	3,700	4,004	1.08	38.3	E	3,280	0.89	27.3	D

Notes:

1. Peak hour capacity and traffic volumes are shown in vehicles per hour (vph).
2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
3. Level of Service (LOS): General Purpose (GP) lane LOS is based on density except when demand-to-capacity (D/C) ratio is greater than or equal to 1.0, which is LOS F.
4. Peak hour capacities for freeway lanes include 1,850 vph for each GP lane and a single High Occupancy Vehicle (HOV) lane.
5. * Density is in excess of 45 pc/mi/ln; therefore LOS is F.

Table 3-5: Year 2020 No Build Alternative Mainline Peak Hour Level of Service

Location	Lane Type	Direction	Mainline		Year 2020 No Build Alternative Conditions							
					AM Peak Hour				PM Peak Hour			
			Lanes	Capacity[1,4]	Traffic Demand Volume[1]	D/C	Density[2]	LOS[3]	Traffic Demand Volume[1]	D/C	Density[2]	LOS[3]
I-405 Mainline												
Temple Avenue to Lakewood Boulevard/Willow Street	GP	NB	5	9,250	9,530	1.03	41.5	E	9,810	1.06	41.2	E
		SB	5	9,250	9,720	1.05	36.3	E	10,090	1.09	--*	F
	HOV	NB	1	1,850	1,860	1.01	--	--	2,190	1.18	--	--
		SB	1	1,850	1,820	0.98	--	--	1,960	1.06	--	--
Lakewood Boulevard/Willow Street to Bellflower Boulevard	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	1,860	1.01	--	--	2,190	1.18	--	--
		SB	1	1,850	1,820	0.98	--	--	1,960	1.06	--	--
Bellflower Boulevard to Woodruff Avenue	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	1,730	0.94	--	--	2,080	1.12	--	--
		SB	1	1,850	1,910	1.03	--	--	2,080	1.12	--	--
Woodruff Avenue to Palo Verde Avenue/Stearns Street	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	4	7,400	8,530	1.15	--*	F	8,790	1.19	--*	F
	HOV	NB	1	1,850	1,730	0.94	--	--	2,080	1.12	--	--
		SB	1	1,850	2,060	1.11	--	--	1,990	1.08	--	--
Palo Verde Avenue/Stearns Street to Studebaker Road	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	1,730	0.94	--	--	2,080	1.12	--	--
		SB	1	1,850	2,140	1.16	--	--	2,060	1.11	--	--
Studebaker Road to I-605 NB Off Ramp	GP	NB	4	7,400	8,600	1.16	--*	F	9,560	1.29	--*	F
		SB	5	9,250	8,550	0.92	29.7	D	9,090	0.98	38.5	E
	HOV	NB	1	1,850	2,490	1.35	--	--	2,790	1.51	--	--
		SB	1	1,850	2,140	1.16	--	--	2,060	1.11	--	--
I-605 NB Off Ramp to 7th St Off Ramp	GP	NB	1	7,400	6,910	0.93	35.9	E	7,940	1.07	41.0	E
		SB	4	7,400	7,150	0.97	31.8	D	7,830	1.06	43.7	E
	HOV	NB	1	1,850	2,490	1.35	--	--	2,790	1.51	--	--
		SB	1	1,850	2,140	1.16	--	--	2,060	1.11	--	--
7th St Off Ramp to I-605 SB On Ramp	GP	NB	4	7,400	6,910	0.93	35.9	E	7,940	1.07	41.0	E
		SB	4	7,400	7,050	0.95	31.1	D	7,690	1.04	42.2	E
	HOV	NB	1	1,850	2,490	1.35	--	--	2,790	1.51	--	--
		SB	1	1,850	2,140	1.16	--	--	2,060	1.11	--	--
I-605 Mainline												
Carson Street to Spring Street	GP	NB	4	7,400	5,900	0.80	25.8	C	7,420	1.00	37.9	E
		SB	4	7,400	7,750	1.05	37.7	E	7,280	0.98	35.0	D
	HOV	NB	1	1,850	1,510	0.82	--	--	1,900	1.03	--	--
		SB	1	1,850	1,940	1.05	--	--	1,740	0.94	--	--
Spring Street to Willow Street/Katella Avenue	GP	NB	4	7,400	5,120	0.69	20.9	C	6,330	0.86	26.6	D
		SB	4	7,400	6,720	0.91	28.8	D	5,840	0.79	24.1	C
	HOV	NB	1	1,850	1,870	1.01	--	--	2,450	1.32	--	--
		SB	1	1,850	2,140	1.16	--	--	1,840	0.99	--	--
Willow Street/Katella Avenue CD Road On Ramp to I-405	GP	NB	5	9,250	5,120	0.55	17.0	B	5,740	0.62	20.8	C
		SB	4	7,400	5,660	0.76	24.3	C	5,140	0.69	24.5	C
	HOV	NB	1	1,850	1,690	0.91	--	--	2,220	1.20	--	--
		SB	1	1,850	1,660	0.90	--	--	1,470	0.79	--	--
7th Street Mainline												
Pepper Tree Lane to Studebaker Road	GP	EB	2	3,700	3,270	0.88	17.5	B	3,160	0.85	16.9	B
		WB	3	5,550	3,690	0.66	19.7	C	2,870	0.52	15.3	B
Studebaker Road to I-605	GP	EB	2	3,700	4,390	1.19	--*	F	4,010	1.08	38.4	E
		WB	2	3,700	3,910	1.06	36.4	E	3,900	1.05	36.2	E

Notes:

1. Peak hour capacity and traffic volumes are shown in vehicles per hour (vph).
2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
3. Level of Service (LOS): General Purpose (GP) lane LOS is based on density except when demand-to-capacity (D/C) ratio is greater than or equal to 1.0, which is LOS F.
4. Peak hour capacities for freeway lanes include 1,850 vph for each GP lane and a single High Occupancy Vehicle (HOV) lane.
5. * Density is in excess of 45 pc/mi/ln; therefore LOS is F.

Table 3-8: Year 2040 No Build Alternative Mainline Peak Hour Level of Service

Location	Lane Type	Direction	Mainline		Year 2040 No Build Alternative Conditions							
					AM Peak Hour				PM Peak Hour			
			Lanes	Capacity[1,4]	Traffic Demand Volume[1]	D/C	Density[2]	LOS[3]	Traffic Demand Volume[1]	D/C	Density[2]	LOS[3]
I-405 Mainline												
Temple Avenue to Lakewood Boulevard/Willow Street	GP	NB	5	9,250	10,300	1.11	--*	F	10,610	1.15	--*	F
		SB	5	9,250	10,500	1.14	43.9	E	10,910	1.18	--*	F
	HOV	NB	1	1,850	2,010	1.09	--	--	2,370	1.28	--	--
		SB	1	1,850	1,970	1.06	--	--	2,120	1.15	--	--
Lakewood Boulevard/Willow Street to Bellflower Boulevard	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	2,010	1.09	--	--	2,370	1.28	--	--
		SB	1	1,850	1,970	1.06	--	--	2,120	1.15	--	--
Bellflower Boulevard to Woodruff Avenue	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	1,870	1.01	--	--	2,250	1.22	--	--
		SB	1	1,850	2,060	1.11	--	--	2,240	1.21	--	--
Woodruff Avenue to Palo Verde Avenue/Stearns Street	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	4	7,400	9,220	1.25	--*	F	9,500	1.28	--*	F
	HOV	NB	1	1,850	1,870	1.01	--	--	2,250	1.22	--	--
		SB	1	1,850	2,230	1.21	--	--	2,150	1.16	--	--
Palo Verde Avenue/Stearns Street to Studebaker Road	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	1,870	1.01	--	--	2,250	1.22	--	--
		SB	1	1,850	2,310	1.25	--	--	2,230	1.21	--	--
Studebaker Road to I-605 NB Off Ramp	GP	NB	4	7,400	9,290	1.26	--*	F	10,330	1.40	--*	F
		SB	5	9,250	9,240	1.00	33.7	D	9,830	1.06	44.1	E
	HOV	NB	1	1,850	2,700	1.46	--	--	3,020	1.63	--	--
		SB	1	1,850	2,310	1.25	--	--	2,230	1.21	--	--
I-605 NB Off Ramp to 7th St Off Ramp	GP	NB	1	7,400	7,470	1.01	40.1	E	8,590	1.16	--*	F
		SB	4	7,400	7,730	1.04	36.7	E	8,460	1.14	--*	F
	HOV	NB	1	1,850	2,700	1.46	--	--	3,020	1.63	--	--
		SB	1	1,850	2,310	1.25	--	--	2,230	1.21	--	--
7th St Off Ramp to I-605 SB On Ramp	GP	NB	4	7,400	7,470	1.01	40.1	E	8,590	1.16	--*	F
		SB	4	7,400	7,630	1.03	35.8	E	8,310	1.12	--*	F
	HOV	NB	1	1,850	2,700	1.46	--	--	3,020	1.63	--	--
		SB	1	1,850	2,310	1.25	--	--	2,230	1.21	--	--
I-605 Mainline												
Carson Street to Spring Street	GP	NB	4	7,400	6,380	0.86	28.3	D	8,020	1.08	44.4	E
		SB	4	7,400	8,370	1.13	--*	F	7,870	1.06	40.6	E
	HOV	NB	1	1,850	1,630	0.88	--	--	2,050	1.11	--	--
		SB	1	1,850	2,100	1.14	--	--	1,880	1.02	--	--
Spring Street to Willow Street/Katella Avenue	GP	NB	4	7,400	5,540	0.75	22.7	C	6,840	0.92	29.6	D
		SB	4	7,400	7,260	0.98	32.6	D	6,310	0.85	26.5	D
	HOV	NB	1	1,850	1,630	0.88	--	--	2,050	1.11	--	--
		SB	1	1,850	2,100	1.14	--	--	1,880	1.02	--	--
Willow Street/Katella Avenue CD Road On Ramp to I-405	GP	NB	5	9,250	5,540	0.60	18.3	C	6,200	0.67	22.5	C
		SB	4	7,400	6,120	0.83	26.6	D	5,560	0.75	26.5	D
	HOV	NB	1	1,850	2,020	1.09	--	--	2,650	1.43	--	--
		SB	1	1,850	2,310	1.25	--	--	1,990	1.08	--	--
7th Street Mainline												
Pepper Tree Lane to Studebaker Road	GP	EB	2	3,700	3,540	0.96	18.9	C	3,420	0.92	18.3	C
		WB	3	5,550	3,990	0.72	21.4	C	3,100	0.56	16.6	B
Studebaker Road to I-605	GP	EB	2	3,700	4,750	1.28	--*	F	4,340	1.17	--*	F
		WB	2	3,700	4,220	1.14	43.4	E	4,210	1.14	43.1	E

Notes:

1. Peak hour capacity and traffic volumes are shown in vehicles per hour (vph).
2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
3. Level of Service (LOS): General Purpose (GP) lane LOS is based on density except when demand-to-capacity (D/C) ratio is greater than or equal to 1.0, which is LOS F.
4. Peak hour capacities for freeway lanes include 1,850 vph for each GP lane and a single High Occupancy Vehicle (HOV) lane.
5. * Density is in excess of 45 pc/mi/ln; therefore LOS is F.

Table 4-5: Year 2020 Alternative 1 Mainline Peak Hour Level of Service

Location	Lane Type	Direction	Mainline		Year 2020 Alternative 1 Conditions							
					AM Peak Hour				PM Peak Hour			
			Lanes	Capacity[1,4]	Traffic Demand Volume[1]	D/C	Density[2]	LOS[3]	Traffic Demand Volume[1]	D/C	Density[2]	LOS[3]
I-405 Mainline												
Temple Avenue to Lakewood Boulevard/Willow Street	GP	NB	5	9,250	9,540	1.03	41.6	E	10,400	1.12	--*	F
		SB	5	9,250	9,680	1.05	36.0	E	10,050	1.09	--*	F
	HOV	NB	1	1,850	2,070	1.12	--	--	1,980	1.07	--	--
		SB	1	1,850	1,990	1.08	--	--	2,140	1.16	--	--
Lakewood Boulevard/Willow Street to Bellflower Boulevard	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	2,060	1.11	--	--	2,050	1.11	--	--
		SB	1	1,850	1,990	1.08	--	--	2,140	1.16	--	--
Bellflower Boulevard to Woodruff Avenue	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	2,060	1.11	--	--	2,050	1.11	--	--
		SB	1	1,850	1,990	1.08	--	--	2,140	1.16	--	--
Woodruff Avenue to Palo Verde Avenue/Stearns Street	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	4	7,400	8,670	1.17	--*	F	8,810	1.19	--*	F
	HOV	NB	1	1,850	2,070	1.12	--	--	2,060	1.11	--	--
		SB	1	1,850	2,180	1.18	--	--	2,020	1.09	--	--
Palo Verde Avenue/Stearns Street to Studebaker Road	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	2,070	1.12	--	--	2,060	1.11	--	--
		SB	1	1,850	2,240	1.21	--	--	2,020	1.09	--	--
Studebaker Road to I-605 NB Off Ramp	GP	NB	4	7,400	8,810	1.19	--*	F	10,380	1.40	--*	F
		SB	5	9,250	8,740	0.94	30.7	D	9,090	0.98	38.5	E
	HOV	NB	1	1,850	2,410	1.30	--	--	1,990	1.08	--	--
		SB	1	1,850	2,240	1.21	--	--	2,010	1.09	--	--
I-605 NB Off Ramp to 7th St Off Ramp	GP	NB	1	7,400	7,260	0.98	38.4	E	8,900	1.20	--*	F
		SB	4	7,400	7,460	1.01	34.3	D	8,030	1.09	--*	F
	HOV	NB	1	1,850	2,410	1.30	--	--	1,990	1.08	--	--
		SB	1	1,850	2,140	1.16	--	--	2,010	1.09	--	--
7th St Off Ramp to I-605 SB On Ramp	GP	NB	4	7,400	7,260	0.98	38.4	E	8,900	1.20	--*	F
		SB	4	7,400	7,380	1.00	33.6	D	7,910	1.07	44.6	E
	HOV	NB	1	1,850	2,410	1.30	--	--	1,990	1.08	--	--
		SB	1	1,850	2,140	1.16	--	--	2,010	1.09	--	--
I-605 Mainline												
Carson Street to Spring Street	GP	NB	4	7,400	6,140	0.83	27.0	D	7,490	1.01	38.5	E
		SB	4	7,400	7,890	1.07	39.1	E	7,420	1.00	36.1	E
	HOV	NB	1	1,850	1,590	0.86	--	--	1,980	1.07	--	--
		SB	1	1,850	1,900	1.03	--	--	1,780	0.96	--	--
Spring Street to Willow Street/Katella Avenue	GP	NB	4	7,400	5,360	0.72	21.9	C	6,410	0.87	27.0	D
		SB	4	7,400	6,870	0.93	29.8	D	6,010	0.81	24.9	C
	HOV	NB	1	1,850	1,850	1.00	--	--	2,430	1.31	--	--
		SB	1	1,850	2,200	1.19	--	--	1,890	1.02	--	--
Willow Street/Katella Avenue CD Road On Ramp to I-405	GP	NB	5	9,250	5,320	0.58	17.6	B	6,630	0.72	24.0	C
		SB	4	7,400	5,770	0.78	24.8	C	5,220	0.71	24.8	C
	HOV	NB	1	1,850	1,480	0.80	--	--	1,990	1.08	--	--
		SB	1	1,850	1,400	0.76	--	--	980	0.53	--	--
7th Street Mainline												
Pepper Tree Lane to Studebaker Road	GP	EB	2	3,700	3,160	0.85	16.9	B	2,750	0.74	14.7	B
		WB	3	5,550	3,980	0.72	21.3	C	2,900	0.52	15.5	B
Studebaker Road to I-605	GP	EB	2	3,700	4,410	1.19	--*	F	3,630	0.98	31.8	D
		WB	2	3,700	4,240	1.15	43.9	E	4,030	1.09	38.8	E

Notes:

1. Peak hour capacity and traffic volumes are shown in vehicles per hour (vph).
2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
3. Level of Service (LOS): General Purpose (GP) lane LOS is based on density except when demand-to-capacity (D/C) ratio is greater than or equal to 1.0, which is LOS F.
4. Peak hour capacities for freeway lanes include 1,850 vph for each GP lane and a single High Occupancy Vehicle (HOV) lane.
5. * Density is in excess of 45 pc/mi/ln; therefore LOS is F.

Table 4-8: Year 2040 Alternative 1 Mainline Peak Hour Level of Service

Location	Lane Type	Direction	Mainline		Year 2040 Alternative 1 Conditions							
					AM Peak Hour				PM Peak Hour			
			Lanes	Capacity[1,4]	Traffic Demand Volume[1]	D/C	Density[2]	LOS[3]	Traffic Demand Volume[1]	D/C	Density[2]	LOS[3]
I-405 Mainline												
Temple Avenue to Lakewood Boulevard/Willow Street	GP	NB	5	9,250	10,310	1.11	--*	F	11,240	1.22	--*	F
		SB	5	9,250	10,460	1.13	43.5	E	10,860	1.17	--*	F
	HOV	NB	1	1,850	2,240	1.21	--	--	2,140	1.16	--	--
		SB	1	1,850	2,160	1.17	--	--	2,310	1.25	--	--
Lakewood Boulevard/Willow Street to Bellflower Boulevard	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	2,220	1.20	--	--	2,210	1.19	--	--
		SB	1	1,850	2,160	1.17	--	--	2,310	1.25	--	--
Bellflower Boulevard to Woodruff Avenue	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	2,220	1.20	--	--	2,210	1.19	--	--
		SB	1	1,850	2,150	1.16	--	--	2,310	1.25	--	--
Woodruff Avenue to Palo Verde Avenue/Stearns Street	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	4	7,400	9,370	1.27	--*	F	9,530	1.29	--*	F
	HOV	NB	1	1,850	2,240	1.21	--	--	2,220	1.20	--	--
		SB	1	1,850	2,350	1.27	--	--	2,180	1.18	--	--
Palo Verde Avenue/Stearns Street to Studebaker Road	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	2,240	1.21	--	--	2,220	1.20	--	--
		SB	1	1,850	2,420	1.31	--	--	2,180	1.18	--	--
Studebaker Road to I-605 NB Off Ramp	GP	NB	4	7,400	9,520	1.29	--*	F	11,220	1.52	--*	F
		SB	5	9,250	9,450	1.02	35.1	E	9,830	1.06	44.1	E
	HOV	NB	1	1,850	2,610	1.41	--	--	2,150	1.16	--	--
		SB	1	1,850	2,420	1.31	--	--	2,170	1.17	--	--
I-605 NB Off Ramp to 7th St Off Ramp	GP	NB	1	7,400	7,850	1.06	43.9	E	9,620	1.30	--*	F
		SB	4	7,400	8,060	1.09	40.2	E	8,270	1.12	--*	F
	HOV	NB	1	1,850	2,610	1.41	--	--	2,150	1.16	--	--
		SB	1	1,850	2,420	1.31	--	--	2,170	1.17	--	--
7th St Off Ramp to I-605 SB On Ramp	GP	NB	4	7,400	7,850	1.06	43.9	E	9,620	1.30	--*	F
		SB	4	7,400	7,980	1.08	39.3	E	8,140	1.10	--*	F
	HOV	NB	1	1,850	2,610	1.41	--	--	2,150	1.16	--	--
		SB	1	1,850	2,310	1.25	--	--	2,170	1.17	--	--
I-605 Mainline												
Carson Street to Spring Street	GP	NB	4	7,400	6,640	0.90	29.8	D	8,100	1.09	--*	F
		SB	4	7,400	8,530	1.15	--*	F	8,020	1.08	42.4	E
	HOV	NB	1	1,850	1,720	0.93	--	--	2,140	1.16	--	--
		SB	1	1,850	2,050	1.11	--	--	1,920	1.04	--	--
Spring Street to Willow Street/Katella Avenue	GP	NB	4	7,400	5,790	0.78	23.8	C	6,930	0.94	30.2	D
		SB	4	7,400	7,420	1.00	33.9	D	6,500	0.88	27.5	D
	HOV	NB	1	1,850	2,000	1.08	--	--	2,630	1.42	--	--
		SB	1	1,850	2,370	1.28	--	--	2,040	1.10	--	--
Willow Street/Katella Avenue CD Road On Ramp to I-405	GP	NB	5	9,250	5,750	0.62	19.0	C	7,170	0.78	26.0	D
		SB	4	7,400	6,240	0.84	27.2	D	5,650	0.76	26.9	D
	HOV	NB	1	1,850	2,000	1.08	--	--	2,630	1.42	--	--
		SB	1	1,850	1,520	0.82	--	--	1,060	0.57	--	--
7th Street Mainline												
Pepper Tree Lane to Studebaker Road	GP	EB	2	3,700	3,160	0.85	16.9	B	2,750	0.74	14.7	B
		WB	3	5,550	3,980	0.72	21.3	C	2,900	0.52	15.5	B
Studebaker Road to I-605	GP	EB	2	3,700	4,410	1.19	--*	F	3,630	0.98	31.8	D
		WB	2	3,700	4,240	1.15	43.9	E	4,030	1.09	38.8	E

Notes:

1. Peak hour capacity and traffic volumes are shown in vehicles per hour (vph).
2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
3. Level of Service (LOS): General Purpose (GP) lane LOS is based on density except when demand-to-capacity (D/C) ratio is greater than or equal to 1.0, which is LOS F.
4. Peak hour capacities for freeway lanes include 1,850 vph for each GP lane and a single High Occupancy Vehicle (HOV) lane.
5. * Density is in excess of 45 pc/mi/ln; therefore LOS is F.

Table 5-5: Year 2020 Alternative 2 Mainline Peak Hour Level of Service

Location	Lane Type	Direction	Mainline		Year 2020 Alternative 2 Conditions							
					AM Peak Hour				PM Peak Hour			
			Lanes	Capacity[1,4]	Traffic Demand Volume[1]	D/C	Density[2]	LOS[3]	Traffic Demand Volume[1]	D/C	Density[2]	LOS[3]
I-405 Mainline												
Temple Avenue to Lakewood Boulevard/Willow Street	GP	NB	5	9,250	9,600	1.04	42.1	E	10,060	1.09	43.6	E
		SB	5	9,250	9,660	1.04	35.9	E	10,030	1.08	--*	F
	HOV	NB	1	1,850	2,040	1.10	--	--	2,280	1.23	--	--
		SB	1	1,850	1,920	1.04	--	--	1,810	0.98	--	--
Lakewood Boulevard/Willow Street to Bellflower Boulevard	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	1,980	1.07	--	--	2,240	1.21	--	--
		SB	1	1,850	1,920	1.04	--	--	1,810	0.98	--	--
Bellflower Boulevard to Woodruff Avenue	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	2,060	1.11	--	--	2,240	1.21	--	--
		SB	1	1,850	1,920	1.04	--	--	1,810	0.98	--	--
Woodruff Avenue to Palo Verde Avenue/Stearns Street	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	4	7,400	8,730	1.18	--*	F	8,920	1.21	--*	F
	HOV	NB	1	1,850	2,030	1.10	--	--	2,060	1.11	--	--
		SB	1	1,850	2,160	1.17	--	--	2,020	1.09	--	--
Palo Verde Avenue/Stearns Street to Studebaker Road	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	2,030	1.10	--	--	2,340	1.26	--	--
		SB	1	1,850	2,210	1.19	--	--	2,020	1.09	--	--
Studebaker Road to I-605 NB Off Ramp	GP	NB	4	7,400	8,850	1.20	--*	F	10,130	1.37	--*	F
		SB	5	9,250	8,740	0.94	30.7	D	9,150	0.99	38.9	E
	HOV	NB	1	1,850	2,300	1.24	--	--	2,710	1.46	--	--
		SB	1	1,850	2,210	1.19	--	--	2,010	1.09	--	--
I-605 NB Off Ramp to 7th St Off Ramp	GP	NB	1	7,400	7,340	0.99	39.0	E	8,700	1.18	--*	F
		SB	4	7,400	7,480	1.01	34.4	D	8,160	1.10	--*	F
	HOV	NB	1	1,850	2,300	1.24	--	--	2,710	1.46	--	--
		SB	1	1,850	2,210	1.19	--	--	2,360	1.28	--	--
7th St Off Ramp to I-605 SB On Ramp	GP	NB	4	7,400	7,340	0.99	39.0	E	8,700	1.18	--*	F
		SB	4	7,400	7,390	1.00	33.7	D	8,040	1.09	--*	F
	HOV	NB	1	1,850	2,300	1.24	--	--	2,710	1.46	--	--
		SB	1	1,850	2,210	1.19	--	--	2,360	1.28	--	--
I-605 Mainline												
Carson Steet to Spring Street	GP	NB	4	7,400	5,540	0.75	24.1	C	6,490	0.88	31.3	D
		SB	4	7,400	8,000	1.08	40.4	E	7,400	1.00	36.0	E
	HOV	NB	1	1,850	1,570	0.85	--	--	2,040	1.10	--	--
		SB	1	1,850	2,020	1.09	--	--	1,800	0.97	--	--
Spring Street to Willow Street/Katella Ave	GP	NB	4	7,400	4,810	0.65	19.6	C	5,450	0.74	22.3	C
		SB	4	7,400	6,960	0.94	30.4	D	5,970	0.81	24.7	C
	HOV	NB	1	1,850	1,850	1.00	--	--	2,450	1.32	--	--
		SB	1	1,850	2,240	1.21	--	--	2,000	1.08	--	--
Willow Street/Katella Ave CD Road On Ramp to I-405	GP	NB	5	9,250	4,810	0.52	15.9	B	5,680	0.61	20.6	C
		SB	4	7,400	5,910	0.80	25.5	C	5,170	0.70	24.6	C
	HOV	NB	1	1,850	1,490	0.81	--	--	2,000	1.08	--	--
		SB	1	1,850	1,770	0.96	--	--	1,580	0.85	--	--
7th Street Mainline												
Pepper Tree Lane to Studebaker Road	GP	EB	2	3,700	3,180	0.86	17.0	B	2,770	0.75	14.8	B
		WB	3	5,550	4,010	0.72	21.5	C	3,080	0.55	16.5	B
Studebaker Road to I-605	GP	EB	2	3,700	4,350	1.18	--*	F	3,530	0.95	30.4	D
		WB	2	3,700	4,200	1.14	42.9	E	4,120	1.11	40.9	E

Notes:

1. Peak hour capacity and traffic volumes are shown in vehicles per hour (vph).
2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
3. Level of Service (LOS): General Purpose (GP) lane based on density except when demand-to-capacity (D/C) ratiois greater than or equal to 1.0, which is LOS F.
4. Peak hour capacities for freeway lanes include 1,850 vph for each GP lane and a single High Occupancy Vehicle (HOV) lane.
5. * Density is in excess of 45 pc/mi/ln; therefore LOS is F.

Table 5-8: Year 2040 Alternative 2 Mainline Peak Hour Level of Service

Location	Lane Type	Direction	Mainline		Year 2040 Alternative 2 Conditions							
					AM Peak Hour				PM Peak Hour			
			Lanes	Capacity[1,4]	Traffic Demand Volume[1]	D/C	Density[2]	LOS[3]	Traffic Demand Volume[1]	D/C	Density[2]	LOS[3]
I-405 Mainline												
Temple Avenue to Lakewood Boulevard/Willow Street	GP	NB	5	9,250	10,370	1.12	--*	F	10,870	1.18	--*	F
		SB	5	9,250	10,440	1.13	43.2	E	10,840	1.17	--*	F
	HOV	NB	1	1,850	2,200	1.19	--	--	2,460	1.33	--	--
		SB	1	1,850	2,070	1.12	--	--	1,960	1.06	--	--
Lakewood Boulevard/Willow Street to Bellflower Boulevard	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	2,140	1.16	--	--	2,420	1.31	--	--
		SB	1	1,850	2,070	1.12	--	--	1,960	1.06	--	--
Bellflower Boulevard to Woodruff Avenue	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	2,220	1.20	--	--	2,420	1.31	--	--
		SB	1	1,850	2,070	1.12	--	--	1,960	1.06	--	--
Woodruff Avenue to Palo Verde Avenue/Stearns Street	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	4	7,400	9,440	1.28	--*	F	9,640	1.30	--*	F
	HOV	NB	1	1,850	2,190	1.18	--	--	2,220	1.20	--	--
		SB	1	1,850	2,330	1.26	--	--	2,180	1.18	--	--
Palo Verde Avenue/Stearns Street to Studebaker Road	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	2,190	1.18	--	--	2,540	1.37	--	--
		SB	1	1,850	2,380	1.29	--	--	2,180	1.18	--	--
Studebaker Road to I-605 NB Off Ramp	GP	NB	4	7,400	9,560	1.29	--*	F	10,950	1.48	--*	F
		SB	5	9,250	9,450	1.02	35.1	E	9,890	1.07	44.7	E
	HOV	NB	1	1,850	2,490	1.35	--	--	2,930	1.58	--	--
		SB	1	1,850	2,380	1.29	--	--	2,170	1.17	--	--
I-605 NB Off Ramp to 7th St Off Ramp	GP	NB	1	7,400	7,940	1.07	45.0	E	9,400	1.27	--*	F
		SB	4	7,400	8,090	1.09	40.5	E	8,830	1.19	--*	F
	HOV	NB	1	1,850	2,490	1.35	--	--	2,930	1.58	--	--
		SB	1	1,850	2,380	1.29	--	--	2,560	1.38	--	--
7th St Off Ramp to I-605 SB On Ramp	GP	NB	4	7,400	7,940	1.07	45.0	E	9,400	1.27	--*	F
		SB	4	7,400	7,990	1.08	39.4	E	8,690	1.17	--*	F
	HOV	NB	1	1,850	2,490	1.35	--	--	2,930	1.58	--	--
		SB	1	1,850	2,380	1.29	--	--	2,560	1.38	--	--
I-605 Mainline												
Carson Steet to Spring Street	GP	NB	4	7,400	5,990	0.81	26.2	D	7,020	0.95	34.7	D
		SB	4	7,400	8,650	1.17	--*	F	8,000	1.08	42.2	E
	HOV	NB	1	1,850	1,700	0.92	--	--	2,200	1.19	--	--
		SB	1	1,850	2,180	1.18	--	--	1,950	1.05	--	--
Spring Street to Willow Street/Katella Ave	GP	NB	4	7,400	5,210	0.70	21.2	C	5,900	0.80	24.4	C
		SB	4	7,400	7,520	1.02	34.7	D	6,450	0.87	27.2	D
	HOV	NB	1	1,850	2,000	1.08	--	--	2,650	1.43	--	--
		SB	1	1,850	2,420	1.31	--	--	2,160	1.17	--	--
Willow Street/Katella Ave CD Road On Ramp to I-405	GP	NB	5	9,250	5,200	0.56	17.2	B	6,140	0.66	22.3	C
		SB	4	7,400	6,390	0.86	28.0	D	5,580	0.75	26.6	D
	HOV	NB	1	1,850	1,610	0.87	--	--	2,160	1.17	--	--
		SB	1	1,850	1,910	1.03	--	--	1,710	0.92	--	--
7th Street Mainline												
Pepper Tree Lane to Studebaker Road	GP	EB	2	3,700	3,180	0.86	17.0	B	2,770	0.75	14.8	B
		WB	3	5,550	4,010	0.72	21.5	C	3,080	0.55	16.5	B
Studebaker Road to I-605	GP	EB	2	3,700	4,350	1.18	--*	F	3,530	0.95	30.4	D
		WB	2	3,700	4,200	1.14	42.9	E	4,120	1.11	40.9	E

Notes:

1. Peak hour capacity and traffic volumes are shown in vehicles per hour (vph).
2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
3. Level of Service (LOS): General Purpose (GP) lane LOS is based on density except when demand-to-capacity (D/C) ratio is greater than or equal to 1.0, which is LOS F.
4. Peak hour capacities for freeway lanes include 1,850 vph for each GP lane and a single High Occupancy Vehicle (HOV) lane.
5. * Density is in excess of 45 pc/mi/ln; therefore LOS is F.

Table 6-5: Year 2020 Alternative 3 Mainline Peak Hour Level of Service

Location	Lane Type	Direction	Mainline		Year 2020 Alternative 3 Conditions							
					AM Peak Hour				PM Peak Hour			
			Lanes	Capacity[1,4]	Traffic Demand Volume[1]	D/C	Density[2]	LOS[3]	Traffic Demand Volume[1]	D/C	Density[2]	LOS[3]
I-405 Mainline												
Temple Avenue to Lakewood Boulevard/Willow Street	GP	NB	5	9,250	9,930	1.07	--*	F	10,550	1.14	--*	F
		SB	5	9,250	9,910	1.07	37.9	E	10,290	1.11	--*	F
	HOV	NB	1	1,850	1,850	1.00	--	--	2,040	1.10	--	--
		SB	1	1,850	1,660	0.90	--	--	1,960	1.06	--	--
Lakewood Boulevard/Willow Street to Bellflower Boulevard	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	1,820	0.98	--	--	2,060	1.11	--	--
		SB	1	1,850	1,660	0.90	--	--	2,130	1.15	--	--
Bellflower Boulevard to Woodruff Avenue	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	1,870	1.01	--	--	1,870	1.01	--	--
		SB	1	1,850	1,680	0.91	--	--	2,130	1.15	--	--
Woodruff Avenue to Palo Verde Avenue/Stearns Street	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	4	7,400	8,890	1.20	--*	F	9,110	1.23	--*	F
	HOV	NB	1	1,850	1,820	0.98	--	--	1,850	1.00	--	--
		SB	1	1,850	1,740	0.94	--	--	2,130	1.15	--	--
Palo Verde Avenue/Stearns Street to Studebaker Road	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	1,660	0.90	--	--	1,850	1.00	--	--
		SB	1	1,850	1,740	0.94	--	--	1,970	1.06	--	--
Studebaker Road to I-605 NB Off Ramp	GP	NB	4	7,400	9,090	1.23	--*	F	10,480	1.42	--*	F
		SB	5	9,250	9,000	0.97	32.2	D	9,470	1.02	41.1	E
	HOV	NB	1	1,850	2,070	1.12	--	--	2,290	1.24	--	--
		SB	1	1,850	1,770	0.96	--	--	1,970	1.06	--	--
I-605 NB Off Ramp to 7th St Off Ramp	GP	NB	1	7,400	9,090	1.23	--*	F	10,480	1.42	--*	F
		SB	4	7,400	7,690	1.04	36.3	E	8,350	1.13	--*	F
	HOV	NB	1	1,850	2,070	1.12	--	--	2,290	1.24	--	--
		SB	1	1,850	1,770	0.96	--	--	1,970	1.06	--	--
7th St Off Ramp to I-605 SB On Ramp	GP	NB	4	7,400	7,640	1.03	41.7	E	9,040	1.22	--*	F
		SB	4	7,400	7,600	1.03	35.5	E	8,190	1.11	--*	F
	HOV	NB	1	1,850	2,070	1.12	--	--	2,290	1.24	--	--
		SB	1	1,850	1,770	0.96	--	--	1,970	1.06	--	--
I-605 Mainline												
Carson Steet to Spring Street	GP	NB	4	7,400	5,740	0.78	25.0	C	6,530	0.88	31.5	D
		SB	4	7,400	7,730	1.04	37.4	E	7,600	1.03	37.8	E
	HOV	NB	1	1,850	1,490	0.81	--	--	1,760	0.95	--	--
		SB	1	1,850	1,490	0.81	--	--	1,400	0.76	--	--
Spring Street to Willow Street/Katella Ave	GP	NB	4	7,400	4,990	0.67	20.3	C	5,500	0.74	22.5	C
		SB	4	7,400	6,670	0.90	28.5	D	6,190	0.84	25.8	C
	HOV	NB	1	1,850	1,840	0.99	--	--	1,870	1.01	--	--
		SB	1	1,850	1,490	0.81	--	--	1,400	0.76	--	--
Willow Street/Katella Ave CD Road On Ramp to I-405	GP	NB	5	9,250	5,010	0.54	16.6	B	5,750	0.62	20.9	C
		SB	4	7,400	5,660	0.76	24.3	C	5,500	0.74	26.2	D
	HOV	NB	1	1,850	1,370	0.74	--	--	1,800	0.97	--	--
		SB	1	1,850	1,360	0.74	--	--	1,400	0.76	--	--
7th Street Mainline												
Pepper Tree Lane to Studebaker Road	GP	EB	2	3,700	2,950	0.80	15.8	B	2,730	0.74	14.6	B
		WB	3	5,550	3,860	0.70	20.7	C	3,830	0.69	20.5	C
Studebaker Road to I-605	GP	EB	2	3,700	4,140	1.12	41.3	E	3,560	0.96	30.8	D
		WB	2	3,700	4,120	1.11	40.9	E	4,850	1.31	--*	F

Notes:

1. Peak hour capacity and traffic volumes are shown in vehicles per hour (vph).
2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
3. Level of Service (LOS): General Purpose (GP) lane based on density except when demand-to-capacity (D/C) ratiois greater than or equal to 1.0, which is LOS F.
4. Peak hour capacities for freeway lanes include 1,850 vph for each GP lane and a single High Occupancy Vehicle (HOV) lane.
5. * Density is in excess of 45 pc/mi/ln; therefore LOS is F.

Table 6-8: Year 2040 Alternative 3 Mainline Peak Hour Level of Service

Location	Lane Type	Direction	Mainline		Year 2040 Alternative 2 Conditions							
					AM Peak Hour				PM Peak Hour			
			Lanes	Capacity[1,4]	Traffic Demand Volume[1]	D/C	Density[2]	LOS[3]	Traffic Demand Volume[1]	D/C	Density[2]	LOS[3]
I-405 Mainline												
Temple Avenue to Lakewood Boulevard/Willow Street	GP	NB	5	9,250	10,730	1.16	--*	F	11,410	1.23	--*	F
		SB	5	9,250	10,710	1.16	--*	F	11,130	1.20	--*	F
	HOV	NB	1	1,850	2,000	1.08	--	--	2,200	1.19	--	--
		SB	1	1,850	1,800	0.97	--	--	2,120	1.15	--	--
Lakewood Boulevard/Willow Street to Bellflower Boulevard	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	1,970	1.06	--	--	2,220	1.20	--	--
		SB	1	1,850	1,800	0.97	--	--	2,300	1.24	--	--
Bellflower Boulevard to Woodruff Avenue	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	2,020	1.09	--	--	2,020	1.09	--	--
		SB	1	1,850	1,820	0.98	--	--	2,300	1.24	--	--
Woodruff Avenue to Palo Verde Avenue/Stearns Street	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	4	7,400	9,610	1.30	--*	F	9,850	1.33	--*	F
	HOV	NB	1	1,850	1,970	1.06	--	--	2,000	1.08	--	--
		SB	1	1,850	1,880	1.02	--	--	2,300	1.24	--	--
Palo Verde Avenue/Stearns Street to Studebaker Road	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	1,800	0.97	--	--	2,000	1.08	--	--
		SB	1	1,850	1,880	1.02	--	--	2,130	1.15	--	--
Studebaker Road to I-605 NB Off Ramp	GP	NB	4	7,400	9,830	1.33	--*	F	11,330	1.53	--*	F
		SB	5	9,250	9,730	1.05	37.2	E	10,240	1.11	--*	F
	HOV	NB	1	1,850	2,240	1.21	--	--	2,480	1.34	--	--
		SB	1	1,850	1,910	1.03	--	--	2,130	1.15	--	--
I-605 NB Off Ramp to 7th St Off Ramp	GP	NB	1	7,400	9,830	1.33	--*	F	11,330	1.53	--*	F
		SB	4	7,400	8,320	1.12	43.4	E	9,030	1.22	--*	F
	HOV	NB	1	1,850	2,240	1.21	--	--	2,480	1.34	--	--
		SB	1	1,850	1,910	1.03	--	--	2,130	1.15	--	--
7th St Off Ramp to I-605 SB On Ramp	GP	NB	4	7,400	8,260	1.12	--*	F	9,780	1.32	--*	F
		SB	4	7,400	8,220	1.11	42.1	E	8,850	1.20	--*	F
	HOV	NB	1	1,850	2,240	1.21	--	--	2,480	1.34	--	--
		SB	1	1,850	1,910	1.03	--	--	2,130	1.15	--	--
I-605 Mainline												
Carson Steet to Spring Street	GP	NB	4	7,400	6,210	0.84	27.4	D	7,060	0.95	35.0	D
		SB	4	7,400	8,360	1.13	--*	F	8,220	1.11	--*	F
	HOV	NB	1	1,850	1,620	0.88	--	--	1,900	1.03	--	--
		SB	1	1,850	1,620	0.88	--	--	1,520	0.82	--	--
Spring Street to Willow Street/Katella Ave	GP	NB	4	7,400	5,390	0.73	22.0	C	5,950	0.80	24.6	C
		SB	4	7,400	7,210	0.97	32.2	D	6,690	0.90	28.7	D
	HOV	NB	1	1,850	1,990	1.08	--	--	2,020	1.09	--	--
		SB	1	1,850	1,620	0.88	--	--	1,520	0.82	--	--
Willow Street/Katella Ave CD Road On Ramp to I-405	GP	NB	5	9,250	5,420	0.59	18.0	B	6,210	0.67	22.5	C
		SB	4	7,400	6,120	0.83	26.6	D	5,940	0.80	28.3	D
	HOV	NB	1	1,850	1,490	0.81	--	--	1,950	1.05	--	--
		SB	1	1,850	1,480	0.80	--	--	1,520	0.82	--	--
7th Street Mainline												
Pepper Tree Lane to Studebaker Road	GP	EB	2	3,700	2,950	0.80	15.8	B	2,730	0.74	14.6	B
		WB	3	5,550	3,860	0.70	20.7	C	3,830	0.69	20.5	C
Studebaker Road to I-605	GP	EB	2	3,700	4,140	1.12	41.3	E	3,560	0.96	30.8	D
		WB	2	3,700	4,120	1.11	40.9	E	4,850	1.31	--*	F

Notes:

1. Peak hour capacity and traffic volumes are shown in vehicles per hour (vph).
2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
3. Level of Service (LOS): General Purpose (GP) lane LOS is based on density except when demand-to-capacity (D/C) ratio is greater than or equal to 1.0, which is LOS F.
4. Peak hour capacities for freeway lanes include 1,850 vph for each GP lane and a single High Occupancy Vehicle (HOV) lane.
5. * Density is in excess of 45 pc/mi/ln; therefore LOS is F.

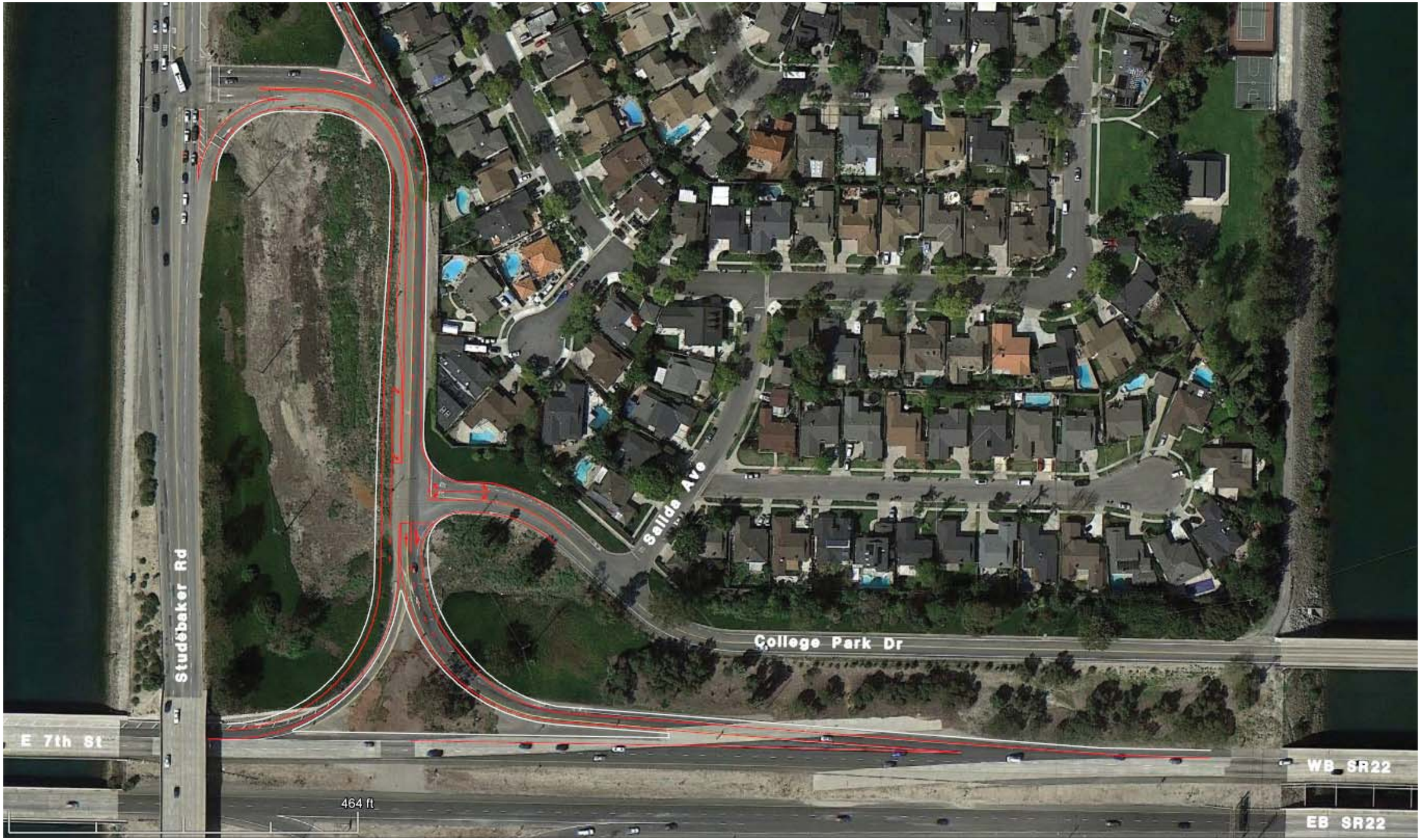
Appendix B2: Recommended Improvements

NOT TO SCALE

I-405 PA/ED Long Beach Study

FIGURE 4-5

LOS COYOTES DIAGONAL AND BELLFLOWER BOULEVARD INTERSECTION PROPOSED IMPROVEMENTS

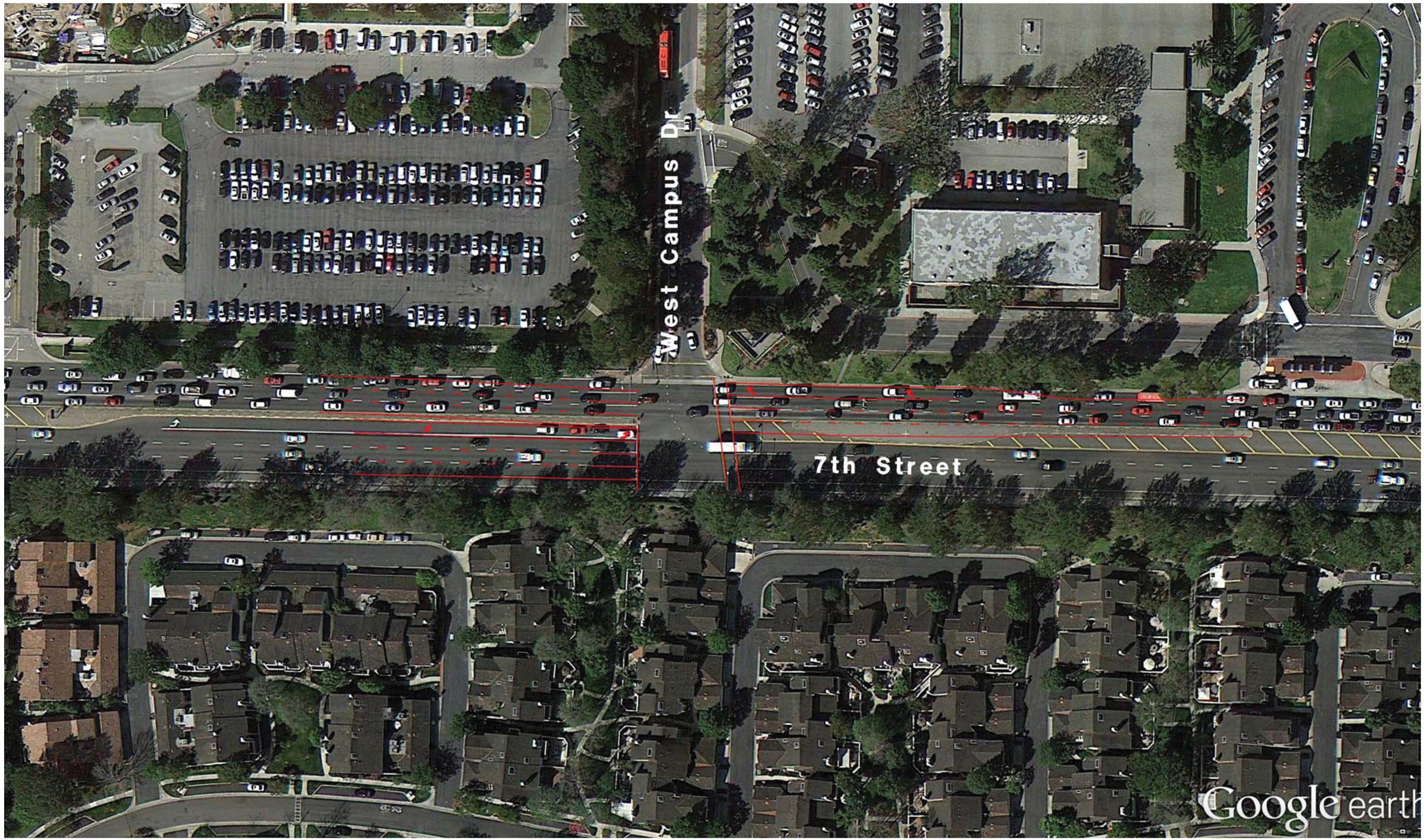


NOT TO SCALE

I-405 PA/ED Long Beach Study

FIGURE 4-6

SR-22 WB ON/OFF RAMP AND COLLEGE PARK DRIVE INTERSECTION PROPOSED IMPROVEMENTS

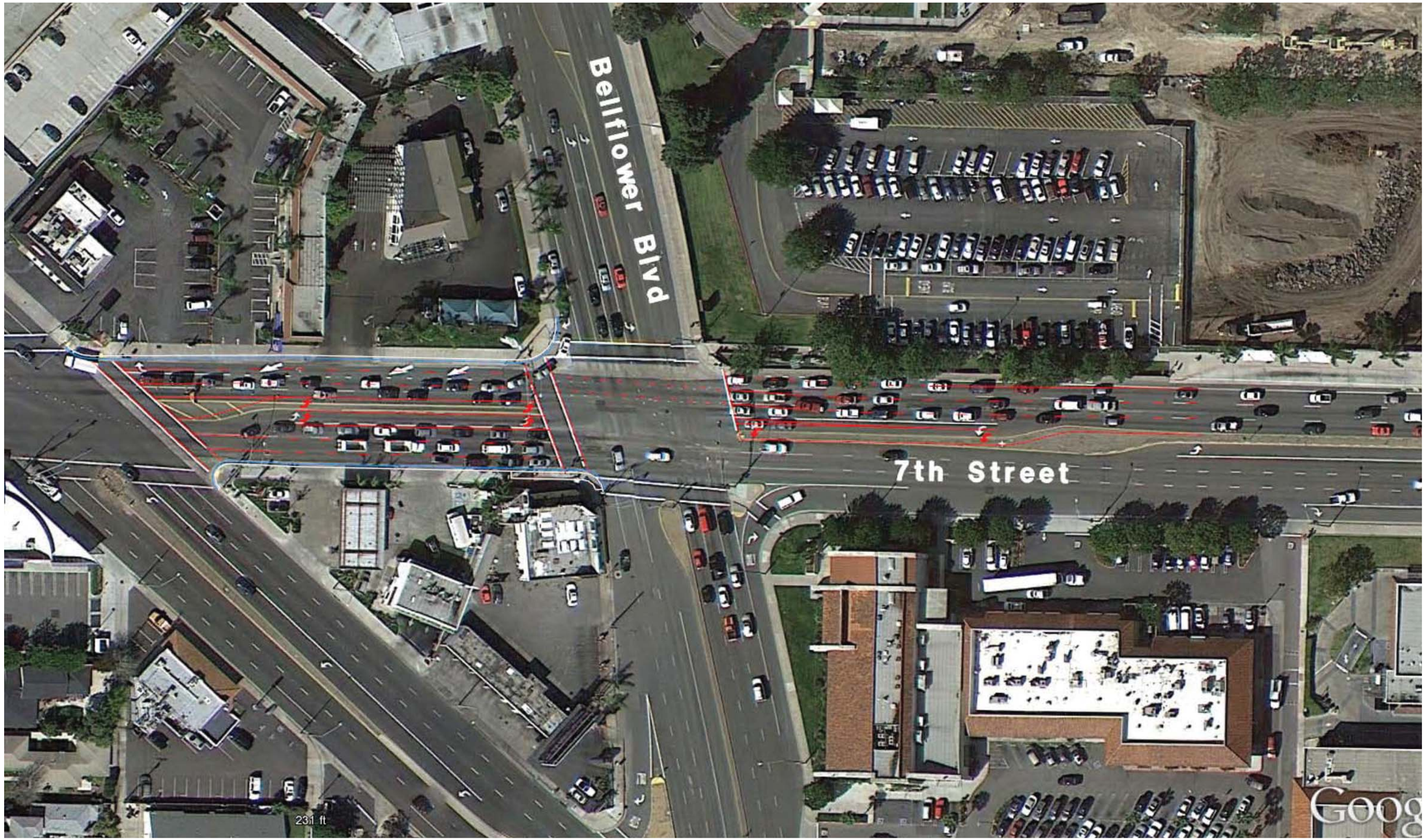


NOT TO SCALE

I-405 PA/ED Long Beach Study

FIGURE 4-7

7th STREET AND W. CAMPUS DRIVE INTERSECTION PROPOSED IMPROVEMENTS

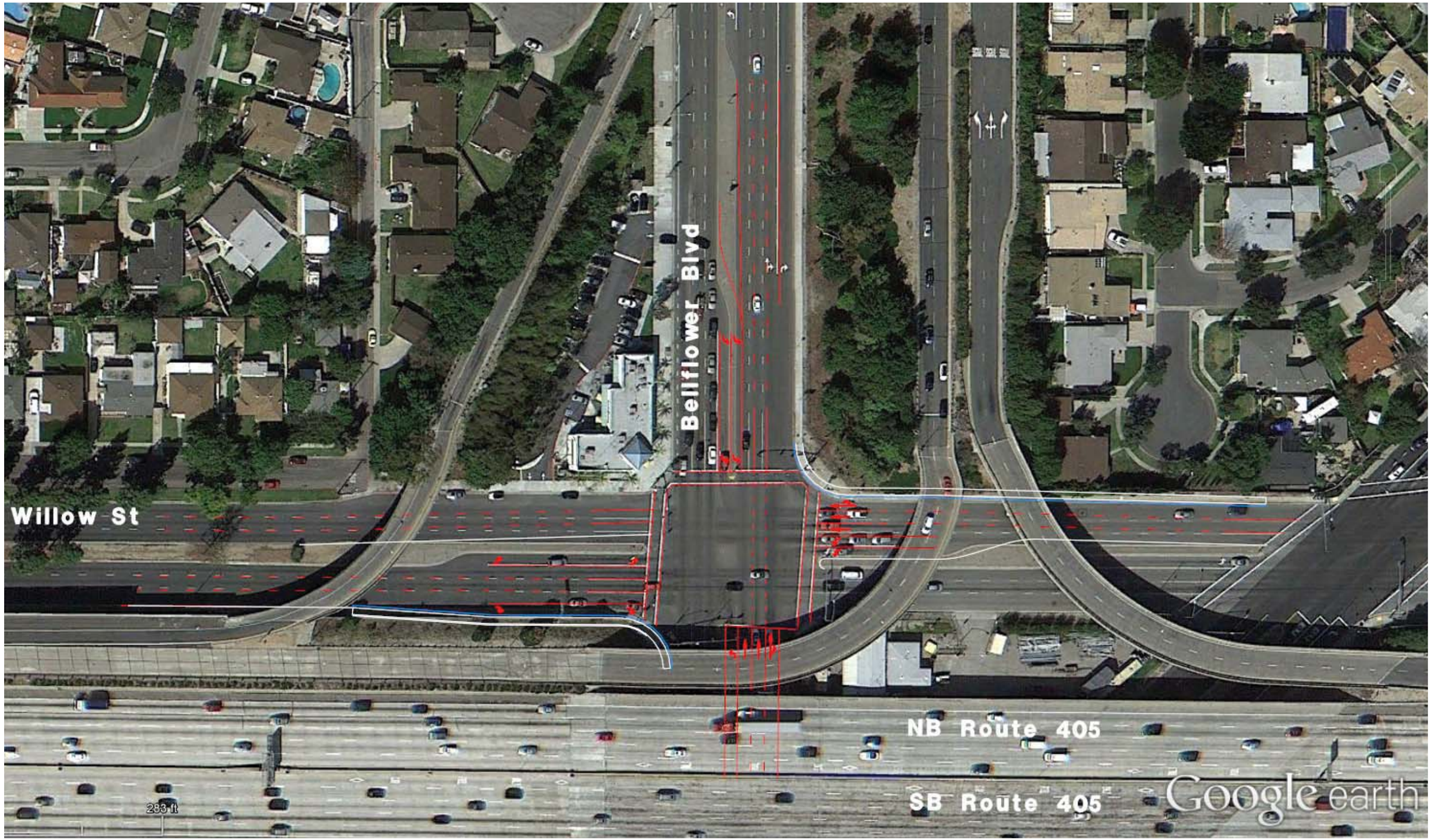


NOT TO SCALE

I-405 PA/ED Long Beach Study

FIGURE 4-8

7th STREET AND
BELLFLOWER BOULEVARD INTERSECTION
PROPOSED IMPROVEMENTS



NOT TO SCALE

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FIGURE 5-5

WILLOW STREET AND
BELLFLOWER BOULEVARD INTERSECTION
PROPOSED IMPROVEMENTS

NOT TO SCALE

I-405 PA/ED Long Beach Study

FIGURE 5-6

WILLOW STREET AND
LOS COYOTES DIAGONAL INTERSECTION
PROPOSED IMPROVEMENTS

NOT TO SCALE

I-405 PA/ED Long Beach Study

FIGURE 5-7

WILLOW STREET AND WOODRUFF AVENUE INTERSECTION PROPOSED IMPROVEMENTS

NOT TO SCALE

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FIGURE 5-8

7th STREET AND CHANNEL DRIVE INTERSECTION PROPOSED IMPROVEMENTS

NOT TO SCALE

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FIGURE 5-9

7th STREET AND E. CAMPUS DRIVE INTERSECTION PROPOSED IMPROVEMENTS

Appendix B3: Fair Share Calculations

I-405 PA/ED: LONG BEACH STUDY AREA
FAIR SHARE PERCENTAGE CALCULATION

$$P = \frac{T}{T_B - T_E}$$

P = The equitable share for the proposed project's cumulative traffic impact expressed as a percentage.

T = Additional traffic volume entering the intersection during the peak hour assuming the project compared to the No Build Alternative in vehicles per hour, vph.

T_B = The forecasted traffic volume with the project entering the intersection during the peak hour assuming the project, vph.

T_E = The existing traffic volume entering the intersection during the peak hour, vph.

ID #	Intersection	ALTERNATIVE 1 FAIR SHARE PERCENTAGE			
		T (vph)	T_B (vph)	T_E (vph)	P (%)
13	Los Coyotes Diagonal/Bellflower Boulevard	58	7191	5888	4.45%
29	SR-22 WB Ramp/College Park Drive	70	2135	1557	12.11%
30	7th Street/Pacific Coast Highway	95	7032	6220	11.70%
34	7th Street/West Campus Drive	77	5764	4923	9.16%
31	7th Street/Bellflower Boulevard*	-64	6850	6045	11.70%

* Since T is negative P is less than zero. The P value from the nearest intersection (#30) is used.

ID #	Intersection	ALTERNATIVE 2 FAIR SHARE PERCENTAGE			
		T (vph)	T_B (vph)	T_E (vph)	P (%)
12	Willow Street/Bellflower Boulevard	206	7329	5351	10.41%
16	Willow Street/Los Coyotes Diagonal	661	6474	4380	31.57%
17	Willow Street/Woodruff Avenue	162	4972	3414	10.40%
29	SR-22 WB Ramp/College Park Drive	253	2318	1557	33.25%
30	7th Street/Pacific Coast Highway	61	6998	6220	7.84%
31	7th Street/Bellflower Boulevard	177	7091	6045	16.92%
33	7th Street/Channel Drive	84	5407	4789	13.59%
34	7th Street/West Campus Drive	184	6154	5481	27.34%
35	7th Street/East Campus Drive	217	6739	5720	21.30%

ID #	Intersection	ALTERNATIVE 3 FAIR SHARE PERCENTAGE			
		T (vph)	T_B (vph)	T_E (vph)	P (%)
12	Willow Street/Bellflower Boulevard	206	7329	5351	10.41%
13	Los Coyotes Diagonal/Bellflower Boulevard	113	7246	5888	8.32%
16	Willow Street/Los Coyotes Diagonal	615	6428	4380	30.03%
30	7th Street/Pacific Coast Highway	63	7000	6220	8.08%
31	7th Street/Bellflower Boulevard	200	7103	5969	17.64%
33	7th Street/Channel Drive	87	5410	4789	14.01%
34	7th Street/West Campus Drive	255	5942	4923	25.02%
35	7th Street/East Campus Drive	64	6586	5720	7.39%

Appendix C: Environmental Commitment Record

Section and Measure Number	Avoidance, Minimization, and/or Mitigation Measure and Brief Description	*Responsible Party	Timing / Phase	Compliance Action	Verification of Compliance		Remarks
					Initial	Date	
	TRAFFIC AND TRANSPORTATION/PEDESTRIAN AND BICYCLE FACILITIES						
T-10	A payment shall be made by the Orange County Transportation Authority (OCTA) to the City of Long Beach based on a Cooperative Agreement to be negotiated and executed between OCTA and the City of Long Beach. The Cooperative Agreement shall identify the project's fair share of the costs for the improvements at intersections owned by the City of Long Beach based on the Preferred Alternative (PA) and in accordance with the fair share percentages for each location identified below. The Cooperative Agreement shall provide: • that the City of Long Beach's Transportation Mitigation Program will be revised to include the locations listed below under A, B, or C for the PA; • that the payment made by the OCTA shall be placed into the City of Long Beach Transportation Mitigation Program and shall only be used to provide improvements to remedy impacts of the PA at the intersections listed below under A, B, or C for the PA; • the amount of the total payment to be applied to each location; and • that the proposed improvements shall be implemented by the City of Long Beach, with the City of Long Beach bearing responsibility for necessary clearances and permits. A. If PA is Alternative 1: • Los Coyotes Diagonal and Bellflower Boulevard intersection: – Add a second left-turn lane to eastbound approach. – Fair Share Percentage: 4.45%. (estimated total construction cost in 2013 dollars is $250,000) B. If PA is Alternative 2: • Willow Street and Bellflower Boulevard intersection: – Add an exclusive right-turn lane to eastbound approach; – Add a second left-turn lane to westbound approach; and – Add a second left-turn lane to southbound approach. – Fair Share Percentage: 10.41%. (estimated total construction cost in 2013 dollars is $810,000) • Willow Street and Los Coyotes Diagonal intersection: – Add a second left-turn lane to eastbound approach; and – Add a second left-turn lane to southbound approach. – Fair Share Percentage: 31.57%. (estimated total construction cost in 2013 dollars is $440,000) • Willow Street and Woodruff Avenue intersection: – Add a second left-turn lane to northbound approach. – Fair Share Percentage: 10.40%.(estimated total construction cost in 2013 dollars is $240,000) C. If PA is Alternative 3: • Willow Street and Bellflower Boulevard intersection: – Add an exclusive right-turn lane to eastbound approach; – Add a second left-turn lane to westbound approach; and	OCTA	Design	Payment of funds to the City of Long Beach.			

*The implementing agency will be responsible subject to any changes resulting from a future cooperative agreement(s) between OCTA and Caltrans.

Section and Measure Number	Avoidance, Minimization, and/or Mitigation Measure and Brief Description	*Responsible Party	Timing / Phase	Compliance Action	Verification of Compliance		Remarks
					Initial	Date	
	– Add a second left-turn lane to southbound approach. – Fair Share Percentage: 10.41%. (estimated total construction cost in 2013 dollars is $810,000) • Los Coyotes Diagonal and Bellflower Boulevard intersection: – Add a second left-turn lane to eastbound approach. – Fair Share Percentage: 8.32%. (estimated total construction cost in 2013 dollars is $250,000) • Willow Street and Los Coyotes Diagonal intersection: – Add a second left-turn lane to eastbound approach; and – Add a second left-turn lane to southbound approach. – Fair Share Percentage: 30.03%. (estimated total construction cost in 2013 dollars is $440,000)						
T-11	A payment shall be made by OCTA to the State of California Department of Transportation based on a Traffic Mitigation Agreement Fair Share Deferment to be negotiated and executed between OCTA and the State of California Department of Transportation. The Traffic Mitigation Agreement Fair Share Deferment shall identify the project's fair share of the costs for the improvements at intersections owned by the State of California based on the PA and in accordance with the fair share percentages for each location identified below. The Traffic Mitigation Agreement Fair Share Deferment shall provide: • that the State of California Department of Transportation will establish separate accounts for each of the locations listed below under A, B, or C for the PA; • that the payment made by the OCTA shall be held by the State of California Department of Transportation and shall only be used to provide improvements to remedy impacts of the PA at the intersections listed below under A, B, or C for the PA; • the amount of the total payment to be applied to each location; • that the amounts for different locations shall not be commingled; and • that the proposed improvements shall be implemented by the State of California Department of Transportation, with the State of California Department of Transportation bearing responsibility for necessary clearances and permits. It should be noted that the State of California would implement a project only when enough funds have been collectively received for that specific mitigation measure. A. If PA is Alternative 1: • SR-22 westbound on-/off-ramp and College Park Drive intersection: – Add a second northbound through lane to the off-ramp approach to College Park Drive starting approximately 300 feet (ft) south of their intersection; and – Replace existing traffic control with a traffic signal. – Fair Share Percentage: 12.11%. (estimated total construction cost in 2013 dollars is $1,570,000) • 7th Street and Pacific Coast Highway intersection: – Add protected/permitted signal phasing to the eastbound and westbound approaches of Pacific Coast Highway to Bellflower Boulevard. – Fair Share Percentage: 11.70%. (estimated total construction cost in 2013 dollars is $450,000)	OCTA	Design	Payment of funds to State of California Department of Transportation.			

*The implementing agency will be responsible subject to any changes resulting from a future cooperative agreement(s) between OCTA and Caltrans.

Section and Measure Number	Avoidance, Minimization, and/or Mitigation Measure and Brief Description	*Responsible Party	Timing / Phase	Compliance Action	Verification of Compliance		Remarks
					Initial	Date	
	• 7th Street and West Campus Drive intersection: – Add an exclusive right-turn lane to westbound approach, modifying traffic signals as needed. – Fair Share Percentage: 9.16%. (estimated total construction cost in 2013 dollars is $300,000) • 7th Street and Bellflower Boulevard intersection: – Add a second left-turn lane to eastbound approach, modifying signals and adjusting sidewalk as necessary. – Fair Share Percentage: 11.70%. (estimated total construction cost in 2013 dollars is $640,000) B. If PA is Alternative 2: • SR-22 westbound on-/off-ramp and College Park Drive intersection: – Add a second northbound through lane to the off-ramp approach to College Park Drive starting approximately 300 ft south of their intersection; and – Replace existing traffic control with a traffic signal. – Fair Share Percentage: 33.25%. (estimated total construction cost in 2013 dollars is $1,570,000) • 7th Street and Pacific Coast Highway intersection: – Add protected/permitted signal phasing to the eastbound and westbound approaches of Pacific Coast Highway to Bellflower Boulevard. – Fair Share Percentage: 7.84%. (estimated total construction cost in 2013 dollars is $450,000) • 7th Street and Bellflower Boulevard intersection: – Add a second left-turn lane to eastbound approach, modifying signals and adjusting sidewalk as necessary. – Fair Share Percentage: 16.92%. (estimated total construction cost in 2013 dollars is $640,000) • 7th Street and Channel Drive intersection: – Add a second left-turn lane to westbound approach, modifying signals as necessary; and – Provide dual southbound exclusive left-turn lanes. – Fair Share Percentage: 13.59%. (estimated total construction cost in 2013 dollars is $240,000) • 7th Street and West Campus Drive intersection: – Add an exclusive right-turn lane to westbound approach, modifying traffic signals as necessary. – Fair Share Percentage: 27.34%. (estimated total construction cost in 2013 dollars is $300,000) • 7th Street and East Campus Drive intersection: – Add a right-turn lane to westbound approach, modifying traffic signals as necessary and maximizing eastbound and westbound left-turn pocket lengths. – Fair Share Percentage: 21.30%. (estimated total construction cost in 2013 dollars is $450,000) C. If PA is Alternative 3: • 7th Street and Pacific Coast Highway intersection: – Add protected/permitted signal phasing to the eastbound and westbound approaches of Pacific Coast Highway to Bellflower Boulevard.						

*The implementing agency will be responsible subject to any changes resulting from a future cooperative agreement(s) between OCTA and Caltrans.

Section and Measure Number	Avoidance, Minimization, and/or Mitigation Measure and Brief Description	*Responsible Party	Timing / Phase	Compliance Action	Verification of Compliance		Remarks
					Initial	Date	
	– Fair Share Percentage: 8.08%. (estimated total construction cost in 2013 dollars is $450,000) • 7th Street and Bellflower Boulevard intersection: – Add a second left-turn lane to eastbound approach, modifying signals and adjusting sidewalk as necessary. – Fair Share Percentage: 17.64%. (estimated total construction cost in 2013 dollars is $640,000) • 7th Street and Channel Drive intersection: – Add a second left-turn lane to westbound approach, modifying signals as necessary; and – Provide dual southbound exclusive left-turn lanes. – Fair Share Percentage: 14.01%. (estimated total construction cost in 2013 dollars is $240,000) • 7th Street and West Campus Drive intersection: – Add an exclusive right-turn lane to westbound approach, modifying traffic signals as necessary. – Fair Share Percentage: 25.02%. (estimated total construction cost in 2013 dollars is $300,000) • 7th Street and East Campus Drive intersection: – Add a right-turn lane to westbound approach, modifying traffic signals as necessary and maximizing eastbound and westbound left-turn pocket lengths. – Fair Share Percentage: 7.39%. (estimated total construction cost in 2013 dollars is $450,000)						

*The implementing agency will be responsible subject to any changes resulting from a future cooperative agreement(s) between OCTA and Caltrans.