

# Chapter 1 Proposed Project

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## 1.1 Introduction

The California Department of Transportation (Caltrans), in cooperation with the Orange County Transportation Authority (OCTA), is proposing to widen Interstate 5 (I-5) between Interstate 405 (I-405) and State Route 55 (SR-55). The project limits on I-5 extend from approximately 0.4 mile (mi) north of the I-5/I-405 interchange (Post Mile [PM] 21.3) to 0.2 mi south of SR-55 (PM 30.3). Caltrans, as assigned by the Federal Highway Administration (FHWA), is the Lead Agency for compliance under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA).

The proposed project is in the Southern California Association of Governments (SCAG) Federal Transportation Improvement Program (FTIP) Projects Listing in the 2016–2040 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), which received its conformity determination from the Federal Highway Administration (FHWA)/Federal Transit Administration (FTA) on June 1, 2016. The project is also in the 2019 FTIP, which received its conformity determination from the FHWA/FTA on December 17, 2018: “Project ID: ORA130302, Description: I-5 (I-405 to SR-55) in the Cities of Irvine and Tustin. Add 1 mixed flow lane NB from truck bypass on ramp to SR-55, add 1 mixed flow lane SB from SR-55 to Alton and 1 Aux lane from Alton to truck bypass. (PA&ED and PS&E phase) Project will utilize toll credit match.” Copies of the 2016 RTP and 2019 FTIP Project Listings for the proposed project are provided in Appendix D, 2016 SCAG RTP/SCS and 2019 FTIP Project Listings.

California participated in the “Surface Transportation Project Delivery Pilot Program” (Pilot Program) pursuant to 23 USC 327, for more than five years, beginning July 1, 2007, and ending September 30, 2012. MAP-21 (P.L. 112-141), signed by President Obama on July 6, 2012, amended 23 USC 327 to establish a permanent Surface Transportation Project Delivery Program. As a result, Caltrans entered into a Memorandum of Understanding pursuant to 23 USC 327 (NEPA Assignment MOU) with FHWA. The NEPA Assignment MOU became effective October 1, 2012, and was renewed on December 23, 2016, for a term of five years. In summary, Caltrans continues to assume FHWA responsibilities under NEPA and other federal environmental laws in the same manner as was assigned under the Pilot Program, with minor changes. With NEPA Assignment, FHWA assigned and

Caltrans assumed all of the United States Department of Transportation (USDOT) Secretary's responsibilities under NEPA. This assignment includes projects on the State Highway System and Local Assistance Projects off of the State Highway System within the State of California, except for certain categorical exclusions that FHWA assigned to Caltrans under the 23 USC 326 Categorical Exclusion Assignment MOU, projects excluded by definition, and specific project exclusions.

### **1.1.1 Existing Facility**

I-5 is a major north-south interstate freeway that traverses the western United States from Mexico to Canada. In Orange County, I-5 (also known as the Santa Ana Freeway), serves as the linkage connecting Orange County to Los Angeles County. Within the project Study Area (refer to Figure 1-1), I-5 serves the Cities of Irvine and Tustin connecting to the City of Santa Ana and central Orange County to the north, and southern Orange County to the south. There are two toll roads that interface with the I-5 within the Study Area: State Route 133 (SR-133), which connects to the I-5 north of the I-405/I-5 interchange, and State Route 261 (SR-261), which passes under the I-5 south of the Jamboree Road/I-5 interchange.

Regional postwar development and settlement came as a result of the expanding road systems throughout Orange County. In the early 20<sup>th</sup> century, with the advent of automotive travel, the demand for good roads grew. As large ranch lands were broken up and sold off, the County developed in a decentralized, sprawling pattern. The Cities of Tustin and Irvine were largely developed along I-5 during the early-1950s to the late-1960s with commercial, light industrial, and manufacturing businesses that began locating along the I-5 corridor and within the project limits. The development of this area is representative of larger demographic trends associated with postwar residential development. As suburbanization continued, populations and amenities increasingly moved from the city centers to the peripheries, increasingly adding to the use of I-5.

In general, the I-5 project limits currently consists of one high-occupancy vehicle (HOV) lane and four or five general-purpose lanes in each direction, with auxiliary lanes provided at some locations. The HOV lanes currently operate without continuous access, and access is limited to designated locations along this segment of I-5.



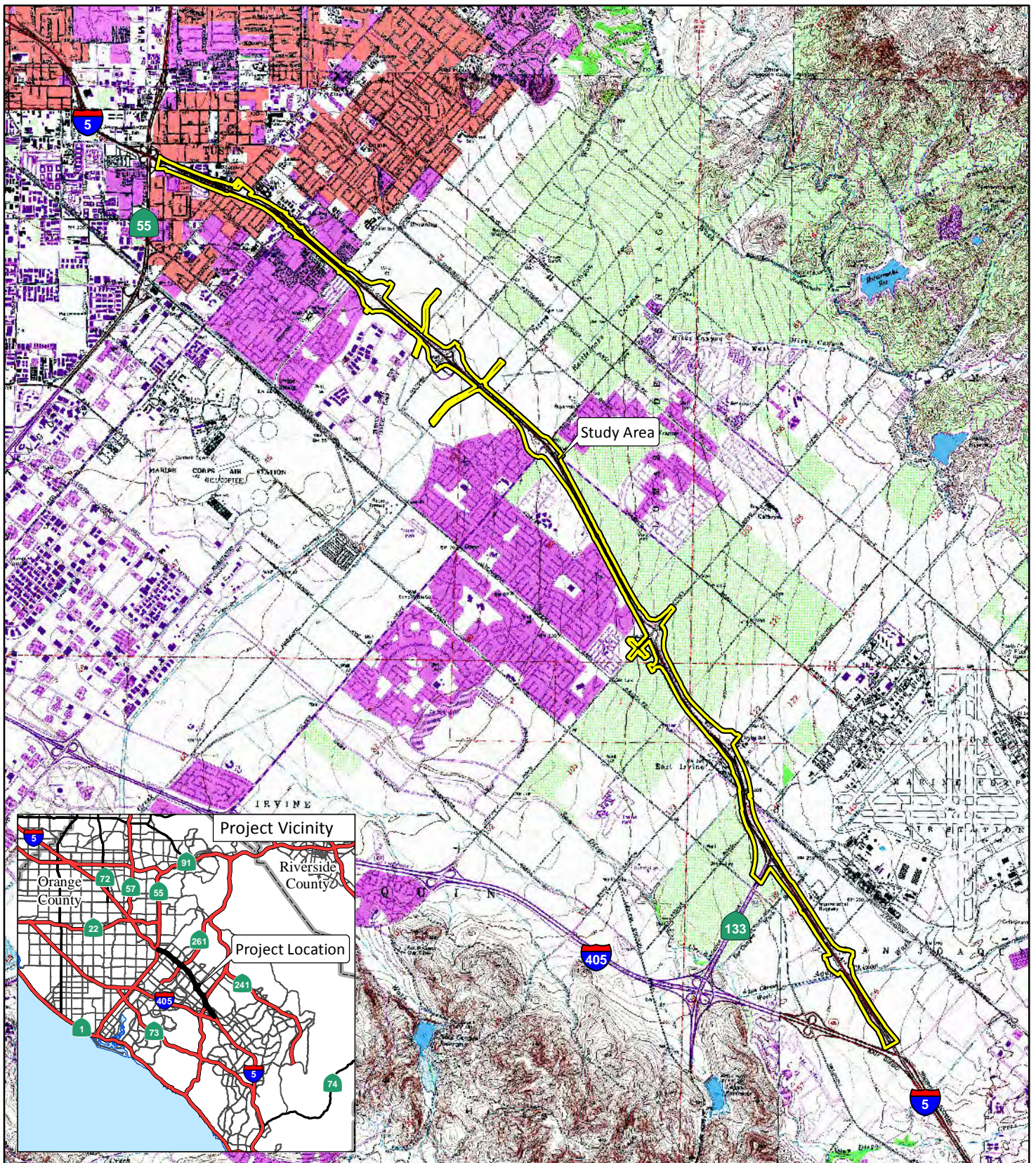

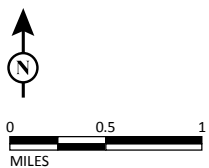


FIGURE 1-1

LEGEND

 Study Area



*I-5 Improvement Project: I-405 to SR-55*

**Project Location Map**

12-ORA-5 PM 21.3/30.3

EA No. 0K670

SOURCE: USGS 7.5' Quad - Tustin (1981) and El Toro (1982); AECOM (2017)

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## 1.2 Purpose and Need

### 1.2.1 Purpose

The purpose of the proposed project is to address existing and future traffic demand on I-5 from I-405 to SR-55. The project will address congestion and enhance freeway operations as follows:

- Increase the mainline capacity within the project limits along the I-5 corridor;
- Improve the capacity of the ramps within the project limits along the I-5 corridor;
- Improve operational deficiencies of merge and diverge areas within the project limits along the I-5 corridor;
- Improve the existing auxiliary lanes operations; and
- Optimize access of the existing HOV lane.

The goal of the proposed project is to also minimize environmental impacts as well as right-of-way acquisitions within the project limits.

### 1.2.2 Need

In general, severe traffic congestion occurs along I-5 between I-405 and SR-55, and congestion is anticipated to worsen in the future. The *Final Traffic/Circulation Impact Report for the I-5 PA/ED Project from I-405 to SR-55* (January 2017) was prepared to identify existing and forecasted traffic conditions within the Study Area. The proposed project is needed because:

- The I-5 corridor within the project limits currently experiences congestion and long traffic delays due to the demand exceeding the capacity of the facility.
- The existing interchanges within the project limits are generally closely spaced, and the mainline lanes are generally at or above capacity during peak hours, which further exacerbates the congestion associated with merge, diverge and weaving areas.
- Inadequate merge/diverge and weaving distances along the mainline and limited-access HOV lanes that slow traffic speeds contribute to the overall low levels of service (LOS) along the I-5.
- This section of I-5 will have deteriorating LOS conditions in the future.

### **1.2.2.1 Capacity, Transportation Demand, and Safety**

#### ***Capacity and Transportation Demand in the I-5 Corridor***

##### ***Levels of Service and Travel Times***

Existing Baseline conditions (2014) result in LOS D or worse at 58 of 62 freeway segments (general-purpose lanes) in the project limits (refer to Table 1.1). LOS would severely deteriorate under the No Build condition for 58 of 62 freeway segments (general-purpose lanes) and 13 of 49 freeway segments (HOV lanes) by the build-out opening year (2030) and 60 of 62 freeway segments (general-purpose lanes) and 27 of 49 freeway segments (HOV lanes) by the future year (2050) conditions, including both mainline and HOV lanes.

Freeway traffic flow can be defined in terms of LOS. For freeways, there are six defined levels, ranging from LOS A to LOS F. LOS A represents free traffic flow with low traffic volumes and high speeds, and LOS F represents traffic volumes that exceed the facility capacity and result in forced flow operations at low speeds, as shown on Figure 1-2. As shown on that figure, traffic volumes on a facility such as I-5 substantially affect travel speeds and times.

The LOS on a freeway characterizes the performance of the freeway in terms of both travel time and speed. Table 1.1 provides traffic volume data on the existing year (2014), opening year (2030), and future year (2050) in the No Build condition in the number of vehicles traveling on mixed-flow segments and HOV lanes of both northbound and southbound I-5 during the AM peak hour and the PM peak hour. As shown in Table 1.1, similar traffic demand exists for both northbound and southbound directions during the AM and PM peak hours under existing conditions (2014), and the No Build condition in the opening year (2030) and the future year (2050).

An additional measure of freeway traffic is the volume-to-capacity ratio (V/C), which is a comparison of an amount of traffic on a road with the capacity of that road. Table 1.2 provides the LOS for general-purpose lanes and the V/C ratio for HOV lanes for the existing year (2014), opening year (2030), and future year (2050) No Build condition on the I-5 mainline during the AM and PM peak hours. The *Caltrans 2017 California High-Occupancy Vehicle Facilities Degradation Report and Action Plan*, November 2018, states that the HOV lanes within the project limits are degraded. This report identifies vehicle weaving conflicts at the ingress/egress locations as one of the potential causes for the degradation. This project proposes to convert the existing limited-access HOV lanes to continuous access.









| <h1>LEVELS OF SERVICE</h1> <p>for Freeways</p> |   |                       |  |
|--|---|-----------------------|--|
| Level of Service                               | Flow Conditions   | Operating Speed (mph) | Technical Descriptions   |
| <b>A</b>                                       |    | 70                    | Highest quality of service. Traffic flows freely with little or no restrictions on speed or maneuverability.<br><b>No delays</b>         |
| <b>B</b>                                       |    | 70                    | Traffic is stable and flows freely. The ability to maneuver in traffic is only slightly restricted.<br><b>No delays</b>                  |
| <b>C</b>                                       |   | 67                    | Few restrictions on speed. Freedom to maneuver is restricted. Drivers must be more careful making lane changes.<br><b>Minimal delays</b> |
| <b>D</b>                                       |  | 62                    | Speeds decline slightly and density increases. Freedom to maneuver is noticeably limited.<br><b>Minimal delays</b>                       |
| <b>E</b>                                       |  | 53                    | Vehicles are closely spaced, with little room to maneuver. Driver comfort is poor.<br><b>Significant delays</b>                          |
| <b>F</b>                                       |  | <53                   | Very congested traffic with traffic jams, especially in areas where vehicles have to merge.<br><b>Considerable delays</b>                |

Figure 1-2: LOS Thresholds for a Basic Freeway Segment

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Table 1.1: Existing (2014) and Forecast Years (2030 and 2050) No Build Alternative Traffic Volumes

| Freeway Segments           | Existing (2014) |       |              |       |         | Opening Year (2030) |       |              |       |         | Future Year (2050) |       |              |       |         |
|----------------------------|-----------------|-------|--------------|-------|---------|---------------------|-------|--------------|-------|---------|--------------------|-------|--------------|-------|---------|
|                            | AM Peak Hour    |       | PM Peak Hour |       | ADT     | AM Peak Hour        |       | PM Peak Hour |       | ADT     | AM Peak Hour       |       | PM Peak Hour |       | ADT     |
|                            | Mainline        | HOV   | Mainline     | HOV   |         | Mainline            | HOV   | Mainline     | HOV   |         | Mainline           | HOV   | Mainline     | HOV   |         |
| Northbound                 |                 |       |              |       |         |                     |       |              |       |         |                    |       |              |       |         |
| North of SR-55 SB Off-ramp | 8,710           | 1,276 | 6,549        | 1,336 | --      | 9,070               | 1,590 | 6,690        | 1,730 | --      | 9,450              | 1,760 | 6,990        | 1,870 | --      |
| SR-55 SB                   | 1,020           | --    | 740          | --    | --      | 1,055               | --    | 765          | --    | --      | 1,090              | --    | 790          | --    | --      |
| --                         | 9,730           | 1,276 | 7,289        | 1,336 | --      | 10,125              | 1,590 | 7,455        | 1,730 | --      | 10,540             | 1,760 | 7,780        | 1,870 | --      |
| SR-55 NB                   | 2,330           | --    | 2,900        | --    | --      | 2,620               | --    | 3,170        | --    | --      | 2,790              | --    | 3,350        | --    | --      |
| --                         | 12,060          | 1,276 | 10,189       | 1,336 | 145,740 | 12,745              | 1,590 | 10,625       | 1,730 | 241,500 | 13,330             | 1,760 | 11,130       | 1,870 | 252,500 |
| Newport Rd                 | 822             | --    | 932          | --    | --      | 860                 | --    | 970          | --    | --      | 900                | --    | 1,010        | --    | --      |
| --                         | 11,238          | 1,276 | 9,257        | 1,336 | 145,740 | 11,885              | 1,590 | 9,655        | 1,730 | 226,000 | 12,430             | 1,760 | 10,120       | 1,870 | 236,700 |
| Red Hill Ave               | 870             | --    | 678          | --    | --      | 895                 | --    | 760          | --    | --      | 930                | --    | 810          | --    | --      |
| --                         | 10,368          | 1,276 | 8,579        | 1,336 | --      | 10,990              | 1,590 | 8,895        | 1,730 | --      | 11,500             | 1,760 | 9,310        | 1,870 | --      |
| Red Hill Ave               | 455             | --    | 614          | --    | --      | 480                 | --    | 635          | --    | --      | 500                | --    | 660          | --    | --      |
| --                         | 10,943          | 1,156 | 9,198        | 1,331 | 145,740 | 11,575              | 1,485 | 9,595        | 1,665 | 222,300 | 12,120             | 1,640 | 10,060       | 1,780 | 232,800 |
| Tustin Ranch Rd            | 1,148           | --    | 959          | --    | --      | 1,185               | --    | 990          | --    | --      | 1,230              | --    | 1,030        | --    | --      |
| --                         | 9,795           | 1,156 | 8,239        | 1,331 | --      | 10,390              | 1,485 | 8,605        | 1,665 | --      | 10,890             | 1,640 | 9,030        | 1,780 | --      |
| Tustin Ranch Rd            | 270             | --    | 443          | --    | --      | 380                 | --    | 455          | --    | --      | 420                | --    | 480          | --    | --      |
| --                         | 10,085          | 1,136 | 8,722        | 1,291 | 138,730 | 10,860              | 1,395 | 9,160        | 1,565 | 220,800 | 11,400             | 1,550 | 9,600        | 1,690 | 232,200 |
| Jamboree Rd WB             | 612             | --    | 638          | --    | --      | 745                 | --    | 660          | --    | --      | 810                | --    | 680          | --    | --      |
| --                         | 9,473           | 1,136 | 8,084        | 1,291 | --      | 10,115              | 1,395 | 8,500        | 1,565 | --      | 10,590             | 1,550 | 8,920        | 1,690 | --      |
| Jamboree Rd EB             | 562             | --    | 788          | --    | --      | 620                 | --    | 815          | --    | --      | 660                | --    | 850          | --    | --      |
| --                         | 8,911           | 1,136 | 7,296        | 1,291 | --      | 9,495               | 1,395 | 7,685        | 1,565 | --      | 9,930              | 1,550 | 8,070        | 1,690 | --      |
| Jamboree Rd                | 1,139           | --    | 1,207        | --    | --      | 1,185               | --    | 1,230        | --    | --      | 1,240              | --    | 1,270        | --    | --      |
| --                         | 9,840           | 1,346 | 8,573        | 1,221 | 133,930 | 10,460              | 1,615 | 9,005        | 1,475 | 211,500 | 10,980             | 1,740 | 9,420        | 1,610 | 222,600 |
| Culver Dr WB               | 612             | --    | 351          | --    | --      | 715                 | --    | 515          | --    | --      | 770                | --    | 580          | --    | --      |
| --                         | 9,228           | 1,346 | 8,222        | 1,221 | --      | 9,745               | 1,615 | 8,490        | 1,475 | --      | 10,210             | 1,740 | 8,840        | 1,610 | --      |
| Trabuco Rd/Culver Dr       | 901             | --    | 719          | --    | --      | 1,010               | --    | 740          | --    | --      | 1,070              | --    | 770          | --    | --      |
| --                         | 8,327           | 1,346 | 7,503        | 1,221 | --      | 8,735               | 1,615 | 7,750        | 1,475 | --      | 9,140              | 1,740 | 8,070        | 1,610 | --      |
| Culver Dr                  | 264             | --    | 696          | --    | --      | 270                 | --    | 725          | --    | --      | 280                | --    | 750          | --    | --      |
| --                         | 8,686           | 1,251 | 8,099        | 1,321 | 133,930 | 9,205               | 1,415 | 8,380        | 1,570 | 195,800 | 9,590              | 1,570 | 8,700        | 1,730 | 203,900 |
| Jeffrey Rd WB              | 448             | --    | 441          | --    | --      | 590                 | --    | 455          | --    | --      | 650                | --    | 470          | --    | --      |
| --                         | 8,238           | 1,251 | 7,658        | 1,321 | --      | 8,615               | 1,415 | 7,925        | 1,570 | --      | 8,940              | 1,570 | 8,230        | 1,730 | --      |
| Jeffrey Rd EB              | 149             | --    | 340          | --    | --      | 155                 | --    | 395          | --    | --      | 160                | --    | 430          | --    | --      |
| --                         | 8,089           | 1,251 | 7,318        | 1,321 | --      | 8,460               | 1,415 | 7,530        | 1,570 | --      | 8,780              | 1,570 | 7,800        | 1,730 | --      |
| Jeffrey Rd                 | 1,081           | --    | 1,460        | --    | --      | 1,215               | --    | 1,640        | --    | --      | 1,290              | --    | 1,750        | --    | --      |
| --                         | 9,330           | 1,091 | 8,858        | 1,241 | 126,940 | 9,895               | 1,195 | 9,255        | 1,485 | 197,500 | 10,330             | 1,310 | 9,640        | 1,640 | 206,600 |
| SR-133 SB                  | 1,250           | --    | 260          | --    | --      | 1,300               | --    | 460          | --    | --      | 1,360              | --    | 540          | --    | --      |
| --                         | 8,080           | 1,091 | 8,598        | 1,241 | --      | 8,595               | 1,195 | 8,795        | 1,485 | --      | 8,970              | 1,310 | 9,100        | 1,640 | --      |

Table 1.1: Existing (2014) and Forecast Years (2030 and 2050) No Build Alternative Traffic Volumes

| Freeway Segments             | Existing (2014) |       |              |       |         | Opening Year (2030) |       |              |       |         | Future Year (2050) |       |              |       |         |
|------------------------------|-----------------|-------|--------------|-------|---------|---------------------|-------|--------------|-------|---------|--------------------|-------|--------------|-------|---------|
|                              | AM Peak Hour    |       | PM Peak Hour |       | ADT     | AM Peak Hour        |       | PM Peak Hour |       | ADT     | AM Peak Hour       |       | PM Peak Hour |       | ADT     |
|                              | Mainline        | HOV   | Mainline     | HOV   |         | Mainline            | HOV   | Mainline     | HOV   |         | Mainline           | HOV   | Mainline     | HOV   |         |
| Sand Canyon Ave              | 686             | --    | 610          | --    | --      | 790                 | --    | 645          | --    | --      | 840                | --    | 680          | --    | --      |
| --                           | 7,394           | 1,091 | 7,988        | 1,241 | --      | 7,805               | 1,195 | 8,150        | 1,485 | --      | 8,130              | 1,310 | 8,420        | 1,640 | --      |
| Sand Canyon Ave              | 680             | --    | 628          | --    | --      | 925                 | --    | 825          | --    | --      | 1,030              | --    | 910          | --    | --      |
| --                           | 8,274           | 891   | 8,641        | 1,216 | 105,070 | 8,835               | 1,090 | 9,040        | 1,420 | 184,500 | 9,280              | 1,190 | 9,410        | 1,560 | 192,900 |
| SR-133 NB                    | 1,200           | --    | 1,700        | --    |         | 1,435               | --    | 1,845        | --    | --      | 1,550              | --    | 1,950        | --    | --      |
| --                           | 7,074           | 891   | 6,941        | 1,216 | 105,070 | 7,400               | 1,090 | 7,195        | 1,420 | 166,100 | 7,730              | 1,190 | 7,460        | 1,560 | 171,300 |
| SR-133 NB                    | 310             | --    | 910          | --    | --      | 430                 | --    | 940          | --    | --      | 480                | --    | 980          | --    | --      |
| --                           | 7,424           | 851   | 7,971        | 1,096 | --      | 7,925               | 995   | 8,190        | 1,365 | --      | 8,330              | 1,070 | 8,520        | 1,480 | --      |
| Barranca Pkwy HOV            | --              | 31    | --           | 136   | --      | --                  | 35    | --           | 250   | --      | --                 | 40    | --           | 290   | --      |
| --                           | 7,424           | 820   | 7,971        | 960   | 100,260 | 7,925               | 960   | 8,190        | 1,115 | 171,700 | 8,330              | 1,030 | 8,520        | 1,190 | 177,900 |
| Alton Pkwy WB                | 287             | --    | 1,088        | --    | --      | 295                 | --    | 1,115        | --    | --      | 310                | --    | 1,160        | --    | --      |
| --                           | 7,137           | 820   | 6,883        | 960   | --      | 7,630               | 960   | 7,075        | 1,115 | --      | 8,020              | 1,030 | 7,360        | 1,190 | --      |
| Alton Pkwy EB                | 175             | --    | 453          | --    | --      | 305                 | --    | 555          | --    | --      | 360                | --    | 610          | --    | --      |
| --                           | 6,962           | 820   | 6,430        | 960   | --      | 7,325               | 960   | 6,520        | 1,115 | --      | 7,660              | 1,030 | 6,750        | 1,190 | --      |
| Alton Pkwy                   | 1,208           | --    | 550          | --    | --      | 1,245               | --    | 570          | --    | --      | 1,300              | --    | 590          | --    | --      |
| South of Alton Pkwy Off-ramp | 8,170           | 820   | 6,980        | 960   | 100,260 | 8,570               | 960   | 7,090        | 1,115 | 159,000 | 8,960              | 1,030 | 7,340        | 1,190 | 162,100 |
| Southbound                   |                 |       |              |       |         |                     |       |              |       |         |                    |       |              |       |         |
| North of Newport Rd Off-ramp | 6,661           | 1,330 | 7,390        | 1,290 | --      | 7,410               | 1,705 | 8,320        | 1,555 | --      | 7,790              | 1,880 | 8,850        | 1,680 | --      |
| Newport Rd                   | 366             | --    | 577          | --    | --      | 380                 | --    | 595          | --    | --      | 390                | --    | 620          | --    | --      |
| --                           | 6,295           | 1,330 | 6,813        | 1,290 | --      | 7,030               | 1,705 | 7,725        | 1,555 | --      | 7,400              | 1,880 | 8,230        | 1,680 | --      |
| SR-55 NB                     | 695             | --    | 465          | --    | --      | 720                 | --    | 480          | --    | --      | 750                | --    | 500          | --    | --      |
| --                           | 6,990           | 1,330 | 7,278        | 1,290 | 114,920 | 7,750               | 1,705 | 8,205        | 1,555 | 175,700 | 8,150              | 1,880 | 8,730        | 1,680 | 190,200 |
| SR-55 SB                     | 2,930           | --    | 3,410        | --    | --      | 3,025               | --    | 3,455        | --    | --      | 3,150              | --    | 3,570        | --    | --      |
| --                           | 9,920           | 1,330 | 10,688       | 1,290 | 168,950 | 10,775              | 1,705 | 11,660       | 1,555 | 222,700 | 11,300             | 1,880 | 12,300       | 1,680 | 241,500 |
| Red Hill Ave                 | 564             | --    | 507          | --    | --      | 625                 | --    | 515          | --    | --      | 660                | --    | 530          | --    | --      |
| --                           | 9,196           | 1,490 | 10,041       | 1,430 | --      | 10,140              | 1,715 | 11,070       | 1,630 | --      | 10,630             | 1,890 | 11,710       | 1,740 | --      |
| Red Hill Ave                 | 875             | --    | 765          | --    | --      | 905                 | --    | 790          | --    | --      | 940                | --    | 820          | --    | --      |
| --                           | 10,071          | 1,490 | 10,806       | 1,430 | 162,870 | 11,045              | 1,715 | 11,860       | 1,630 | 223,300 | 11,570             | 1,890 | 12,530       | 1,740 | 242,100 |
| Tustin Ranch Rd              | 988             | --    | 1,008        | --    | --      | 1,020               | --    | 1,040        | --    | --      | 1,060              | --    | 1,080        | --    | --      |
| --                           | 9,153           | 1,420 | 9,848        | 1,380 | --      | 10,105              | 1,635 | 10,855       | 1,595 | --      | 10,570             | 1,830 | 11,460       | 1,730 | --      |
| Tustin Ranch Rd              | 606             | --    | 569          | --    | --      | 625                 | --    | 665          | --    | --      | 650                | --    | 720          | --    | --      |
| --                           | 9,759           | 1,420 | 10,417       | 1,380 | 154,550 | 10,730              | 1,635 | 11,520       | 1,595 | 216,800 | 11,220             | 1,830 | 12,180       | 1,730 | 236,600 |
| Jamboree Rd                  | 1,209           | --    | 1,290        | --    | --      | 1,330               | --    | 1,615        | --    | --      | 1,410              | --    | 1,770        | --    | --      |
| --                           | 8,560           | 1,410 | 9,157        | 1,350 | --      | 9,525               | 1,510 | 9,935        | 1,565 | --      | 9,940              | 1,700 | 10,490       | 1,650 | --      |
| Jamboree Rd WB               | 731             | --    | 446          | --    | --      | 775                 | --    | 460          | --    | --      | 810                | --    | 480          | --    | --      |
| --                           | 9,291           | 1,410 | 9,603        | 1,350 | --      | 10,300              | 1,510 | 10,395       | 1,565 | --      | 10,750             | 1,700 | 10,970       | 1,650 | --      |



Table 1.1: Existing (2014) and Forecast Years (2030 and 2050) No Build Alternative Traffic Volumes

| Freeway Segments      | Existing (2014) |       |              |       |         | Opening Year (2030) |       |              |       |         | Future Year (2050) |       |              |       |         |
|-----------------------|-----------------|-------|--------------|-------|---------|---------------------|-------|--------------|-------|---------|--------------------|-------|--------------|-------|---------|
|                       | AM Peak Hour    |       | PM Peak Hour |       | ADT     | AM Peak Hour        |       | PM Peak Hour |       | ADT     | AM Peak Hour       |       | PM Peak Hour |       | ADT     |
|                       | Mainline        | HOV   | Mainline     | HOV   |         | Mainline            | HOV   | Mainline     | HOV   |         | Mainline           | HOV   | Mainline     | HOV   |         |
| Jamboree Rd EB        | 288             | --    | 1,197        | --    | --      | 295                 | --    | 1,210        | --    | --      | 300                | --    | 1,250        | --    | --      |
| --                    | 9,579           | 1,410 | 10,800       | 1,350 | 138,560 | 10,595              | 1,510 | 11,605       | 1,565 | 194,000 | 11,050             | 1,700 | 12,220       | 1,650 | 205,600 |
| Culver Dr             | 947             | --    | 1,660        | --    | --      | 975                 | --    | 1,690        | --    | --      | 1,020              | --    | 1,750        | --    | --      |
| --                    | 8,642           | 1,400 | 9,180        | 1,310 | --      | 9,690               | 1,440 | 9,940        | 1,540 | --      | 10,100             | 1,630 | 10,490       | 1,630 | --      |
| Culver Dr WB          | 404             | --    | 236          | --    | --      | 450                 | --    | 255          | --    | --      | 480                | --    | 270          | --    | --      |
| --                    | 9,046           | 1,400 | 9,416        | 1,310 | --      | 10,140              | 1,440 | 10,195       | 1,540 | --      | 10,580             | 1,630 | 10,760       | 1,630 | --      |
| Culver Dr EB          | 312             | --    | 351          | --    | --      | 325                 | --    | 360          | --    | --      | 340                | --    | 370          | --    | --      |
| --                    | 9,358           | 1,400 | 9,767        | 1,310 | 142,560 | 10,465              | 1,440 | 10,555       | 1,540 | 181,400 | 10,920             | 1,630 | 11,130       | 1,630 | 193,400 |
| Jeffrey Rd            | 692             | --    | 1,025        | --    | --      | 790                 | --    | 1,060        | --    | --      | 850                | --    | 1,100        | --    | --      |
| --                    | 8,786           | 1,280 | 8,772        | 1,280 | --      | 9,765               | 1,350 | 9,515        | 1,520 | --      | 10,170             | 1,530 | 10,060       | 1,600 | --      |
| Jeffrey Rd            | 622             | --    | 742          | --    | --      | 785                 | --    | 820          | --    | --      | 860                | --    | 870          | --    | --      |
| --                    | 9,408           | 1,280 | 9,514        | 1,280 | 127,970 | 10,550              | 1,350 | 10,335       | 1,520 | 179,000 | 11,030             | 1,530 | 10,930       | 1,600 | 191,100 |
| SR-133 NB             | 240             | --    | 1,060        | --    | --      | 535                 | --    | 1,340        | --    | --      | 650                | --    | 1,470        | --    | --      |
| --                    | 9,168           | 1,280 | 8,454        | 1,280 | --      | 10,015              | 1,350 | 8,995        | 1,520 | --      | 10,380             | 1,530 | 9,460        | 1,600 | --      |
| Sand Canyon Ave       | 1,264           | --    | 619          | --    | --      | 1,330               | --    | 695          | --    | --      | 1,390              | --    | 740          | --    | --      |
| --                    | 8,139           | 1,045 | 7,875        | 1,240 | --      | 8,770               | 1,265 | 8,325        | 1,495 | --      | 9,080              | 1,440 | 8,730        | 1,590 | --      |
| Sand Canyon Ave       | 469             | --    | 483          | --    | --      | 480                 | --    | 530          | --    | --      | 500                | --    | 560          | --    | --      |
| --                    | 8,608           | 1,045 | 8,358        | 1,240 | 114,610 | 9,250               | 1,265 | 8,855        | 1,495 | 157,400 | 9,580              | 1,440 | 9,290        | 1,590 | 160,500 |
| SR-133 SB             | 1,740           | --    | 1,250        | --    | --      | 2,035               | --    | 1,565        | --    | --      | 2,190              | --    | 1,710        | --    | --      |
| --                    | 6,868           | 1,045 | 7,108        | 1,240 | --      | 7,215               | 1,265 | 7,290        | 1,495 | --      | 7,390              | 1,440 | 7,580        | 1,590 | --      |
| Barranca Pkwy HOV     | --              | 159   | --           | 110   | --      | --                  | 270   | --           | 115   | --      | --                 | 310   | --           | 120   | --      |
| --                    | 6,892           | 862   | 7,138        | 1,100 | 99,200  | 7,240               | 970   | 7,320        | 1,350 | 138,300 | 7,420              | 1,100 | 7,610        | 1,440 | 137,900 |
| SR-133 SB             | 1,090           | --    | 330          | --    | --      | 1,130               | --    | 410          | --    | --      | 1,180              | --    | 450          | --    | --      |
| --                    | 7,982           | 862   | 7,468        | 1,100 | 99,200  | 8,370               | 970   | 7,730        | 1,350 | 146,200 | 8,600              | 1,100 | 8,060        | 1,440 | 147,700 |
| Alton Pkwy/Fortune Dr | 1,813           | --    | 884          | --    | --      | 1,905               | --    | 920          | --    | --      | 2,000              | --    | 960          | --    | --      |
| --                    | 6,169           | 862   | 6,584        | 1,100 | --      | 6,465               | 970   | 6,810        | 1,350 | --      | 6,600              | 1,100 | 7,100        | 1,440 | --      |
| CD/Truck Bypass       | 2,310           | --    | 3,060        | --    | --      | 2,385               | --    | 3,265        | --    | --      | 2,480              | --    | 3,430        | --    | --      |
| --                    | 4,009           | 712   | 3,564        | 1,060 | --      | 4,115               | 935   | 3,635        | 1,260 | --      | 4,130              | 1,090 | 3,750        | 1,360 | --      |
| Alton Pkwy/Fortune Dr | 106             | --    | 589          | --    | --      | 130                 | --    | 600          | --    | --      | 140                | --    | 620          | --    | --      |
| South of Alton Pkwy   | 4,115           | 712   | 4,153        | 1,060 | 71,580  | 4,245               | 935   | 4,235        | 1,260 | 110,800 | 4,270              | 1,090 | 4,370        | 1,360 | 110,800 |

Source: Final Traffic/Circulation Impact Report (January 2017).

ADT = average daily traffic

CD = Collector Distributor

EB = eastbound

GP = General Purpose

HOV = High-Occupancy Vehicle

ML=Mainline

NB = northbound

SB = southbound

SR-55 = State Route 55

SR-133 = State Route 133

WB = westbound

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**Table 1.2: Existing (2014) and Forecast Years (2030 and 2050) No Build Alternative Level of Service**

| Freeway Segments           | Existing (2014)       |        |           |        | Opening Year (2030)   |        |           |             | Future Year (2050)    |        |             |             |
|----------------------------|-----------------------|--------|-----------|--------|-----------------------|--------|-----------|-------------|-----------------------|--------|-------------|-------------|
|                            | General Purpose Lanes |        | HOV Lanes |        | General Purpose Lanes |        | HOV Lanes |             | General Purpose Lanes |        | HOV Lanes   |             |
|                            | AM LOS                | PM LOS | AM V/C    | PM V/C | AM LOS                | PM LOS | AM V/C    | PM V/C      | AM LOS                | PM LOS | AM V/C      | PM V/C      |
| <b>Northbound</b>          |                       |        |           |        |                       |        |           |             |                       |        |             |             |
| North of SR-55 SB Off-ramp | F                     | F      | 0.58      | 0.61   | F                     | F      | 0.72      | <b>0.79</b> | F                     | F      | <b>0.80</b> | <b>0.85</b> |
| SR-55 SB                   | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --          | N/A                   | N/A    | --          | --          |
| --                         | E                     | F      | 0.58      | 0.61   | E                     | F      | 0.72      | <b>0.79</b> | F                     | F      | <b>0.80</b> | <b>0.85</b> |
| SR-55 NB                   | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --          | N/A                   | N/A    | --          | --          |
| --                         | F                     | F      | 0.58      | 0.61   | F                     | F      | 0.72      | <b>0.79</b> | F                     | F      | <b>0.80</b> | <b>0.85</b> |
| Newport Rd                 | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --          | N/A                   | N/A    | --          | --          |
| --                         | F                     | F      | 0.58      | 0.61   | F                     | F      | 0.72      | <b>0.79</b> | F                     | F      | <b>0.80</b> | <b>0.85</b> |
| Red Hill Ave               | F                     | D      | --        | --     | F                     | D      | --        | --          | F                     | D      | --          | --          |
| --                         | F                     | F      | 0.58      | 0.61   | F                     | F      | 0.72      | <b>0.79</b> | F                     | F      | <b>0.80</b> | <b>0.85</b> |
| Red Hill Ave               | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --          | N/A                   | N/A    | --          | --          |
| --                         | F                     | F      | 0.53      | 0.61   | F                     | F      | 0.68      | <b>0.76</b> | F                     | F      | 0.75        | <b>0.81</b> |
| Tustin Ranch Rd            | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --          | N/A                   | N/A    | --          | --          |
| --                         | F                     | F      | 0.53      | 0.61   | F                     | F      | 0.68      | <b>0.76</b> | F                     | F      | 0.75        | <b>0.81</b> |
| Tustin Ranch Rd            | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --          | N/A                   | N/A    | --          | --          |
| --                         | F                     | F      | 0.52      | 0.59   | F                     | F      | 0.63      | 0.71        | F                     | F      | 0.70        | <b>0.77</b> |
| Jamboree Rd WB             | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --          | N/A                   | N/A    | --          | --          |
| --                         | F                     | F      | 0.52      | 0.59   | F                     | F      | 0.63      | 0.71        | F                     | F      | 0.70        | <b>0.77</b> |
| Jamboree Rd EB             | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --          | N/A                   | N/A    | --          | --          |
| --                         | F                     | F      | 0.52      | 0.59   | F                     | F      | 0.63      | 0.71        | F                     | F      | 0.70        | <b>0.77</b> |
| Jamboree Rd                | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --          | N/A                   | N/A    | --          | --          |
| --                         | F                     | F      | 0.61      | 0.56   | F                     | F      | 0.73      | 0.67        | F                     | F      | <b>0.79</b> | 0.73        |
| Culver Dr WB               | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --          | N/A                   | N/A    | --          | --          |
| --                         | F                     | F      | 0.61      | 0.56   | F                     | F      | 0.73      | 0.67        | F                     | F      | <b>0.79</b> | 0.73        |
| Trabuco Rd/Culver Dr       | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --          | N/A                   | N/A    | --          | --          |
| --                         | F                     | E      | 0.61      | 0.56   | F                     | E      | 0.73      | 0.67        | F                     | F      | <b>0.79</b> | 0.73        |
| Culver Dr                  | D                     | D      | --        | --     | E                     | E      | --        | --          | E                     | E      | --          | --          |
| --                         | E                     | E      | 0.57      | 0.60   | F                     | E      | 0.64      | 0.71        | F                     | F      | 0.71        | <b>0.79</b> |

**Table 1.2: Existing (2014) and Forecast Years (2030 and 2050) No Build Alternative Level of Service**

| Freeway Segments             | Existing (2014)       |        |           |        | Opening Year (2030)   |        |             |        | Future Year (2050)    |        |             |             |
|------------------------------|-----------------------|--------|-----------|--------|-----------------------|--------|-------------|--------|-----------------------|--------|-------------|-------------|
|                              | General Purpose Lanes |        | HOV Lanes |        | General Purpose Lanes |        | HOV Lanes   |        | General Purpose Lanes |        | HOV Lanes   |             |
|                              | AM LOS                | PM LOS | AM V/C    | PM V/C | AM LOS                | PM LOS | AM V/C      | PM V/C | AM LOS                | PM LOS | AM V/C      | PM V/C      |
| Jeffrey Rd WB                | C                     | C      | --        | --     | D                     | C      | --          | --     | D                     | C      | --          | --          |
| --                           | F                     | E      | 0.57      | 0.60   | F                     | E      | 0.64        | 0.71   | F                     | F      | 0.71        | <b>0.79</b> |
| Jeffrey Rd EB                | C                     | C      | --        | --     | C                     | C      | --          | --     | C                     | C      | --          | --          |
| --                           | F                     | D      | 0.57      | 0.60   | F                     | E      | 0.64        | 0.71   | F                     | E      | 0.71        | <b>0.79</b> |
| Jeffrey Rd                   | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --          | --     | N/A                   | N/A    | --          | --          |
| --                           | E                     | D      | 0.50      | 0.56   | E                     | D      | 0.54        | 0.68   | F                     | E      | 0.60        | 0.75        |
| SR-133 SB                    | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --          | --     | N/A                   | N/A    | --          | --          |
| --                           | D                     | D      | 0.50      | 0.56   | D                     | D      | 0.54        | 0.68   | E                     | E      | 0.60        | 0.75        |
| Sand Canyon Ave              | C                     | C      | --        | --     | C                     | C      | --          | --     | D                     | D      | --          | --          |
| --                           | D                     | D      | 0.50      | 0.56   | D                     | D      | 0.54        | 0.68   | D                     | D      | 0.60        | 0.75        |
| Sand Canyon Ave              | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --          | --     | N/A                   | N/A    | --          | --          |
| --                           | E                     | E      | 0.41      | 0.55   | E                     | F      | 0.50        | 0.65   | F                     | F      | 0.54        | 0.71        |
| SR-133 NB                    | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --          | --     | N/A                   | N/A    | --          | --          |
| --                           | D                     | D      | 0.41      | 0.55   | E                     | D      | 0.50        | 0.65   | E                     | E      | 0.54        | 0.71        |
| SR-133 NB                    | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --          | --     | N/A                   | N/A    | --          | --          |
| --                           | D                     | E      | 0.39      | 0.50   | E                     | E      | 0.45        | 0.62   | E                     | E      | 0.49        | 0.67        |
| Alton Pkwy WB                | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --          | --     | N/A                   | N/A    | --          | --          |
| --                           | D                     | D      | 0.37      | 0.44   | E                     | E      | 0.44        | 0.51   | F                     | E      | 0.47        | 0.54        |
| Alton Pkwy EB                | D                     | D      | --        | --     | D                     | D      | --          | --     | D                     | D      | --          | --          |
| --                           | D                     | D      | 0.37      | 0.44   | E                     | D      | 0.44        | 0.51   | E                     | D      | 0.47        | 0.54        |
| Alton Pkwy                   | E                     | E      | --        | --     | F                     | E      | --          | --     | F                     | E      | --          | --          |
| South of Alton Pkwy Off-ramp | E                     | D      | 0.37      | 0.44   | F                     | D      | 0.44        | 0.51   | F                     | D      | 0.47        | 0.54        |
| <b>Southbound</b>            |                       |        |           |        |                       |        |             |        |                       |        |             |             |
| North of Newport Rd Off-ramp | D                     | D      | 0.60      | 0.59   | E                     | E      | <b>0.78</b> | 0.71   | E                     | E      | <b>0.85</b> | <b>0.76</b> |
| Newport Rd                   | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --          | --     | N/A                   | N/A    | --          | --          |
| --                           | E                     | E      | 0.60      | 0.59   | F                     | E      | <b>0.78</b> | 0.71   | F                     | F      | <b>0.85</b> | <b>0.76</b> |
| SR-55 NB                     | D                     | D      | --        | --     | D                     | D      | --          | --     | D                     | F      | --          | --          |
| --                           | F                     | E      | 0.60      | 0.59   | F                     | F      | <b>0.78</b> | 0.71   | F                     | F      | <b>0.85</b> | <b>0.76</b> |

**Table 1.2: Existing (2014) and Forecast Years (2030 and 2050) No Build Alternative Level of Service**

| Freeway Segments | Existing (2014)       |        |           |        | Opening Year (2030)   |        |           |        | Future Year (2050)    |        |           |        |
|------------------|-----------------------|--------|-----------|--------|-----------------------|--------|-----------|--------|-----------------------|--------|-----------|--------|
|                  | General Purpose Lanes |        | HOV Lanes |        | General Purpose Lanes |        | HOV Lanes |        | General Purpose Lanes |        | HOV Lanes |        |
|                  | AM LOS                | PM LOS | AM V/C    | PM V/C | AM LOS                | PM LOS | AM V/C    | PM V/C | AM LOS                | PM LOS | AM V/C    | PM V/C |
| SR-55 SB         | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --     |
| --               | F                     | F      | 0.60      | 0.59   | F                     | F      | 0.78      | 0.71   | F                     | F      | 0.85      | 0.76   |
| Red Hill Ave     | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --     |
| --               | F                     | E      | 0.68      | 0.65   | F                     | F      | 0.78      | 0.74   | F                     | F      | 0.86      | 0.79   |
| Red Hill Ave     | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --     |
| --               | F                     | E      | 0.68      | 0.65   | F                     | F      | 0.78      | 0.74   | F                     | F      | 0.86      | 0.79   |
| Tustin Ranch Rd  | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --     |
| --               | F                     | E      | 0.65      | 0.63   | F                     | F      | 0.74      | 0.73   | F                     | F      | 0.83      | 0.79   |
| Tustin Ranch Rd  | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --     |
| --               | F                     | F      | 0.65      | 0.63   | F                     | F      | 0.74      | 0.73   | F                     | F      | 0.83      | 0.79   |
| Jamboree Rd      | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --     |
| --               | F                     | E      | 0.64      | 0.61   | F                     | E      | 0.69      | 0.71   | F                     | F      | 0.77      | 0.75   |
| Jamboree Rd WB   | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --     |
| --               | E                     | D      | 0.64      | 0.61   | F                     | D      | 0.69      | 0.71   | F                     | E      | 0.77      | 0.75   |
| Jamboree Rd EB   | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --     |
| --               | E                     | F      | 0.64      | 0.61   | F                     | F      | 0.69      | 0.71   | F                     | F      | 0.77      | 0.75   |
| Culver Dr        | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --     |
| --               | F                     | E      | 0.64      | 0.60   | F                     | E      | 0.65      | 0.70   | F                     | F      | 0.74      | 0.74   |
| Culver Dr WB     | D                     | D      | --        | --     | D                     | D      | --        | --     | F                     | F      | --        | --     |
| --               | F                     | E      | 0.64      | 0.60   | F                     | E      | 0.65      | 0.70   | F                     | F      | 0.74      | 0.74   |
| Culver Dr EB     | C                     | D      | --        | --     | F                     | F      | --        | --     | F                     | F      | --        | --     |
| --               | E                     | E      | 0.64      | 0.60   | F                     | F      | 0.65      | 0.70   | F                     | F      | 0.74      | 0.74   |
| Jeffrey Rd       | E                     | E      | --        | --     | F                     | F      | --        | --     | F                     | F      | --        | --     |
| --               | F                     | D      | 0.58      | 0.58   | F                     | E      | 0.61      | 0.69   | F                     | F      | 0.70      | 0.73   |
| Jeffrey Rd       | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --     |
| --               | E                     | E      | 0.58      | 0.58   | E                     | E      | 0.61      | 0.69   | F                     | F      | 0.70      | 0.73   |
| SR-133 NB        | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --     | N/A                   | N/A    | --        | --     |
| --               | E                     | D      | 0.58      | 0.58   | E                     | D      | 0.61      | 0.69   | E                     | E      | 0.70      | 0.73   |

**Table 1.2: Existing (2014) and Forecast Years (2030 and 2050) No Build Alternative Level of Service**

| Freeway Segments      | Existing (2014)       |          |           |        | Opening Year (2030)   |          |           |        | Future Year (2050)    |          |           |        |
|-----------------------|-----------------------|----------|-----------|--------|-----------------------|----------|-----------|--------|-----------------------|----------|-----------|--------|
|                       | General Purpose Lanes |          | HOV Lanes |        | General Purpose Lanes |          | HOV Lanes |        | General Purpose Lanes |          | HOV Lanes |        |
|                       | AM LOS                | PM LOS   | AM V/C    | PM V/C | AM LOS                | PM LOS   | AM V/C    | PM V/C | AM LOS                | PM LOS   | AM V/C    | PM V/C |
| Sand Canyon Ave       | <b>E</b>              | <b>E</b> | --        | --     | <b>E</b>              | <b>E</b> | --        | --     | <b>F</b>              | <b>E</b> | --        | --     |
| --                    | D                     | D        | 0.48      | 0.56   | D                     | D        | 0.58      | 0.68   | D                     | D        | 0.65      | 0.72   |
| Sand Canyon Ave       | N/A                   | N/A      | --        | --     | N/A                   | N/A      | --        | --     | N/A                   | N/A      | --        | --     |
| --                    | D                     | D        | 0.48      | 0.56   | D                     | D        | 0.58      | 0.68   | <b>E</b>              | <b>E</b> | 0.65      | 0.72   |
| SR-133 SB             | N/A                   | N/A      | --        | --     | N/A                   | N/A      | --        | --     | N/A                   | N/A      | --        | --     |
| --                    | D                     | D        | 0.39      | 0.50   | D                     | <b>E</b> | 0.44      | 0.61   | <b>E</b>              | <b>E</b> | 0.50      | 0.65   |
| SR-133 SB             | N/A                   | N/A      | --        | --     | N/A                   | N/A      | --        | --     | N/A                   | N/A      | --        | --     |
| --                    | <b>E</b>              | D        | 0.39      | 0.50   | <b>E</b>              | D        | 0.44      | 0.61   | <b>E</b>              | <b>E</b> | 0.50      | 0.65   |
| Alton Pkwy/Fortune Dr | N/A                   | N/A      | --        | --     | N/A                   | N/A      | --        | --     | N/A                   | N/A      | --        | --     |
| --                    | D                     | <b>E</b> | 0.39      | 0.50   | D                     | <b>E</b> | 0.44      | 0.61   | D                     | <b>E</b> | 0.50      | 0.65   |
| CD/Truck Bypass       | N/A                   | N/A      | --        | --     | N/A                   | N/A      | --        | --     | N/A                   | N/A      | --        | --     |
| --                    | C                     | D        | 0.32      | 0.48   | C                     | D        | 0.43      | 0.57   | C                     | D        | 0.50      | 0.62   |
| Alton Pkwy/Fortune Dr | C                     | C        | --        | --     | C                     | C        | --        | --     | C                     | C        | --        | --     |
| South of Alton Pkwy   | C                     | <b>F</b> | 0.32      | 0.48   | C                     | <b>F</b> | 0.43      | 0.57   | C                     | <b>F</b> | 0.50      | 0.62   |

Source: *Final Traffic/Circulation Impact Report* (January 2017).

Notes : LOS and/or density information are not shown for major merge areas, single-lane addition/drop, and merge/diverge operations within a weaving segment.

Density = passenger car per mile per lane.

Single-lane addition/drop; HCM methodology (page 13-18) applied for analysis.

Demand exceeds capacity, no density is predicted.

**Bolded** cells indicate LOS E or F.

ADT = average daily traffic

CD = Collector Distributor

HCM = Highway Capacity Manual

HOV = high-occupancy vehicle

LOS = levels of service

N/A = not applicable

SR-55 = State Route 55

SR-133 = State Route 133

V/C = volume-to-capacity ratio.



Continuous access provides greater flexibility of locations where motorists can exit the HOV lanes, which is expected to reduce the vehicle weaving conflicts. Additionally, OCTA develops a Long Range Transportation Plan (LRTP) every four years to assess current transportation conditions and available funding, and to provide input to the SCAG RTP/SCS. The LRTP improvements are expected to provide additional incremental improvements to the HOV lanes within the project limits and to the regional HOV network.

Consistent with traffic volumes shown in Table 1.1, LOS E and F occur consistently during the AM and PM peak hours along both northbound and southbound lanes under existing conditions, and under the No Build condition in years 2030 and 2050. As a result, the majority of the study segments on northbound and southbound I-5 would operate at LOS E and F during AM and PM peak hours by 2030 and 2050 under the No Build condition. Implementation of the proposed improvements would improve the overall operation and ramp merge/diverge and weaving movements in the portion of the I-5 within the Study Area during both AM and PM peak hours.

### ***Accidents and Safety within the Corridor***

Accident data for the I-5 project limits were provided by Caltrans for the 3-year period from July 1, 2009, to June 30, 2012. As shown in Table 1.3, a total of 2,242 accidents occurred on the I-5 project limits including the on- and off-ramps. The majority of the accidents (85 percent) occurred on the I-5 mainline and 15 percent occurred at the on- and off-ramps. Approximately 69 percent of mainline accidents occurred in the northbound rather than in the southbound direction, and accidents in both directions were higher than the statewide average at various locations throughout the project corridor. As shown in Table 1.3, the accident rates at 21 locations were higher than the statewide averages for total accidents, injury rates at 26 locations were higher than the statewide averages for total injuries, and fatality rates at 6 locations were higher than the statewide averages for total fatalities for similar facilities.

Rear-end collisions were the most common accident type, accounting for approximately 63 percent of all accidents. Other key accident types included sideswipes and hit-objects. Rear-end collisions are typically related to traffic congestion in chokepoint areas and are associated with sudden attempts to stop when traffic volumes exceed the capacity of the road. The majority of sideswipe accidents can usually be attributed to lane weaving.

**Table 1.3: Existing Year (2014) Traffic Accident Data**

| Freeway Segments                      | California Post Mile | Number of Accidents |          |            | Accident Rates  |          |            | Statewide Average Accident Rates |          |            |
|---------------------------------------|----------------------|---------------------|----------|------------|-----------------|----------|------------|----------------------------------|----------|------------|
|                                       |                      | Total Accidents     | Injuries | Fatalities | Total Accidents | Injuries | Fatalities | Total Accidents                  | Injuries | Fatalities |
| Freeway Mainline                      |                      |                     |          |            |                 |          |            |                                  |          |            |
| I-5 NB- I-405 to Alton Pkwy           | 21.300–22.199        | 46                  | 18       | 0          | 0.61            | 0.24     | 0.000      | 0.76                             | 0.23     | 0.003      |
| I-5 SB- I-405 to Alton Pkwy           | 21.310–22.199        | 59                  | 23       | 0          | 0.79            | 0.31     | 0.000      | 0.76                             | 0.23     | 0.003      |
| I-5 NB- Alton Pkwy to Barranca Pkwy   | 22.200–22.799        | 46                  | 13       | 0          | 0.69            | 0.19     | 0.000      | 0.80                             | 0.23     | 0.002      |
| I-5 SB- Alton Pkwy to SR-133          | 22.200–22.799        | 41                  | 13       | 0          | 0.61            | 0.19     | 0.000      | 0.80                             | 0.23     | 0.002      |
| I-5 NB- Barranca Pkwy to SR-133       | 22.800–23.099        | 15                  | 4        | 0          | 0.44            | 0.12     | 0.000      | 0.80                             | 0.23     | 0.002      |
| I-5 SB- Barranca Pkwy to SR-133       | 22.800–23.099        | 5                   | 3        | 0          | 0.15            | 0.09     | 0.000      | 0.80                             | 0.23     | 0.002      |
| I-5 NB- SR-133 to Sand Canyon Ave     | 23.101–23.899        | 52                  | 18       | 0          | 0.50            | 0.17     | 0.000      | 0.92                             | 0.28     | 0.004      |
| I-5 SB- SR-133 to Sand Canyon Ave     | 23.100–23.899        | 35                  | 10       | 0          | 0.33            | 0.10     | 0.000      | 0.92                             | 0.28     | 0.004      |
| I-5 NB- Sand Canyon Ave to Jeffrey Rd | 23.900–24.999        | 148                 | 48       | 0          | 0.97            | 0.32     | 0.000      | 0.99                             | 0.30     | 0.004      |
| I-5 SB- Sand Canyon Ave to Jeffrey Rd | 23.900–24.999        | 50                  | 19       | 0          | 0.33            | 0.13     | 0.000      | 0.99                             | 0.30     | 0.004      |
| I-5 NB- Jeffrey Rd to Culver Dr       | 25.000–26.599        | 301                 | 104      | 1          | 1.28            | 0.45     | 0.004      | 0.95                             | 0.28     | 0.003      |
| I-5 SB- Jeffrey Rd to Culver Dr       | 25.000–26.599        | 93                  | 30       | 1          | 0.40            | 0.13     | 0.004      | 0.95                             | 0.28     | 0.003      |
| I-5 NB- Culver Dr to Jamboree Rd      | 26.600–27.599        | 196                 | 56       | 0          | 1.21            | 0.35     | 0.000      | 1.02                             | 0.30     | 0.003      |
| I-5 SB- Culver Dr to Jamboree Rd      | 26.600–27.599        | 67                  | 21       | 0          | 0.41            | 0.13     | 0.000      | 1.02                             | 0.30     | 0.003      |

**Table 1.3: Existing Year (2014) Traffic Accident Data**

| Freeway Segments                        | California Post Mile | Number of Accidents             |          |            | Accident Rates    |                   |                    | Statewide Average Accident Rates |                   |                    |
|---|----------------------|---------------------------------|----------|------------|-------------------|-------------------|--------------------|----------------------------------|-------------------|--------------------|
|   |                      | Total Accidents                 | Injuries | Fatalities | Total Accidents   | Injuries          | Fatalities         | Total Accidents                  | Injuries          | Fatalities         |
| I-5 NB- Jamboree Rd to Tustin Ranch Rd  | 27.600–28.299        | 114                             | 40       | 0          | 0.95              | <b>0.33</b>       | 0.000              | 1.07                             | 0.31              | 0.003              |
| I-5 SB- Jamboree Rd to Tustin Ranch Rd  | 27.600–28.299        | 52                              | 15       | 0          | 0.43              | 0.13              | 0.000              | 1.07                             | 0.31              | 0.003              |
| I-5 NB- Tustin Ranch Rd to Red Hill Ave | 28.300–29.099        | 128                             | 35       | 0          | 0.91              | 0.25              | 0.000              | 1.12                             | 0.33              | 0.004              |
| I-5 SB- Tustin Ranch Rd to Red Hill Ave | 28.300–29.099        | 75                              | 24       | 2          | 0.54              | 0.19              | <b>0.014</b>       | 1.12                             | 0.33              | 0.004              |
| I-5 NB- Red Hill Ave to Newport Ave     | 29.100–29.599        | 72                              | 18       | 0          | 0.86              | 0.22              | 0.000              | 1.25                             | 0.39              | 0.006              |
| I-5 SB- Red Hill Ave to Newport Ave     | 29.100–29.599        | 67                              | 30       | 0          | 0.80              | 0.36              | 0.000              | 1.25                             | 0.39              | 0.006              |
| I-5 NB- Newport Ave to SR-55            | 29.600–30.199        | 201                             | 55       | 0          | <b>2.22</b>       | <b>0.61</b>       | 0.000              | 0.97                             | 0.28              | 0.003              |
| I-5 SB- Newport Ave to SR-55            | 29.600–30.199        | 47                              | 13       | 0          | 0.52              | 0.14              | 0.000              | 0.97                             | 0.28              | 0.003              |
| <b>Totals (Mainline)</b>                |                      | 1,910<br>(1,319 NB)<br>(591 SB) | 610      | 4          | 0.73 <sup>2</sup> | 0.23 <sup>2</sup> | 0.001 <sup>2</sup> | 0.73 <sup>2</sup>                | 0.23 <sup>2</sup> | 0.001 <sup>2</sup> |
| <b>Ramps</b>                            |                      |                                 |          |            |                   |                   |                    |                                  |                   |                    |
| I-5 SB On-ramp from Alton Pkwy          | 21.539               | 3                               | 1        | 0          | <b>0.66</b>       | <b>0.22</b>       | 0.000              | 0.46                             | 0.13              | 0.001              |
| I-5 NB Off-ramp to Alton Pkwy           | 21.991               | 8                               | 2        | 0          | <b>1.09</b>       | 0.27              | 0.000              | 1.01                             | 0.35              | 0.003              |
| I-5 NB On-ramp from EB Alton Pkwy       | 22.141               | 4                               | 0        | 0          | <b>2.43</b>       | 0.00              | 0.000              | 0.73                             | 0.21              | 0.002              |
| I-5 SB Off-ramp to Alton Pkwy           | 22.201               | 7                               | 2        | 0          | 0.37              | 0.11              | 0.000              | 0.84                             | 0.24              | 0.003              |
| I-5 NB On-ramp from WB Alton Pkwy       | 22.331               | 1                               | 1        | 0          | 0.11              | 0.11              | 0.000              | 0.57                             | 0.18              | 0.003              |

Table 1.3: Existing Year (2014) Traffic Accident Data

| Freeway Segments                    | California Post Mile | Number of Accidents |          |            | Accident Rates  |             |              | Statewide Average Accident Rates |          |            |
|-------------------------------------|----------------------|---------------------|----------|------------|-----------------|-------------|--------------|----------------------------------|----------|------------|
|                                     |                      | Total Accidents     | Injuries | Fatalities | Total Accidents | Injuries    | Fatalities   | Total Accidents                  | Injuries | Fatalities |
| I-5 NB On-ramp from Barranca Pkwy   | 22.762               | 0                   | 0        | 0          | 0.00            | 0.00        | 0.000        | 0.63                             | 0.22     | 0.002      |
| I-5 SB Off-ramp to Barranca Pkwy    | 22.763               | 1                   | 1        | 0          | 0.70            | <b>0.70</b> | 0.000        | 1.01                             | 0.35     | 0.003      |
| I-5 SB On-ramp from Sand Canyon Ave | 23.772               | 4                   | 1        | 0          | <b>0.66</b>     | 0.16        | 0.000        | 0.63                             | 0.22     | 0.002      |
| I-5 NB Off-ramp to Sand Canyon Ave  | 23.960               | 9                   | 2        | 0          | <b>1.85</b>     | <b>0.41</b> | 0.000        | 1.00                             | 0.33     | 0.004      |
| I-5 SB Off-ramp to Sand Canyon Ave  | 24.082               | 10                  | 2        | 0          | 0.79            | 0.16        | 0.000        | 1.01                             | 0.35     | 0.003      |
| I-5 NB On-ramp from Sand Canyon Ave | 24.127               | 6                   | 3        | 0          | 0.61            | <b>0.30</b> | 0.000        | 0.63                             | 0.22     | 0.002      |
| I-5 SB On-ramp from Jeffrey Rd      | 24.736               | 0                   | 0        | 0          | 0.00            | 0.00        | 0.000        | 0.46                             | 0.13     | 0.001      |
| I-5 NB Off-ramp to Jeffrey Rd       | 24.801               | 15                  | 3        | 1          | 0.96            | 0.26        | <b>0.064</b> | 1.01                             | 0.35     | 0.003      |
| I-5 SB Off-ramp to Jeffrey Rd       | 24.873               | 2                   | 0        | 0          | 0.17            | 0.00        | 0.000        | 0.84                             | 0.24     | 0.003      |
| I-5 NB On-ramp from NB Jeffrey Rd   | 24.965               | 2                   | 1        | 0          | 0.30            | 0.15        | 0.000        | 0.73                             | 0.21     | 0.002      |
| I-5 NB Off-ramp from SB Jeffrey Rd  | 25.191               | 1                   | 0        | 0          | 0.21            | 0.00        | 0.000        | 0.57                             | 0.18     | 0.003      |
| I-5 SB On-ramp from EB Culver Dr    | 26.351               | 6                   | 4        | 0          | <b>1.40</b>     | <b>0.94</b> | 0.000        | 0.57                             | 0.18     | 0.003      |
| I-5 NB Off-ramp to Culver Dr        | 26.389               | 5                   | 2        | 0          | 0.67            | <b>0.27</b> | 0.000        | 0.84                             | 0.24     | 0.003      |
| I-5 NB On-ramp from EB Culver Dr    | 26.564               | 9                   | 2        | 0          | <b>0.90</b>     | <b>0.20</b> | 0.000        | 0.46                             | 0.13     | 0.001      |
| I-5 SB On-ramp from WB Culver Dr    | 26.634               | 2                   | 1        | 0          | 0.51            | <b>0.25</b> | 0.000        | 0.73                             | 0.21     | 0.002      |
| I-5 NB On-ramp from WB Culver Dr    | 26.747               | 5                   | 2        | 0          | <b>0.68</b>     | <b>0.27</b> | 0.000        | 0.57                             | 0.18     | 0.003      |



**Table 1.3: Existing Year (2014) Traffic Accident Data**

| Freeway Segments                    | California Post Mile | Number of Accidents |          |            | Accident Rates  |             |              | Statewide Average Accident Rates |          |            |
|-------------------------------------|----------------------|---------------------|----------|------------|-----------------|-------------|--------------|----------------------------------|----------|------------|
|                                     |                      | Total Accidents     | Injuries | Fatalities | Total Accidents | Injuries    | Fatalities   | Total Accidents                  | Injuries | Fatalities |
| I-5 SB Off-ramp to Culver Dr        | 26.865               | 8                   | 3        | 0          | 0.34            | 0.13        | 0.000        | 1.01                             | 0.35     | 0.003      |
| I-5 NB Off-ramp to Jamboree Rd      | 27.390               | 6                   | 2        | 0          | 0.36            | 0.12        | 0.000        | 1.01                             | 0.35     | 0.003      |
| I-5 SB On-ramp from NB Jamboree Rd  | 27.498               | 9                   | 2        | 0          | <b>1.15</b>     | <b>0.25</b> | 0.000        | 0.57                             | 0.18     | 0.003      |
| I-5 NB On-ramp from NB Jamboree Rd  | 27.547               | 8                   | 2        | 0          | 0.67            | 0.17        | 0.000        | 0.73                             | 0.21     | 0.002      |
| I-5 SB On-ramp from SB Jamboree Rd  | 27.641               | 3                   | 2        | 0          | 0.40            | <b>0.26</b> | 0.000        | 0.73                             | 0.21     | 0.002      |
| I-5 NB On-ramp from SB Jamboree Rd  | 27.729               | 15                  | 5        | 0          | <b>1.28</b>     | <b>0.43</b> | 0.000        | 0.57                             | 0.18     | 0.003      |
| I-5 SB Off-ramp to Jamboree Rd      | 27.799               | 19                  | 3        | 0          | 0.53            | 0.08        | 0.000        | 1.01                             | 0.35     | 0.003      |
| I-5 NB Off-ramp to Tustin Ranch Rd  | 28.224               | 4                   | 0        | 0          | 0.83            | 0.00        | 0.000        | 1.00                             | 0.33     | 0.004      |
| I-5 SB On-ramp from Tustin Ranch Rd | 28.301               | 5                   | 2        | 0          | 0.69            | <b>0.28</b> | 0.000        | 0.72                             | 0.24     | 0.003      |
| I-5 NB On-ramp from Tustin Ranch Rd | 28.417               | 8                   | 3        | 0          | <b>1.55</b>     | <b>0.58</b> | 0.000        | 0.63                             | 0.22     | 0.002      |
| I-5 SB Off-ramp to Tustin Ranch Rd  | 28.456               | 12                  | 4        | 1          | 0.78            | 0.32        | <b>0.065</b> | 1.01                             | 0.35     | 0.003      |
| I-5 NB Off-ramp to Red Hill Ave     | 28.976               | 16                  | 4        | 1          | <b>1.49</b>     | <b>0.47</b> | <b>0.093</b> | 1.01                             | 0.35     | 0.003      |
| I-5 SB On-ramp to Red Hill Ave      | 28.981               | 13                  | 0        | 0          | <b>1.19</b>     | 0.00        | 0.000        | 0.63                             | 0.22     | 0.002      |
| I-5 NB On-ramp to Red Hill Ave      | 29.228               | 19                  | 6        | 0          | <b>1.45</b>     | <b>0.46</b> | 0.000        | 0.63                             | 0.22     | 0.002      |
| I-5 SB Off-ramp to Red Hill Ave     | 29.255               | 20                  | 6        | 0          | <b>1.57</b>     | <b>0.47</b> | 0.000        | 1.01                             | 0.35     | 0.003      |

Table 1.3: Existing Year (2014) Traffic Accident Data

| Freeway Segments                            | California Post Mile | Number of Accidents         |          |            | Accident Rates    |                   |                    | Statewide Average Accident Rates |                   |                    |
|---|----------------------|-----------------------------|----------|------------|-------------------|-------------------|--------------------|----------------------------------|-------------------|--------------------|
|   |                      | Total Accidents             | Injuries | Fatalities | Total Accidents   | Injuries          | Fatalities         | Total Accidents                  | Injuries          | Fatalities         |
| I-5 NB On-ramp from Newport Ave             | 29.728               | 5                           | 1        | 0          | 0.37              | 0.07              | 0.000              | 0.63                             | 0.22              | 0.002              |
| I-5 SB Off-ramp to SR-55/Newport Ave        | 29.863               | 9                           | 6        | 0          | <b>0.82</b>       | <b>0.55</b>       | 0.000              | 0.25                             | 0.08              | 0.002              |
| I-5 SB Off-ramp to SR-55/4 <sup>th</sup> St | 29.864               | 16                          | 3        | 0          | 0.34              | 0.06              | 0.000              | 0.41                             | 0.14              | 0.003              |
| I-5 NB Off-ramp to SR-55/4 <sup>th</sup> St | 30.185               | 29                          | 12       | 0          | <b>0.88</b>       | <b>0.36</b>       | 0.000              | 0.25                             | 0.08              | 0.002              |
| I-5 SB Off-ramp to SR-55                    | 30.323               | 8                           | 1        | 0          | 0.48              | 0.06              | 0.000              | 0.68                             | 0.20              | 0.004              |
| <b>Totals (Ramps)</b>                       |                      | 332<br>(175 NB)<br>(157 SB) | 97       | 3          | 0.79 <sup>2</sup> | 0.24 <sup>2</sup> | 0.005 <sup>2</sup> | 0.79 <sup>2</sup>                | 0.24 <sup>2</sup> | 0.005 <sup>2</sup> |

Source: *Final Traffic/Circulation Impact Report* (January 2017).

<sup>1</sup> For mainline sections, the accident rate is the number of accidents per million vehicle-miles. For ramps, the accident rate is the number of accidents per million vehicles.

<sup>2</sup> Average, rather than total.

**Bold** indicates actual accident rate higher than average accident rate.

EB = eastbound

SB = southbound

I-5 = Interstate 5

SR-55 = State Route 55

I-405 = Interstate 405

SR-133 = State Route 55

NB = northbound

WB = westbound

Improvements in the I-5 corridor would reduce the potential for accidents by relieving traffic congestion on the mainline and ramps. The improvements would allow vehicles to weave/merge easier throughout the corridor, thereby reducing sideswipe occurrences by giving drivers more time and space to merge with adjacent traffic.

### 1.2.2.2 Roadway Deficiencies

The traffic congestion, delays, and reduced travel speeds currently experienced on the I-5 project limits are partly the result of the following existing nonstandard features that are not consistent with the Caltrans *Highway Design Manual* (December 2016):

- Nonstandard merge, diverge, and weave length and design
- Insufficient number of auxiliary lanes at various locations
- Nonstandard horizontal clearances

These existing deficiencies would be corrected by designing and constructing the project improvements, where possible, to the standards in the Caltrans *Highway Design Manual* (2016). Mandatory and advisory design exceptions are proposed for some of these deficiencies, as described later in this chapter.

Table 1.4 summarizes the current and forecasted average daily traffic (ADT) volumes and weekday daily VMT for the project corridor. Travel demand along the corridor is anticipated to increase. The average weekday VMT on I-5 between I-405 and SR-55 is expected to increase approximately 17 percent by the year 2050, and ADT by the year 2050 is also expected to increase by approximately 56 percent along the project corridor. The increased demand on the already congested freeway will lead to further congestion and delay experienced by the motorists.

**Table 1.4: I-5 Mainline (I-405 to SR-55) Average Daily Traffic Volumes and Vehicle Miles Traveled**

|     | Direction    | Year             |                            |                  |
|-----|--------------|------------------|----------------------------|------------------|
|     |              | 2014             | 2030 <sup>1</sup> No Build | 2050 No Build    |
| ADT | Northbound   | 130,200          | 201,900                    | 215,800          |
|     | Southbound   | 145,400          | 184,200                    | 213,200          |
|     | <b>Total</b> | <b>275,600</b>   | <b>386,100</b>             | <b>429,000</b>   |
| VMT | Northbound   | 1,387,295        | 1,535,017                  | 1,628,616        |
|     | Southbound   | 1,344,312        | 1,485,652                  | 1,575,716        |
|     | <b>Total</b> | <b>2,731,607</b> | <b>3,020,669</b>           | <b>3,204,332</b> |

<sup>1</sup> Opening year for the project is 2030 as funding is not secured

ADT = average daily traffic

I-5 = Interstate 5

I-405 = Interstate 405

SR-55 = State Route 55

VMT = vehicle miles traveled

### 1.2.2.3 Social Demands and Economic Development

A review of SCAG regionally adopted growth projections in the 2016–2040 RTP/SCS indicates that continuing growth is forecast in the subregion served by I-5 (SCAG 2015). The population of Orange County is expected to increase at a modest rate of 0.7 percent. New housing units would also increase at a modest rate of approximately 5,465 new residential units annually, on average, between 2012 and 2040.<sup>1</sup> However, the unemployment rate is projected to decline, dropping from approximately 3.8 percent in 2016 to a projected 3.3 percent in 2050. Job opportunities are also projected to increase (on average, 6.1 percent across all sectors of employment) in the County between 2016 and 2021, outpacing the growth rate and housing availability in the County.<sup>2</sup> These trends indicate that Orange County must improve vital transportation corridors in the County (including I-5) to meet existing and future transportation demands for employees traveling from outside Orange County to work, in addition to population growth occurring within the County (refer to Table 1.1 for the projected increase of average daily traffic [ADT] and peak hour traffic volumes under the No Build Alternative through 2050).

Although employment and population growth is anticipated in Orange County, the General Plan documents for the Cities of Irvine and Tustin account for this anticipated growth in the vicinity of the Study Area. According to those general plans, existing land uses closely match planned land uses with opportunity for larger development projects in two undeveloped areas. Those areas include undeveloped parcels west of I-5 and north of the junction of Sand Canyon Avenue and I-5 and southeast of the I-405/I-5 junction in the City of Irvine. During the 2016–2035 period, the percentage of Orange County’s population residing in Irvine is forecast to increase from 8.1 percent in 2016 to 8.9 percent by 2035; the percentage of Orange County’s population residing in Tustin is forecast to decrease from 2.6 percent in 2016 to 2.4 percent by 2035. The project is not anticipated to induce growth; however, potential increases in ADT related to projected population increases in the

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<sup>1</sup> Southern California Association of Governments. 2016 (Adopted April 2016). 2016–2040 RTP/SCS. Table 3.1 Proposed 2016–2040 RTP/SCS Growth Forecast. Website: <http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS.pdf> (accessed August 3, 2017).

<sup>2</sup> California Department of Transportation (Caltrans). 2016. California County-Level Economic Forecast. 2016–2050. October. Website: [http://www.dot.ca.gov/hq/tpp/offices/eab/index\\_files/2016/FullReport2016.pdf](http://www.dot.ca.gov/hq/tpp/offices/eab/index_files/2016/FullReport2016.pdf) (accessed August 4, 2017).

City of Irvine, and specifically in the area of the Orange County Great Park, are included in traffic models for this proposed project.

#### **1.2.2.4 Legislation**

##### **Measure M**

The I-5 Improvement Project from I-405 to SR-55 is part of a larger suite of transportation improvements included in Orange County's 30-year Measure M2 (M2) Plan. M2, the one-half cent transportation sales tax, is planned to provide transportation improvements in Orange County through 2041. M2 consists of the following transportation improvement programs: freeways, local streets and roads, and transit. M2 allocates approximately 43 percent of funds to freeway projects, 32 percent to streets, and 25 percent to transit projects. The Measure M2 Freeway Environmental Mitigation Program receives 5 percent of the M2 funding allocated to freeway projects, and the Environmental Cleanup program receives 2 percent of the overall M2 funds. To guide the restoration efforts, OCTA developed a Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP).

The Measure M2 Next 10 Delivery Plan provides guidance for what can be accomplished during the 10-year span from 2017 to 2026. The Build Alternative is included in the Next 10 Delivery Plan as Project B.

The M2 program was publicly reviewed through a Program Environmental Impact Report (EIR) prior to voters approving the ballot measure in November 2006. Since 2008, the M2 program has been included in the SCAG RTP/SCS, and the associated Program EIR prepared by SCAG.

#### **1.2.2.5 Modal Interrelationships and System Linkages**

I-5 is an integral component of the transportation system in Orange County. I-5 provides a key linkage across the County and California, extending from as far south as San Diego to the State of Washington to the north. Locally, I-5 connects Orange County to San Diego County to the south and Los Angeles County to the north. In addition, I-5 has several interchanges with a number of other freeways, providing access to the countywide and regional freeway systems. The proposed Build Alternative would enhance mobility in the I-5 corridor, thereby improving mobility in this part of Orange County.

The Los Angeles to San Diego (LOSSAN) rail corridor, which is an important passenger and freight rail corridor that connects metropolitan areas from Los Angeles to San Diego, crosses I-5 in two locations in Orange County. Those crossings include



an overhead bridge alongside the Lincoln Avenue crossing in the City of Santa Ana, and an at grade crossing under the SR-133 interchange in the City of Irvine. Train operations on this segment of the LOSSAN rail corridor include Amtrak's Pacific Surfliner intercity passenger rail service, the Southern California Regional Rail Authority (SCRRA) Metrolink commuter rail service, and the Union Pacific Railroad (UPRR) and BNSF Railway freight rail services.

I-5 directly serves the rail transfer yards in Los Angeles County and is a major corridor for goods movement in Southern California via I-405, State Route 22 (SR-22), State Route 91 (SR-91), and Interstate 110 (I-110). Although I-5 does not directly serve the Ports of Los Angeles and Long Beach, I-5 provides a connection to the Port of Long Beach via Interstate 710 (I-710) in Los Angeles County. In addition, I-5 provides a connection with John Wayne Airport (JWA) via SR-55, I-405, SR-133, and Jamboree Road.

Thirteen OCTA bus routes operate on I-5 and/or arterials in the vicinity of I-5:

- Route 66 on Walnut
- Route 71 on Red Hill Avenue
- Route 79 on Culver Drive and Bryan Avenue
- Route 83 on Main Street and I-5
- Route 86 on Alton Parkway
- Route 167 on Jeffrey Road and Irvine Boulevard
- Route 206 on I-5
- Route 211 on Barranca Parkway and Irvine Center Drive
- Route 212 on I-5
- Routes 213, 463, and 794 on SR-55 at the I-5 interchange
- Route 480 on Technology Drive

The HOV lanes on I-5 are used by private transit companies, taxis, carpools, and vanpools. All the transit and shared ride modes would continue to use I-5 during the project construction and in the long term. OCTA will also continue to identify opportunities to improve transit services in the I-5 corridor as part of its transit planning activities throughout Orange County. The capacity and operational improvements provided by the proposed Build Alternative would support these transit and shared ride modes in the future.

### 1.2.2.6 Air Quality Improvements

Within the Study Area, both HOV lanes and ramp metering have been incorporated into the I-5 freeway as transportation control measures. HOV lanes have already been constructed on I-5 from south Orange County and through the Study Area to address existing and forecasted congestion during peak travel periods, which tend to be directional. Northbound traffic is heavier in the AM peak hour, and southbound traffic is heavier in the PM peak hour. Additionally, all on-ramps within the Study Area are metered to optimize the operation of the on-ramps during peak periods.

OCTA offers several Transportation Demand Management (TDM) programs to encourage the use of alternative modes of transportation or the more efficient use of vehicles. Rideshare services and programs, including commuter and local bus services, commuter rail services, and assistance in forming, joining, and managing carpools and vanpools are provided by OCTA. Portions of some of the major roadways within the Study Area are designated Class II on-road bike lanes (Tustin Ranch Road, Culver Drive, and Sand Canyon Avenue). Yale Avenue, Jeffrey Road, and Barranca Parkway have marked bicycle lanes on the shoulders in both the eastbound and westbound directions. Five Class I bikeways are located within 0.5 mi of the Study Area (Walnut Trail, Cypress Village Trail, Peters Canyon Regional Trail and Bikeway, West Irvine Trail, and a separate off-street bicycle lane along the north side of Newport Boulevard). These bikeways can connect to local OCTA bus lines (as OCTA allows storage of bikes on its buses) within the Study Area. These local bus routes connect to several bus routes on I-5 (Bus Routes 66, 71, 79, 83, 86, 167, 206, 211, 212, 213, 463, 794, and 480).

### 1.2.2.7 Independent Utility and Logical Termini

Federal regulations (23 Code of Federal Regulations [CFR] 771.111 [f]) require that “independent utility” and “logical termini” be established for a transportation improvement project evaluated under NEPA. The following discusses the specific criteria listed in 23 CFR 771.111(f) and how the I-5 Improvement Project satisfies these criteria in a separate analysis:

- a) *Connect logical termini and be of sufficient length to address environmental matters on a broad scope;*
- b) *Have independent utility or independent significance (be usable and require a reasonable expenditure event if no additional transportation improvements in the area are made); and*
- c) *Not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.*

The project limits for the I-5 Improvement Project were defined based on providing a logical and independent set of improvements. Logical termini are defined as rational end points for transportation improvement and analysis of the potential environmental impacts of a proposed project. A project is defined as having independent utility if it meets the project purpose in the absence of other improvements in the project limits or in other parts of the corridor.

### ***Logical Termini***

The Build Alternative provides logical termini for the proposed improvements to I-5 because it connects to other major transportation facilities (I-405, SR-55, SR-133, and Jamboree Road), which themselves are destinations for major traffic volumes. The improvements in the Build Alternative terminate at major freeway-to-freeway interchanges (SR-55 on the north and I-405 on the south).

### ***Independent Utility***

The Build Alternative would have independent utility. The general-purpose, HOV, and auxiliary lanes included in the Build Alternative would provide benefits to the traveling public without requiring or being dependent on the provision of other improvements on I-5 or other freeways or arterials. Those improvements would benefit travelers as they enter/exit the freeway or travel in the general-purpose and HOV lanes. The Build Alternative represents a reasonable expenditure even if no additional transportation improvements are made in the corridor; they can be implemented in the absence of any other improvements; and they do not restrict consideration of alternatives for other reasonably foreseeable transportation improvements in the I-5 corridor and other corridors in the project limits. Because the Build Alternative meets the project purpose in the absence of other improvements in the I-5 corridor, the I-5 Improvement Project would have independent utility.

## **1.3 Project Description**

This section describes the proposed action and project alternatives that were developed to meet the identified Purpose and Need of the project, while avoiding or minimizing environmental impacts and right-of-way acquisitions. The alternatives include Alternative 1 (No Build Alternative) and Alternative 2. Alternative 2 includes two design variations, Design Variation A and Design Variation B. Therefore, throughout this document, Alternative 2 with Design Variation A is called Alternative 2A, and Alternative 2 with Design Variation B is called Alternative 2B (Preferred Alternative). Each of these design variations requires various design exceptions that will need to be approved by Caltrans. A design exception is a documented decision to

design a highway element or a segment of highway to design criteria that do not meet minimum values or ranges established for that highway or project. The analysis in this Initial Study/Environmental Assessment (IS/EA) evaluates both Alternatives 2A and 2B. This IS/EA includes an evaluation of the design variation with the greatest impacts. However, note that these impacts may be reduced as the Build Alternative continues to be refined through the project development process.

The project is located in Orange County on I-5, extending from approximately 0.4 mi north of the I-5/I-405 interchange to 0.2 mi south of the SR-55 interchange between PMs 21.3 and 30.3 (refer to Figure 1-1). Within the limits of the proposed project, I-5 currently has four to five general-purpose lanes, plus a limited access HOV lane in each direction, with auxiliary lanes between most of the 9 interchanges throughout the project limits. The purpose of the proposed project is to increase capacity on I-5 from I-405 to SR-55; increase capacity of existing ramps; optimize access between the mainline and the existing HOV lane; and improve operational deficiencies including merge, diverge, and weaving movements.

### **1.3.1 Project Alternatives**

The No Build Alternative and the Build Alternative are evaluated in this environmental document and are described in this section.

This project contains a number of standardized project features which are employed on most, if not all, Caltrans projects and were not developed in response to any specific environmental impact resulting from the proposed project. These features are addressed in more detail in the Environmental Consequences sections found in Chapter 2. In addition, for the purposes of consistency, these project features are included in the Environmental Commitment Record (Appendix E) and referenced in Chapter 2 of this IS/EA, as applicable, as Project Features (PF) (per title of sub-section), and numbered. For example, a project feature applicable to water quality would be titled and listed as PF-WQ-1.

#### **1.3.1.1 Alternative 1: No Build Alternative**

The No Build Alternative would keep I-5 in its present condition with no additional through lanes or interchange improvements. HOV lanes will continue to be striped and signed as limited access, with periodic breaks for entry and exit to the HOV lane, similar to existing conditions. This alternative does not preclude the construction of future improvements or general maintenance in order to improve the operation of the freeway mainline and ramp facilities or incorporate safety enhancements.

The No Build Alternative serves as the baseline against which to evaluate the effects of the Build Alternative.

### **1.3.1.2 Alternative 2**

Alternative 2 proposes to remove the existing paved outside shoulders of the I-5 freeway and construct new traveled way and new shoulder pavement to the outside of the northbound and southbound lanes to accommodate one additional general-purpose lane in each direction from just north of I-405 to just south of SR-55.

The existing buffer-separated HOV lane would be converted to a continuous access HOV lane, with continuous entry/exit opportunity for motorists, throughout the project limits. The existing centerline will not be shifted; rather, the widening and the addition of lanes will occur on both sides of the existing traveled way. For overcrossing replacements, open-faced abutments will be used where feasible and applicable.

### ***Permanent Project Components***

#### ***Auxiliary Lanes***

Existing auxiliary lanes throughout the project limits are proposed to be re-established, and new auxiliary lanes will be constructed at the following locations:

- Northbound from Culver Drive to Jamboree Road
- Southbound from Jeffrey Road to Sand Canyon Avenue

#### ***Ramp Improvements***

Ramps within the project limits would be modified where needed in order to accommodate the additional general-purpose lane, as indicated in Table 1.5.

#### ***Ramp Metering***

All the existing on-ramps on the I-5 project limits are currently metered; those ramps would continue to be metered under the Build Alternative.

#### ***Other Improvements***

Stormwater Best Management Practices (BMPs) are proposed at locations along the corridor from Alton Parkway to north of Tustin Ranch Road.

#### ***Utilities***

During construction, all utilities within the freeway right-of-way would be protected in place or relocated. During final design, the Project Engineer would coordinate with each utility provider to finalize the exact location of that utility's facilities, assess



**Table 1.5: Ramp Modifications Under the Build Alternative**

| <b>Ramp</b>                    | <b>Existing Condition</b>               | <b>Build Alternative</b>                         |
|--------------------------------|---|--|
| NB Sand Canyon Avenue On-Ramp  | One shared lane with one-lane exit      | Limited length (generally 300 ft) auxiliary lane |
| SB Sand Canyon Avenue Off-Ramp | One shared lane with one-lane exit      | Two-lane exit from one auxiliary lane            |
| NB Jeffrey Road On-Ramp        | One-lane entrance                       | Limited length (generally 300 ft) auxiliary lane |
| NB Jeffrey Road Loop On-Ramp   | One-lane entrance                       | Limited length (generally 300 ft) auxiliary lane |
| SB Jeffrey Road On-Ramp        | One-lane entrance                       | Two-lane entrance                                |
| SB Culver Drive On-Ramp        | One lane entrance                       | Limited length (generally 300 ft) auxiliary lane |
| NB Jamboree Road Off-Ramp      | One auxiliary lane with one-lane exit   | Two-lane exit from two auxiliary lanes           |
| NB Tustin Ranch Road Off-Ramp  | One auxiliary lane with one-lane exit   | Two-lane exit from one auxiliary lane            |
| SB Tustin Ranch Road On-Ramp   | One-lane entrance to one auxiliary lane | Two-lane entrance                                |
| NB Red Hill Avenue Off-Ramp    | One auxiliary lane with one-lane exit   | Two-lane exit from one auxiliary lane            |

ft = foot/feet

I-5 = Interstate 5

NB = northbound

SB = southbound

SR-55 = State Route 55

whether the facilities can be protected in place during construction or would require relocation, and review the project plans for protection in place/relocation of the facility with the utility provider prior to construction. Specifics regarding utility relocations are provided in Sections 1.3.1.3 (Design Variation A) and 1.3.1.4 (Design Variation B).

### ***Park and Ride Facilities***

One Caltrans park-and-ride facility, Park and Ride Irvine, is located south of Jeffrey Road and west of I-5 at the Jeffrey Road/I-5 interchange. Modifications proposed under the Build Alternative would alter street access (e.g., the entrance) to that park-and-ride facility but would not alter the facility or remove spaces.

### ***California Highway Patrol Enforcement Area***

There are currently no existing California Highway Patrol (CHP) Enforcement Areas in the median of I-5 within the project limits. The project does not preclude adding a CHP Enforcement Area, and can be further considered during the PS&E phase. If a CHP Enforcement Area is included during the PS&E phase, it would be located within the project limits.

### ***Design Exceptions (Advisory and Mandatory)***

The Build Alternative would require design exceptions. Design exceptions are necessary when the proposed design deviates from the standard design features presented in the Caltrans *Highway Design Manual* (2016). For example, reduced lane widths and inside shoulder widths are proposed. The proposed Build Alternative would not be full standard, and mandatory and advisory design exceptions would be required. A full standard alternative would not be cost effective, would require extensive rebuilding of the existing freeway, and would have extensive right-of-way impacts.

### ***Design Option***

One design option, Design Option 3, was considered as part of the draft environmental document. Although it is not being carried forward as part of the Preferred Alternative, Caltrans may design, construct, and fund Design Option 3 at a later phase. If Design Option 3 is to be constructed at a later time, an assessment of any environmental impacts beyond what was identified in this environmental document will be made at that time. Section 1.5 provides a more detailed discussion of the Preferred Alternative. The following includes the improvements that were considered under Design Option 3:

- Braid the northbound Sand Canyon Avenue on-ramp and southbound SR-133/northbound I-5 connector with the northbound Jeffrey Road off-ramp; and
- Construct a new Jeffrey Road off-ramp separation.

#### **1.3.1.3 Design Variation A (Alternative 2A)**

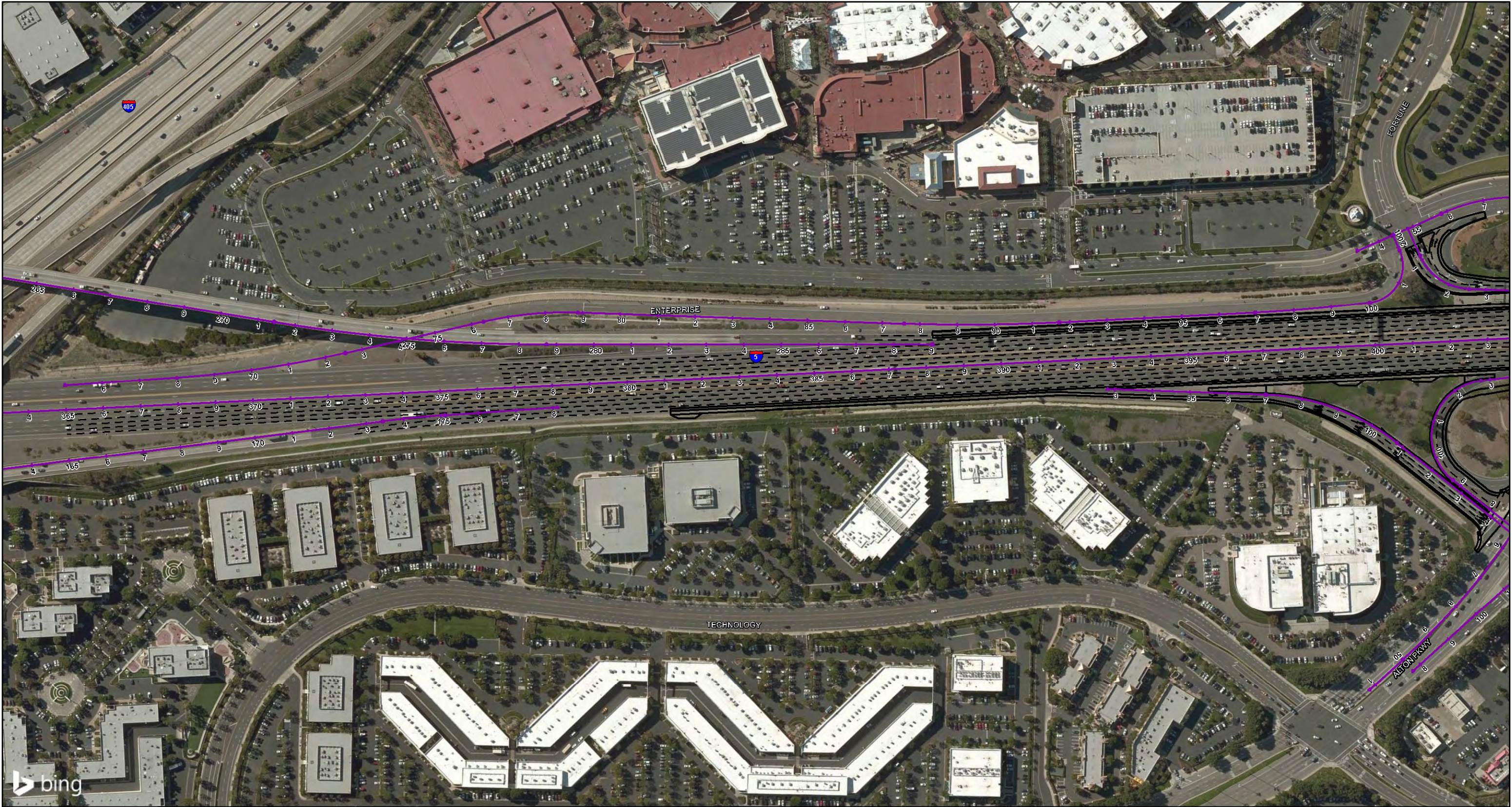
This section describes features related to Alternative 2A. Alternative 2A is shown on Figure 1-3 (Sheets 1 through 13) and includes the improvements described above under Alternative 2.

### ***Structures***

Structures are proposed to be widened and/or replaced at the following locations:

- Alton Parkway Overcrossing (55-0629) Replacement
- Irvine Overhead (55-0002) Widening
- Sand Canyon Avenue Undercrossing (55-0201) Widening
- Jeffrey Road Overcrossing (55-0215) Replacement
- Yale Avenue Overcrossing (55-0638) Tie-Back Walls
- Culver Drive Undercrossing (55-0197) Widening





LEGEND

| Alternative 2A | Alternative 2A with Option 3* |
|----------------|-------------------------------|
| Geometrics     | Geometrics                    |
| Centerline     | Centerline                    |
| Striping       | Striping                      |



SOURCE: Bing (2018); AECOM (09/2017)

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\* Alternative 2A with Option 3 will be highlighted where differences from Alternative 2A occur.

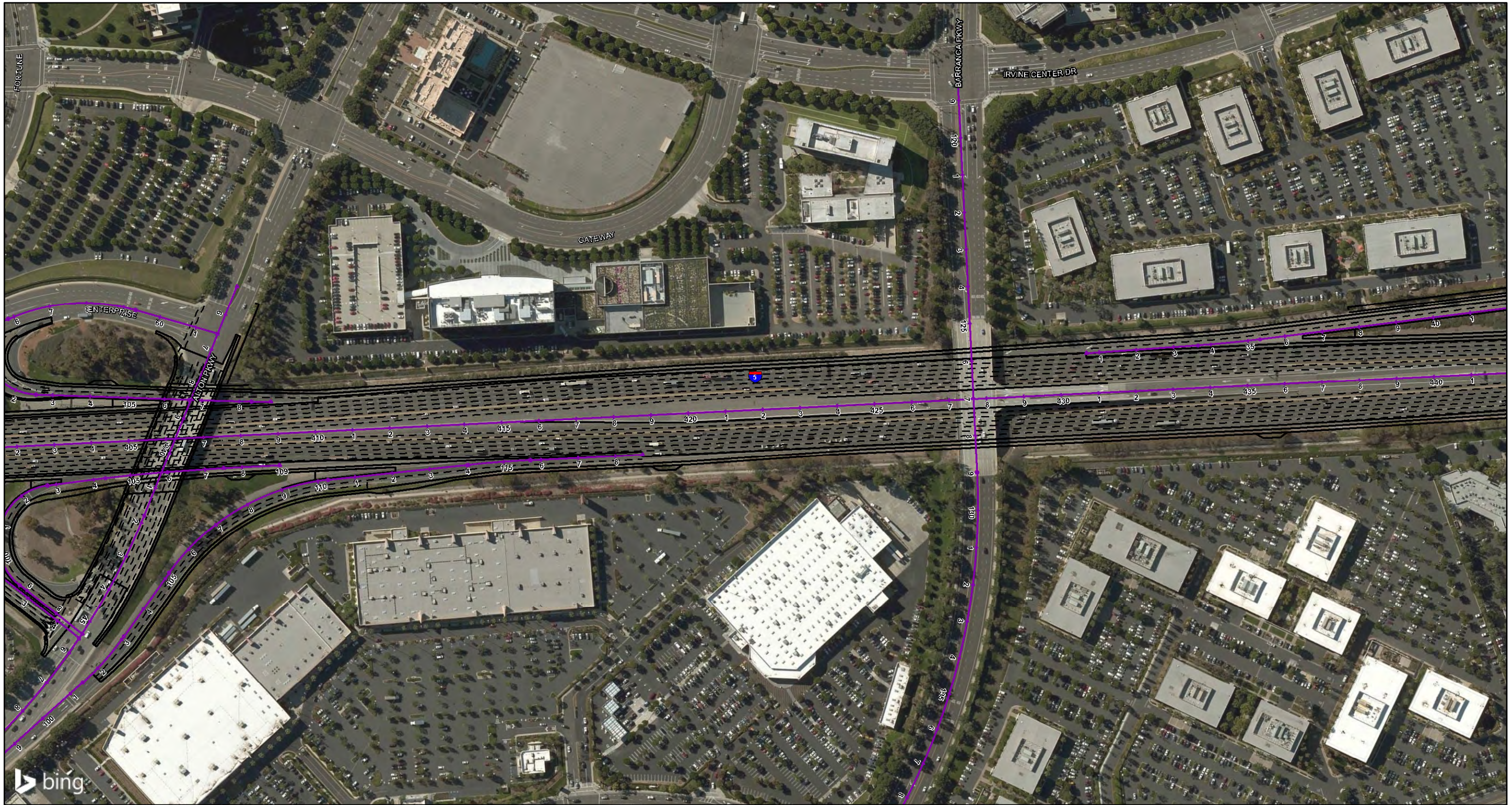
FIGURE 1-3  
Sheet 1 of 13

I-5 Improvement Project: I-405 to SR-55  
Alternative 2A and Design Option 3  
12-ORA-5 PM 21.3/30.3  
EA No. 0K670



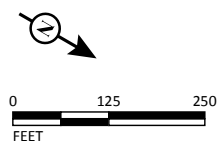
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\* Alternative 2A with Option 3 will be highlighted where differences from Alternative 2A occur.

FIGURE 1-3  
Sheet 2 of 13

*I-5 Improvement Project: I-405 to SR-55*  
Alternative 2A and Design Option 3  
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\* Alternative 2A with Option 3 will be highlighted where differences from Alternative 2A occur.

FIGURE 1-3

Sheet 3 of 13

I-5 Improvement Project: I-405 to SR-55

Alternative 2A and Design Option 3

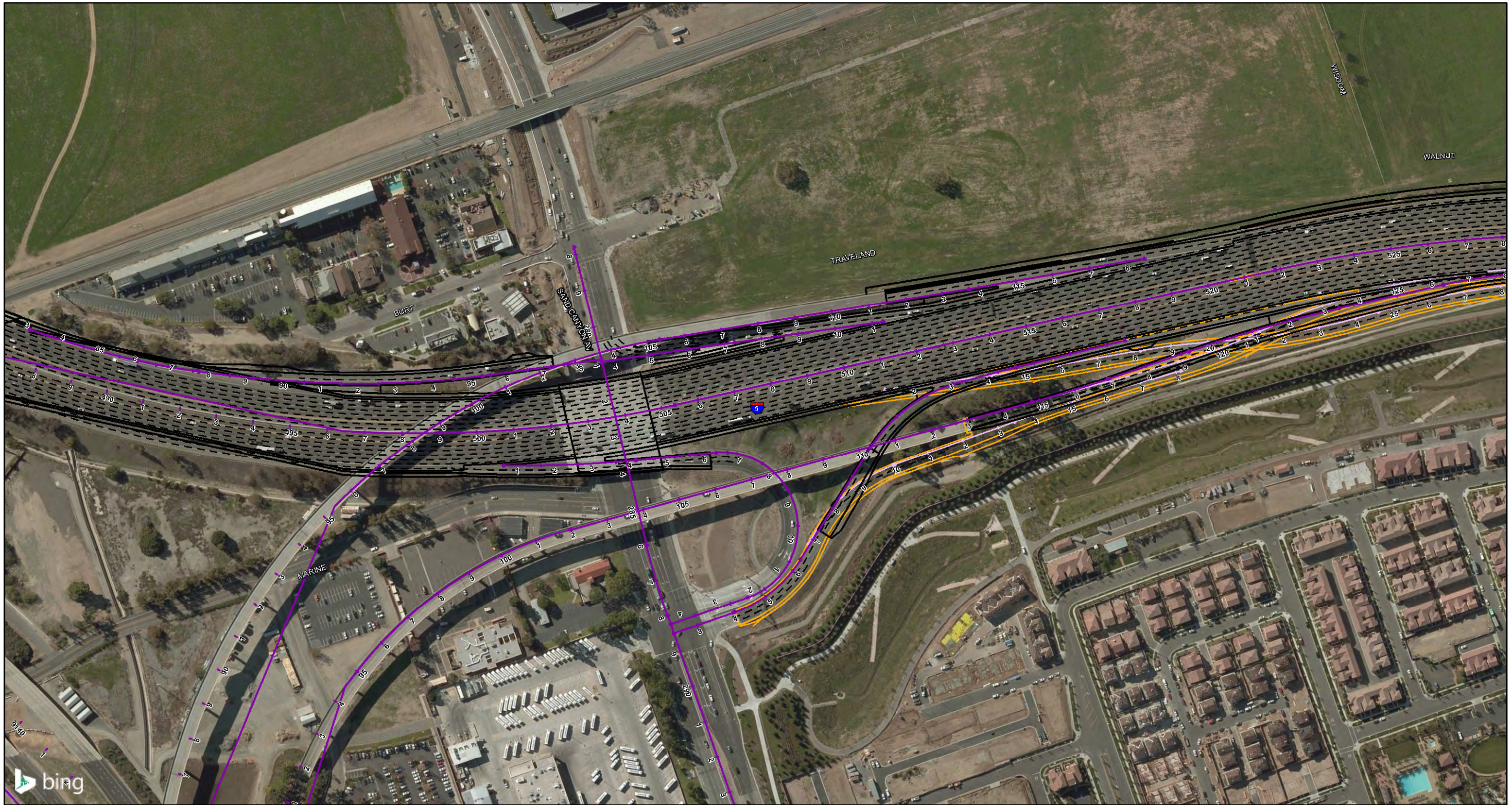
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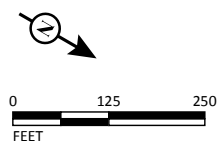
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| Alternative 2A | Alternative 2A with Option 3* |
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\* Alternative 2A with Option 3 will be highlighted where differences from Alternative 2A occur.

FIGURE 1-3  
Sheet 4 of 13

*I-5 Improvement Project: I-405 to SR-55*  
Alternative 2A and Design Option 3  
12-ORA-5 PM 21.3/30.3  
EA No. 0K670




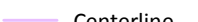




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| Alternative 2A   | Alternative 2A with Option 3*  |
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\* Alternative 2A with Option 3 will be highlighted where differences from Alternative 2A occur.

FIGURE 1-3

Sheet 5 of 13

I-5 Improvement Project: I-405 to SR-55

Alternative 2A and Design Option 3

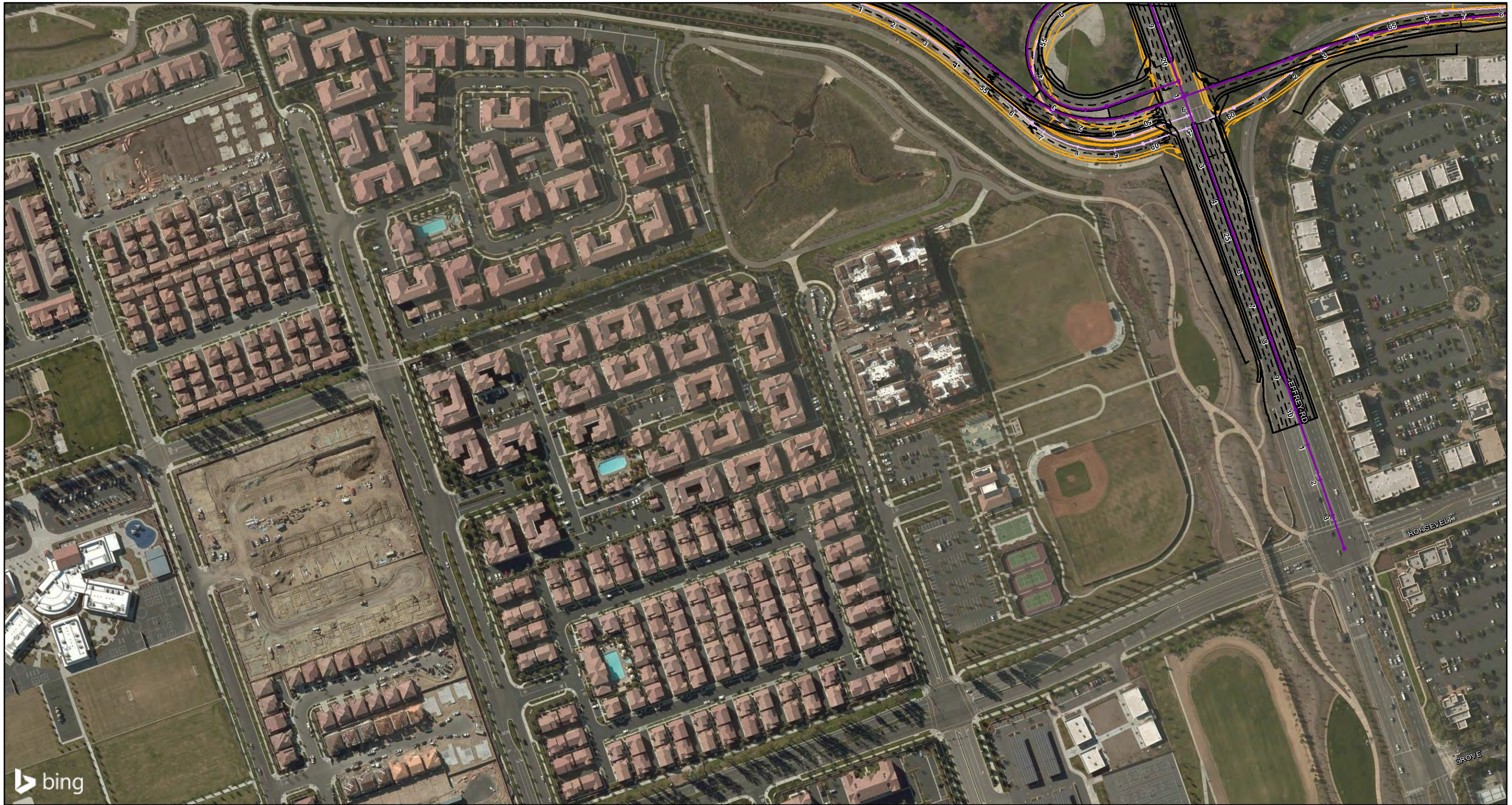
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LEGEND

Alternative 2A

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Alternative 2A with Option 3\*

— Geometrics

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\* Alternative 2A with Option 3 will be highlighted where differences from Alternative 2A occur.

FIGURE 1-3

Sheet 6 of 13

I-5 Improvement Project: I-405 to SR-55

Alternative 2A and Design Option 3

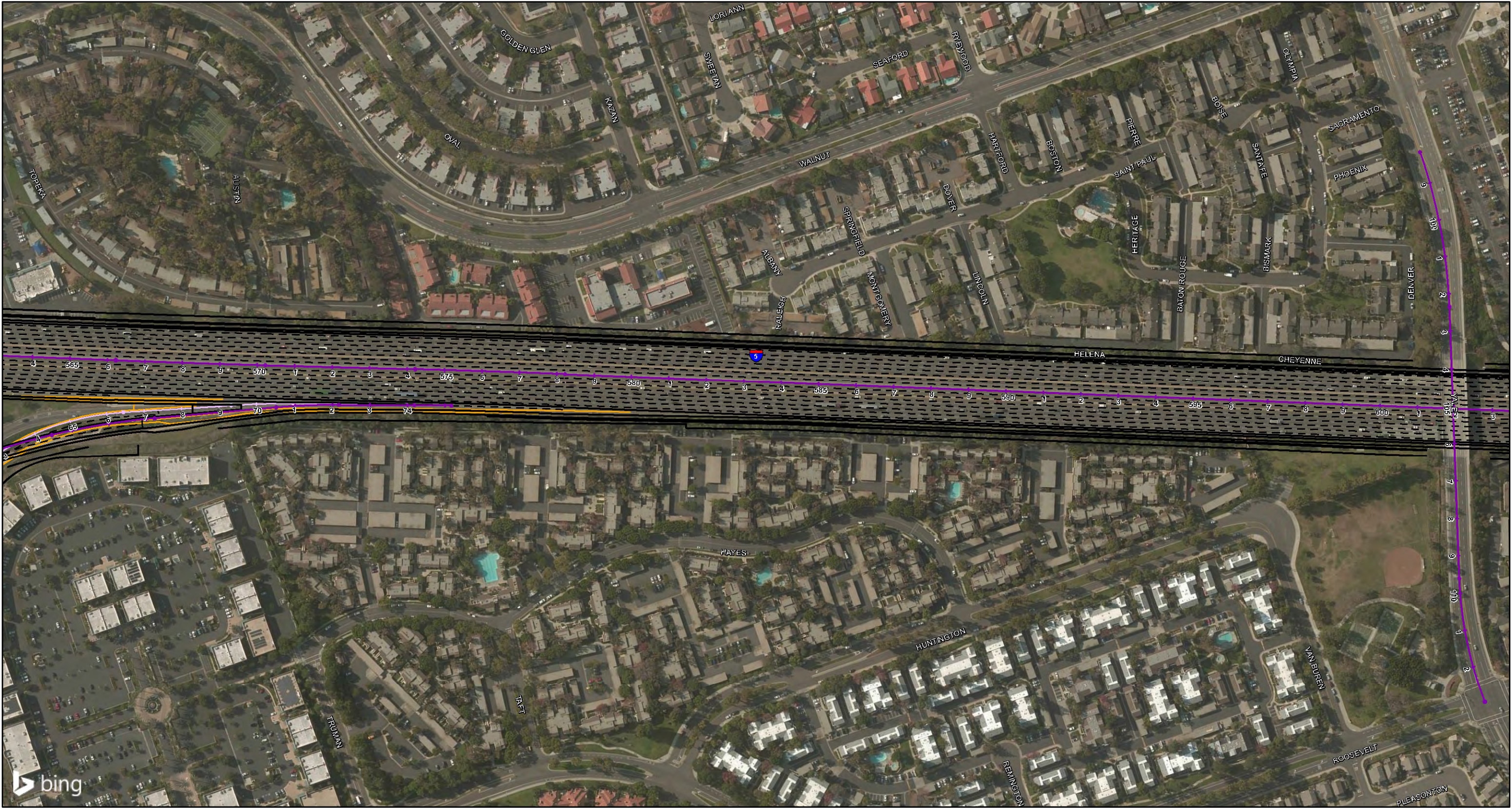
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\* Alternative 2A with Option 3 will be highlighted where differences from Alternative 2A occur.

FIGURE 1-3  
Sheet 7 of 13

I-5 Improvement Project: I-405 to SR-55  
Alternative 2A and Design Option 3  
12-ORA-5 PM 21.3/30.3  
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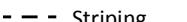



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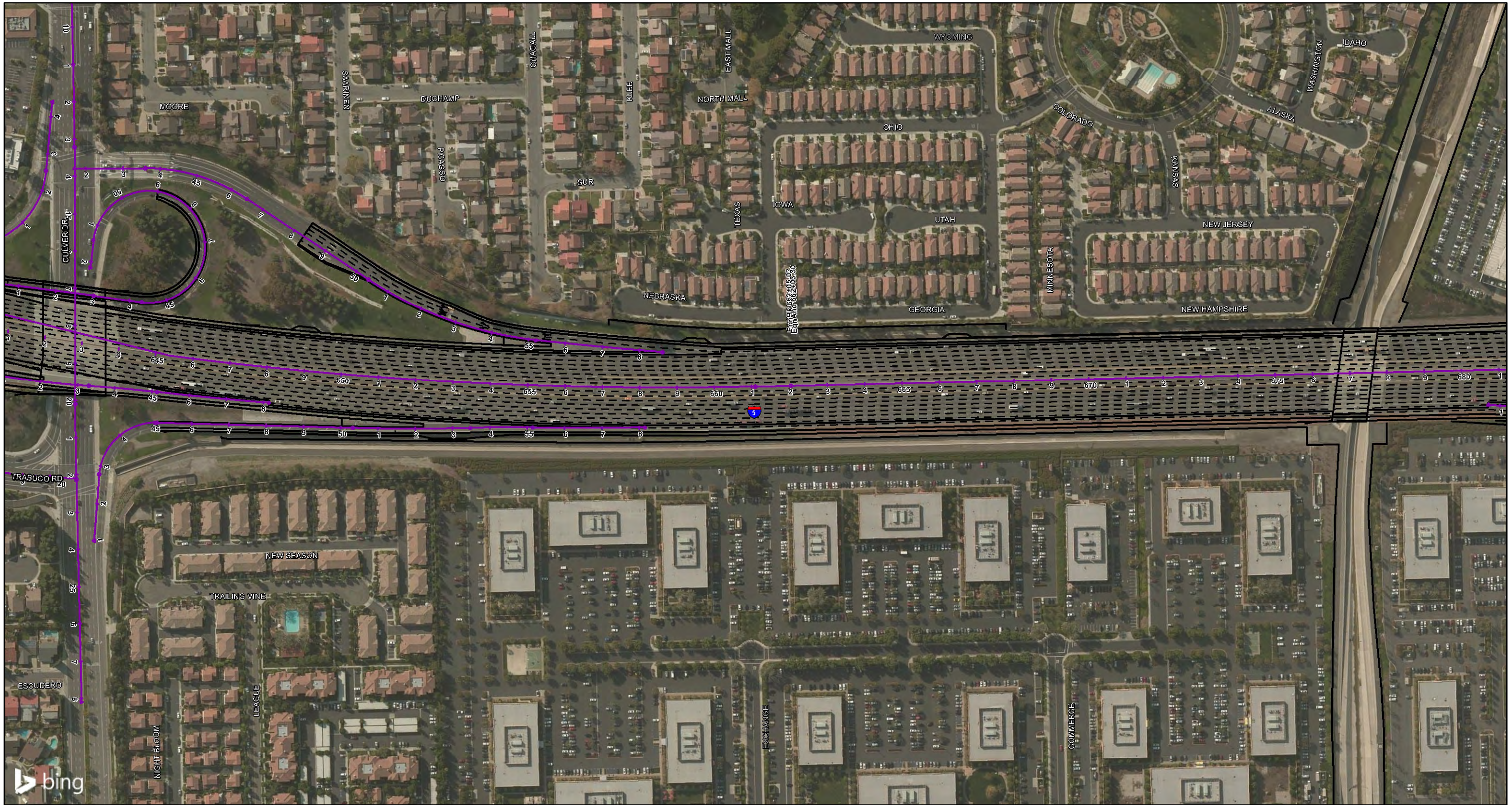
FIGURE 1-3  
Sheet 8 of 13

I-5 Improvement Project: I-405 to SR-55  
Alternative 2A and Design Option 3  
12-ORA-5 PM 21.3/30.3  
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Alternative 2A

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Alternative 2A with Option 3\*

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\* Alternative 2A with Option 3 will be highlighted where differences from Alternative 2A occur.

FIGURE 1-3

Sheet 9 of 13

I-5 Improvement Project: I-405 to SR-55

Alternative 2A and Design Option 3

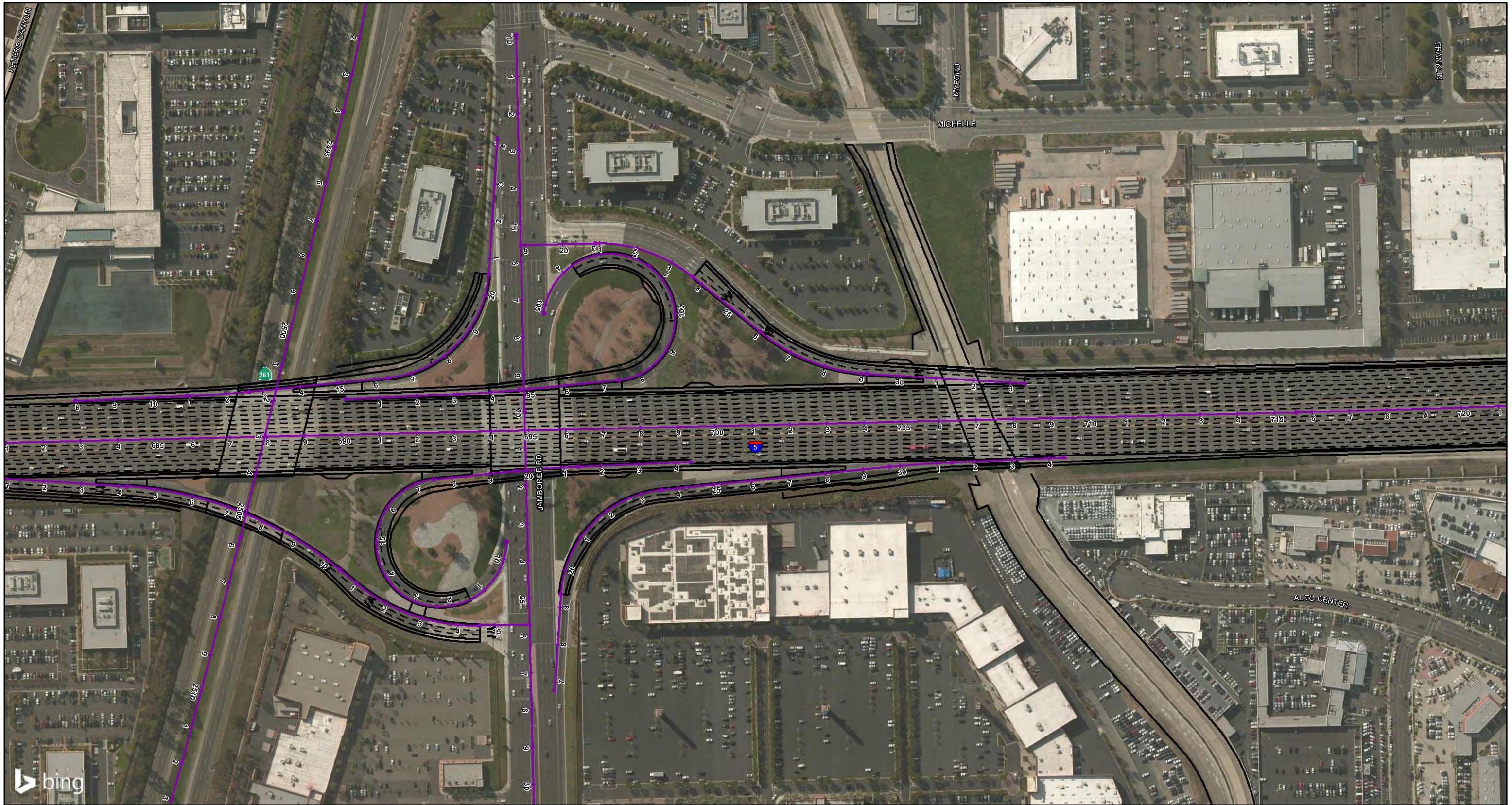
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| Alternative 2A | Alternative 2A with Option 3* |
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| Centerline     | Centerline                    |
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\* Alternative 2A with Option 3 will be highlighted where differences from Alternative 2A occur.

FIGURE 1-3

Sheet 10 of 13

I-5 Improvement Project: I-405 to SR-55

Alternative 2A and Design Option 3

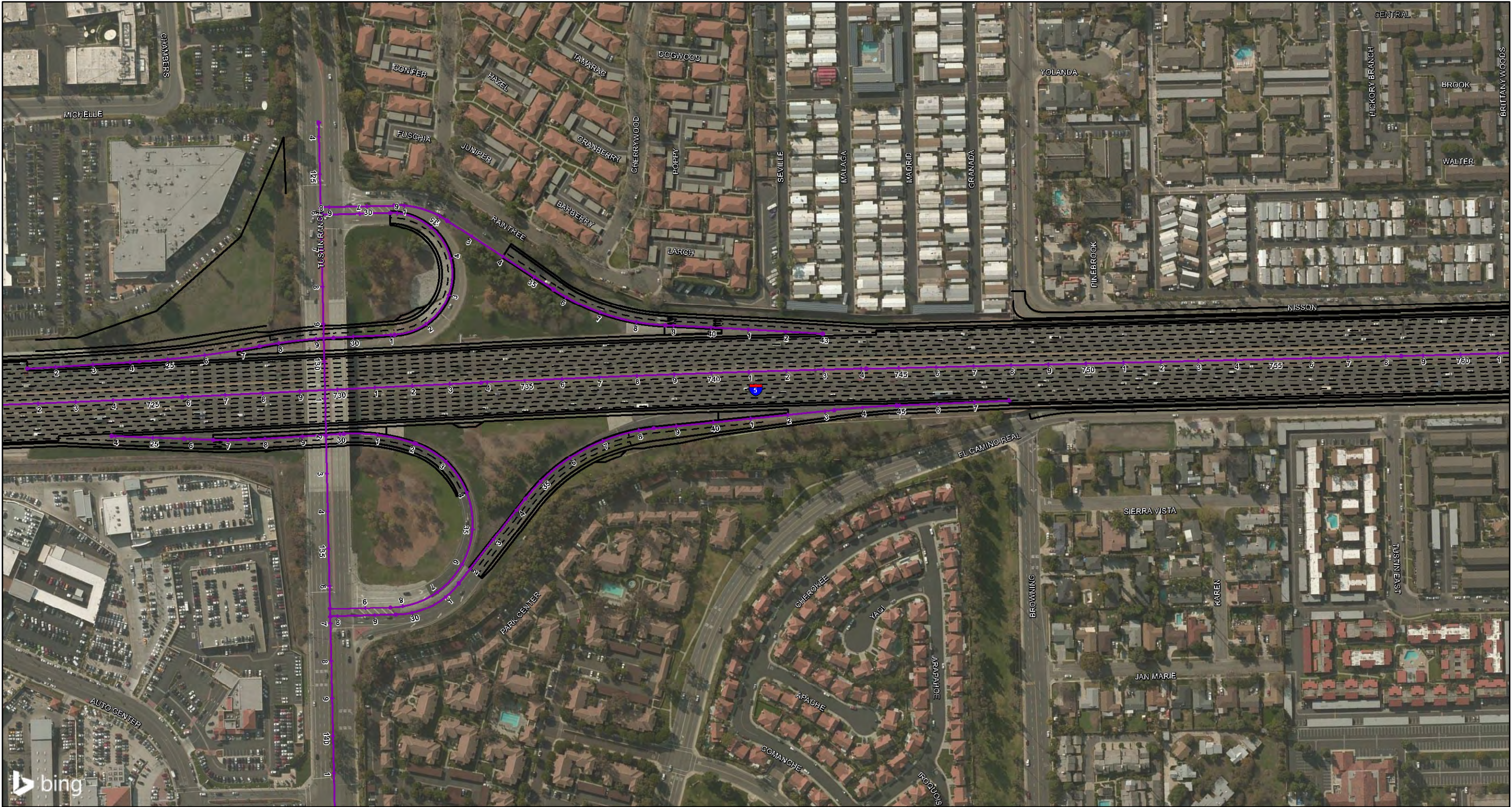
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|  Geometrics |  Geometrics |
|  Centerline |  Centerline |
|  Striping   |  Striping   |



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\* Alternative 2A with Option 3 will be highlighted where differences from Alternative 2A occur.

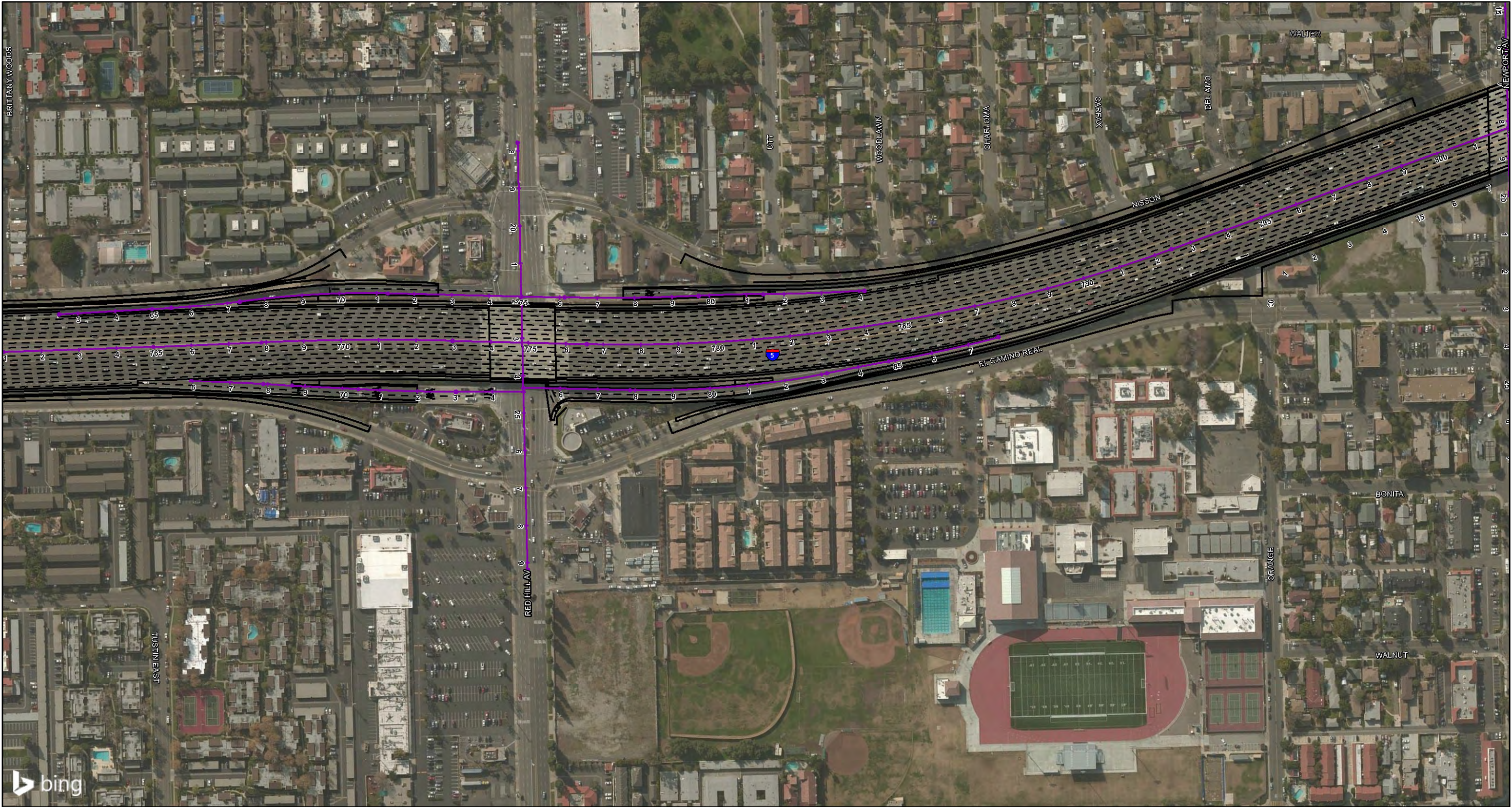
FIGURE 1-3  
Sheet 11 of 13

I-5 Improvement Project: I-405 to SR-55  
Alternative 2A and Design Option 3  
12-ORA-5 PM 21.3/30.3  
EA No. 0K670









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\* Alternative 2A with Option 3 will be highlighted where differences from Alternative 2A occur.

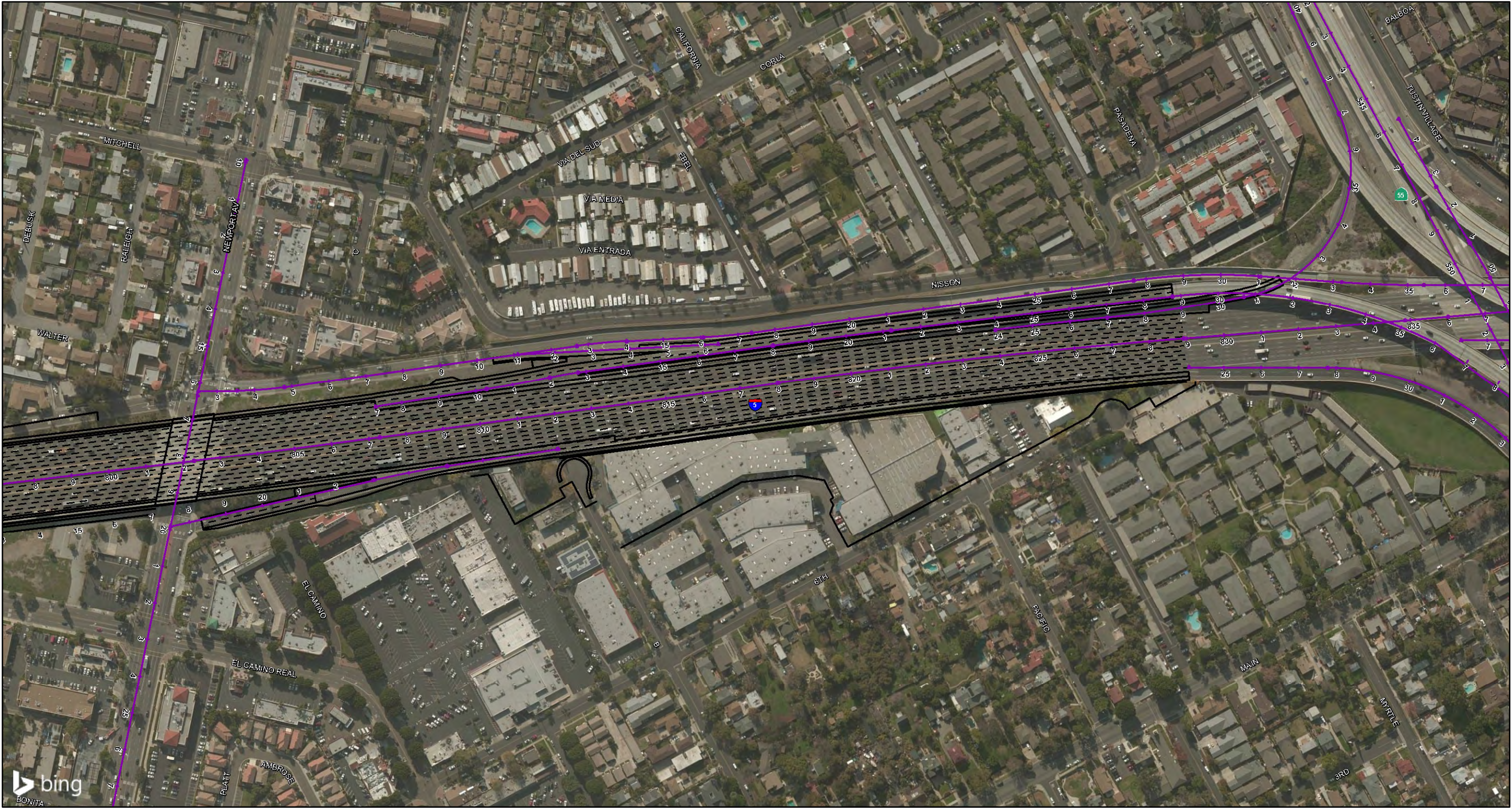
FIGURE 1-3  
Sheet 12 of 13

I-5 Improvement Project: I-405 to SR-55  
Alternative 2A and Design Option 3  
12-ORA-5 PM 21.3/30.3  
EA No. 0K670









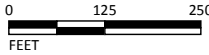
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LEGEND

| Alternative 2A   | Alternative 2A with Option 3*  |
|--|--|
|  Geometrics |  Geometrics |
|  Centerline |  Centerline |
|  Striping   |  Striping   |



SOURCE: Bing (2018); AECOM (09/2017)

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FIGURE 1-3  
Sheet 13 of 13

*I-5 Improvement Project: I-405 to SR-55*  
**Alternative 2A and Design Option 3**  
12-ORA-5 PM 21.3/30.3  
EA No. 0K670

\* Alternative 2A with Option 3 will be highlighted where differences from Alternative 2A occur.



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- Peters Canyon Channel (55-0663) Widening
- I-5/SR-261 Separation (55-0688) Widening
- Jamboree Road Off-Ramp Overcrossing (55-0763S) Widening
- Jamboree Road Undercrossing (55-0656) Widening
- El Modena - Irvine Channel (55-0655) Widening
- Red Hill Avenue Undercrossing (55-0193) Widening
- Newport Avenue Undercrossing (55-0940) Widening

### ***Right-of-Way Acquisition, Easements, and Temporary Construction Easements***

Table 1.6, below, provides the right-of-way acquisition and easement details for Alternative 2A.

**Table 1.6: Right-of-Way Acquisitions, Easements, and Temporary Construction Easements Required under Alternative 2A**

| <b>Alternative</b>                       | <b>TCE</b> | <b>Partial Acquisition/<br/>TCE</b> | <b>Partial Acquisitions</b> | <b>Full Acquisitions</b> |
|--|------------|-------------------------------------|-----------------------------|--------------------------|
| Alternative 2A<br>(Baseline Alternative) | 20         | 29                                  | 4                           | 2                        |
| Design Option 3 (2A)                     | 2          | 2                                   | 0                           | 0                        |

Source: AECOM, Inc. (2018).

TCE = Temporary Construction Easement

Temporary construction easements (TCEs) are needed within the project limits. Staging for the proposed construction work would be located within these TCEs. Specific staging locations as well as fill and borrow sites will be determined by the construction contractor during the construction phase but all locations would remain within project limits.

### ***Utilities***

The utility relocations and/or protection in place for Alternative 2A are listed in Table 1.7.

### ***Design Exceptions (Advisory and Mandatory)***

Alternative 2A would require several design exceptions such as reduced lane shoulder width at spot locations. Many of these exceptions are existing features that would remain with the project.

**Table 1.7: Potential Relocations of the Build Alternative on Existing Utility Facilities**

| Utility Provider            | Description of Facility   | Alt 2A | Alt 2B | Option 3 |
|-----------------------------|---|--------|--------|----------|
| AT&T                        | Underground Telephone Line within SB freeway                          | •      | •      |          |
|                             | Underground Telephone Vault   | •      |        |          |
|                             | Underground Telephone Line at Edge of Construction                    | •      |        |          |
|                             | Underground Telephone Line crossing at Nisson Road                    | •      |        |          |
|                             | Underground Telephone Line crossing over Jeffrey Road Bridge          | •      |        |          |
|                             | Underground Telephone Line crossing over Jeffrey Road Bridge          | •      |        |          |
|                             | Underground Telephone Facility at Edge of Construction                | •      | •      |          |
|                             | 6-4" Underground Telephone Line at Alton Parkway Bridge               | •      |        |          |
|                             | 12-4" Underground Telephone Line at Alton Parkway Bridge              | •      |        |          |
|                             | Adjust Manhole at Culver Drive Right-Turn Pocket                      |        | •      |          |
| Comcast                     | Underground Cable Line at Alton Parkway Bridge                        | •      |        |          |
| Cox Communications          | Underground Cable Line at Proposed Soundwall                          | •      |        |          |
|                             | Underground Cable under SB Culver Drive Off-Ramp                      | •      | •      |          |
|                             | Underground Fiber Optic Cable at Alton Parkway Bridge                 | •      |        |          |
|                             | Underground Television Line at Culver Drive Right-Turn Pocket         |        | •      |          |
| Kinder Morgan               | 10" Oil Pipeline Facility at Edge of Construction                     | •      | •      |          |
| Irvine Ranch Water District | 12" Reclaimed Water Line crossing within Alton Parkway Bridge         | •      |        |          |
|                             | 16" Water Line crossing within Jeffrey Road Bridge                    | •      |        |          |
|                             | 16" Water Line crossing within Alton Parkway Bridge                   | •      |        |          |
|                             | 24" Water Line crossing within Jeffrey Road Bridge                    | •      |        |          |
|                             | 30" Water Pipeline within NB Jeffrey Road Off-Ramp                    |        |        | •        |
|                             | Underground Water Facility at Edge of Construction                    | •      | •      |          |
| City of Irvine              | 30" Sewer Pipeline within NB Jeffrey Road Off-Ramp                    |        |        | •        |
| Southern California Gas     | 8" Natural Gas Line within Alton Parkway Bridge                       | •      |        |          |
| Southern California Edison  | Intersection Pole on El Camino Real and Orange Street                 | •      |        |          |
|                             | 4 Utility Poles parallel to El Camino Real south of Newport Boulevard | •      |        |          |
|                             | Distribution Service Box at Alton Parkway On-Ramp                     | •      |        |          |
|                             | Underground Distribution Lines crossing Jeffrey Road Bridge           | •      |        |          |



**Table 1.7: Potential Relocations of the Build Alternative on Existing Utility Facilities**

| Utility Provider | Description of Facility  | Alt 2A | Alt 2B | Option 3 |
|------------------|--|--------|--------|----------|
|                  | Underground Distribution Lines crossing Alton Parkway Proposed On-Ramp       | •      |        |          |
|                  | Utility Guy Pole at Edge of NB Red Hill Avenue Off-Ramp along El Camino Real | •      | •      |          |
|                  | Utility Guy Pole at Edge of NB Red Hill Avenue Off-Ramp along El Camino Real | •      | •      |          |
|                  | 66 kV Conductor crossing Freeway   | •      | •      | •        |
|                  | 66 kV Transmission Pole at Edge of Freeway                                   | •      | •      | •        |
|                  | Underground Electrical Line at Culver Drive Right-Turn Pocket.               |        | •      |          |

kV = kilovolt

I-5 = Interstate 5

NB = northbound

OH = overhead

SB = southbound

**1.3.1.4 Design Variation B (Alternative 2B [Preferred Alternative])**

This section describes features related to Alternative 2B. Alternative 2B is shown on Figure 1-4 (Sheets 1 through 13) and includes the improvements described above under Alternative 2.

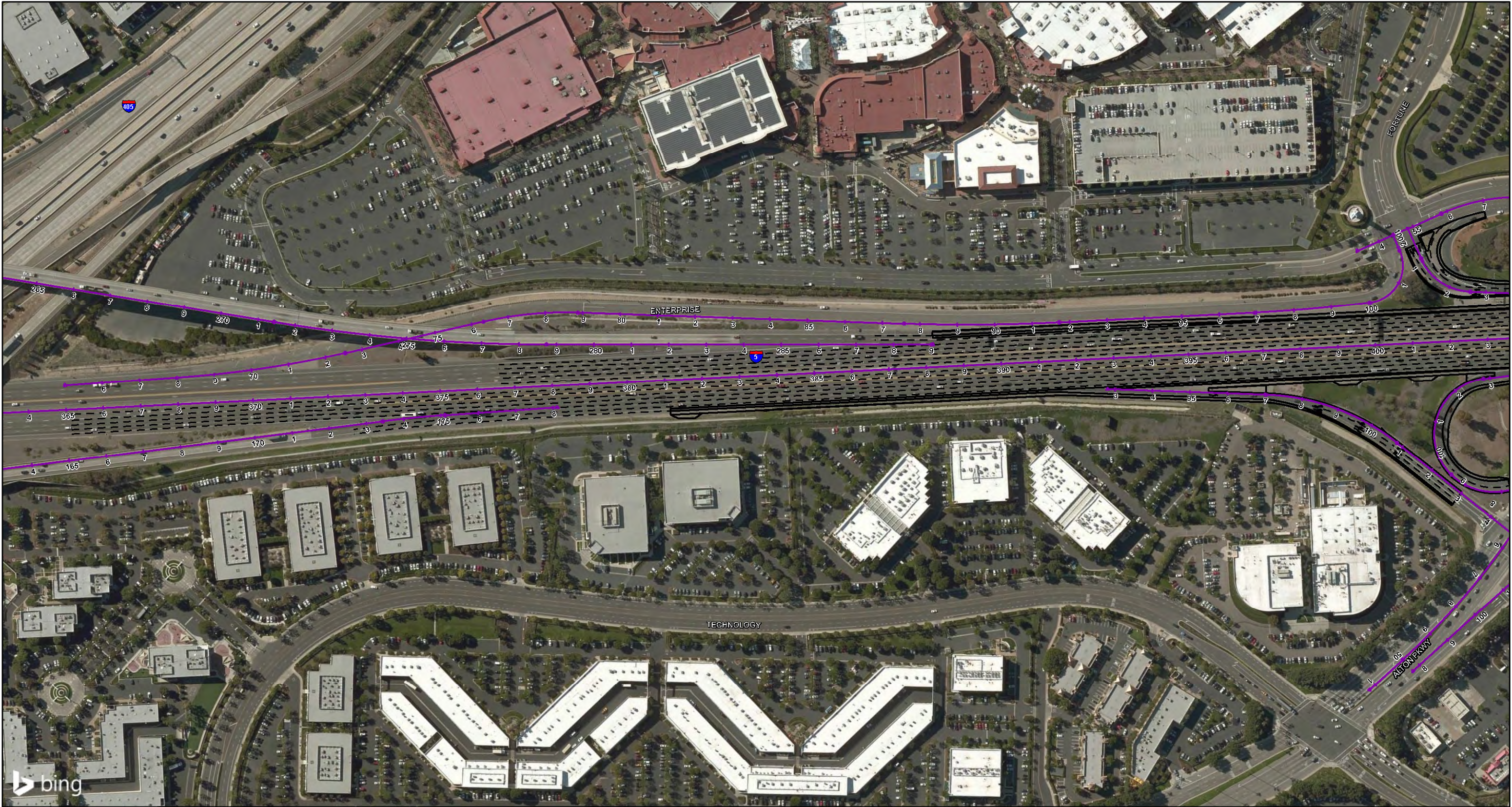
**Structures**

Alternative 2B does not require replacement of any structures. Existing structures are proposed to be widened and/or improved at the following locations:

- Alton Parkway Overcrossing (55-0629) Tie-Back Walls
- Irvine Overhead (55-0002) Widening
- Sand Canyon Avenue Undercrossing (55-0201) Widening
- Jeffrey Road Overcrossing (55-0215) Tie-Back Walls
- Culver Drive Undercrossing (55-0197) Widening
- Peters Canyon Channel (55-0663) Widening
- I-5/SR-261 Separation (55-0688) Widening
- Jamboree Road Undercrossing (55-0656) Widening
- El Modena - Irvine Channel (55-0655) Widening

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LEGEND

Alternative 2B

— Geometrics

— Centerline

- - - Striping



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SOURCE: Bing (2018); AECOM (9/2017)

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FIGURE 1-4

Sheet 1 of 13

*I-5 Improvement Project: I-405 to SR-55*

**Alternative 2B (Preferred Alternative)**

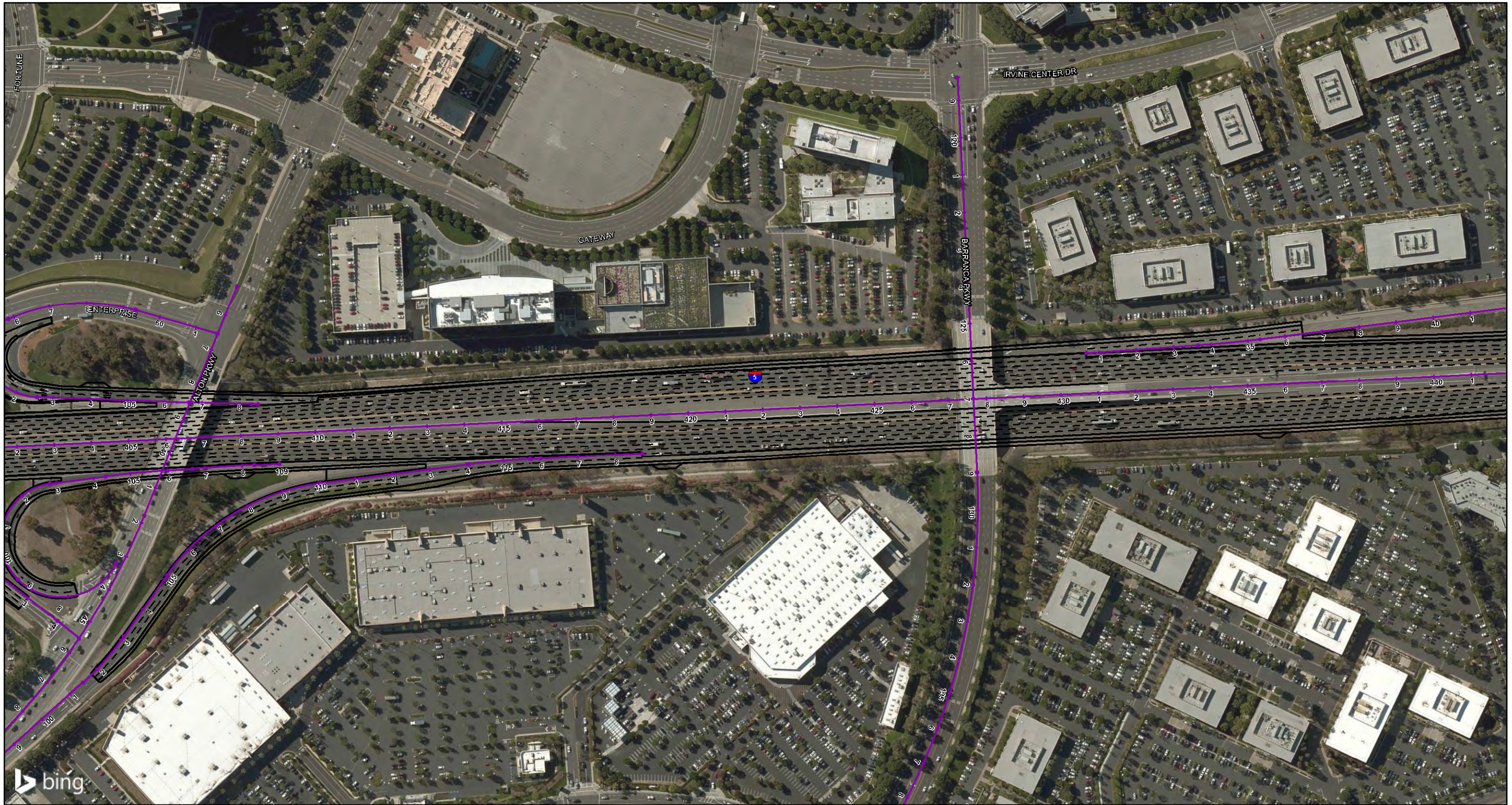
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LEGEND

Alternative 2B

— Geometrics

— Centerline

- - - Striping



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FIGURE 1-4

Sheet 2 of 13

*I-5 Improvement Project: I-405 to SR-55*

**Alternative 2B (Preferred Alternative)**

12-ORA-5 PM 21.3/30.3

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LEGEND

Alternative 2B

— Geometrics

— Centerline

- - - Striping



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FIGURE 1-4

Sheet 3 of 13

*I-5 Improvement Project: I-405 to SR-55*

**Alternative 2B (Preferred Alternative)**

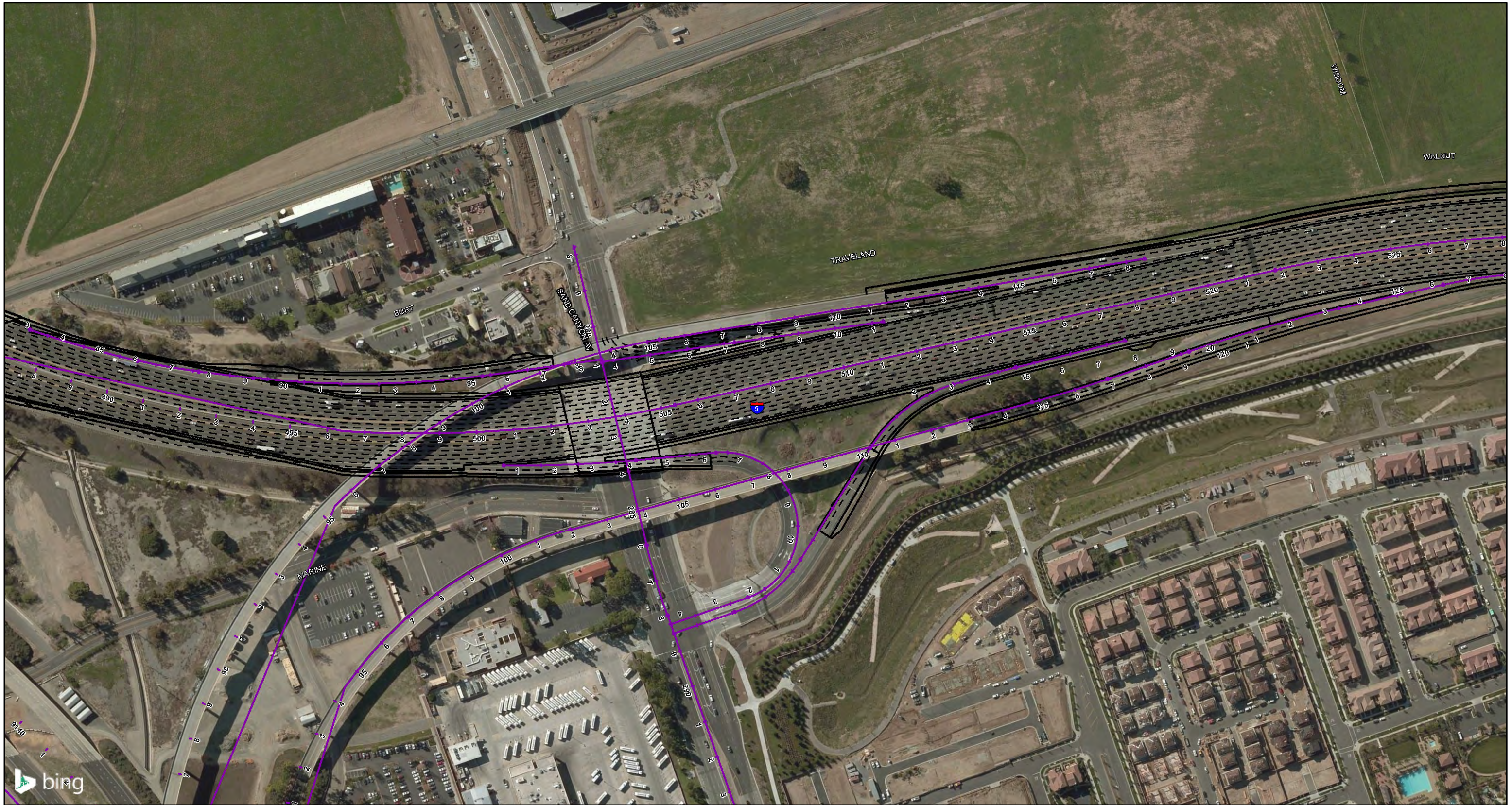
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LEGEND

Alternative 2B

— Geometrics

— Centerline

- - - Striping



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FIGURE 1-4

Sheet 4 of 13

*I-5 Improvement Project: I-405 to SR-55*

**Alternative 2B (Preferred Alternative)**

12-ORA-5 PM 21.3/30.3

EA No. 0K670



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LEGEND

Alternative 2B

— Geometrics

— Centerline

- - - Striping



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FIGURE 1-4

Sheet 5 of 13

*I-5 Improvement Project: I-405 to SR-55*

**Alternative 2B (Preferred Alternative)**

12-ORA-5 PM 21.3/30.3

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LEGEND

Alternative 2B

— Geometrics

— Centerline

- - - Striping



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FIGURE 1-4

Sheet 6 of 13

*I-5 Improvement Project: I-405 to SR-55*

**Alternative 2B (Preferred Alternative)**

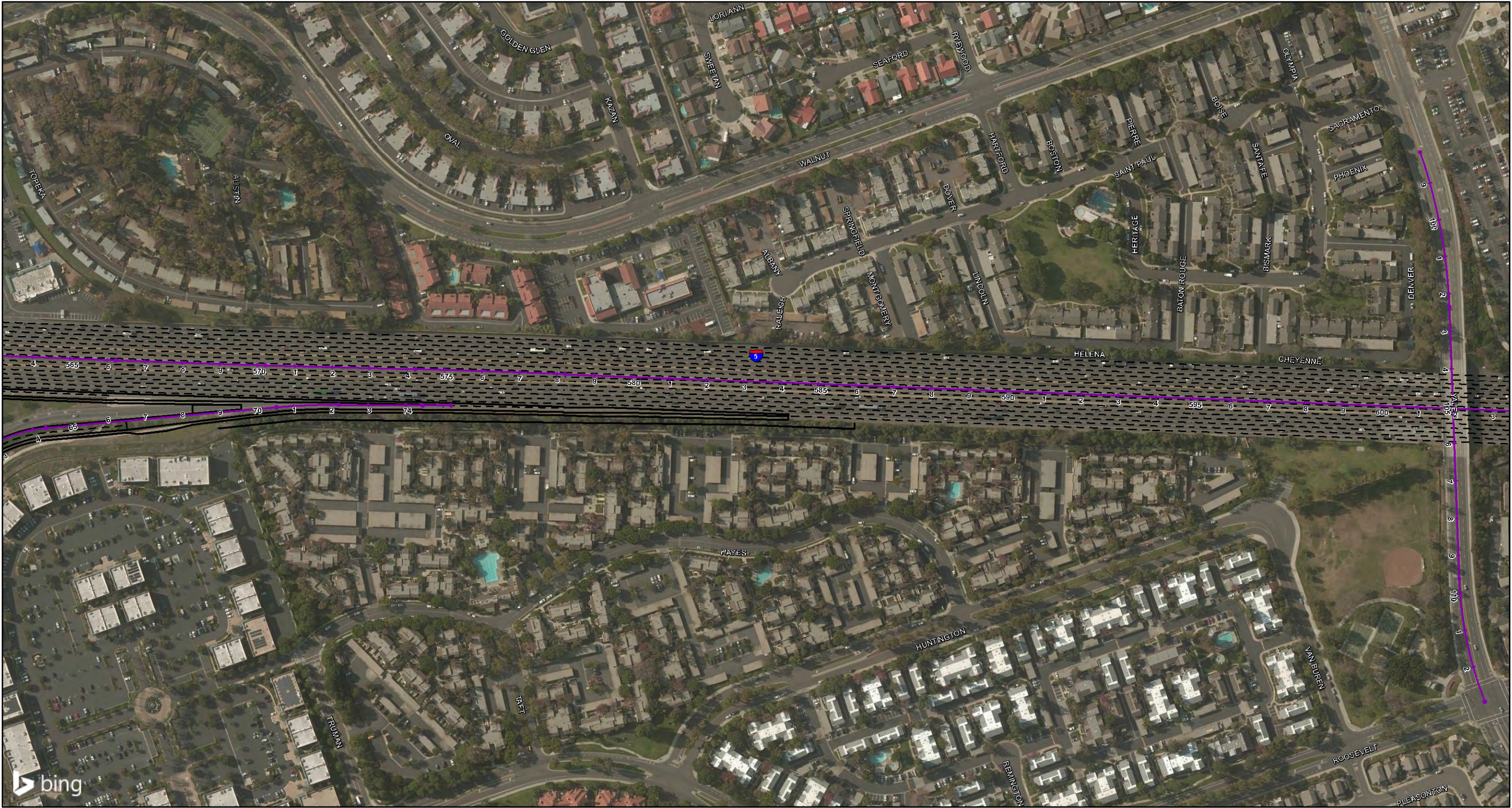
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LEGEND

Alternative 2B

— Geometrics

— Centerline

- - - Stripping



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FIGURE 1-4

Sheet 7 of 13

*I-5 Improvement Project: I-405 to SR-55*

**Alternative 2B (Preferred Alternative)**

12-ORA-5 PM 21.3/30.3

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LEGEND

Alternative 2B

- Geometrics
- Centerline
- Striping



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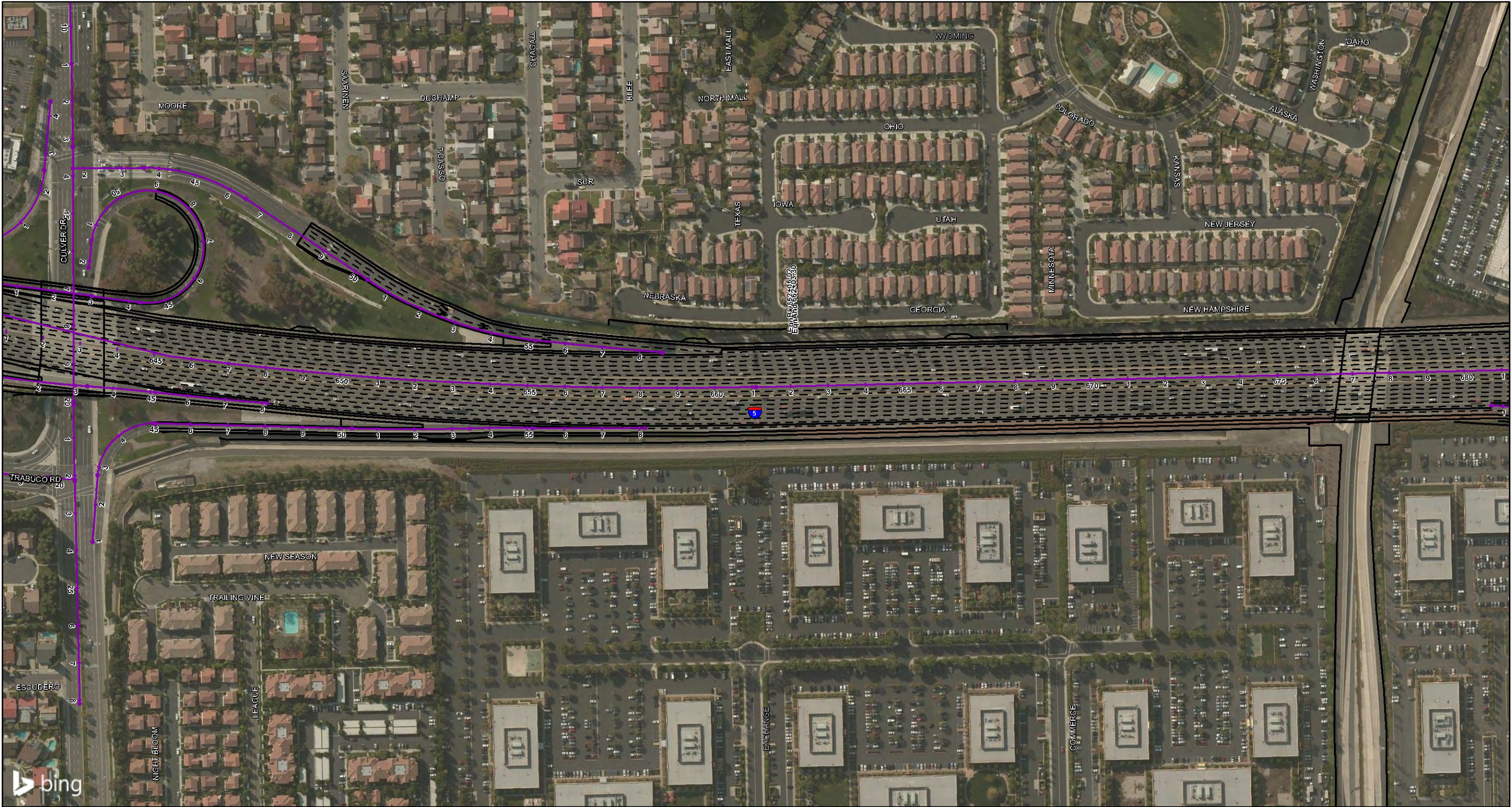
FIGURE 1-4  
Sheet 8 of 13

*I-5 Improvement Project: I-405 to SR-55*  
**Alternative 2B (Preferred Alternative)**  
12-ORA-5 PM 21.3/30.3  
EA No. 0K670



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LEGEND

Alternative 2B

- Geometrics
- Centerline
- Striping



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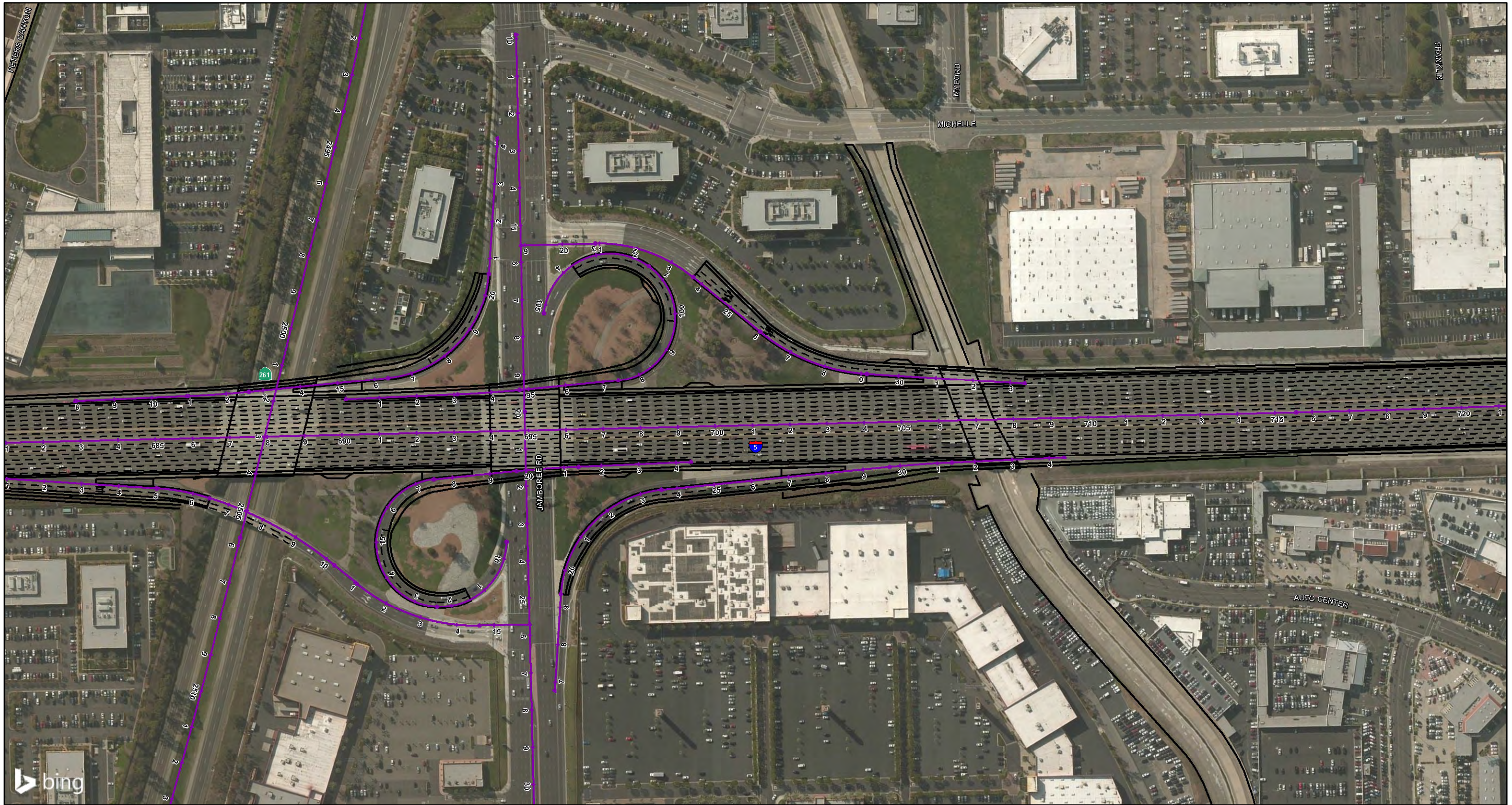
FIGURE 1-4  
Sheet 9 of 13

I-5 Improvement Project: I-405 to SR-55  
Alternative 2B (Preferred Alternative)  
12-ORA-5 PM 21.3/30.3  
EA No. 0K670



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LEGEND

Alternative 2B

— Geometrics

— Centerline

- - - Striping



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FIGURE 1-4

Sheet 10 of 13

*I-5 Improvement Project: I-405 to SR-55*

**Alternative 2B (Preferred Alternative)**

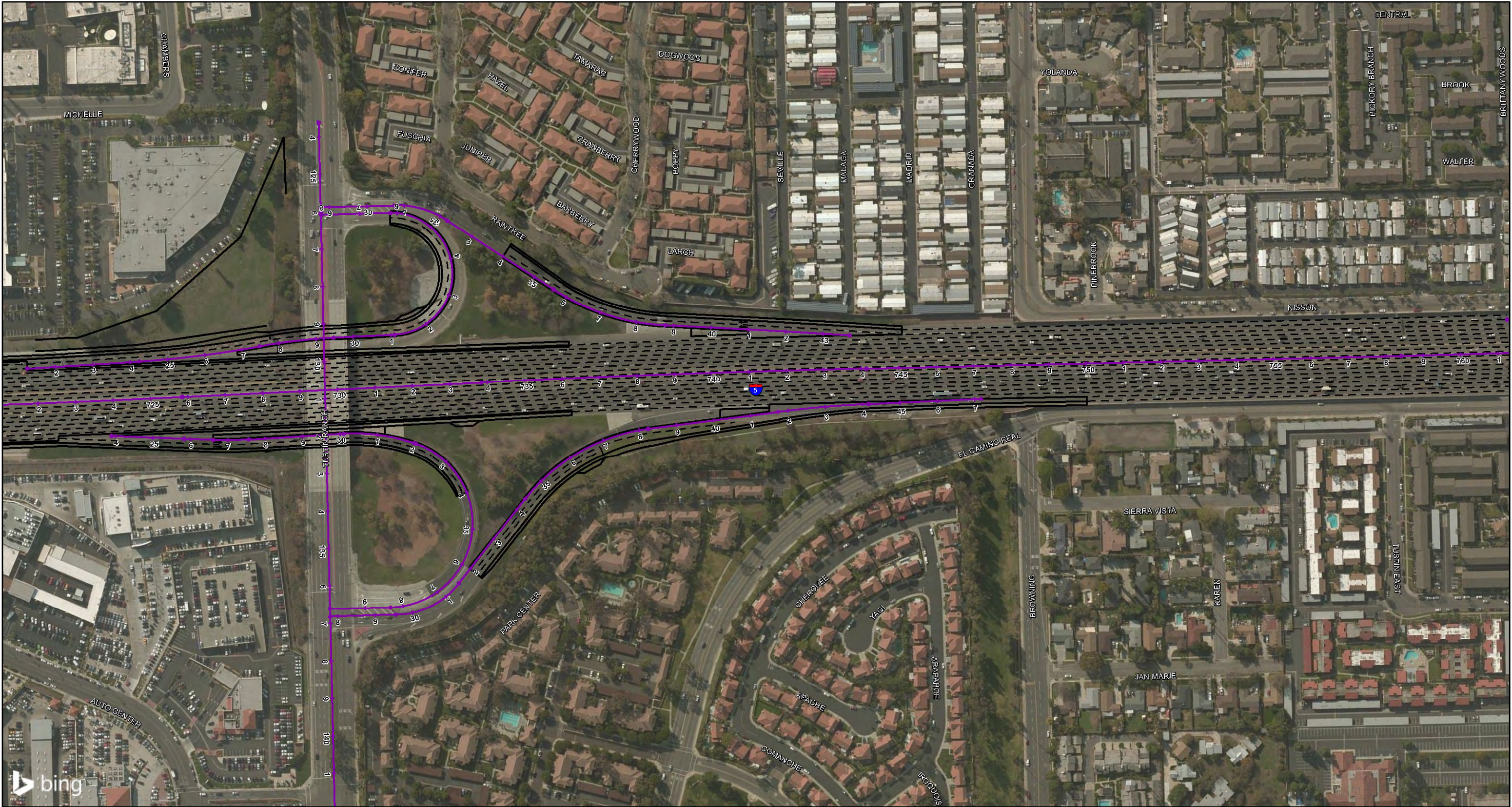
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LEGEND

Alternative 2B

— Geometrics

— Centerline

- - - Striping



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SOURCE: Bing (2018); AECOM (9/2017)

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FIGURE 1-4  
Sheet 11 of 13

*I-5 Improvement Project: I-405 to SR-55*

**Alternative 2B (Preferred Alternative)**

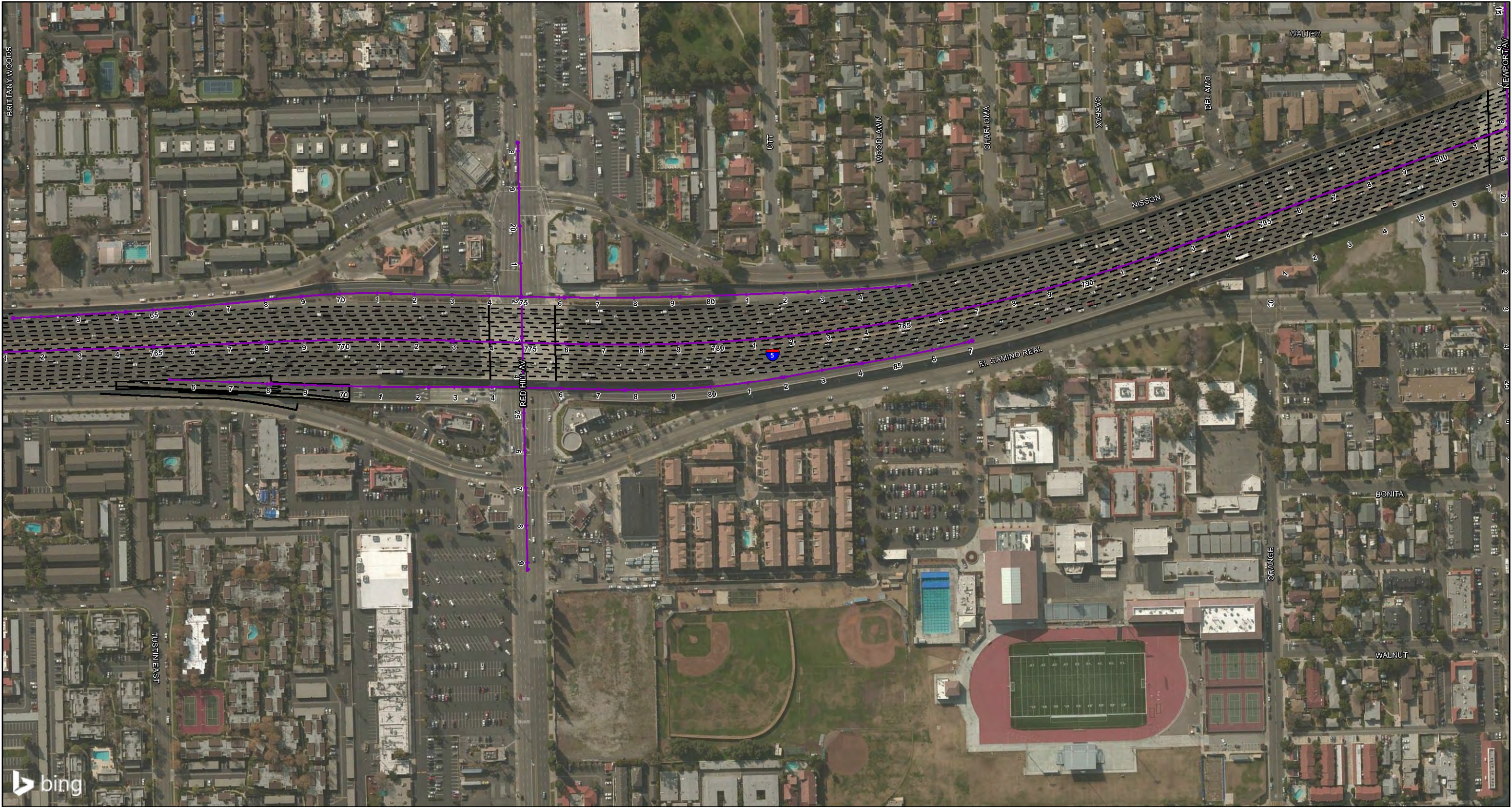
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LEGEND

Alternative 2B

— Geometrics

— Centerline

- - - Striping



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FIGURE 1-4

Sheet 12 of 13

*I-5 Improvement Project: I-405 to SR-55*

**Alternative 2B (Preferred Alternative)**

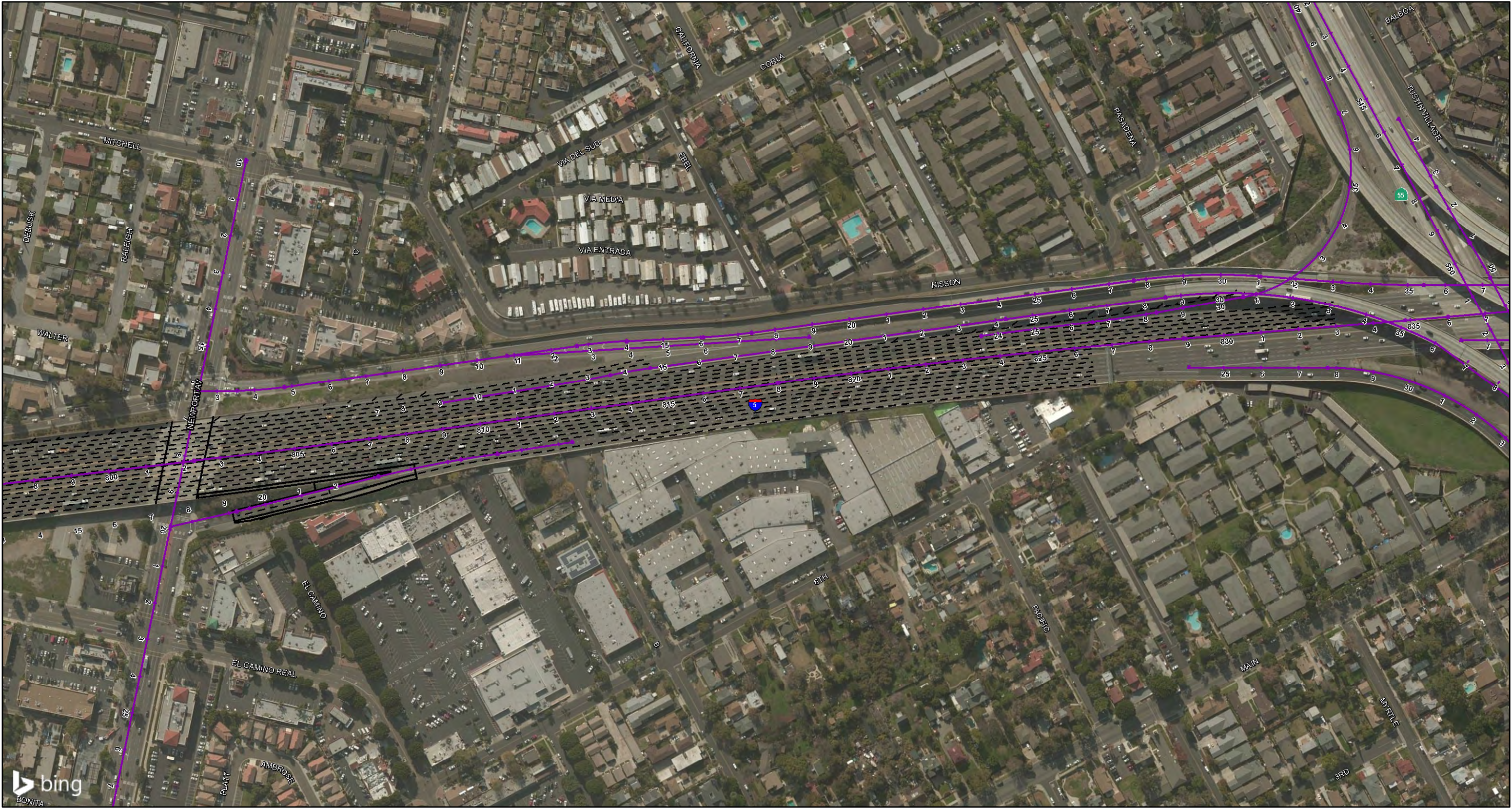
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LEGEND

Alternative 2B

— Geometrics

— Centerline

- - - Striping



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FIGURE 1-4  
Sheet 13 of 13

*I-5 Improvement Project: I-405 to SR-55*  
**Alternative 2B (Preferred Alternative)**  
12-ORA-5 PM 21.3/30.3  
EA No. 0K670



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## **Right-of-Way Acquisition, Easements, and Temporary Construction Easements**

Table 1.8, below, provides the right-of-way acquisition details under Alternative 2B.

**Table 1.8: Right-of-Way Acquisitions, Easements, and Temporary Construction Easements Required under Alternative 2B**

| Alternative                            | TCE | Partial Acquisition/<br>TCE | Partial Acquisitions | Full Acquisitions |
|--|-----|-----------------------------|----------------------|-------------------|
| Alternative 2B (Preferred Alternative) | 7   | 10                          | 2                    | 1                 |
| Design Option 3 (2B)                   | 2   | 2                           | 0                    | 0                 |

TCE = Temporary Construction Easement

## **Utilities**

The utility relocations and/or protection in place for Alternative 2B are listed in Table 1.7.

## **Design Exceptions (Advisory and Mandatory)**

Alternative 2B requires additional design exceptions due to the nonstandard shoulder widths and nonstandard lane widths that occur at the following locations:

- I-5 at Alton Parkway
  - 8 ft (ft) right shoulders
  - 11 ft lanes on northbound and southbound I-5, except for the outer two lanes, which are 12 ft wide
- Jeffrey Road to Culver Drive
  - 2.9 ft to 4 ft inside shoulder on northbound I-5
  - 4 ft inside shoulder on southbound I-5
- Northbound I-5 Off-Ramp to Jamboree Road
  - 4 ft right shoulder across the bridge over SR-261
- Tustin Ranch Road to Newport Avenue
  - 4 ft inside shoulder on northbound and southbound I-5
- Newport Avenue to south of SR-55
  - 2 ft inside shoulder on northbound and southbound I-5
  - 11 ft lanes on northbound and southbound I-5 except for the outer two northbound lanes, which are 12 ft wide



## Noise Attenuation

Noise barrier surveys were sent to the benefited receptors for the feasible and reasonable noise barriers identified in the Noise Abatement Decision Report (NADR). Based on the *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects* (May 2011) for abatement located within State right-of-way, if more than 50 percent of the votes from responding benefited receptors oppose the abatement, the abatement will not be considered reasonable. Votes from property owners and non-owner occupants of benefited receptors were surveyed. For owner-occupied dwelling units, the property owner gets one vote. For non-owner-occupied dwelling units, the renter gets 10 percent of one vote and the owner get 90 percent of one vote. For noise abatement to occur on private property, 100 percent of owners of the property upon which the abatement is to be placed must support the proposed abatement. In the case of proposed noise abatement on private property, no response from a property owner, after a reasonable number of attempts, is considered a “no” vote.

On May 14, 2018, noise barrier survey letters were delivered via United States Postal Service (USPS) Certified Mail to a total of 1,308 property owners and non-owner occupants of the benefited receptors to obtain their viewpoints on the feasible and reasonable noise barriers. Specifically, for noise barriers located within the State right-of-way, survey letters were delivered to both property owners and non-owner occupants. For noise barriers located on private property, survey letters were delivered to property owners only. Residents were asked to respond by June 15, 2018, and informed that surveys not received by the due date would be counted as a “no” vote. A follow-up letter, dated July 11, 2018, and the original survey letter package were delivered to property owners who had not responded to the initial survey letter via USPS Priority Mail. The follow-up survey responses were due August 1, 2018. After August 1, 2018, an assessment was conducted specifically for property owners located behind private property noise barriers. Site visits were used to contact the property owners to obtain their viewpoint on the proposed noise barrier.

Following the due dates from the surveys, the responses were tallied for each of the noise barriers. Based on the responses received, the 16 ft high barrier received the highest vote for Noise Barrier Nos. 1.1, 3.3, 4.1<sup>1</sup>, 6.1, 6.2, 7.2, 10.1, 11.2/11.4, 13.1,

<sup>1</sup> Although Alternative 2B received 11 votes not in favor of the noise barrier, the 9 votes in favor of the noise barrier represent a total of 193 residential units. Therefore, the votes in favor of the barrier outweigh the votes not in favor of the barrier.



and 14.1. Noise Barrier Nos. 7.2, 10.1, 13.1, and 14.1 were not considered under Alternative 2B; therefore, they are not included as part of the Preferred Alternative. In addition, Noise Barrier Nos. 3.2, 4.3, and 14.3 would no longer be considered for construction because the owner(s) of the properties on which the noise barrier would be constructed did not achieve 100 percent support. Based on these responses and the selection of the Build Alternative with Alternative 2B as the Preferred Alternative, Noise Barrier Nos. 1.1, 3.3, 4.1, 6.1, 6.2, and 11.2/11.4 will be carried forward into final design.

The preliminary noise abatement decision presented here is based on preliminary project alignments and profiles, which may be subject to change during the design phase. As such, the physical characteristics of noise abatement measures described herein may also be subject to change. The final decision regarding noise abatement measures is made during final design. The public will be notified of the final location and height of noise abatement measures during final design.

### 1.3.2 Project Costs

The estimated right-of-way and construction costs for Alternatives 2A and 2B range from \$332 million to \$723 million. As shown in Table 1.9, estimated right-of-way, construction, and support costs for Alternatives 2A and 2B with Design Option 3 range from \$411 million to \$891 million, escalated to year 2028. As noted earlier, the Build Alternative is anticipated to be constructed with M2 funds and/or other State and federal funding sources.

**Table 1.9: Estimated Right-of-Way and Construction Costs (2028)**

| <b>Capital Cost Estimate<br/>(Escalated Costs)</b> | <b>Alternative 2A</b> | <b>Alternative 2A<br/>with Design<br/>Option 3</b> | <b>Alternative 2B<br/>(Preferred<br/>Alternative)</b> | <b>Alternative 2B<br/>with Design<br/>Option 3</b> |
|--|-----------------------|--|---|--|
| Construction Costs                                 | \$496M                | \$614M   | \$291M  | \$419M   |
| Right-of-Way Costs                                 | \$97M                 | \$109M   | \$41M   | \$50M  |
| Support Costs                                      | \$138M                | \$168M   | \$79M   | \$114M   |
| <b>Total Costs</b>                                 | <b>\$731M</b>         | <b>\$891M</b>                                      | <b>\$411M</b>   | <b>\$583M</b>                                      |

### 1.3.3 Construction Schedule

Construction of the Build Alternative is scheduled to begin in 2024 with a construction duration of approximately four years. The majority of the work will be conducted during the day behind k-rails with some supplemental work to be done at night. While short-term ramp closures are anticipated for this project, full freeway



nighttime closures will be minimal (to set k-rails, place falsework, and for bridge demolition activities). The contractor shall contact the respective Transportation Management Center (TMC) for Caltrans District 12, and the Cities of Irvine and Tustin, regarding events taking place in Irvine and Tustin, and coordinate timing for construction activities.

Construction is proposed to occur in two stages. The first stage provides a construction work zone on the outside of the freeway while shifting the traffic to the inner shoulder; the second stage maintains mainline striping and the lane layout from the initial construction stage, but on- and off-ramp traffic would be shifted, and may include additional sub-staging areas. The two-stage configuration would suffice for constructing the majority of the proposed widening. However, there are certain locations within the project limits that would require a limited full freeway nighttime closure, speed reduction, or substantial temporary construction. These locations include:

- Westbound Jeffrey Road to northbound I-5 on-ramp (temporary ramp construction is proposed for this location)
- Red Hill Avenue to northbound I-5 (short-term ramp closures during construction Stages 1 and 2)
- Northbound SR-55 connector to southbound I-5 connector (speed reductions)
- Limited/directional closure of I-5 mainline at Alton Parkway (for the placement of falsework to construct proposed bridge) (Alternative 2A only)
- Limited/directional closure of I-5 mainline at Jeffrey Road (for the placement of falsework to construct proposed bridge) (Alternative 2A only)

## **1.4 Comparison of Alternatives**

Table 1.10 provides information for comparison of the design variations of Alternative 2 (Alternatives 2A and 2B), and the No Build Alternative. The table summarizes the criteria used to evaluate the project alternatives, including design features, operational improvements, and environmental impacts. The criteria were developed by the Project Development Team (PDT) and informed the selection of the Preferred Alternative.

After the public circulation period, all comments were considered, and Caltrans selected a Preferred Alternative and made the final determination of the project's effect on the environment. Under CEQA, no unmitigable significant adverse impacts were identified, and Caltrans prepared a Mitigated Negative Declaration (MND).



Similarly, Caltrans, as assigned by the FHWA, determined that the NEPA action does not significantly impact the environment, and Caltrans is issuing a Finding of No Significant Impact (FONSI).

## 1.5 Identification of Preferred Alternative

On March 14, 2019, the PDT decided to recommend the Build Alternative with Alternative 2B as the Preferred Alternative. In making this selection, the PDT compared the alternatives analyzed in the IS/EA using the evaluation criteria as defined by the Purpose and Need for the project as well as criteria determined by the PDT. These criteria were as follows:

- Increase the mainline capacity within the project limits along the I-5 corridor;
- Improve the capacity of the ramps within the project limits along the I-5 corridor;
- Improve operational deficiencies of merge and diverge areas within the project limits along the I-5 corridor;
- Improve the existing auxiliary lanes operations;
- Optimize access of the existing HOV lane;
- Minimize right-of-way acquisitions;
- Minimize permanent community impacts;
- Minimize temporary construction impacts;
- Maintain consistency with regional plans;
- Provide cost effectiveness;
- Receive public comments; and
- Provide project delivery in the next 10 years.

Using these criteria, the Build Alternative with Alternative 2B was recommended as the Preferred Alternative. Alternative 2B would increase capacity and operations without acquisition of substantial right-of-way. Alternative 2B was recommended over Alternative 2A because the criteria analysis showed that Alternative 2B minimizes temporary construction impacts and that project delivery in the next 10 years can be assured. As a result, there was not sufficient benefit to warrant implementation of Alternative 2A. The impacts associated with Alternative 2B are minimal compared to the benefits to the motoring public and the surrounding residents.



**Table 1.10: Summary of Alternatives and Impacts**

| Environmental Issue  | No Build Alternative<br>Alternative 1   | Build Alternative  |  |
|--|---|--|--|
|  |   | Alternative 2A   | Alternative 2B <sup>1</sup><br>(Preferred Alternative)   |
| Project Features and Design Standards  |   |  |  |
| Number of Lanes  | 1 HOV lane, 4 or 5 general-purpose lanes, and auxiliary lanes provided at some locations. | 1 HOV lane, 5 or 6 general-purpose lanes, including restoring existing auxiliary lanes, and the addition of new auxiliary lanes.     | 1 HOV lane, 5 or 6 general-purpose lanes, including restoring existing auxiliary lanes, and the addition of new auxiliary lanes.                                 |
| Travel Lanes consistent with the Caltrans <i>Highway Design Manual</i> ?                                 | No  | No   | No. Contains additional segments of nonstandard lane widths than Alternative 2A.   |
| Shoulders consistent with the Caltrans <i>Highway Design Manual</i> ?                                    | No  | No (spot locations)  | No (spot locations). Contains longer stretches of nonstandard shoulders and lanes than Alternative 2A.   |
| Horizontal clearances consistent with the Caltrans <i>Highway Design Manual</i> ?                        | No  | No   | No   |
| Vertical clearances consistent with the Caltrans <i>Highway Design Manual</i> ?                          | No  | 2 will not meet minimum standard but are same as existing condition (Sand Canyon Avenue undercrossing and Yale Avenue overcrossing). | 3 will not meet minimum standard but are same as existing condition (Sand Canyon Avenue undercrossing, Yale Avenue overcrossing, and Jeffrey Road overcrossing). |
| Number of freeway segments operating at unacceptable LOS in AM/PM peak hours(out of a total 35 segments) | <ul style="list-style-type: none"><li>• 24/35 AM</li><li>• 21/35 PM</li></ul>             | <ul style="list-style-type: none"><li>• 24/35 AM</li><li>• 18/35 PM</li></ul>  | <ul style="list-style-type: none"><li>• 24/35 AM</li><li>• 18/35 PM</li></ul>  |
| Number of Parcels Impacted   | None  | <ul style="list-style-type: none"><li>• 55</li><li>• 4 additional with Design Option 3</li></ul>                                     | <ul style="list-style-type: none"><li>• 20</li><li>• 4 additional with Design Option 3</li></ul>   |
| Total Project Cost   | None  | \$731 million  | \$411 million  |
| Construction Duration  | None  | Up to four years   | Up to four years   |



**Table 1.10: Summary of Alternatives and Impacts**

| Environmental Issue               | No Build Alternative<br>Alternative 1             | Build Alternative   |   |
|-----------------------------------|---|---|---|
|                                   |   | Alternative 2A  | Alternative 2B <sup>1</sup><br>(Preferred Alternative)  |
| Potential Environmental Impacts   |   |   |   |
| Land Use                          | Not consistent with applicable circulation plans. | Alternative 2A is consistent with local, regional, and State plans.   | Alternative 2B is consistent with local, regional, and State plans.   |
| Parks and Recreational Facilities | No impact.  | <ul style="list-style-type: none"><li>• Conversion of approximately one ac of existing open space and recreation land uses to transportation uses</li><li>• With Design Option 3, conversion of approximately three ac of existing open space and recreation land uses to transportation uses.</li><li>• Conversion of less than one ac of land planned for open space and recreation land uses.</li><li>• With Design Option 3, conversion of less than one ac of land planned for open space and recreation land uses.</li><li>• Sliver acquisitions on the perimeter of Heritage Park and Orchard Park. None of the activities or facilities on the park would be impaired.</li><li>• Replacement of Jeffrey Open Space Trail overcrossing. Permanent access to an overpass connecting Jeffrey Open Space Trail would be maintained.</li></ul> | <ul style="list-style-type: none"><li>• Conversion of approximately 0.3 ac of land classified as existing open space and recreation uses to transportation uses.</li><li>• With Design Option 3, conversion of approximately two ac of land classified as existing open space and recreation uses.</li><li>• Neither Alternative 2B nor Alternative 2B with Design Option 3 would result in any permanent impacts to parks or recreational facilities.</li><li>• Design Option 3 would convert approximately six ac of land planned for open space and recreation land uses into transportation uses.</li></ul> |
| Farmlands and Timberlands         | No impact.  | No impact.  | No impact.  |
| Growth                            | No impact.  | Alternative 2A would not influence the rate, type, or amount of growth and would not result in unplanned growth.  | Alternative 2B would not influence the rate, type, or amount of growth and would not result in unplanned growth.  |



**Table 1.10: Summary of Alternatives and Impacts**

| Environmental Issue          | No Build Alternative<br>Alternative 1 | Build Alternative   |   |
|------------------------------|---------------------------------------|---|---|
|                              |                                       | Alternative 2A  | Alternative 2B <sup>1</sup><br>(Preferred Alternative)  |
| Community Impacts            | No impact.                            | Community Character and Cohesion: <ul style="list-style-type: none"> <li>• Temporary impacts related to increased travel times during construction of the Alton Parkway and Jeffrey Road overcrossings.</li> <li>• Potential removal of up to 75 parking spaces.</li> <li>• Minimal alterations to community character and cohesion, and no substantial adverse effects to communities would occur.</li> </ul>  | Community Character and Cohesion: Minimal alterations to community character and cohesion, and no substantial adverse effects to communities would occur.   |
|                              | No impact.                            | Two full acquisitions, four partial acquisitions with no associated TCEs, 29 partial acquisitions with associated TCEs, and 20 TCEs with no associated partial acquisitions. The two full acquisitions result in five relocations.<br><br>Design Option 3 requires no additional full acquisitions or relocations, two partial acquisitions with associated TCEs, and two TCEs with no associated partial acquisitions.   | One full acquisition, two partial acquisitions with no associated TCEs, 11 partial acquisitions with associated TCEs, and 6 TCEs with no associated partial acquisitions. No relocations are required.<br><br>Design Option 3 requires no additional full acquisitions or relocations, two partial acquisitions with associated TCEs, and two TCEs with no associated partial acquisitions. |
|                              | No impact.                            | Environmental Justice: Low-income and minority populations would not be adversely affected.   | Environmental Justice: Low-income and minority populations would not be adversely affected.   |
| Utilities/Emergency Services | No impact.                            | <ul style="list-style-type: none"> <li>• During construction, some impairment to the delivery of emergency services, including fire and police response times, may occur due to limited lane closures on the mainline, ramps and arterials.</li> <li>• During operation, improvements in traffic flow are likely to improve emergency response times within the Study Area.</li> <li>• No permanent adverse effects on utility facilities and providers.</li> </ul> | <ul style="list-style-type: none"> <li>• During construction, some impairment to the delivery of emergency services, including fire and police response times, may occur due to limited lane closures on the mainline, ramps and arterials.</li> <li>• During operation, improvements in traffic flow are likely to improve emergency response times within the Study Area.</li> </ul>      |



**Table 1.10: Summary of Alternatives and Impacts**

| Environmental Issue  | No Build Alternative<br>Alternative 1 | Build Alternative  |  |
|--|---------------------------------------|--|--|
|  |                                       | Alternative 2A   | Alternative 2B <sup>1</sup><br>(Preferred Alternative)   |
|  |                                       |  | <ul style="list-style-type: none"> <li>No permanent adverse effects on utility facilities and providers.</li> </ul>  |
| Traffic and Transportation/Pedestrian and Bicycle Facilities | Long-term negative impact.            | <ul style="list-style-type: none"> <li>Temporary affects to freeway and local street traffic during bridge replacement construction, as well as during the widening of I-5.</li> <li>Alternative 2A would improve traffic operations and reduced congestion in the long term.</li> </ul>   | <ul style="list-style-type: none"> <li>Temporary affects to freeway and local street traffic during bridge replacement construction, as well as during the widening of I-5.</li> <li>Alternative 2B would improve traffic operations and reduced congestion in the long term.</li> </ul> |
| Visual/Aesthetics  | No impact.                            | <ul style="list-style-type: none"> <li>Alternative 2A would result in temporary impacts to visual/aesthetic resources during construction.</li> <li>Alternative 2A would result in permanent wall, elevated structures, and landscaping enhancements.</li> </ul>   | <ul style="list-style-type: none"> <li>Alternative 2B would result in temporary impacts to visual/aesthetic resources during construction.</li> <li>Alternative 2B would result in permanent wall, elevated structures, and landscaping enhancements.</li> </ul>                         |
| Cultural Resources   | No impact.                            | <ul style="list-style-type: none"> <li>Alternative 2A would have the potential to encounter unknown cultural resources during construction.</li> <li>Alternative 2A would not result in long-term impacts to cultural resources.</li> </ul>  | <ul style="list-style-type: none"> <li>Alternative 2B would have the potential to encounter unknown cultural resources during construction.</li> <li>Alternative 2B would not result in long-term impacts to cultural resources.</li> </ul>  |
| Hydrology and Floodplain                                     | No impact.                            | <ul style="list-style-type: none"> <li>Construction activities associated with Alternative 2A could result in indirect impacts to the functions and values of Peters Canyon Wash and to the beneficial uses of downstream and all receiving waters in the Study Area through degradation of water quality from pollutants of concern. The wetland area in Peters Canyon Wash could be directly impacted when the bridge over the channel is widened. Disturbance of wetland vegetation could introduce sediment or pollutants into the water that could result in direct impacts to water</li> </ul> | <ul style="list-style-type: none"> <li>Impacts under Alternative 2B to Hydrology and Floodplains would be the same as Alternative 2A.</li> </ul>   |



**Table 1.10: Summary of Alternatives and Impacts**

| Environmental Issue                  | No Build Alternative<br>Alternative 1 | Build Alternative  |  |
|--------------------------------------|---------------------------------------|--|--|
|                                      |                                       | Alternative 2A   | Alternative 2B <sup>1</sup><br>(Preferred Alternative)   |
|                                      |                                       | <p>resource values and living resource value provided by the wetland. Erosion and the downstream transport of sediments could occur from land and vegetation clearing. Potential construction-related impacts to channel functions would be restored after construction is complete.</p> <ul style="list-style-type: none"> <li>Alternative 2A would result in permanent minimal changes in water surface elevation, base flood elevations, base flood flow volumes and rates in the channels impacted by Alternative 2A. Floodplain encroachments would be minimal and there is low potential for overtopping of newly-constructed bridges. The OCPW freeboard requirement would be met by all channels with the exception of the El Modena-Irvine Channel (which will be calculated during final design).</li> </ul> |  |
| Water Quality and Storm Water Runoff | No impact.                            | <ul style="list-style-type: none"> <li>Construction activities associated with Alternative 2A would disturb a total area of 195 ac, resulting in temporary impacts to water quality and storm water runoff during construction.</li> <li>Alternative 2A would result in the permanent increase in impervious surface area of 21 ac, thereby increasing the volume of runoff and permanent improvement in water quality with project Treatment BMPs.</li> </ul>   | <ul style="list-style-type: none"> <li>Construction activities associated with Alternative 2B would disturb a total area of 155 ac, resulting in temporary impacts to water quality and storm water runoff during construction.</li> <li>Alternative 2B would result in the permanent increase in impervious surface area of 14 ac, thereby increasing the volume of runoff and permanent improvement in water quality with project Treatment BMPs.</li> </ul> |



**Table 1.10: Summary of Alternatives and Impacts**

| Environmental Issue              | No Build Alternative<br>Alternative 1 | Build Alternative  |  |
|----------------------------------|---------------------------------------|--|--|
|                                  |                                       | Alternative 2A   | Alternative 2B <sup>1</sup><br>(Preferred Alternative)   |
| Geology/Soils/Seismic/Topography | No impact.                            | <ul style="list-style-type: none"> <li>Alternative 2A would result in temporary impacts to geology, soils, seismic, and topography impacts during construction.</li> <li>Alternative 2A would not result in substantial long-term impacts to geology, soils, seismic, and topography impacts during construction.</li> </ul>   | <ul style="list-style-type: none"> <li>Alternative 2B would result in temporary impacts to geology, soils, seismic, and topography impacts during construction.</li> <li>Alternative 2B would not result in substantial long-term impacts to geology, soils, seismic, and topography impacts during construction.</li> </ul>   |
| Paleontology                     | No impact.                            | <ul style="list-style-type: none"> <li>Alternative 2A would have the potential to encounter unknown paleontological resources during construction.</li> <li>Alternative 2A would have the potential to impact paleontological resources because the depth of excavation would be more than 10 ft in some locations.</li> </ul>   | <ul style="list-style-type: none"> <li>Alternative 2B would have the potential to encounter unknown paleontological resources during construction.</li> <li>Alternative 2B would have the potential to impact paleontological resources because the depth of excavation would be more than 10 ft in some locations.</li> </ul> |
| Hazardous Waste/Materials        | No impact.                            | <ul style="list-style-type: none"> <li>Eight TCEs and partial acquisitions could result in potential effects related to hazardous materials and wastes.</li> <li>Operation would not result in adverse impacts related to hazardous waste or materials.</li> </ul>   | <ul style="list-style-type: none"> <li>Two TCEs and partial acquisitions could result in potential effects related to hazardous materials and wastes.</li> <li>Operation would not result in adverse impacts related to hazardous waste or materials.</li> </ul>   |
| Air Quality                      | No impact.                            | <ul style="list-style-type: none"> <li>During construction, emissions from construction equipment include CO, NO<sub>x</sub>, VOCs, directly-emitted particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), diesel exhaust particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), soot particulate (PM<sub>10</sub> and PM<sub>2.5</sub>), SO<sub>2</sub>, dust, and odor.</li> <li>The proposed project is not a project of air quality concern under 40 CFR 93.123(b)(1).</li> </ul> | <ul style="list-style-type: none"> <li>Impacts under Alternative 2B to Air Quality would be the same as Alternative 2A.</li> </ul>   |



**Table 1.10: Summary of Alternatives and Impacts**

| Environmental Issue       | No Build Alternative<br>Alternative 1 | Build Alternative   |   |
|---------------------------|---------------------------------------|---|---|
|                           |                                       | Alternative 2A  | Alternative 2B <sup>1</sup><br>(Preferred Alternative)  |
| Noise and Vibration       | No impact.                            | <ul style="list-style-type: none"> <li>Alternative 2A would result in temporary impacts during construction.</li> <li>Alternative 2A would not result in perceptible permanent increase in noise once existing walls are reconstructed to match the existing height (at a minimum).</li> <li>The following noise barriers under Alternative 2A were determined to be reasonable and feasible: Noise Barrier Nos. 1.1, 3.3, 4.1, 4.3, 6.1, 6.2, 7.2, 10.1, 11.2, 11.2 (slope), 11.2/11.4, 11.3, 13.1, 14.1, and 14.3.</li> </ul> | <ul style="list-style-type: none"> <li>Alternative 2B would result in temporary impacts during construction.</li> <li>Alternative 2B would not result in perceptible permanent increase in noise once existing walls are reconstructed to match the existing height (at a minimum).</li> <li>The following noise barriers under Alternative 2B were determined to be reasonable and feasible: Noise Barrier Nos. 1.1, 3.3, 4.1, 6.1, 6.2, 11.2/11.4.</li> </ul> |
| Natural Communities       | No impact.                            | <ul style="list-style-type: none"> <li>Alternative 2A would result in temporary impacts to natural communities during construction.</li> <li>Alternative 2A could result in permanent impacts to bats and bat-roosting habitat.</li> </ul>  | <ul style="list-style-type: none"> <li>Alternative 2B would result in temporary impacts to natural communities during construction.</li> <li>Alternative 2B could result in permanent impacts to bats and bat-roosting habitat.</li> </ul>  |
| Wetlands and Other Waters | No impact.                            | <ul style="list-style-type: none"> <li>Alternative 2A would result in 5.11 ac of temporary impacts to USACE and SWRCB jurisdiction.</li> <li>Alternative 2A would result in 0.71 ac of permanent impacts to USACE jurisdiction, 5.82 ac of permanent impacts to CDFW jurisdiction, and would not impact wetlands subject to USACE jurisdiction.</li> </ul>  | <ul style="list-style-type: none"> <li>Alternative 2B would result in 5.10 ac of temporary impacts to USACE and SWRCB jurisdiction.</li> <li>Alternative 2B would result in 0.71 ac of permanent impacts to USACE jurisdiction, 5.79 ac of permanent impacts to CDFW jurisdiction, and would not impact wetlands subject to USACE jurisdiction.</li> </ul>  |
| Plant Species             | No impact.                            | No impact.  | No impact.  |
| Animal Species            | No impact.                            | <ul style="list-style-type: none"> <li>Potential for temporary impacts during construction to burrowing owls, migratory birds, bats, and other bridge- and crevice-nesting special-status species.</li> <li>No long-term impacts.</li> </ul>  | <ul style="list-style-type: none"> <li>Potential for temporary impacts during construction to burrowing owls, migratory birds, bats, and other bridge- and crevice-nesting special-status species.</li> <li>No long-term impacts.</li> </ul>  |



**Table 1.10: Summary of Alternatives and Impacts**

| Environmental Issue               | No Build Alternative<br>Alternative 1   | Build Alternative  |  |
|-----------------------------------|---|--|--|
|                                   |   | Alternative 2A   | Alternative 2B <sup>1</sup><br>(Preferred Alternative)   |
| Threatened and Endangered Species | No impact.  | No impact.   | No impact.   |
| Invasive Species                  | No impact.  | Alternative 2A would not result in adverse impacts related to invasive species.  | Alternative 2B would not result in adverse impacts related to invasive species.  |
| Cumulative Impacts                | No impact.  | No impact.   | No impact.   |
| Climate Change                    | No temporary impacts.<br><br>The No Build Alternative would result in a decrease in CO <sub>2</sub> emissions of 381.56 tons/day in 2030 and 421.35 tons/day in 2050 compared to existing conditions. | <ul style="list-style-type: none"> <li>Alternative 2A would result in a temporary increase of construction emissions.</li> <li>Alternative 2A would result in an increase in CO<sub>2</sub> emissions of 32.13 tons/day in 2030 and 37.15 tons/day in 2050 compared to the No Build Alternative.</li> <li>Alternative 2A would result in a decrease in CO<sub>2</sub> emissions of 349.43 tons/day in 2030, and 384.2 tons/day in 2050 compared to existing conditions.</li> </ul> | <ul style="list-style-type: none"> <li>Alternative 2B would result in a temporary increase of construction emissions.</li> <li>Alternative 2B would result in an increase in CO<sub>2</sub> emissions of 32.13 tons/day in 2030 and 37.15 tons/day in 2050 compared to the No Build Alternative.</li> <li>Alternative 2B would result in a decrease in CO<sub>2</sub> emissions of 349.43 tons/day in 2030, and 384.2 tons/day in 2050 compared to existing conditions.</li> </ul> |

<sup>1</sup> Alternative 2B without Design Option 3 has been selected as the Preferred Alternative.

ac = acre(s)  
 BMPs = Best Management Practices  
 CDFW = California Department of Fish and Wildlife  
 CFR = Code of Federal Regulations  
 CO = carbon monoxide  
 CO<sub>2</sub> = carbon dioxide  
 ft = foot/feet  
 LOS = level(s) of service  
 NO<sub>x</sub> = nitrogen oxides

OCPW = Orange County Public Works  
 PM<sub>10</sub> = particulate matter less than 10 microns in size  
 PM<sub>2.5</sub> = particulate matter less than 2.5 microns in size  
 SWRCB = State Water Resources Control Board  
 SO<sub>2</sub> = sulfur dioxide  
 TCE = Temporary Construction Easement  
 USACE = United States Army Corps of Engineers  
 VOC = volatile organic compounds



## **1.6 Alternatives Considered but Eliminated from Further Consideration Prior to the “Draft” Initial Study/ Environmental Assessment (IS/EA)**

### **1.6.1 Value Analysis**

A Value Analysis (VA) for this project was conducted in September 2016. The VA included coordination with Caltrans, the OCTA, and consultants known as the Value Analysis Team, or VA Team. The following alternatives from the VA were considered by the VA Team:

- 1.0** Improve vertical clearance at Jeffrey Road to eliminate constructing a new bridge by increasing cross fall to 3 percent for the widened lane
- 2.0** Accommodate proposed additional general purpose lanes within the existing right-of-way to save retaining wall, soundwall, bridge, and right-of-way costs from Jeffrey Road to SR-55
- 3.0** Construct a multiple lane northbound I-5 collector-distributor road between Sand Canyon Avenue on-ramp and Jeffrey Road off-ramp in lieu of Design Option 3

The *Final Value Analysis Study Report* was approved on January 2017 and recommended that the following alternatives and design suggestions be eliminated from further consideration (see Table 1.11 for more detail):

- VA Alternatives 1.0, 2.0, and 3.0 were rejected due to each alternative having geometric and/or operational issues, as described below:
  - **VA Alternative 1.0**—Using a 3 percent cross fall on the widened lane will not provide the standard vertical clearance needed.
  - **VA Alternative 2.0**—This concept is already partially incorporated as part of Alternative 2B. Additionally, any benefits of this alternative cannot be quantified at this time due to the many unknowns.
  - **VA Alternative 3.0**—Changing the braided ramp configuration to a collector-distributor road would not improve the operation of weaving movements at this location due to the short distance available between Sand Canyon Avenue and Jeffrey Road.



**Table 1.11: Alternatives and Design Suggestions Eliminated from Further Consideration**

| VA Alternative                     | Design Suggestion | Description  | Conclusion  | Move Forward or Not? |
|------------------------------------|-------------------|--|---|----------------------|
| <b>Rejected VA Alternatives</b>    |                   |  |   |                      |
| VA Alternative 1.0                 |                   | Improve vertical clearance at Jeffrey Road to eliminate constructing a new bridge by increasing cross fall to 3% for the widened lane.   | The VA team agreed to discard as not viable because this alternative would not provide the required vertical clearance if the freeway is widened and is considered infeasible. Instead, widening the freeway by 1 ft would reduce the minimum vertical clearance below the standard for a freeway with an overlay.  | No                   |
| VA Alternative 2.0                 |                   | Accommodate proposed additional general-purpose lanes within the existing right-of-way to save retaining wall, noise barrier, bridge, and right-of-way costs from Jeffrey Road to SR-55. | The VA team agreed to discard as not viable because this alternative has already been proposed through Alternatives 2A and 2B. In addition, this alternative contains several unknown parameters; therefore, it is too early to make a quantification of any value impacts.   | No                   |
| VA Alternative 3.0                 |                   | Construct a multiple lane NB I-5 collector distributor road between Sand Canyon on ramp and Jeffery Road off-ramp in lieu of Option 3.   | The VA team agreed to discard as not viable because the weave section is too short to accommodate the high weaving volume and would not improve the operation of the weave as compared to the base condition (a standard weave on the mainline). Therefore, Alternative 3 is considered infeasible and fails to meet the Purpose and Need of the project. | No                   |
| <b>Rejected Design Suggestions</b> |                   |  |   |                      |
| 1, 2, and 3                        | 1                 | Do partial takes in lieu of full parcel takes.   | The VA team agreed to discard this design suggestion as not viable because this alternative has already been proposed by Alternatives 2A and 2B.  | No                   |
| 1, 2, and 3                        | 2                 | Review right-of-way requirements during design to minimize takes.  | The VA team agreed to discard this design suggestion as not viable because this alternative has already been proposed by Alternatives 2A and 2B.  | No                   |
| 1, 2, and 3                        | 3                 | Double deck some lanes.  | The VA team agreed to discard this design suggestion as not viable because this design suggestion is infeasible.  | No                   |
| 1, 2, and 3                        | 4                 | Design and construct Alternative 2B in lieu of Alternative 2A.   | The VA team agreed to discard this design suggestion as not viable because either Alternative 2A or Alternative 2B would be acceptable to design and construct.   | No                   |
| 1, 2, and 3                        | 5                 | Design and construct Alternative 2B with a two-lane northbound SR-133 connector in lieu of Option 3.   | The VA team agreed to discard this design suggestion as not viable because this design suggestion is already considered by the design team since Alternative 2B includes the connector.   | No                   |
| 1 and 2                            | 6                 | Design and construct Alternative 2A with Options 3 and 4.  | The VA team agreed to discard this design suggestion as not viable because it would compromise a potential future HOV ramp connector from SR-133 to I-5.  | No                   |



**Table 1.11: Alternatives and Design Suggestions Eliminated from Further Consideration**

| <b>VA Alternative</b> | <b>Design Suggestion</b> | <b>Description</b>   | <b>Conclusion</b>  | <b>Move Forward or Not?</b> |
|-----------------------|--------------------------|--|--|-----------------------------|
| 1 and 2               | 7                        | Design and construct Alternative 2B with Options 3 and 4.  | The VA team agreed to discard this design suggestion as not viable because it would compromise a potential future HOV ramp connector from SR-133 to I-5.   | No                          |
| 1, 2, and 3           | 8                        | Design and construct Alternative 2B with southbound auxiliary lane from southbound Sand Canyon to southbound SR-133.                                   | The VA team agreed to discard this design suggestion as not viable because this design suggestion is duplicative of design elements proposed by Alternatives 2A and 2B and is not considered a new idea.   | No                          |
| 1                     | 9                        | Increase cross fall to 3% on additional travel lane widening.  | Refer to the conclusion in response to Alternative 1, above.   | No                          |
| None                  | 10                       | Consider increasing the number of maintenance pullouts and water quality improvement areas.  | DS   | Yes                         |
| None                  | 11                       | Add slope paving on southbound I-5 at the Yale overcrossing in conjunction with proposed improvements.   | DS   | Yes                         |
| None                  | 12                       | Caltrans to provide past maintenance history for review to identify maintenance access areas behind walls to be documented in the project report.      | DS   | Yes                         |
| 1, 2, and 3           | 13                       | Eliminate car pool ramp at Barranca Parkway to reduce right-of-way.  | The VA team agreed to discard this design suggestion as not viable because this design suggestion would significantly degrade local access.  | No                          |
| None                  | 14                       | Change frontage road on Nisson Road to one way between Browning Avenue and Red Hill Avenue to reduce right-of-way acquisition costs.                   | DS   | Yes                         |
| None                  | 15                       | Review sidewalk quantity provided in the PSR cost estimate; seems too high.  | DS   | Yes                         |
| 1, 2, and 3           | 16                       | Make El Camino Road a northbound only road.  | The VA team agreed to discard this design suggestion as not viable because the VA team considers this to be the responsibility of the City of Tustin—evaluating consistency with the project's Purpose and Need.   | No                          |
| 1, 2, and 3           | 17                       | Make El Camino Real, from Newport Avenue to Browning Avenue, a divided collector with one lane in each direction with a center median.                 | The VA team agreed to discard this design suggestion as not viable because this design suggestion is considered to be the responsibility of the City of Tustin—evaluating consistency with the project's Purpose and Need.   | No                          |
| 3                     | 18                       | Construct a multiple lane northbound I-5 collector-distributor road between the Sand Canyon on-ramp and the Jeffery Road off-ramp in lieu of Option 3. | The VA team identified this design suggestion as a variation of Design Option 3 (northbound braid) that would require additional modeling to test the operational feasibility of this design suggestion. This idea would provide a roadway that is at grade, not elevated. | No                          |



**Table 1.11: Alternatives and Design Suggestions Eliminated from Further Consideration**

| <b>VA Alternative</b> | <b>Design Suggestion</b> | <b>Description</b>   | <b>Conclusion</b>   | <b>Move Forward or Not?</b> |
|-----------------------|--------------------------|--|---|-----------------------------|
| 1, 2, and 3           | 19                       | Reduce the HOV lane width from 12 ft to 11 ft for the entire project length to minimize retaining wall and right-of-way costs. | The VA team agreed to discard this design suggestion as not viable because the suggestion is not needed for the entire project length and would not be compatible with the goal to make all roadway features standard, when possible. | No                          |
| X                     | 20                       | Check the stopping sight distances to make sure they are adequate at reduced shoulder width areas.                             | DS  | Yes                         |
| 1, 2, and 3           | 21                       | Construct a lane on top of the existing box culvert between Jeffery Road and Culver Drive.                                     | The VA team agreed to discard this design suggestion as not viable because this design suggestion is already being proposed by Alternatives 2A and 2B and is not considered a new idea.   | No                          |
| 1, 2, and 3           | 22                       | Use rubberized asphalt to reduce noise.  | The VA team agreed to discard this design suggestion as not viable because the use of rubberized asphalt concrete on this facility would deteriorate faster than hot mix asphalt and would require more maintenance.                  | No                          |
| 1, 2, and 3           | 23                       | Add sound-absorbing materials to noise barriers.   | The VA team agreed to discard this design suggestion as not viable because materials used for this design suggestion require excessive maintenance due to spalling and pose a challenge to graffiti removal.                          | No                          |
| 1, 2, and 3           | 24                       | Install vegetation to reduce noise.  | The VA team agreed to discard this design suggestion as not viable because vegetation results in minimal sound reduction and would require high density to achieve any measurable sound reduction.                                    | No                          |
| 1, 2, and 3           | 25                       | Depress the freeway by approximately 10 ft to reduce noise.  | The VA team agreed to discard this design suggestion as not viable because this design suggestion is not practical.   | No                          |
| None                  | 26                       | Microplane road joints as flat as possible to reduce noise.  | DS  | Yes                         |
| None                  | 27                       | Design sound-absorbing chambers in noise barriers.   | DS  | Yes                         |
| 1, 2, and 3           | 28                       | Fund new noise barrier surface roughness concept with a pilot project.   | The VA team agreed to discard this design suggestion as not viable because this design suggestion is not feasible.  | No                          |
| 1, 2, and 3           | 29                       | Use tilt-up noise barrier construction method.   | The VA team agreed to discard this design suggestion as not viable because limited space in the project limits would not accommodate the area needed to tilt up noise barriers and this method is not a common practice.              | No                          |
| 1, 2, and 3           | 30                       | Use precast noise barrier construction.  | The VA team agreed to discard this design suggestion as not viable because this design suggestion is duplicative of another design suggestion.  | No                          |



**Table 1.11: Alternatives and Design Suggestions Eliminated from Further Consideration**

| <b>VA Alternative</b> | <b>Design Suggestion</b> | <b>Description</b>  | <b>Conclusion</b>   | <b>Move Forward or Not?</b> |
|-----------------------|--------------------------|---|---|-----------------------------|
| None                  | 31                       | Use area adjacent to southbound I-5 between Jamboree Road and Tustin Ranch Road and the southbound I-5 south of the Jeffery Road on-ramp for a construction laydown area and potential area for water quality BMPs. | DS  | Yes                         |
| 1, 2, and 3           | 32                       | Look into subway/light rail options to reduce vehicles on the roadway.  | The VA team agreed to discard as not viable because subway or light rail options do not meet project Purpose and Need. Refer to Section 1.5.1 following this table for an expanded discussion.  | No                          |
| None                  | 33                       | Evaluate the potential for traffic metering at southbound SR-133 to the northbound I-5 branch connector to improve the mainline operations at this location.  | DS  | Yes                         |
| 1, 2, and 3           | 34                       | Reduce inside shoulder width from 10 ft to 4 ft mostly in the Segment 3 area to eliminate need for new retaining walls (consider interchange-to-interchange application).   | The VA team agreed to discard this design suggestion as not viable because either Alternatives 2A or Alternative 2B would be acceptable to design and construct.  | No                          |
| 1                     | 35                       | Improve vertical clearance at Jeffery Road to eliminate constructing a new bridge by increasing cross fall to 3% for the widened lane.  | The VA team agreed to discard this design suggestion as not viable because this alternative would not provide the required vertical clearance if the freeway is widened and is considered infeasible. Instead, widening the freeway by 1 ft would reduce the minimum vertical clearance below the standard for a freeway with an overlay. | No                          |

Source: *Final Value Analysis Study Report* (January 2017).

BMPs = Best Management Practices

DS = Design Suggestion

ft = foot/feet

HOV = High-Occupancy Vehicle

I-5 = Interstate 5

NB = northbound

PSR = Project Study Report

SR-133 = State Route 133

VA = Value Analysis



The process of identifying and eliminating potential alternatives and design suggestions included: identification of key project issues; conducting a site visit to solidify or expand upon key project issues to be identified during this process; performing a cost assessment of identified alternatives and design suggestions; and performing a function analysis. The function analysis weighed project cost, performance, time, and risk for each of the following performance attributes:

- Mainline operations
- Maintainability
- Right-of-way impacts
- Environmental impacts
- Local operations
- Land-use compatibility
- Construction impacts

Those performance attributes were given unequal weight in the function analysis; mainline operations are given the highest priority whereas construction impacts are given the lowest priority. The list above identifies the order of priority in descending order. Therefore, alternatives and design suggestions that have negative impacts to mainline operations would be given a lower ranking than alternatives or design suggestions with negative construction impacts.

This function analysis process was designed to aid the VA team in ranking and eliminating alternatives and design suggestions that either do not meet the project's Purpose and Need, are determined to be infeasible, or would result in significant unavoidable environmental impacts. Refer to the *Final Value Analysis Study Report* (January 2017) for additional detail regarding this process.

### **1.6.2 Design Options**

Additionally, Design Options 2 and 4 were eliminated from consideration after the Value Analysis was complete. Design Option 2 consisted of the relocation/reconfiguration of the existing northbound Newport Avenue half-diamond on-ramp to hook on-ramps at the Orange Street/El Camino Real intersection. Design Option 4 consisted of a braid at the southbound Sand Canyon Avenue on-ramp with the southbound I-5/SR-133 connector. These design options were evaluated by the PDT to assess whether they should be brought forward for further consideration in this environmental document. On July 13, 2017, the PDT agreed that Option 2 does not achieve its objective of improving the traffic weave between the Newport Avenue on-



ramp and the northbound SR-55 and that Option 4 results in a worst-case level of service on adjacent freeway segments. As a result, these design options were withdrawn from further consideration and are not evaluated in detail in this environmental document.

### **1.6.3 Project Study Report/Project Development Study (PSR/PDS)**

As part of the I-5 PSR/PDS, other alternatives were considered to address congestion between SR-133 and Jeffrey Road that were similar to Design Options 3 and 4, but were ultimately rejected. Alternative 3A included additional braided ramp alignments in the northbound and southbound direction. Alternative 3B was similar to Alternative 3A, but included refinements to the geometrics of the braided ramps to reduce the right-of-way impacts. Alternative 3A was rejected due to the extensive right-of-way impacts, and Alternative 3B was rejected because the braided ramp refinements resulted in the elimination of access to SR-133.

### **1.6.4 Reversible Lanes**

Current (Existing Year 2014) directional volumes on I-5 within the project limits, from north of I-405 to south of SR-55, are essentially equal in the northbound and southbound direction in the AM and PM peak hours, for the general purpose lanes and the HOV lanes. Similarly, the future Design Year 2050 directional volumes are relatively equal for the AM and PM peak hours for the general purpose lanes and HOV lanes, indicating that a significant directional imbalance is not anticipated for the future year. Based on the relatively balanced directional volumes in the current year and future Design Year, reversible lanes are not warranted for implementation on I-5 within the project limits. Furthermore, due to the severe congestion currently experienced in the general purpose lanes in both directions, it is anticipated that the remaining lanes cannot accommodate off-peak volumes if reversible lanes were implemented. Therefore, reversible lane alternatives were withdrawn from further consideration and are not evaluated in detail in this environmental document.

### **1.6.5 Transportation Systems Management, Transportation Demand Management, and Transit Alternatives**

Alternative travel modes were considered in the *Final Value Analysis Study Report* (January 2017). Transportation Systems Management (TSM) strives to maximize the efficiency of the existing system through operational modifications such as ridesharing, reversible lanes, ramp metering, and closed circuit television additions for traffic-signal optimization and flow monitoring. The TSM strategy is to improve traffic flow and increase the number of vehicle trips without changing the number of



through lanes on a road. Transportation Demand Management (TDM) focuses on the demand side of travel behavior with regional strategies for reducing the number of vehicle trips and vehicle miles traveled, and increasing vehicle occupancy. It facilitates higher vehicle occupancy or reduces traffic congestion by expanding the traveler's transportation choice through initiatives such as telecommuting and changing work schedules to produce a more even pattern of transportation network use, muting the effect of morning and evening rush hours. In addition, multimodal transportation alternatives integrate multiple transportation modes, such as pedestrian, bicycle, automobile, rail, and mass transit.

The TSM, TDM, and multimodal transportation strategies have been and would continue to be provided in the I-5 corridor area. As discussed in Section 1.1.1, Existing Facility, the existing on-ramps along the I-5 project limits are all currently metered. Several bus routes operate on I-5 and the surrounding areas. The Build Alternative would maintain the existing ramp metering and would not permanently impact the bus lines. In addition, the Build Alternative would improve HOV lanes in each direction to operate with continuous access.

The TSM, TDM, and mass transit alternatives alone do not satisfy the proposed project purpose of improving both existing and future mobility, reducing congestion, and improving mainline weaving, merge, and diverge movements. As a result, design suggestion MT-1, a subway/light rail option, was withdrawn from further consideration and is not evaluated in detail in this environmental document.

## **1.7 Permits and Approvals Needed**

The following Permits, Licenses, Agreements, and Certifications (PLACs) are required for project construction, listed in Table 1.12.



**Table 1.12: PLACs Needed**

| <b>Agency</b>  | <b>PLAC</b>   | <b>Status</b>  |
|--|---|--|
| State Water Resources Control Board (SWRCB)            | NPDES Construction General-Permit Order No. 2009-009-DWQ, Permit Order No. 2010-0014-DWQ, and Permit Order No. 2012-0006-DWQ, NPDES No. CAS000002 (Section 402 of the CWA)  | Application and Notice of Intent will be submitted prior to construction.  |
|  | NPDES Permit, Statewide Storm Water Permit, Waste Discharge Requirements for the State of California and Caltrans, Order No. 2012-0011-DWQ, as amended by WQ 2014-0077-DWQ, NPDES No. CAS000003                               | General discharge permit has already been issued for all discharges on Caltrans projects and the project must comply with the requirements.  |
|  | CWA Section 401 Water Quality Certification or waiver   | Caltrans will submit the application to the SWRCB after approval of the Final Environmental Document. Caltrans will coordinate with the SWRCB to obtain water quality certification during final design. The SWRCB will provide comments on the application. Meetings between Caltrans and the SWRCB will be held if necessary during final design. Caltrans will obtain the certification or waiver from the SWRCB during final design and will implement the requirements included in the certification or waiver.   |
| Santa Ana Regional Water Quality Control Board (RWQCB) | Santa Ana Region dewatering requirement Order No. R8-2015-0004 (NPDES No. CAG998001), Order No. R8-2007-0041, as amended by Order No. R8-2009-0045 (NPDES No. CAG918002), and general discharge permit Order No. R8-2009-0045 | If dewatering is required, the project should demonstrate that groundwater being discharged to surface waters does not contain pollutants of concern (selenium and nitrates) in the discharge.   |
| United States Army Corps of Engineers (USACE)          | Federal Clean Water Act (CWA) Section 404 permit  | After approval of the Final Environmental Document, Caltrans/OCTA will submit an application to the USACE and will obtain authorization under the established LOP procedures. Before submitting an application to use the established LOP procedures, pre-application coordination is required for projects occurring within the San Diego Creek SAMP. Caltrans/OCTA will obtain the LOP and/or other required USACE permits prior to impacting areas under the jurisdiction of the USACE, the CDFW, and the RWQCB, and will implement the approved mitigation plan. |
| California Department of Fish and Wildlife (CDFW)      | Fish and Game Code Section 1602 Streambed Alteration Agreement  | Application will be submitted after Environmental Document approval. Caltrans will coordinate with CDFW to obtain agreement regarding riparian habitat impacts and mitigation.   |

**Table 1.12: PLACs Needed**

| Agency  | PLAC   | Status   |
|---|--|--|
| Federal Highway Administration (FHWA)               | Air Quality Conformity Approval Letter   | The <i>Air Quality Conformity Analysis</i> for the project was sent to the FHWA on April 25, 2019, for conformity determination. Approval was received on June 3, 2019 (refer to Chapter 4, for a copy of this determination)  |
| California Department of Transportation (Caltrans)  | Construction Encroachment Permit   | Application for a Caltrans construction encroachment permit will be submitted prior to construction, if contractor is procured by OCTA.  |
| Southern California Regional Rail Authority (SCRRA) | Construction and Maintenance (C&M) Agreement   | Agreement will be obtained prior to construction.  |
|   | Right of Entry agreement, SCRRA Form 6   | Agreement will be obtained prior to construction (during final design)   |
|   | Service contract   | Contract will be obtained prior to construction.   |
| City of Irvine                                      | Concurrence with Section 4(f) <i>de minimis</i> determination and Construction Encroachment Permit | On June 3, 2019, the City of Irvine provided written concurrence on the <i>de minimis</i> finding, prior to the approval of an MND/FONSI. Application for a City of Irvine construction encroachment permit for temporary access onto public rights-of-way will be submitted prior to construction.                              |
| City of Tustin                                      | Construction Encroachment Permit   | Application for a City of Tustin construction encroachment permit for temporary access onto public rights-of-way will be submitted prior to construction.  |
| Orange County Parks and Recreation                  | Concurrence with Section 4(f) <i>de minimis</i> determination and Construction Encroachment Permit | On June 5, 2019, the County of Orange provided written concurrence on the <i>de minimis</i> finding, prior to the approval of an MND/FONSI. Application for a County of Orange construction encroachment permit for temporary access onto public rights-of-way will be submitted prior to construction near Peters Canyon Trail. |
| Orange County Flood Control                         | Flood Control Encroachment Permit  | Permit will be obtained prior to construction.   |

IS/EA = Initial Study/Environmental Assessment

LOP = Letter of Permission

NPDES = National Pollutant Discharge Elimination System

NWP = Nationwide Permits

OCTA = Orange County Transportation Authority

PLACs = Permits, Licenses, Agreements, and Certifications

PS&amp;E = Plans, Specifications, and Estimates

SAMP = Special Area Management Plan



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