Chapter 1 Proposed Project

1.1 Introduction

California participated in the "Surface Transportation Project Delivery Pilot Program" (Pilot Program), pursuant to 23 United States Code (USC) 327, for more than five years, beginning July 1, 2007, and ending September 30, 2012. MAP-21 (Public Law 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, the California Department of Transportation ("Department") entered into a Memorandum of Understanding pursuant to 23 USC 327 (National Environmental Policy Act [NEPA] Assignment Memorandum of Understanding [MOU]) with the Federal Highway Administration (FHWA). The NEPA Assignment MOU became effective October 1, 2012, and was renewed on December 23, 2016, for a term of 5 years. In summary, the Department 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 the Department assumed all 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 the State Highway System within the State of California, except for certain categorical exclusions that FHWA assigned to the Department under the 23 USC 326 Categorical Exclusion Assignment MOU, projects excluded by definition, and specific project exclusions.

The California Department of Transportation (Caltrans) District 12, in cooperation with the Orange County Transportation Authority (OCTA), proposes to increase capacity on State Route (SR) 55 between Interstate (I-) 5 and SR 22 and provide operational improvement between SR 22 and SR 91 Post Miles 10.4 and R17.9, traversing the cities of Tustin, Santa Ana, Orange, and Anaheim in Orange County, California (Figure 1.1-1). Caltrans, as assigned by the FHWA, is the lead agency under NEPA and the lead agency under the California Environmental Quality Act (CEQA).

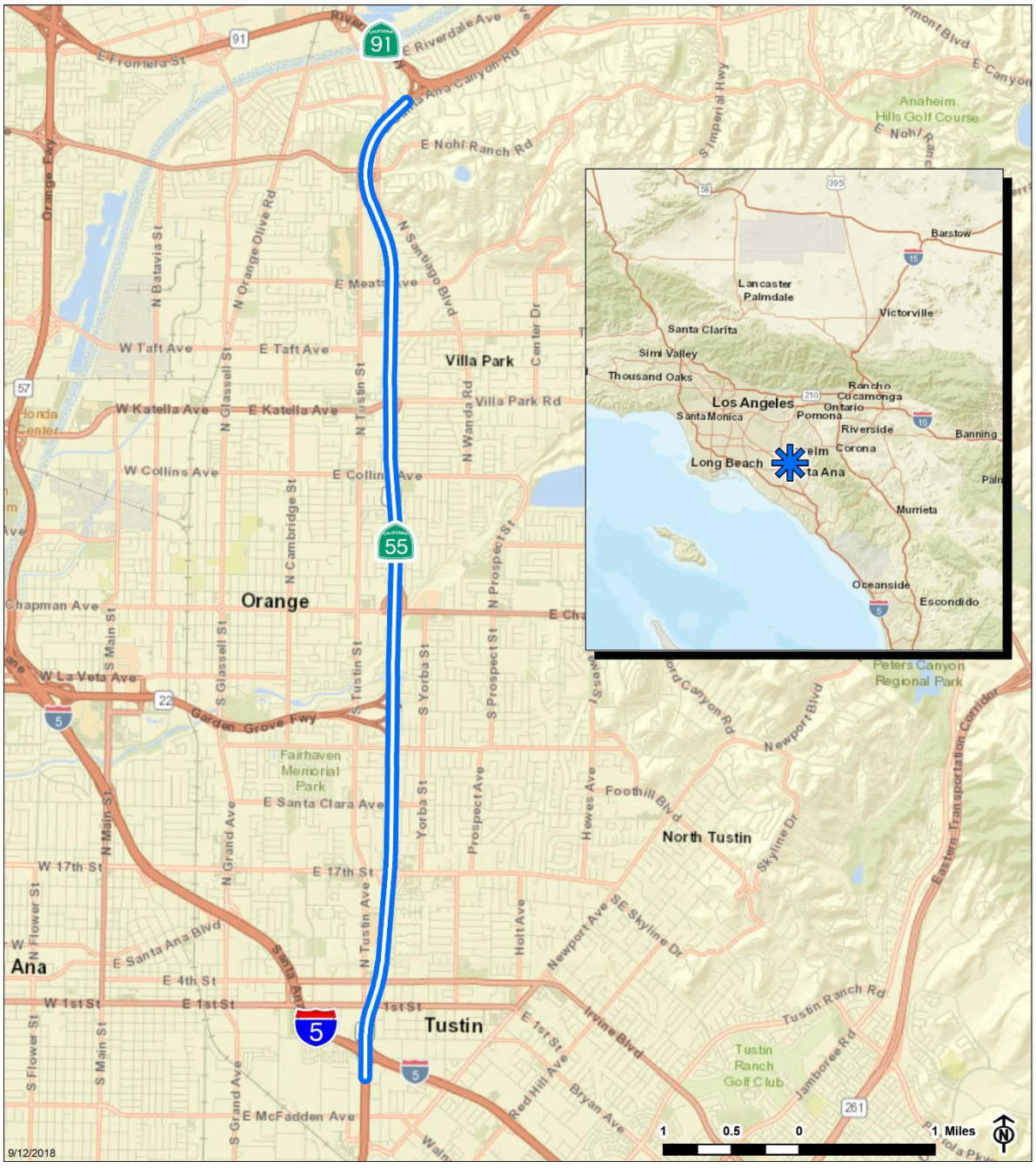
The proposed project is in the Southern California Association of Governments (SCAG) financially constrained 2016–2040 Regional Transportation Plan (RTP)/ Sustainable Communities Strategy (SCS), which was found to be conforming by the FHWA/Federal Transit Administration (FTA) on June 1, 2016. The project is also in the 2019 Federal Transportation Improvement Program (FTIP) (SCAG 2018a), which was found to be conforming by the FHWA/FTA on December 16, 2016: "Project ID: ORA131301 Description: SR 55 (I-5 TO SR 91) – ADD CAPACITY FROM I-5 TO SR 22 AND IMPROVE OPERATIONS FROM I-5 TO SR 91." Copies of the 2016 RTP/SCS and 2015 FTIP listings for the 2016 RTP/SCS and 2019 FTIP Project Listings for the proposed project are provided in Appendix A of the Air Quality Report.

1.1.1 Existing Facility

SR 55 is a major north-south freeway in central and coastal Orange County that extends from Finley Avenue, just south of SR 1 in the City of Newport Beach, to SR 91 in the City of Anaheim. SR 55 provides freeway to freeway connections with SR 73, I-405, I-5, SR 22, and SR 91. SR 55 is a main travel route to residential, commercial, and retail areas in central and

coastal Orange County, John Wayne Airport (JWA), and beaches and tourist attractions in the coastal cities.

Figure 1.1-1. Project Location and Vicinity Map



SR 55 was originally constructed in 1962 as a four-lane freeway with two general purpose lanes in each direction. Over the next 10 years, one additional general purpose lane was added in each direction. In 1985, the median was paved, and the freeway was restriped to provide one high-occupancy vehicle (HOV) lane in each direction. In 1992, SR 55 was extended from Mesa Drive to 19th Street in Costa Mesa. HOV direct connectors were added at the I-5/SR 55 interchange to provide direct connection between I-5 and SR 55 HOV traffic. An additional general purpose

lane was constructed in each direction between SR 22 and McFadden Avenue in 1995. Between 1996 and 2002, one additional general purpose lane was added in each direction between I-5 and SR 91. In 2005, HOV direct connectors were added at the I-405/SR 55 interchange to provide direct connection between SR 55 and I-405 HOV traffic.

In general, the project segment of SR 55 (I-5 to SR 91) currently consists of one HOV lane and three to five general purpose lanes in each direction as shown on Figure 1.2-1. Where feasible, HOV and auxiliary lanes are present in each direction. The existing HOV lanes on SR 55 are continuous access in both directions for the length of the project. Existing HOV lanes would be perpetuated as part of the proposed improvements. Five local interchanges are between I-5 and SR 91 on SR 55 at 4th Street/Irvine Boulevard, 17th Street, Chapman Avenue, Katella Avenue, and Lincoln Avenue. One freeway-to-freeway interchange is located at SR 22 between 17th Street and Chapman Avenue.

1.2 Purpose and Need

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

1.2.1 Purpose

The proposed project would add general purpose lanes to SR 55 between I-5 and SR 22 and provide operational improvements on SR 55 between SR 22 and SR 91.

The purpose of the proposed action is to:

- Improve mobility and reduce congestion
- Increase freeway capacity
- Improve traffic operations

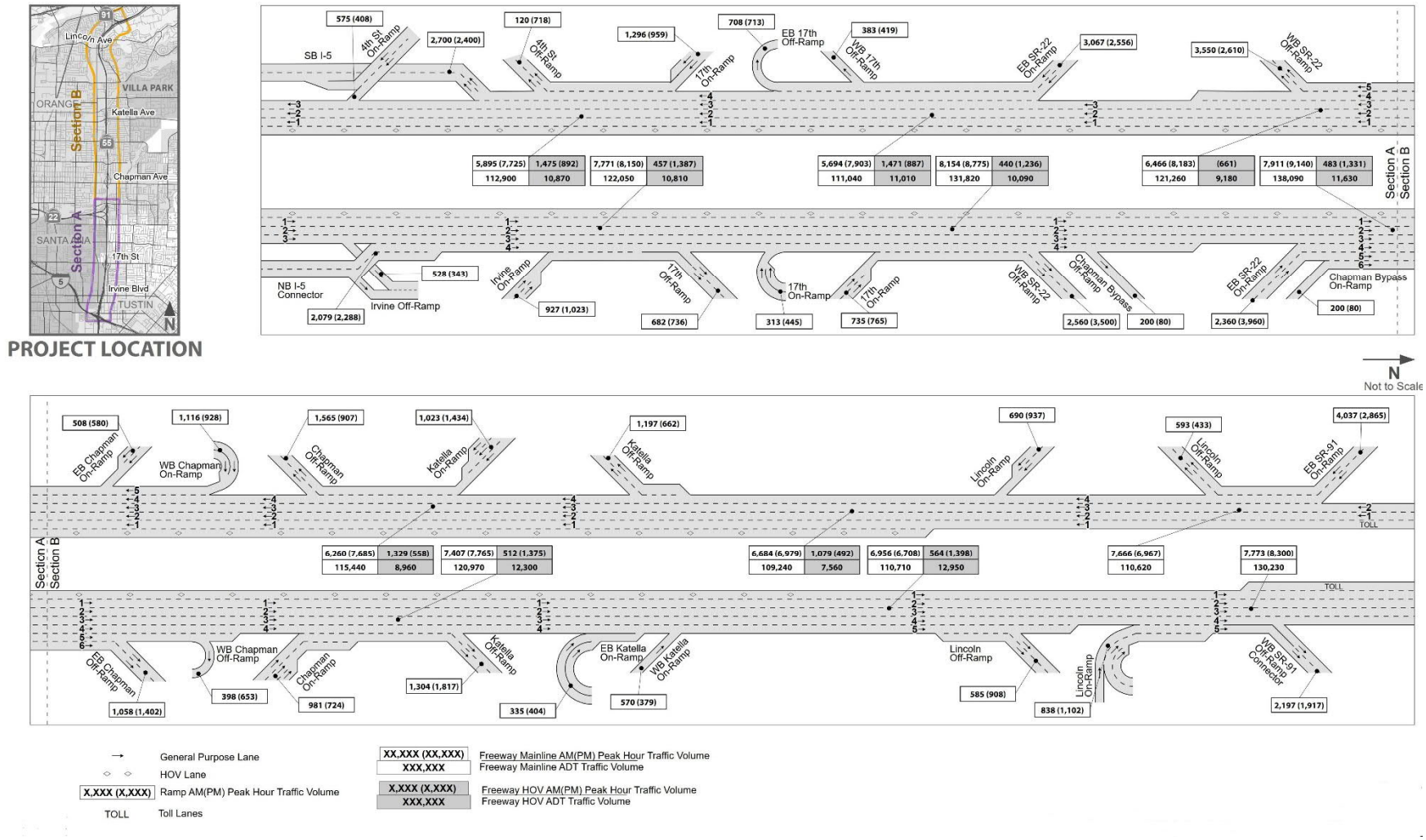
In furtherance of the project's purpose, additional project objectives are to minimize environment impacts and right-of-way impacts within the project limits.

1.2.2 Need

The study area currently operates at unacceptable Level of Service (LOS) during peak periods. Existing traffic volumes, traffic congestion, and travel delay along the SR 55 corridor are anticipated to grow as a result of forecasted increases in population, housing, and employment. Traffic operations along the corridor are impacted due to the following key factors/ issues:

- Limited lane capacity on SR 55 during AM and PM peak periods
- Inadequate weaving distances due to the close proximity of on- and off-ramps along the mainline

Figure 1.2-1. SR 55 (I-5 to SR 91) Freeway Lane Configurations Peak Hour and Daily Traffic Volumes: Existing Conditions



Source: Fehr & Peers 2018

1.2.2.1 Capacity, Transportation Demand, and Safety

Levels of Service

Freeway traffic flow can be defined in terms of LOS. For freeways, there are six defined LOS, ranging from LOS A to LOS F. LOS A represents free traffic flow with low traffic volumes and high speeds. LOS F results in forced flow operations at low speeds due to traffic volumes that exceed the capacity of the facility. As shown on Figure 1.2-2, traffic volumes on a facility such as SR 55 substantially affect flow conditions. Future average daily traffic (ADT) will increase approximately 8.5 percent between existing (2017) and future No Build (2055), and LOS will decrease as shown in Table 1.2-1.

Under existing (2017) conditions, the AM peak direction is southbound SR 55, which experiences significant congestion due to heavy commute traffic and operates under LOS E or F conditions at all the study locations on southbound SR 55 from SR 91 to I-5. During the PM peak hour, the peak direction northbound SR 55 also experiences severe congestion and operates at LOS E or F conditions, with observed multiple congestion hot spots on northbound SR 55 at 17th Street, SR 22 off-ramp (due to westbound SR 22 queue spillback), and SR 91 (due to eastbound SR 91 queue spillback).

Table 1.2-2a and Table 1.2-2b provide the LOS for the existing condition and the No Build Alternative in Opening Year 2035 and Horizon Year 2055 on the SR 55 mainline during the AM and PM peak hours. The poorest LOS (E and F) in 2017 occurred on southbound SR 55 in the AM peak hour and on northbound SR 55 in the PM peak hour.

Under the No Build Alternative in 2035 and 2055, the poorest LOS would still occur on southbound SR 55 in the AM peak hour and on northbound SR 55 in the PM peak hour. However, LOS in both the northbound and southbound other directions on SR 55 during peak hours would be degraded compared to existing 2017 conditions. As a result, without substantial improvements, a majority of the study segments on northbound and southbound SR 55 would operate at LOS E and F during AM and PM peak hours by 2035 and 2055.

Figure 1.2-2. Mainline LOS Exhibit

LEVELS OF SERVICE
for Freeways

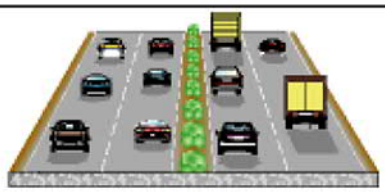
Level of Service	Flow Conditions	Operating Speed (mph)	Technical Descriptions
A		70	Highest quality of service. Traffic flows freely with little or no restrictions on speed or maneuverability. **No delays**
B		70	Traffic is stable and flows freely. The ability to maneuver in traffic is only slightly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

Table 1.2-1: SR 55 Mainline Volumes - 2017 (Existing) and No Build 2035 and 2055

Location	2017 (Existing)- SOV AM	2017 (Existing)- SOV PM	2017 (Existing)- SOV ADT	2017 (Existing)- HOV AM	2017 (Existing)- HOV PM	2017 (Existing)- HOV ADT	2035 No Build - SOV AM	2035 No Build - SOV PM	2035 No Build - SOV ADT	2035 No Build - HOV AM	2035 No Build - HOV PM	2035 No Build - HOV ADT	2055 No Build - SOV AM	2055 No Build - SOV PM	2055 No Build - SOV ADT	2055 No Build - HOV AM	2055 No Build - HOV PM	2055 No Build - HOV ADT
NB 55 - South of I-5	9402	8408	138830	602	1201	10250	9740	9330	148650	650	1330	11260	10130	10360	159720	700	1480	12390
NB 55 - Irvine/4th St to 17th St	7771	8150	122050	457	1387	10810	8050	8530	127100	510	1490	11720	8310	9190	134150	580	1600	12780
NB 55 - 17th St to SR 22	8154	8775	131820	440	1236	10090	8410	9150	136730	490	1300	10780	8650	9760	143350	570	1400	11860
NB 55 - SR 22 to Chapman Ave	7847	8860	135300	483	1331	11630	8030	8860	136780	530	1370	12180	8210	8720	137110	600	1460	13210
NB 55 - Chapman to Katella Ave	7343	7485	118230	512	1375	12300	7570	7590	120880	570	1410	12910	7790	7600	122710	720	1530	14670
NB 55 – Katella Ave to Meats Ave	6892	6428	107920	564	1398	12950	7170	6550	111160	630	1460	13790	7740	6930	118860	660	1430	13790
NB 55 – Meats Ave to Lincoln Ave	6892	6428	107920	564	1398	12950	7170	6550	111160	630	1460	13790	7380	6460	112130	660	1430	13790
NB 55 - Lincoln Ave to SR 91	7709	8020	127440	0	0	0	8150	8220	132630	0	0	0	8440	8080	133850	0	0	0
SB 55 - SR 91 to Lincoln Ave	7666	6967	110620	0	0	0	7910	7430	115960	0	0	0	7900	7670	117700	0	0	0
SB 55 – Lincoln Ave to Meats Ave	6684	6979	109240	1079	492	7560	6890	7390	114170	1120	570	8130	6950	7820	118090	1090	590	8080
SB 55 - Meats Ave to Katella Ave	6684	6979	109240	1079	492	7560	6890	7390	114170	1120	570	8130	7560	8290	126730	1090	590	8080
SB 55 – Katella Ave to Chapman Ave	6260	7685	115440	1329	558	8960	6420	8020	119540	1330	630	9310	6620	8380	124170	1470	850	11020
SB 55 - Chapman Ave to SR 22	6466	8183	121260	1182	661	9180	6410	8520	123590	1220	730	9710	6400	8860	126320	1310	880	10910
SB 55 - SR 22 to 17th St	5694	7903	111040	1471	887	11010	5920	8240	115640	1490	960	11440	6280	8600	121520	1540	1080	12230
SB 55 - 17th St to 4th St	5895	7725	112900	1475	892	10870	6040	8070	116960	1630	970	11940	6230	8460	121770	1820	1080	13320
SB 55 - South of I-5	8282	9177	140150	1552	729	11390	8650	9620	146660	1700	810	12530	8990	10110	153320	1870	930	13980

Notes:
ADT: average daily traffic; Ave: Avenue; HOV: high-occupancy vehicle; I-: Interstate; NB: northbound; SB: southbound; SOV; single-occupancy vehicle; SR: State Route; St: Street
Source: Fehr & Peers 2018a

Table 1.2-2a: SR 55 Traffic Northbound SR 55 Level of Service

Northbound SR 55 Operations Location	Type	Existing (2017) AM Peak Hour Density	Existing (2017) AM Peak Hour LOS	Existing (2017) PM Peak Hour Density	Existing (2017) PM Peak Hour LOS	No Build (2035) AM Peak Hour Density	No Build (2035) AM Peak Hour LOS	No Build (2035) PM Peak Hour Density	No Build (2035) PM Peak Hour LOS	No Build (2055) AM Peak Hour Density	No Build (2055) AM Peak Hour LOS	No Build (2055) PM Peak Hour Density	No Build (2055) PM Peak Hour LOS
SR 55 NB: Irvine Blvd off-ramp	Diverge	36.6	E	86.5	F	56	F	91	F	51	F	91	F
SR 55 NB: NB I-5 on-ramp merge	Merge	37.2	E	111.1	F	68	F	119	F	52	F	123	F
SR 55 NB: Irvine Blvd on-ramp to 17th St off-ramp	Weave	32.1	E	86.3	F	33	D	89	F	33	D	92	F
SR 55 NB: 17th St EB on-ramp	Merge	46.1	F	103.6	F	60	F	107	F	45	F	104	F
SR 55 NB: 17th St WB on-ramp to SR 22 off-ramp	Weave	28.1	D	70.8	F	28	C	76	F	31	D	74	F
SR 55 NB: Chapman Ave Bypass off-ramp	Diverge	32.1	D	36.8	E	31	D	74	F	55	E	83	F
SR 55 NB: SR 22 on-ramp to Chapman Ave off-ramp	Weave	23.9	C	55.1	F	23	C	89	F	69	F	107	F
SR 55 NB: Chapman Ave WB off-ramp	Diverge	25.8	C	54.2	F	25	C	82	F	85	F	97	F
SR 55 NB: Chapman Ave on-ramp	Merge	23.8	C	77.6	F	24	C	102	F	107	F	110	F
SR 55 NB: Chapman Ave on-ramp to Katella Ave off-ramp	Basic	22.8	C	77	F	27	C	89	F	98	F	95	F
SR 55 NB: Katella Ave off-ramp	Diverge	24	C	78	F	49	F	87	F	87	F	92	F
SR 55 NB: Katella Ave EB on-ramp	Merge	27.4	C	111.8	F	85	F	118	F	102	F	135	F
SR 55 NB: Katella Ave WB on-ramp	Merge	36.8	E	104	F	77	F	111	F	84	F	116	F
SR 55 NB: Meats Ave off-ramp	Diverge	*	*	*	*	*	*	*	*	56	F	105	F
SR 55 NB: Meats Ave on-ramp to Lincoln Ave off-ramp	Weave	*	*	*	*	*	*	*	*	64	F	90	F
SR 55 NB: Katella Ave WB on-ramp to Lincoln Ave off-ramp	Basic	32.9	D	68.9	F	55	F	72	F	*	*	*	*
SR 55 NB: Lincoln Ave off-ramp	Diverge	37.8	E	70.8	F	54	F	83	F	*	*	*	*
SR 55 NB: Lane Drop to Lincoln Ave on-ramp	Basic	34.4	D	74.6	F	34	D	75	F	40	E	79	F
SR 55 NB: Lincoln Ave on-ramp to SR 91 off-ramp	Weave	25.6	C	89.3	F	27	C	82	F	36.4	E	85	F

Notes: Ave: Avenue; Blvd: Boulevard; EB: eastbound; I-: Interstate; LOS: level of service; NB: northbound; SB: southbound; SR: State Route; St: Street; WB: westbound
1) Density is reported in vehicles per hour per lane.
2) **Bold** font indicates unacceptable LOS E or F conditions.
Source: Fehr & Peers 2018a

Table 1.2-2b: SR 55 Traffic Southbound SR 55 Level of Service

Southbound SR 55 Operations Location	Type	Existing (2017) AM Peak Hour Density	Existing (2017) AM Peak Hour LOS	Existing (2017) PM Peak Hour Density	Existing (2017) PM Peak Hour LOS	No Build (2035) AM Peak Hour Density	No Build (2035) AM Peak Hour LOS	No Build (2035) PM Peak Hour Density	No Build (2035) PM Peak Hour LOS	No Build (2055) AM Peak Hour Density	No Build (2055) AM Peak Hour LOS	No Build (2055) PM Peak Hour Density	No Build (2055) PM Peak Hour LOS
SR 55 SB: SR 91 on-ramp to Lincoln Ave off-ramp	Weave	37.1	E	26.7	C	67	F	29	D	97	F	30	D
SR 55 SB: Lincoln Ave on-ramp	Merge	82.5	F	40.4	E	55	F	45	F	*	*	*	*
SR 55 SB: Lincoln Ave on-ramp to Katella Ave off-ramp	Basic	72.5	F	26.6	C	48	F	28	C	*	*	*	*
SR 55 SB: Katella Ave off-ramp	Diverge	78.2	F	26.2	C	60	F	27	C	*	*	*	*
SR 55 SB: Lincoln Ave on-ramp to Meats Ave off-ramp	Weave	*	*	*	*	*	*	*	*	94	F	30	D
SR 55 SB: Meats Ave on-ramp to Katella Ave off-ramp	Weave	*	*	*	*	*	*	*	*	99	E	30	D
SR 55 SB: Katella Ave on-ramp to Chapman Ave off-ramp	Weave	78.8	F	27.6	C	86	F	31	D	20	C	31	D
SR 55 SB: Chapman Ave WB on-ramp	Merge	63.3	F	27.1	C	32	D	37	E	23	C	39	E
SR 55 SB: Chapman Ave EB on-ramp	Merge	92.9	F	30.9	D	54	F	43	E	38	E	61	F
SR 55 SB: SR 22 off-ramp	Diverge	56.7	F	44.6	F	35	E	47	F	31	D	64	F
SR 55 SB: SR 22 on-ramp	Merge	147	F	25.8	C	120	F	33	D	129	F	27	C
SR 55 SB: 17th St WB off-ramp	Diverge	125.5	F	28.8	D	102	F	33	D	110	F	31`	D
SR 55 SB: 17th St EB off-ramp	Diverge	90.1	F	31.5	D	86	F	35	D	91	F	37	E
SR 55 SB: 17th St on-ramp to 4th St off-ramp	Weave	95.4	F	39.1	E	79	F	45	F	80	F	50	F
SR 55 SB: SB I-5 off-ramp	Diverge	65.8	F	41.6	E	58	F	45	F	61	F	46	F
SR 55 SB: 4th St on-ramp	Merge	44.2	F	24.7	C	21	C	26	C	21	C	27	C

Notes: Ave: Avenue; Blvd: Boulevard; EB: eastbound; I-: Interstate; LOS: level of service; NB: northbound; SB: southbound; SR: State Route; St: Street; WB: westbound
1) Density is reported in vehicles per hour per lane.
2) **Bold** font indicates unacceptable LOS E or F conditions.
Source: Fehr & Peers 2018a

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Travel Times

The LOS on freeways characterizes the performance of the freeway in terms of both travel times and speed. Table 1.2-3 summarizes the peak-hour travel times and speeds on northbound and southbound segments of SR 55 for existing conditions (2017) and the No Build Alternative in 2035 and 2055. There is strong directionality in the traffic volumes and congestion between the AM and PM peak hours and directions that are clearly reflected in the travel times and speeds. As shown in Table 1.2-3, the higher travel times and lower travel speeds in all three scenarios would occur on southbound SR 55 in the AM peak hour and northbound SR 55 in the PM peak hour.

Table 1.2-3: Travel Times and Speed – Existing (2017), No Build 2035 and No Build 2055

Direction	Location	AM Peak Hour Travel Time (min:sec)	AM Peak Hour Speed (mph)	PM Peak Hour Travel Time (min:sec)	PM Peak Hour Speed (mph)
2017 (Existing Conditions)					
NB SR 55	I-5 to SR 22	2:20	64	5:00	31
NB SR 55	SR 22 to SR 91	4:20	64	9:50	29
NB SR 55	I-5 to SR 91 (Total)	6:40	64	14:50	29
SB SR 55	SR 91 to SR 22	9:50	29	4:30	64
SB SR 55	SR 22 to I-5	8:00	19	2:30	62
SB SR 55	SR 91 to I-5 (Total)	17:40	25	7:00	63
2035 (No Build)					
NB SR 55	I-5 to SR 22	2:40	60	5:10	30
NB SR 55	SR 22 to SR 91	5:40	51	12:00	24
NB SR 55	I-5 to SR 91 (Total)	8:20	54	17:10	26
SB SR 55	SR 91 to SR 22	9:40	30	4:50	60
SB SR 55	SR 22 to I-5	5:10	29	2:50	54
SB SR 55	SR 91 to I-5 (Total)	14:50	30	7:40	57
2055 (No Build)					
NB SR 55	I-5 to SR 22	3:00	51	5:10	30
NB SR 55	SR 22 to SR 91	9:30	30	12:50	22
NB SR 55	I-5 to SR 91 (Total)	12:30	35	18:00	24
SB SR 55	SR 91 to SR 22	10:40	27	5:00	57
SB SR 55	SR 22 to I-5	6:20	24	3:00	51
SB SR 55	SR 91 to I-5 (Total)	17:00	26	8:00	55

Notes: I-: Interstate; min: minutes; mph: miles per hour; NB: northbound; SB: southbound; sec: seconds; SR: State Route
Source: Fehr & Peers 2018b

Accidents and Safety in the SR 55 Corridor

Accident data for the project segment of SR 55 were provided by Caltrans for the 3-year period from January 2012 to December 2014. Data was reviewed for mainline segments and ramps within the project limit (I-5 to SR 91). Table 1.2-4 shows the number of total accidents, fatalities, and injuries for both freeway mainline and ramps, as well as the actual 3-year accident rates with a comparison to the statewide average accident rates on similar facilities.

A total of 1,473 accidents with two fatalities and 490 injuries occurred in the study area between January 2012 and December 2014. A majority of the accidents (i.e., 78 percent) occurred on the SR 55 mainline, while the remaining 22 percent occurred at the on- and off-ramps. Southbound SR 55 had 907 accidents in total, 341 more accidents than the northbound direction. Accident rates at 24 out of 46 analyzed locations are higher than the statewide average for similar facilities. Among the 24 locations, the following 11 locations had accident rates as high as twice the statewide average rates (either fatalities accident rate, total fatalities and injuries accident rate, or total accident rate).

- Northbound SR 55 off-ramp to 4th Street (about 375 percent higher than for total fatalities and injuries accident rate and about 208 percent higher for total accident rate)
- Northbound SR 55 between First Street and 4th Street (about 950 percent higher for fatalities accident rate)
- Northbound SR 55 off-ramp to Chapman Avenue bypass (about 2,933 percent higher than for total fatalities and injuries accident rate and about 658 percent higher for total accident rate). Two accidents occurred at this off-ramp during the three-year period (January 2012 to December 2014); however, the accident rates were very high due to the low traffic volumes (e.g., the denominator for accident rate calculation) at this ramp.
- Northbound SR 55 on-ramp from Chapman Avenue (about 428 percent higher than for total fatalities and injuries accident rate and about 177 percent higher for total accident rate)
- Northbound SR 55 on-ramp from Katella Avenue (about 175 percent higher than for total fatalities and injuries accident rate)
- Southbound SR 55 off-ramp to westbound 17th Street (about 183 percent higher than for total fatalities and injuries accident rate and about 128 percent higher for total accident rate)
- Southbound SR 55 off-ramp to westbound SR 22 (about 192 percent higher than for total fatalities and injuries accident rate)
- Southbound SR 55 off-ramp to Chapman Avenue (about 279 percent higher than for total fatalities and injuries accident rate and about 132 percent higher for total accident rate)
- Southbound SR 55 on-ramp from Katella Avenue (about 109 percent higher than for total fatalities and injuries accident rate)
- Southbound SR 55 on-ramp from Lincoln Avenue (about 269 percent higher than for total fatalities and injuries accident rate)
- Southbound SR 55 off-ramp to Lincoln Avenue (about 317 percent higher than for total fatalities and injuries accident rate and about 224 percent higher for total accident rate)

Table 1.2-4: SR 55 Collision Rate Summary (January 2012 through December 2014)

Location	Post Mile	Number of Accidents Total	Number of Accidents Fatal	Number of Accidents Injury	Actual Accident Rates Fatal	Actual Accident Rates Fatal + Injury	Actual Accident Rates Total	Statewide Average Accident Rates Fatal	Statewide Average Accident Rates Fatal + Injury	Statewide Average Accident Rates Total
NB SR 55 between I-5 and First St	10.450-10.796	13	0	1	0	0.02	0.29	0.004	0.32	1.03
NB SR 55 Off 5/55 to 4th St	10.721	8	0	4	0	0.38	0.77	0.002	0.08	0.25
NB SR 55 First St and 4th St	10.797-10.978	19	1	5	0.042	0.25	0.8	0.004	0.31	1
NB SR 55 on-ramp from Northbound I-5	10.806	3	0	2	0	0.05	0.08	0.003	0.14	0.41
NB SR 55 between 4th and 17th St	10.979-11.784	65	0	14	0	0.12	0.57	0.004	0.03	1
NB SR 55 on-ramp from 4th St	11.094	5	0	2	0	0.16	0.41	0.002	0.22	0.63
NB SR 55 off-ramp to 17th St	11.604	19	0	6	0	0.22	0.69	0.003	0.35	1.01
NB SR 55 on-ramp from EB 17th St	11.744	2	0	1	0	0.16	0.32	0.002	0.21	0.73
NB SR 55 between 17th St and SR 22	11.785-12.966	76	1	32	0.001	0.2	0.47	0.003	0.28	0.95
NB SR 55 on-ramp from WB 17th St	12.001	2	0	2	0	0.26	0.26	0.003	0.18	0.57
NB SR 55 off-ramp to WB SR 22	12.733	7	0	4	0	0.13	0.23	0.004	0.16	0.49
NB SR 55 off-ramp to Chapman Ave Bypass	12.947	2	0	2	0	1.82	1.82	0.001	0.06	0.24
NB SR 55 between SR 22 and Chapman Ave	12.967-13.697	33	0	15	0	0.14	0.31	0.005	0.35	1.14
NB SR 55 on-ramp from EB SR 22	13.183	5	0	1	0	0.03	0.16	0.003	0.14	0.41
NB SR 55 off-ramp to EB Chapman Ave	13.555	10	0	7	0	0.34	0.48	0.004	0.24	0.75
NB SR 55 between Chapman Ave and Katella Ave	13.698-15.241	106	0	39	0	0.21	0.58	0.003	0.28	0.92
NB SR 55 off-ramp to WB Chapman Ave	13.758	7	0	4	0	0.4	0.7	0.003	-0.3	1.06
NB SR 55 on-ramp from Chapman Ave	13.898	20	0	12	0	0.95	1.58	0.003	0.18	0.57
NB SR 55 off-ramp to Katella Ave	15.108	18	0	5	0	0.21	0.76	0.003	0.35	1.01
NB SR 55 on-ramp from Katella Ave	15.222	11	0	6	0	0.66	1.22	0.003	0.24	0.72
NB SR 55 between Katella Ave and Lincoln Ave	15.242-16.980	114	0	38	0	0.19	0.56	0.004	0.28	0.92
NB SR 55 on-ramp from WB Katella Ave	15.477	1	0	0	0	0	0.43	0.003	0.18	0.57
NB SR 55 NB off-ramp to Lincoln Ave	16.823	13	0	2	0	0.15	0.96	0.003	0.24	0.84
NB SR 55 on-ramp from Lincoln Ave	16.956	7	0	3	0	0.27	0.62	0.002	0.21	0.73
NB SR 55 between I-5 and SR 91	10.450-17.875	566	2	207	0.002	0.17	0.51	0.004	0.3	0.99
SB SR 55 between I-5 and First St	10.450-10.796	30	0	1	0	0.24	0.66	0.004	0.32	1.03
SB SR 55 between First St and 4th St	10.797-10.978	25	0	7	0	0.29	1.05	0.004	0.31	1

Location	Post Mile	Number of Accidents Total	Number of Accidents Fatal	Number of Accidents Injury	Actual Accident Rates Fatal	Actual Accident Rates Fatal + Injury	Actual Accident Rates Total	Statewide Average Accident Rates Fatal	Statewide Average Accident Rates Fatal + Injury	Statewide Average Accident Rates Total
SB SR 55 on-ramp from 4th St	10.820	1	0	0	0	0	0.11	0.002	0.22	0.63
SB SR 55 between 4th St and 17th Street	10.979-11.784	118	0	35	0	**0.31**	**1.03**	0.004	0.3	1
SB SR 55 off-ramp to SB I-5	10.997	5	0	1	0	0.02	0.09	0.005	0.13	0.38
SB SR 55 off-ramp to 4th St	11.211	8	0	4	0	**0.43**	0.86	0.003	0.35	1.01
SB SR 55 on-ramp from 17th St	11.640	9	0	6	0	**0.31**	0.47	0.002	0.22	0.63
SB SR 55 off-ramp to EB 17th St	11.739	13	0	2	0	0.29	**1.87**	0.003	0.3	1.06
SB SR 55 between 17th St and SR 22	11.785-12.966	150	0	41	0	0.25	0.93	0.003	0.28	0.95
SB SR 55 off-ramp to WB 17th St	12.029	10	0	4	0	**0.68**	**1.71**	0.004	0.24	0.75
SB SR 55 on-ramp from EB SR 22	12.71	6	0	1	0	0.04	0.24	0.003	0.11	0.32
SB SR 55 between SR 22 and Chapman Ave	12.967-13.697	133	0	33	0	0.31	**1.26**	0.005	0.35	1.14
SB SR 55 off-ramp to WB SR 22	13.207	19	0	12	0	**0.38**	**0.61**	0.005	0.13	0.38
SB SR 55 on-ramp from EB Chapman Ave	13.578	3	0	1	0	0.08	0.23	0.003	0.18	0.57
SB SR 55 between Chapman Ave and Katella Ave	13.698-15.241	186	0	52	0	0.28	**1.02**	0.003	0.28	0.92
SB SR 55 on-ramp from WB Chapman Ave	13.754	10	0	3	0	0.18	0.59	0.002	0.21	0.73
SB SR 55 off-ramp to Chapman Ave	13.921	21	0	11	0	**0.91**	**1.74**	0.004	0.24	0.75
SB SR 55 on-ramp from Katella Ave	15.108	19	0	9	0	**0.46**	**0.97**	0.002	0.22	0.63
SB SR 55 between Katella Ave and Lincoln Ave	15.242-16.980	86	0	31	0	0.15	0.42	0.004	0.28	0.92
SB SR 55 off-ramp to Katella Ave	15.383	19	0	4	0	0.29	**1.38**	0.003	0.35	1.01
SB SR 55 on-ramp from Lincoln Ave	16.715	6	0	4	0	**0.48**	**0.71**	0.001	0.13	0.46
SB SR 55 off-ramp to Lincoln Ave	17.233	30	0	11	0	**1**	**2.72**	0.003	0.24	0.84
SB SR 55 between I-5 and SR 91	10.450-17.875	907	0	283	0	0.23	0.81	0.004	0.3	0.99

Notes: Ave: Avenue; EB: eastbound; I-: Interstate; NB: northbound; SB: southbound; SR: State Route; St: Street; WB westbound.
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.
Bold & underline indicates an actual accident rate that is higher than the average accident rate.
Source: Caltrans District 12 TASAS Table B, 2017.

Table 1.2-5 summarizes the number of accidents by accident type on SR 55. Approximately 59 percent of the accidents on the SR 55 were rear-end collisions. 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. Additional key accident types were sideswipe (18 percent) and hit object (15 percent). The percentages of collision type were similar between northbound and southbound of the SR 55 study corridor, except that southbound SR 55 shows a larger share of rear-end accidents than the northbound direction. This corresponds to the longer travel time and heavier congestion on southbound SR 55 in comparison to northbound SR 55 during the peak periods.

As discussed in the Traffic Operation Analysis Report and Draft Project Report, additional benefits of the proposed improvements in the SR 55 corridor would likely enhance safety and operations by decreasing traffic congestion and could reduce associated rear-end accidents in within the project area. The improvements would allow vehicles to merge easier throughout the corridor, thereby reducing sideswipe occurrences by giving drivers more time and space to merge with adjacent traffic. Increasing the lane widths would also improve the safety of the corridor by giving the drivers more space in which to operate their vehicles.

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Table 1.2-5: SR 55 Collision Type Summary (January 2012 through December 2014)

Location	Post Miles	Total Accidents	Rear-End	% Rear-End	Sideswipe	% Sideswipe	Hit Object	% Hit Object	Others [1]	% Other [1]
NB SR 55 between I-5 and First St	10.450-10.796	13	7	54%	3	23%	3	23%	0	0%
NB SR 55 Off 5/55 to 4th St	10.721	8	3	38%	0	0%	2	25%	3	38%
NB SR 55 First St and 4th St	10.797-10.978	19	9	47%	5	26%	4	21%	1	5%
NB SR 55 on-ramp from NB I-5	10.806	3	0	0%	1	33%	2	67%	0	0%
NB SR 55 between 4th and 17th St	10.979-11.784	65	50	77%	6	9%	6	9%	3	5%
NB SR 55 on-ramp from 4th St	11.094	5	2	40%	1	20%	0	0%	2	40%
NB SR 55 off-ramp to 17th St	11.604	19	3	16%	3	16%	4	21%	9	47%
NB SR 55 on-ramp from EB 17th St	11.744	2	1	50%	0	0%	0	0%	1	50%
NB SR 55 between 17th St and SR 22	11.785-12.966	76	45	59%	12	16%	12	16%	7	9%
NB SR 55 on-ramp from WB 17th St	12.001	2	0	0%	0	0%	1	50%	1	50%
NB SR 55 off-ramp to WB SR 22	12.733	7	2	29%	0	0%	5	71%	0	0%
NB SR 55 off-ramp to Chapman Ave Bypass	12.947	2	0	0%	0	0%	1	50%	1	50%
NB SR 55 between SR 22 and Chapman Ave	12.967-13.697	33	15	45%	8	24%	8	24%	2	6%
NB SR 55 on-ramp from EB SR 22	13.183	5	3	60%	0	0%	2	40%	0	0%
NB SR 55 off-ramp to EB Chapman Ave	13.555	10	1	10%	1	10%	6	60%	2	20%
NB SR 55 between Chapman Ave and Katella Ave	13.698-15.241	106	75	71%	17	16%	14	13%	0	0%
NB SR 55 off-ramp to WB Chapman Ave	13.758	7	3	43%	0	0%	2	29%	2	29%
NB SR 55 on-ramp from Chapman Ave	13.898	20	4	20%	5	25%	1	5%	10	50%
NB SR 55 off-ramp to Katella Ave	15.108	18	13	72%	3	17%	0	0%	2	11%

Location	Post Miles	Total Accidents	Rear-End	% Rear-End	Sideswipe	% Sideswipe	Hit Object	% Hit Object	Others [1]	% Other [1]
NB SR 55 on-ramp from Katella Ave	15.222	11	6	55%	2	18%	2	18%	1	9%
NB SR 55 between Katella Ave and Lincoln Ave	15.242-16.980	114	64	56%	31	27%	13	11%	6	5%
NB SR 55 on-ramp from WB Katella Ave	15.477	1	1	100%	0	0%	0	0%	0	0%
NB SR 55 NB off-ramp to Lincoln Ave	16.823	13	3	23%	4	31%	3	15%	4	31%
NB SR 55 on-ramp from Lincoln Ave	16.956	7	0	62%	4	0%	1	0%	2	38%
NB SR 55 between I-5 and SR 91	10.450-17.875	566	310	54%	106	19%	91	15%	59	10%
SB SR 55 between I-5 and First St	10.450-10.796	30	19	63%	5	17%	6	20%	0	0%
SB SR 55 between First St and 4th St	10.797-10.978	25	22	88%	2	8%	0	0%	1	4%
SB SR 55 on-ramp from 4th St	10.82	1	0	0%	1	100%	0	0%	0	0%
SB SR 55 between 4th and 17th St	10.979-11.784	118	86	73%	22	19%	7	6%	3	3%
SB SR 55 off-ramp to SB I-5	10.997	5	2	40%	2	40%	1	20%	0	0%
SB SR 55 off-ramp to 4th St	11.211	8	2	25%	0	0%	0	0%	6	75%
SB SR 55 on-ramp from 17th St	11.64	9	4	44%	2	22%	0	0%	3	33%
SB SR 55 off-ramp to EB 17th St	11.739	13	0	0%	0	0%	9	69%	4	31%
SB SR 55 between 17th St and SR 22	11.785-12.966	150	106	71%	30	20%	11	7%	3	2%
SB SR 55 off-ramp to WB 17th St	12.029	10	1	10%	0	0%	8	80%	1	10%
SB SR 55 on-ramp from EB SR 22	12.71	6	3	50%	1	17%	1	17%	1	17%
SB SR 55 between SR 22 and Chapman Ave	12.967-13.697	133	102	77%	19	14%	9	7%	3	2%
SB SR 55 off-ramp to WB SR 22	13.207	19	5	26%	2	11%	9	47%	3	16%
SB SR 55 on-ramp from EB Chapman Ave	13.578	3	2	66%	0	0%	1	33%	0	0%

Location	Post Miles	Total Accidents	Rear-End	% Rear-End	Sideswipe	% Sideswipe	Hit Object	% Hit Object	Others [1]	% Other [1]
SB SR 55 between Chapman Ave and Katella Ave	13.698-15.241	186	130	70%	32	17%	19	10%	5	3%
SB SR 55 on-ramp from WB Chapman Ave	13.754	10	4	40%	2	20%	4	40%	0	0%
SB SR 55 off-ramp to Chapman Ave	13.921	21	5	24%	3	14%	3	14%	10	48%
SB SR 55 on-ramp from Katella Ave	15.108	19	6	32%	6	32%	1	5%	6	32%
SB SR 55 between Katella Ave and Lincoln Ave	15.242-16.980	86	37	43%	21	24%	25	29%	3	3%
SB SR 55 off-ramp to Katella Ave	15.383	19	12	63%	1	5%	2	11%	4	21%
SB SR 55 on-ramp from Lincoln Ave	16.715	6	2	33%	1	17%	0	0%	3	50%
SB SR 55 off-ramp to Lincoln Ave	17.233	30	12	40%	4	13%	10	33%	4	13%
SB SR 55 between I-5 and SR 91	10.450-17.875	907	562	62%	156	17%	126	14%	63	7%

Notes
[1]: Other accident types include head-on, broadside, overturn, auto-pedestrian and other collisions.
Ave: Avenue; I-: Interstate; NB: northbound; SB: southbound; SR: State Route
Source: Caltrans District 12 TASAS 2017

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1.2.2.2 Roadway Deficiencies

The traffic congestion, delays, and reduced travel speeds currently experienced within the project segment of SR 55 are partly the result of existing nonstandard features that are not consistent with the Caltrans Highway Design Manual based on:

- Interchange spacing
- Intersection spacing
- Weaving length
- Standards for super elevation
- Shoulder width and horizontal clearance
- Access control and access rights
- Angle of intersection
- Successive exits
- Ramp and connector design standards

A full standard Build Alternative, with no mandatory or advisory design exceptions, was considered during the early planning studies for improvements to SR 55. The Project Development Team (PDT) determined that the full standard alternative would not be cost effective, would require extensive rebuild of the existing freeway, and would have extensive right-of-way and environmental impacts.

Based on the design development of the project, deficiencies would be corrected by designing and constructing to the standards in the Caltrans *Highway Design Manual* (Caltrans 2018a). At locations where right-of-way, environmental, or other constraints exist, design exceptions are being requested for this project, which are discussed in detail in Section 5.A.2.2 of the Draft Project Report and The Design Standards Design Document.

1.2.2.3 Social and Economic Demands

The number of jobs in Orange County combined with the lower housing costs of Riverside County contribute to the AM/PM directional split previously discussed in Section 1.2.2.1. A review of regional growth projections adopted by SCAG indicates that continuing growth is forecasted in the subregion served by SR 55 (SCAG 2016b). The population of Orange County is expected to increase from 3.1 million persons in 2012 to nearly 3.5 million persons in 2040, an increase of approximately 13 percent. Growth in Riverside County is projected to increase at a faster pace, with the population in that county projected to increase from 2.2 million in 2012 to 3.2 million in 2040, an increase of approximately 45 percent. This regional growth will continue to place a high demand on SR 55 by Orange and Riverside County residents traveling to jobs, retail, and other destinations in central and coastal Orange County.

The proposed project study area traverses the cities of Tustin, Santa Ana, Orange, and Anaheim, and unincorporated areas in Orange County, California (Figure 1.1-1). Population and employment growth within the study area is expected to take place through the natural increase and redevelopment of existing land uses or infill development of vacant parcels. Land uses within the study area are already established, with limited opportunity for a new unanticipated large-scale development.

The project is consistent with the state, regional, and local programs, plans, and policies, including the SCAG 2016-2040 RTP/SCS (2016b), OCTA 2018 Long Range Transportation Plan, OCTA 2015 Orange County Congestion Management Program, Orange County General Plan (2005), and general plans of the local jurisdictions that comprise the project study area. The roadway improvements associated with the project are anticipated to improve freeway capacity and travel times and accommodate existing and future travel demand in the corridor related to existing and planned growth approved by local jurisdictions.

1.2.2.4 Legislation

Measure M2

The SR 55 Improvement Project Between I-5 and SR 91 is part of a larger suite of transportation improvements included in Orange County's 30-year Measure M2 (M2) Plan. M2, the 0.5-cent transportation sales tax, planned to provide transportation improvements in Orange County through 2041 (2011 to 2041). M2 comprises the following transportation improvement programs: freeways, local streets and roads, and transit. Up to 43 percent of the funds is intended for freeway projects, 32 percent for streets, and 25 percent for transit projects.

In addition, two unique environmental programs, the Freeway Environmental Mitigation Program and Environmental Cleanup Program are part of M2. The Environmental Mitigation Program includes the allocation of funds to acquire land and fund restoration projects as part of the mitigation efforts and streamlined approval process for 13 M2 freeway improvement projects. To guide the restoration efforts, OCTA developed a Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP). The Environmental Mitigation Program receives 5 percent of the M2 funding for freeway projects. The Environmental Cleanup Program receives 2 percent of the overall M2 funds and aims to cleanup roadway runoff by funding local agencies' water quality improvement projects through a competitive grant program.

The M2 program was publicly reviewed through a Program Environmental Impact Report 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 Environmental Impact Report prepared by SCAG (SCAG 2016d).

The Measure M2 Next 10 Delivery Plan provides guidance for what can be accomplished over the 10 years between 2017 and 2026 (OCTA 2018). The capacity and operational improvements of the proposed project are discussed in the Next 10 Delivery Plan as Project F.

OCTA Freeway Chokepoint Program

The OCTA Freeway Chokepoint Program was initiated in 2001 to support cooperative efforts with Caltrans to identify chronic freeway bottlenecks and to develop projects to remedy those identified deficiencies. As part of that program, freeway improvements were identified to alleviate localized freeway chokepoints. Funds for those projects were allocated from Measure M2 and other sources. The SR 55 Widening Project is included in the OCTA Freeway Chokepoint Program.

1.2.2.5 Modal Interrelationships and System Linkages

SR 55 is an integral component of the transportation system in Orange County. It provides a key linkage between the coastal areas in Newport Beach and other beach communities and cities along the corridor in central Orange County. SR 55 has interchanges with a number of other freeways, providing access to the countywide and regional freeway systems. The Build Alternative would enhance mobility in the SR 55 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 SR 55 south of I-5, approximately 500 feet north of Edinger Avenue in the City of Santa Ana. Metrolink Inland Empire – Orange County Line also travels within the corridor but continues north parallel to SR 55, crossing SR 91 0.75 mile west of the SR 55/91 interchange. 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 Metrolink commuter rail service, and the Union Pacific Railroad and BNSF Railway freight rail services. SR 55 does not directly serve the Ports of Los Angeles and Long Beach or the rail transfer yards and is not a major corridor for goods movement in Southern California. However, SR 55 provides a connection to the Ports of Los Angeles and Long Beach via I-405, SR 22, and SR 91.

JWA is located south of the project area near SR 55 and I-405. JWA is immediately east of SR 55 and south of I-405. Direct access to JWA from SR 55 is via ramps from SR 55 southbound or northbound to southbound I-405. The Build Alternative would not modify or otherwise affect the existing access to/from JWA via SR 55.

Twelve OCTA bus routes operate on SR 55 within the project limits and arterials in the vicinity of SR 55: Route 42 on Lincoln Avenue, Routes 24 and 71 on Tustin Avenue; Route 167 on Meats Avenue; Route 46 on Taft Avenue; Route 50 on Katella Avenue; Route 54 on Chapman Avenue; Route 60 on 17th Street, Route 64 on First Street, and Routes 794 and 213.

The HOV lanes on SR 55 are used by private transit companies, taxis, carpools, and vanpools. All the transit and shared ride modes would continue to use SR 55 during the project construction and in the long term. OCTA will also continue to identify opportunities to improve transit services in the SR 55 corridor as part of its transit planning activities throughout Orange County. The capacity and operational improvements provided by the Build Alternative would support these transit and shared ride modes in the future.

1.2.2.6 Air Quality Improvements

Within the project corridor, HOV lanes and ramp metering have been incorporated into the SR 55 as transportation control measures. One HOV lane travels in both the northbound and southbound directions of SR 55 throughout the corridor. Existing on-ramps on SR 55 are metered; those ramps would continue to be metered under the Build Alternative. The Build Alternative would also maintain existing auxiliary lanes. These project features contribute to air quality emissions reductions in the long term. The Build Alternative will continue to directly benefit transit vehicles (and their passengers) traveling on existing HOV lanes. Carpool, vanpool, and bus services in the SR 55 corridor would benefit from the time savings as a result of using the existing HOV lanes.

OCTA offers several programs designed to encourage the use of alternate modes of transportation or more efficient use of vehicles. OCTA provides assistance in forming, joining, and managing ride-sharing and vanpool programs, in addition to providing commuter and local bus services and commuter rail services. Section 1.3.5.2 provides an overview on Transportation System Management (TSM), Transportation Demand Management (TDM), and multi-modal transportation strategies that would be provided in the SR 55 corridor area.

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 SR 55 Improvement Project satisfies these criteria in 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)
c. Not restrict consideration of alternatives for other reasonably foreseeable transportation improvements

This Initial Study/Environmental Assessment (IS/EA) assesses the operational conditions on SR 55 between Post Mile 10.4 and R17.9. This area covers a segment of SR 55 through the cities of Tustin, Santa Ana, Orange, and Anaheim. The project is within an urban setting, including residential, commercial, and urban/industrial land uses. The approximately 7.5-mile-long corridor begins on SR 55 just south of I-5 at the southern end and terminates near the SR 55/SR 91 interchange in Anaheim. Both end points of the proposed project are at intersections with major regional transportation facility interchanges, which serve as logical points of termination. The project corridor is of sufficient length to adequately address the transportation issues that have been identified.

Logical Termini

"Logical termini" are required for project development to establish project boundaries that allow for a comprehensive response to transportation deficiency. Rational end points are required for transportation improvements and the review of environmental impacts. The need for improvements on SR 55 between I-5 and SR 91 is demonstrated by current extensive peak-period congestion that is forecast to become worse over time. The project adequately addresses transportation needs on SR 55 and would not necessitate or rely on other projects to address the project's purpose and need.

Independent Utility

The proposed project satisfies FHWA's regulations for "independent utility" because it would not prevent the implementation of future transportation projects; and, independent of other actions, it would also provide benefits to SR 55 according to the project's purpose and need. This project would provide improvements to capacity by adding general purpose lanes between I-5 and SR 22 and operational improvements between SR 22 and SR 91 to address existing and

future traffic demand, address congestion, and enhance freeway operations. These benefits are a result of the proposed project and do not rely on completion of any other projects.

1.3 Project Description

This section describes the proposed action and the Build and No Build Alternatives developed to meet the purpose and need of the project while avoiding/minimizing environmental impacts. The project is located in Orange County on SR 55 between just south of the I-5/SR 55 interchange and the SR 55/SR 91 interchange (between Post Mile 10.4 and R17.9). The total length of the project is approximately 7.5 miles. Within the limits of the proposed project, SR 55 currently has three to five general purpose lanes and an HOV lane in each direction, with auxiliary lanes between ramps at various locations. The purpose of the proposed project is to provide additional capacity on SR 55 between I-5 and SR 22 and provide operational improvements between SR 22 and SR 91. These improvements will improve traffic operations and reduce congestion. The estimated construction cost for the build Alternative is approximately 90 million.

The Build and No Build Alternatives are evaluated in this environmental document and are described in this section. Additionally, 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 C: Avoidance, Minimization, and/or Mitigation Summary) and referenced in Chapter 2 of this IS/EA, as applicable, as Project Features (PF) (per title of subsection) and numbered. For example, a project feature applicable to Cultural Resources would be titled and listed as PF-CUL-1.

1.3.1 Build Alternative

The "Build Alternative" includes the following (Figure 1.3-1):

- One northbound general purpose lane between I-5 and SR 22
- One southbound general purpose lane between I-5 and SR 22
- Additional capacity on the southbound SR 55 Katella Avenue off- and on-ramps
- The southbound SR 55 Lincoln Avenue off-ramp relocated approximately 1,300 feet to the south

1.3.1.1 One northbound general purpose lane between I-5 and SR 22

A fifth general purpose lane would be extended on northbound SR 55 between 4th Street and Fairhaven Avenue, eliminating the existing lane drop at 4th Street. To accommodate the additional general purpose lane, the existing auxiliary lane from northbound 4th Street on-ramp to 17th Street, the existing northbound 17th Street loop on-ramp and the existing auxiliary lane from northbound 17th Street direct on-ramp would be realigned to the east to provide room for the fifth general purpose lane. One additional right-turn lane would also be added to the northbound 4th Street off ramp from SR 55. The fifth general purpose lane would become one of two lanes obligated to the westbound SR 22 connector. After the SR 22 connector, the northbound SR 55 will join the existing four general purpose lanes and one HOV lane.

1.3.1.2 One southbound general purpose lane between I-5 and SR 22

A fourth general purpose lane would be extended on southbound SR 55 from SR 22 to 4th Street, where it would become one of two obligated lanes to the I-5 southbound connector from SR 55. The existing two-lane eastbound SR 22 to southbound SR 55 connector would join the widened southbound SR 55 mainline as an auxiliary lane and additional general purpose lane. As a result, five general purpose lanes and one auxiliary lane would be present between Fairhaven Avenue and 4th Street. The auxiliary lane from the SR 22 connector would extend to the 17th Street loop off-ramp. The auxiliary lane from the 17th Street off-ramp continues to the 4th Street off-ramp, and the additional general purpose lane is an optional exit to 4th Street. The additional general purpose lane continues to become the second obligated lane to the southbound I-5 connector. The southbound 4th Street off-ramp from SR 55 would be widened with an extra right-turn lane to improve traffic flow.

1.3.1.3 Provide additional capacity on the southbound SR 55 Katella Avenue off- and on-ramps

An additional lane would be added to the southbound SR 55 Katella Avenue off- and on-ramps.

1.3.1.4 Relocate the southbound SR 55 Lincoln Avenue off-ramp approximately 1,300 feet to the south

The existing Lincoln Avenue southbound off-ramp will be relocated to south of Lincoln Avenue (next to the existing southbound hook on-ramp). This ramp relocation will provide operational improvements by increasing the weave length between the westbound SR 91 to southbound SR 55 connector and the Lincoln Avenue off-ramp. The Park and Ride lot would be relocated in-kind within Caltrans right-of-way to the existing southbound Lincoln Avenue off-ramp location.

Figure 1.3-1. Build Alternative 1 of 9

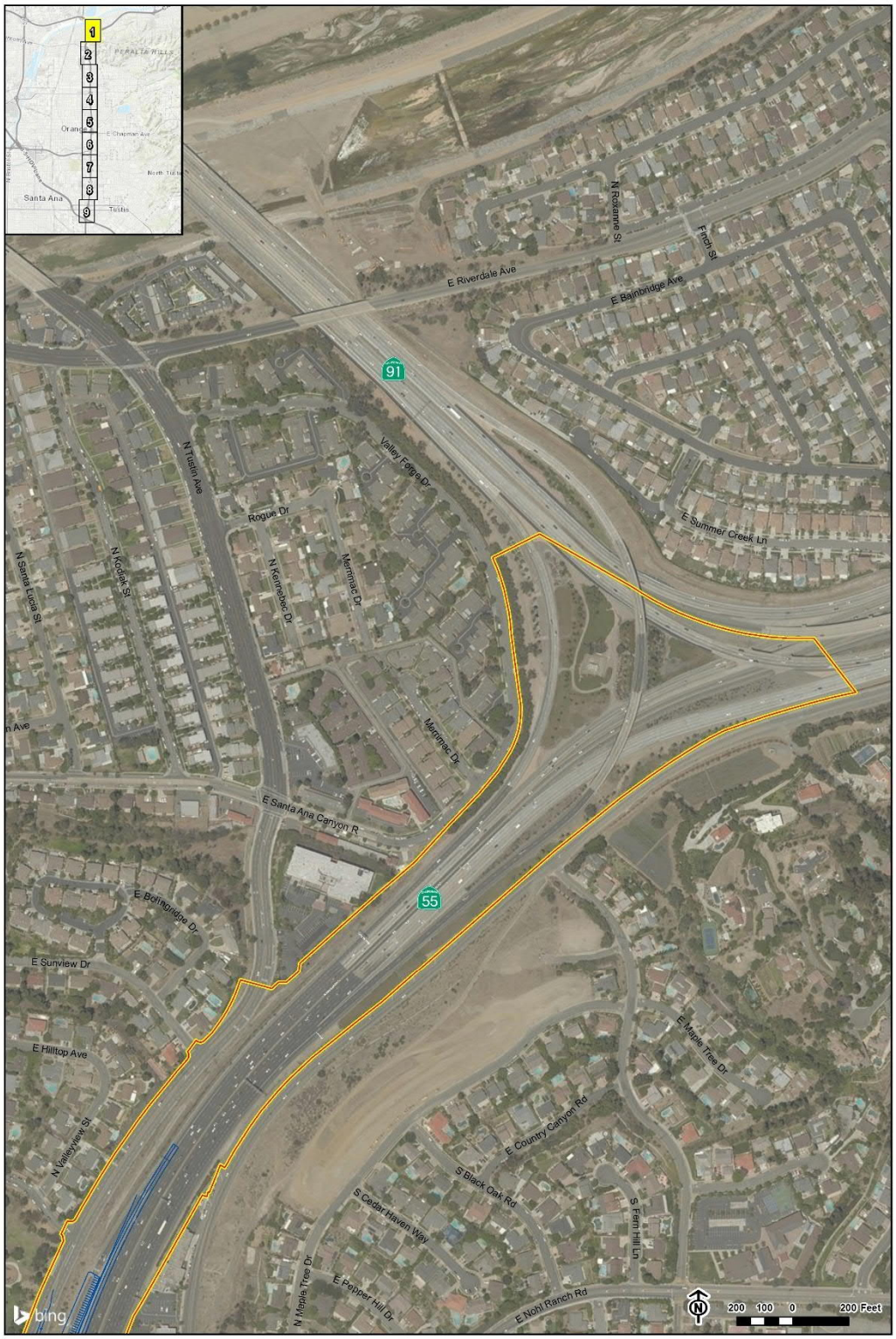


Figure 1.3-1. Build Alternative 2 of 9

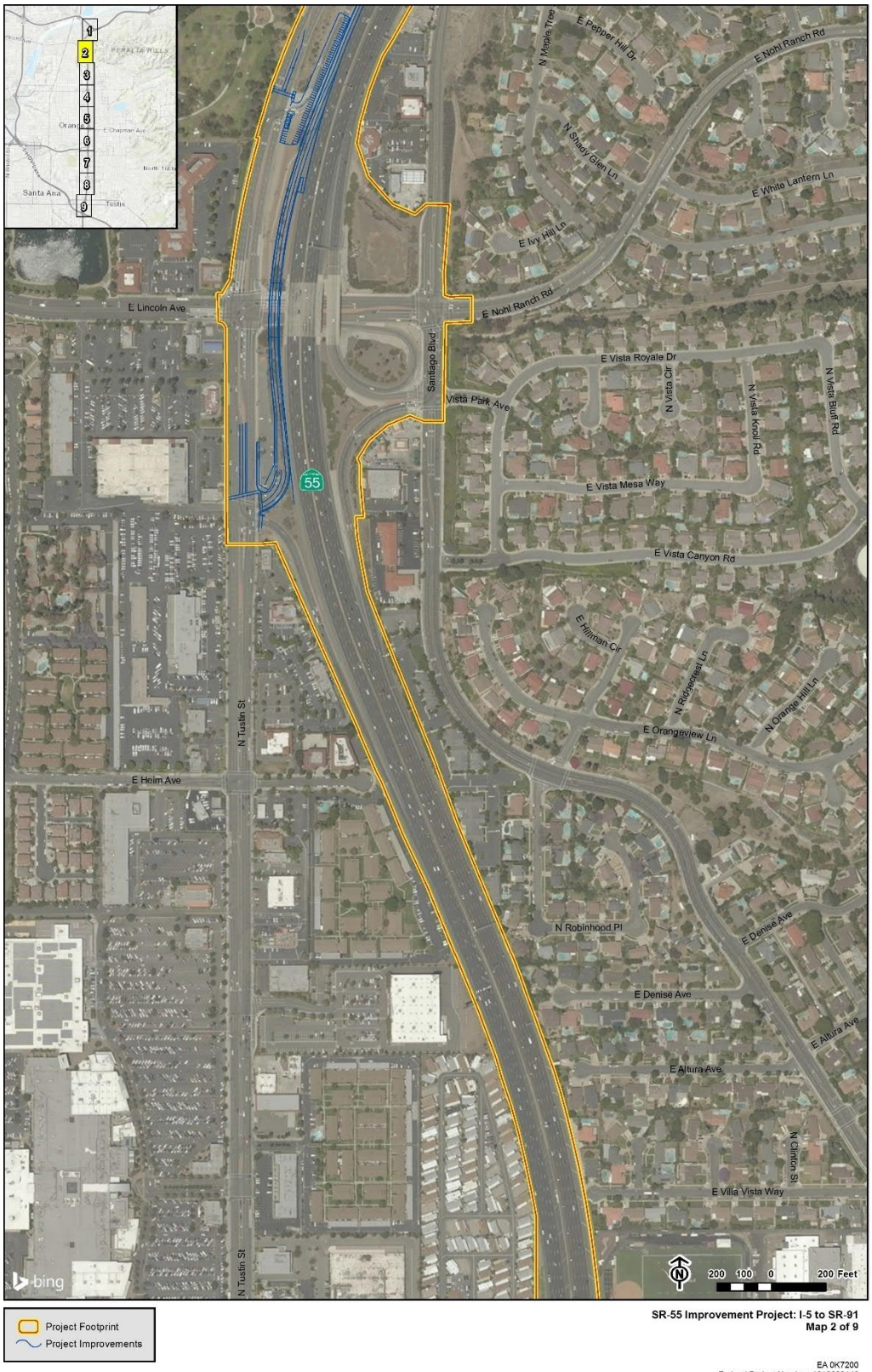


Figure 1.3-1. Build Alternative 3 of 9

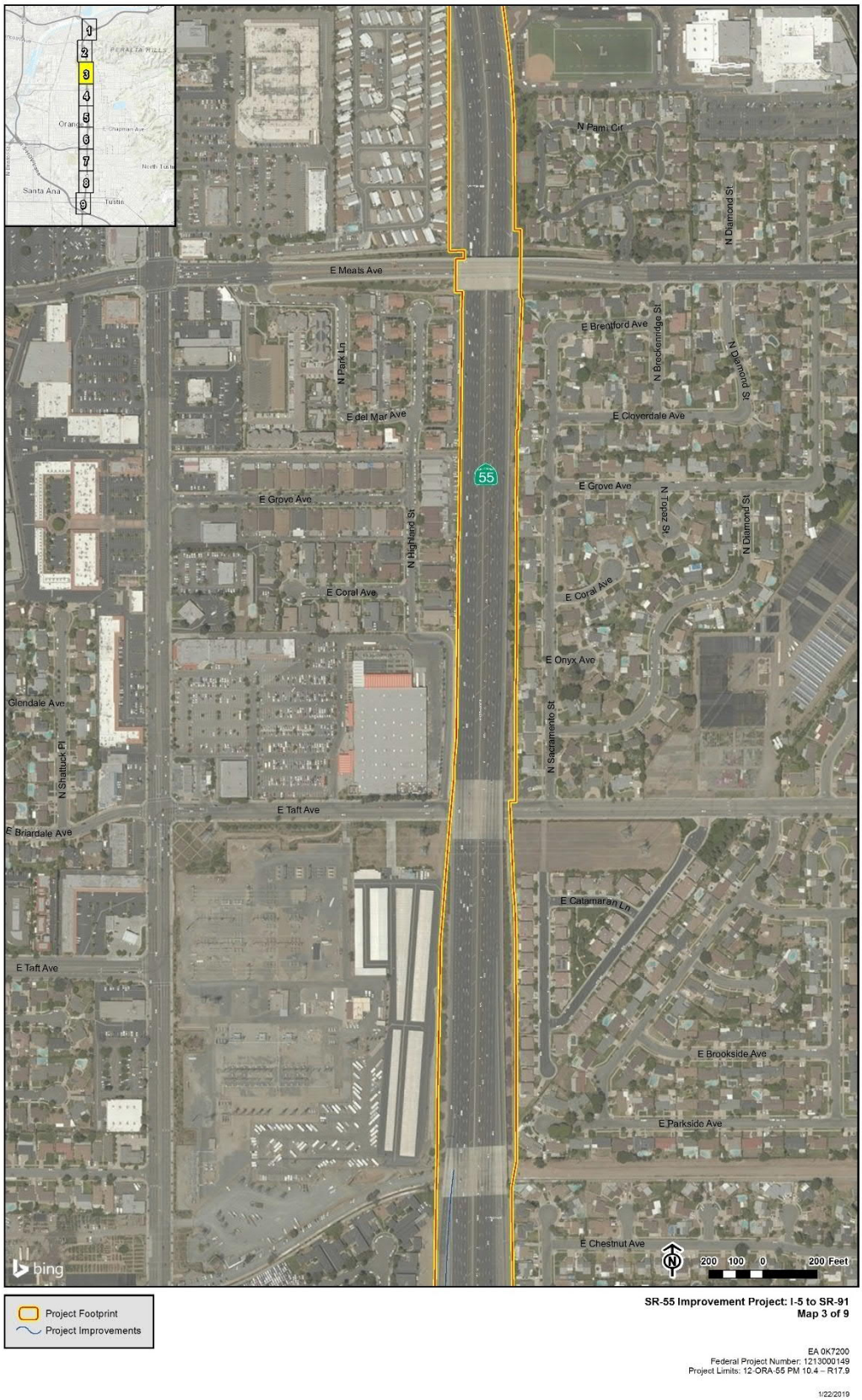


Figure 1.3-1. Build Alternative 4 of 9

Figure 1.3-1. Build Alternative 5 of 9

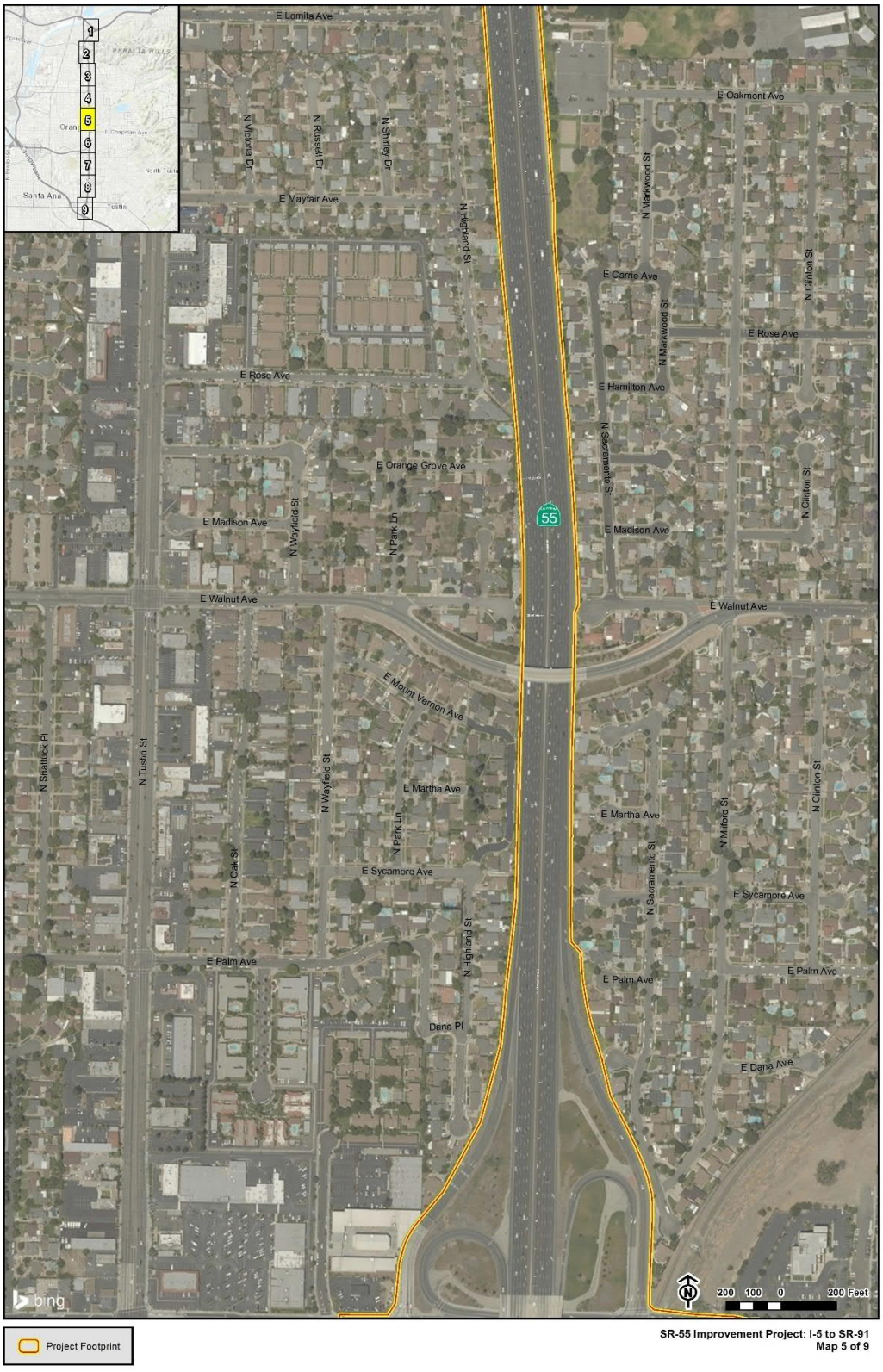


Figure 1.3-1. Build Alternative 6 of 9

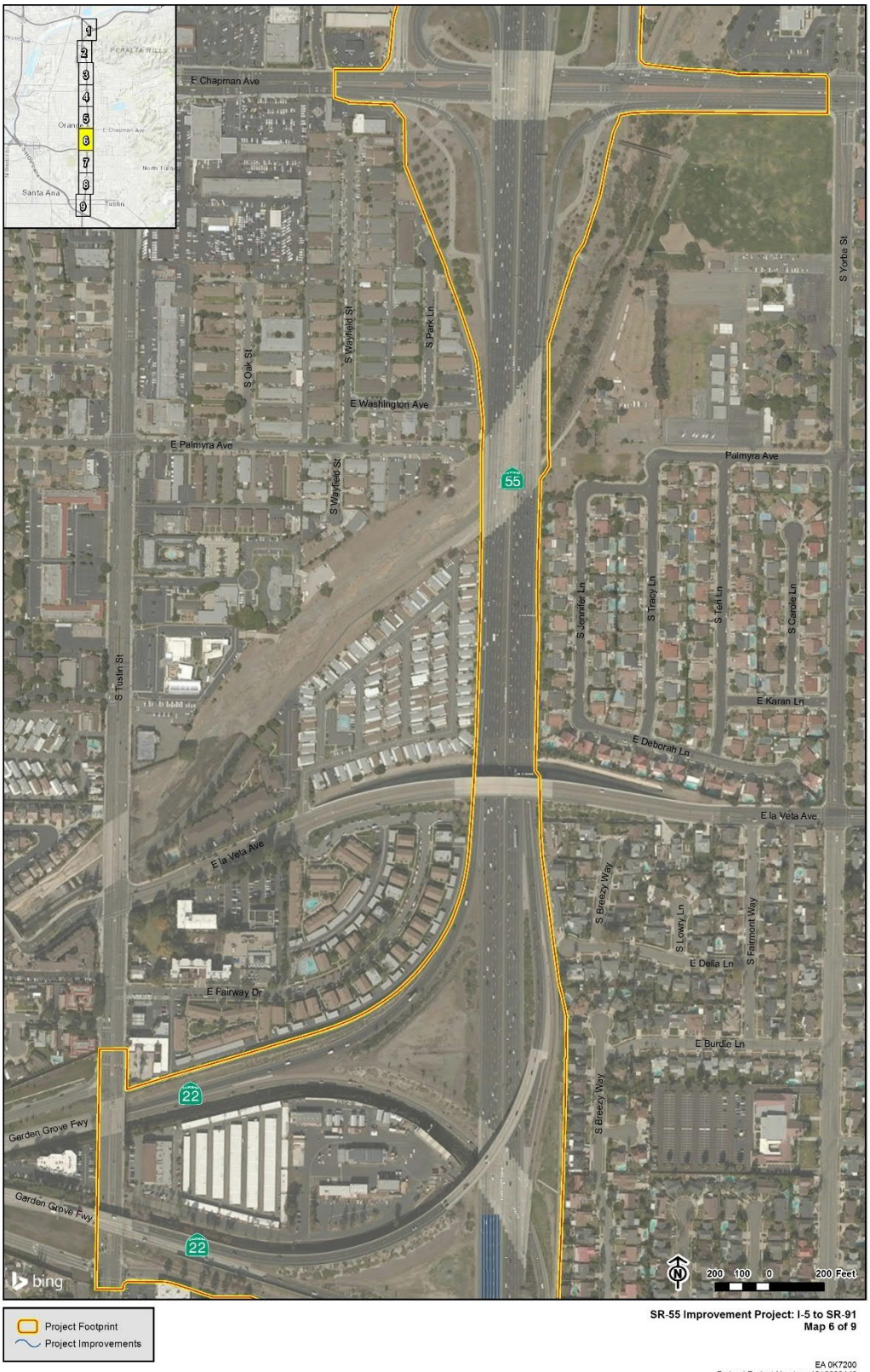
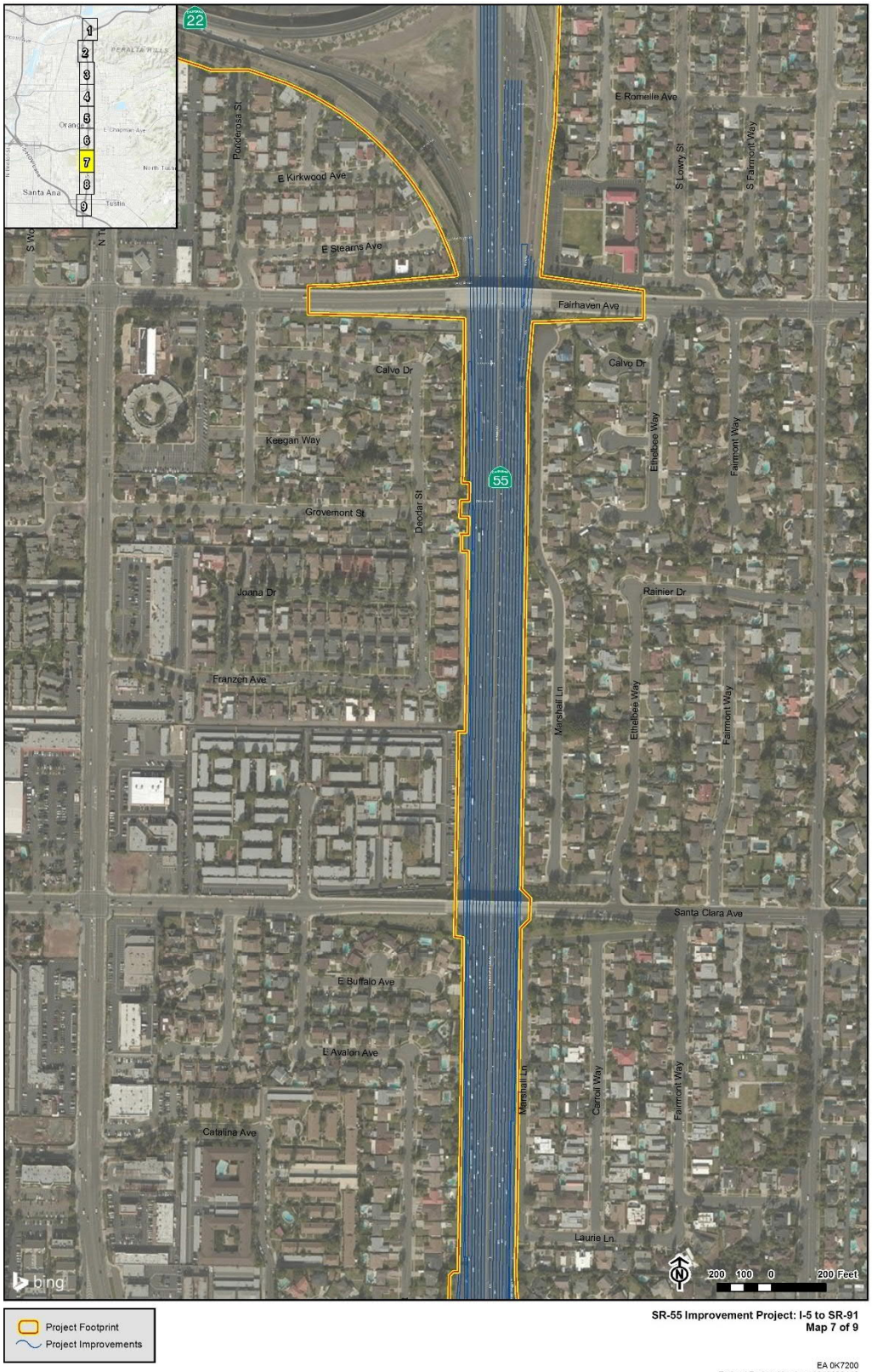


Figure 1.3-1. Build Alternative 7 of 9



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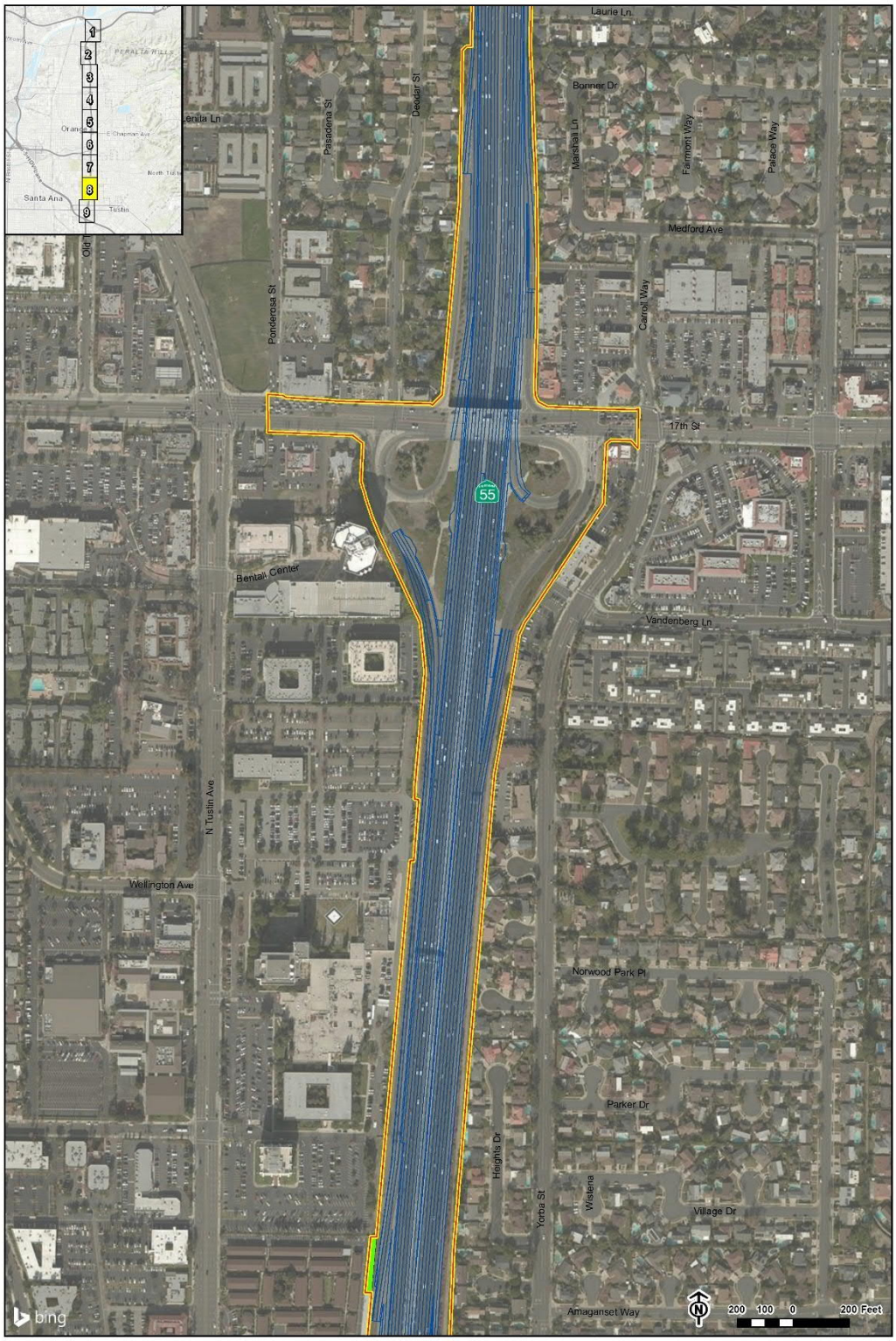

Figure 1.3-1. Build Alternative 9 of 9

1.3.2 No Build Alternative

The No Build Alternative consists of those transportation projects that are already planned for construction by or before 2035 for the Opening Year analysis and 2055 for the Design Year analysis. Consequently, the No Build alternative represents future travel conditions in the SR 55 (I-5 to SR 91) Improvement Project study area without the SR 55 (I-5 to SR 91) Improvement Project.

The No Build Alternative would not meet the project purpose to improve mobility and decrease congestion. As shown in Table 1.3-1, generally, peak-hour speeds under existing conditions are substantially deteriorated relative to free flow traffic conditions, with average peak-hour speeds ranging from 39 to 52 miles per hour (mph).

Table 1.3-1 also shows vehicle average annual daily traffic (AADT) in the project area, including truck AADT and percentage for the existing and future No Build conditions. Future No Build conditions are forecasted for the project corridor segments between exit on- and off-ramps. As shown, generally, peak-hour speeds under the No Build Alternative, in 2035 and 2055, are substantially deteriorated relative to free flow traffic conditions with future average peak-hour speeds ranging from 28 to 53 mph.

Table 1.3-1: Summary of Existing Traffic Conditions

Scenario/ Analysis Year	Location	AADT Total	AADT Truck	% Truck	VMT (mi)	Average Peak Speed (mph)	Average Off-Peak Speed (mph)
Baseline 2017	Irvine Blvd to 17th St NB	122,960	8,512	7.7%	60,918	41	64
Baseline 2017	Irvine Blvd to 17th St SB	121,550	7,818	7.7%	54,212	42	63
Baseline 2017	17th St to SR 22 NB	124,970	8,422	7.5%	76,849	40	64
Baseline 2017	17th St to SR 22 SB	126,910	8,074	7.5%	80,515	40	64
Baseline 2017	SR 22 to Chapman Ave NB	122,200	7,267	5.9%	29,784	52	65
Baseline 2017	SR 22 to Chapman Ave SB	134,220	7,460	5.9%	31,374	46	65
Baseline 2017	Chapman Ave to Katella Ave NB	123,220	7,557	5.9%	127,016	46	64
Baseline 2017	Chapman Ave to Katella Ave SB	118,410	6,669	5.9%	122,620	47	64
Baseline 2017	Katella Ave to Meats Ave NB	114,570	7,207	5.9%	65,493	44	64
Baseline 2017	Katella Ave to Meats Ave SB	109,320	6,188	5.9%	62,020	47	63
Baseline 2017	Meats Ave to Lincoln Ave NB	114,570	7,207	5.9%	61,515	44	64
Baseline 2017	Meats Ave to Lincoln Ave SB	109,320	6,188	5.9%	53,147	47	63
Baseline 2017	Lincoln Ave to SR 91 NB	116,950	7,793	5.9%	99,509	40	64
Baseline 2017	Lincoln Ave to SR 91 SB	115,540	7,298	5.9%	103,986	39	59

Notes: %: percent; AADT: annual average daily traffic; Ave: Avenue; Blvd: Boulevard; I-: Interstate; mph: miles per hour; NB: northbound; SB: southbound; SR: State Route; VMT: vehicle miles traveled
Source: Orange County Transportation Analysis Model, Version 4.0.

Table 1.3-2. Summary of Future No Build Traffic Conditions

Scenario/ Analysis Year	Location	AADT Total	AADT Truck	% Truck	VMT (mi)	Average Peak Speed (mph)	Average Off-Peak Speed (mph)
No Build 2035	Irvine Blvd to 17th St NB	138,520	10,666	7.7%	65,076	36	64
No Build 2035	Irvine Blvd to 17th St SB	132,220	10,181	7.7%	57,825	37	61
No Build 2035	17th St to SR 22 NB	146,580	10,994	7.5%	81,595	36	64
No Build 2035	17th St to SR 22 SB	130,180	9,764	7.5%	85,320	34	60
No Build 2035	SR 22 to Chapman Ave NB	152,440	8,994	5.9%	31,225	52	64
No Build 2035	SR 22 to Chapman Ave SB	136,440	8,050	5.9%	32,628	37	59
No Build 2035	Chapman Ave to Katella Ave NB	137,530	8,114	5.9%	133,859	43	64
No Build 2035	Chapman Ave to Katella Ave SB	131,990	7,787	5.9%	129,370	44	62
No Build 2035	Katella Ave to Meats Ave NB	127,870	7,544	5.9%	69,979	40	64
No Build 2035	Katella Ave to Meats Ave SB	125,020	7,376	5.9%	66,345	43	61
No Build 2035	Meats Ave to Lincoln Ave NB	127,870	7,544	5.9%	68,022	42	64
No Build 2035	Meats Ave to Lincoln Ave SB	125,020	7,376	5.9%	56,862	43	61
No Build 2035	Lincoln Ave to SR 91 NB	135,310	7,983	5.9%	95,096	35	64
No Build 2035	Lincoln Ave to SR 91 SB	118,230	6,976	5.9%	90,647	28	54
No Build 2055	Irvine Blvd to 17th St NB	146,550	11,284	7.7%	70,651	37	63
No Build 2055	Irvine Blvd to 17th St SB	139,320	10,728	7.7%	62,208	37	61
No Build 2055	17th St to SR 22 NB	153,810	11,536	7.5%	88,300	36	63
No Build 2055	17th St to SR 22 SB	137,500	10,313	7.5%	91,516	34	60
No Build 2055	SR 22 to Chapman Ave NB	156,310	9,222	5.9%	33,161	53	64
No Build 2055	SR 22 to Chapman Ave SB	141,040	8,321	5.9%	34,691	37	59
No Build 2055	Chapman Ave to Katella Ave NB	143,680	8,477	5.9%	143,985	44	63
No Build 2055	Chapman Ave to Katella Ave SB	138,840	8,192	5.9%	140,101	44	62
No Build 2055	Katella Ave to Meats Ave NB	140,760	8,305	5.9%	82,007	42	62
No Build 2055	Katella Ave to Meats Ave SB	139,490	8,230	5.9%	77,837	38	59
No Build 2055	Meats Ave to Lincoln Ave NB	134,060	7,910	5.9%	78,495	44	63
No Build 2055	Meats Ave to Lincoln Ave SB	130,880	7,722	5.9%	61,490	44	61
No Build 2055	Lincoln Ave to SR 91 NB	143,250	8,452	5.9%	101,155	38	63
No Build 2055	Lincoln Ave to SR 91 SB	121,110	7,145	5.9%	95,090	30	55

Notes: %: percent; AADT: annual average daily traffic; Ave: Avenue; Blvd: Boulevard; mph: miles per hour; NB: northbound; SB: southbound; SR: State Route; VMT: vehicle miles traveled
Source*:* Orange County Transportation Analysis Model, Version 4.0.

1.3.3 Comparison of Alternatives

Table 1.3-3 provides information for comparison of the Build and the No Build Alternatives. The table compares the impacts of building the project vs. not building the project. After the public circulation period, all comments will be considered, and Caltrans will select either to build the project or not build the project and make the final determination of the project's effect on the environment. Under CEQA, if no unmitigable significant adverse impacts are identified, Caltrans will prepare a Negative Declaration or Mitigated Negative Declaration. Similarly, if Caltrans, as

assigned by the FHWA, determines the NEPA action does not significantly impact the environment, Caltrans will issue a Finding of No Significant Impact.

Table 1.3-3: Summary of Alternatives and Impacts

Environmental Issue	No Build Alternative	Build Alternative
Project Features and Design Standards		
Number of lanes	1 HOV, 3 to 5 general purpose, and auxiliary lanes provided at some locations	1 HOV, 4 to 5 general purpose, auxiliary lanes provided at some locations, an addition of new lane at the SB SR 55 Katella Avenue off- and on-ramps, and relocation of existing SB SR 55 Lincoln Avenue off-ramp
Travel lanes consistent with the Caltrans *Highway Design Manual*?	No	Yes
Shoulders consistent with the Caltrans *Highway Design Manual*?	No	Yes
Horizontal clearances consistent with the Caltrans *Highway Design Manual*?	No	Yes
Vertical clearances consistent with the Caltrans *Highway Design Manual*?	Yes	Yes
Number of freeway segments operating at unacceptable LOS in AM/PM peak hours (out of a total 31 segments)	20/31 AM 23/31 PM	14/31 AM 19/31 PM
Number of Parcels Impacted	None	Temporary: 2 TCE. Permanent: No impacts.
Total Project Cost	None	TBD
Construction Duration	None	24 months
Potential Environmental Impacts		
Land Use	No impact.	The Build Alternative is consistent with local, regional, and State plans.
Growth	No impact.	The Build Alternative would not influence the rate, type, or amount of growth and would not result in unplanned growth.
Community Impacts	No impact.	• Environmental Justice: low-income and minority populations would not be adversely affected.
Utilities and Emergency Services	No impact	• During construction, existing underground and overhead utility facilities could be affected and potentially require protection in-place, removal, or relocation. • Temporary construction delays to emergency services may occur due to limited lane closures on mainline, ramp, and arterial roadways. • During operation, improvements in traffic flow are likely to improve emergency response times within the Study Area; therefore, no permanent adverse effects would occur. • No permanent adverse effects on utility providers or their facilities would occur.

Environmental Issue	No Build Alternative	Build Alternative
Traffic and Transportation/Pedestrian and Bicycle Facilities	Long-term negative impact	• Temporary impacts to traffic circulation and pedestrian and bicycle access would occur during construction activities associated with the freeway improvements. • The Build Alternative would improve traffic operational service and reduce congestion in the long term.
Visual/Aesthetics	No impact	• The Build Alternative would result in minimal temporary impacts to visual/aesthetics resources during construction. • The Build Alternative would result in compatible visual characteristics to the existing project corridor; therefore, any permanent impacts to visual/aesthetics resources would be neutral.
Cultural Resources	No impact	• The Build Alternative would have the potential to encounter previously unidentified cultural resources during construction. • There are no historic properties or archaeological resources identified within the Direct Area of Potential Effect (APE). However, two historic properties are located within the Indirect APE and were evaluated individually, and as potential contributors to a larger district, and determined that they did not qualify as potential contributors to the locally designated Old Town Tustin Historic District. These two properties were previously found individually eligible for listing in the National Register of Historic Places (NHRP) and this finding remains valid. These properties are not eligible for inclusion in the local historic district because they are located outside of the boundary established for the historic district and are physically separated by intervening modern infill construction and substantially altered historic buildings. The project would not result in a take or easement of these properties. Additionally, the properties have been adjacent to an existing freeway that was constructed more than 50 years ago. Therefore, the project would not result in a direct or indirect impact to historic properties. Three CEQA historical resources were identified in the project area and all are located within the Indirect APE. These resources include the two properties described above. The third property is within the same vicinity of the other two properties near the Old Town Tustin Historic District. The Build Alternatives would not directly impact the three CEQA historical resources identified in the project area. In the unlikely event that previously unidentified cultural materials are unearthed during construction, the implementation of PF-CUL-1 would avoid or minimize adverse impacts. Human remains are not anticipated within the APE. PF-CUL-2 will be implemented to address inadvertent discovery during site preparation, grading, or excavation. Therefore, permanent impacts to cultural resources would be less than significant.

Environmental Issue	No Build Alternative	Build Alternative
Hydrology and Floodplains	No impact	• Construction activities associated with the Build Alternative would occur primarily within Caltrans right-of-way. Drainage improvements would be limited to the dry season, would not reduce or otherwise affect the flood storage capacity, and would not modify flood flows. Therefore, no temporary adverse impacts would occur. • The Build Alternative would include improvements that may require abandoning some drainage systems or adjusting some with respect to the finished grade. Others may conflict with proposed retaining walls and will be relocated. These impacts may be minimized or avoided by relocating, extending, and adjusting systems as necessary, as well as abandoning or removing systems which are no longer serviceable. • No improvements that would change channel hydraulics or increase the risk of flooding and inundation would occur. Therefore, impacts to hydrology and floodplains are less than significant.
Water Quality and Stormwater Runoff	No impact	• Construction activities associated with the Build Alternative would disturb a total area of 15.65 ac. Implementation of required permits and preparation of a SWPPP and BMPs would result in no adverse impacts related to water quality and stormwater runoff during construction. • The Build Alternative would increase the impervious surface area by 2.90 ac, thereby increasing the volume of runoff. Implementation of required permits and post-construction source control BMPs and treatment BMPs would result in no adverse impacts related to water quality and stormwater runoff during post-construction.
Geology/Soils/Seismology/Topography	No impact	• The Build Alternative would result in temporary impacts to geology, soils, seismology, and topography during construction. • The Build Alternative would not result in substantial long-term impacts to geology, soils, seismology, and topography.
Paleontology	No impact	• The Build Alternative would have the potential to encounter scientifically important paleontological resources during construction. • The Build Alternative would have the potential to significantly impact paleontological resources during excavations into areas containing native Miocene, Pliocene, and Pleistocene sediments. Implementation of Mitigation Measures PALEO-1 and PALEO-2 would reduce impacts to paleontological resources or unique geologic features to less than significant.
Hazardous Waste/Materials	No impact	• With the implementation of project features PF-HAZ-1 through PF-HAZ-6, the Build Alternative would not result in temporary adverse impacts related to hazardous waste or materials. • Operation would not result in adverse impacts related to hazardous waste or materials.
Air Quality	No impact	• During construction, emissions from construction equipment and activities would include CO, NO_x, VOCs, directly-emitted particulate matter (PM_{10} and $PM_{2.5}$), soot particulate (PM_{10} and $PM_{2.5}$), diesel exhaust particulate matter (PM_{10} and $PM_{2.5}$), SO_2, dust, and odor. • The proposed project is not a project of air quality concern under 40 CFR 93.123(b)(1).

Environmental Issue	No Build Alternative	Build Alternative
Noise	• No temporary noise impacts • Potential long-term noise effects from traffic noise	• The Build Alternative would result in temporary impacts during construction. • The Build Alternative would not result in perceptible permanent increase in noise once the replacement noise barriers are constructed. • The following noise barrier under the Build Alternative was determined to be reasonable and feasible: Noise Barrier No. 1.1.
Natural Communities	No impact	No impact.
Wetlands and Other Waters	No impact	• The Build Alternative would result in 0.19 acre of temporary impacts to CDFW and 0.09 acre to USACE jurisdiction. • The Build Alternative would not result in any permanent impacts to waters of the United States or waters of the State.
Plant Species	No impact	No impact.
Animal Species	No impact	• Potential for temporary impacts during construction to bats and migratory birds. • No long-term impacts.
Threatened and Endangered Species	No impact	No impact
Invasive Species	No impact	With the incorporation of environmental control measures, the Build Alternative would not result in adverse impacts related to invasive species.
Cumulative Impacts	No impact	Excavations into areas containing native Miocene, Pliocene, and Pleistocene sediments may result in significant impacts to paleontological resources. If other projects on or adjacent to SR-55 also require excavation within fossiliferous formations within the project limits, the project has potential to result in cumulatively considerable impacts to paleontological resources; however, the Build Alternative includes Mitigation Measures PALEO-1 and PALEO-2 to avoid and minimize or mitigate potential adverse impacts.
Climate Change	• No temporary impacts • The No Build Alternative would result in a decrease in CO_2 emissions of 242.72 tons/day in 2030 and 225.67 tons/day in 2050 compared to existing conditions.	• The Build Alternative would result in temporary increase of construction emissions. • The Build Alternative would result in a decrease in CO_2 emissions of 4.96 tons/day in 2030 and an increase of 2.55 tons/day in 2050 compared to the No Build Alternative. • The Build Alternative would result in a decrease in CO_2 emissions of 247.67 tons/day in 2030 and 223.12 tons/day in 2050 compared to existing conditions.
Wildfire	No impact.	No impact.

ac: acre(s)
APE: Area of Potential Effects
BMPs: Best Management Practices
CDFW: California Department of Fish and Wildlife
CFR: Code of Federal Regulations
CO: carbon monoxide
CO2: carbon dioxide
HOV: high-occupancy vehicle
LOS: level(s) of service
NOx: nitrogen oxides
PM10: particulate matter less than 10 microns in size
PM2.5: particulate matter less than 2.5 microns in size
SO2: sulfur dioxide
SR: state route
SWPPP: Storm Water Pollution Prevention Plan
TCE: temporary construction easement
USACE: United States Army Corps of Engineers
VOC: volatile organic compounds

1.3.4 Alternatives Considered but Eliminated from Further Discussion

The project previously included additional alternatives described below. These alternatives were intended to improve operations within the project area; however, after consideration of Caltrans design standards, environmental impacts, right-of-way requirements, and traffic safety and operations, the alternatives (Design Options) described below were removed from further consideration.

1.3.4.1 Design Option A: First Street Southbound On-Ramp (New Connection)

Design Option A proposed to relocate the southbound I-5 connection from 4th Street southbound on-ramp to a new ramp from Tustin Avenue/First Street intersection. The new on-ramp would relieve traffic congestion on the 4th Street/Tustin Avenue intersection and the 4th Street/SR 55 southbound ramps intersection. The First Street (proposed) and 4th Street on-ramps would provide enough storage capacity per traffic analysis. Due to geometrical and spatial challenges the widening of the existing southbound I-5 connector was limited to the first frame of the structure. This limited distance required multiple non-standard features including vertical geometry, super elevation rates, entrance geometry, and outside shoulder; additionally, a 300-foot auxiliary lane could not be accommodated. Furthermore, the proposed First Street on-ramp would introduce a partial interchange condition and would relocate an easily accessible return movement to the I-5 from 4th Street to First Street. After multiple meetings with Caltrans, FHWA and the affected cities, this design option was withdrawn from further evaluation and will not be included in the one build alternative.

1.3.4.2 Design Option B: Northbound 4th Street General Purpose Lane from SR 22 to Chapman Avenue

Design Option B proposed to extend the northbound 4th Street general purpose lane on SR 55 from SR 22 to Chapman Avenue. The added capacity due to the additional lane would slightly improve operations on the mainline; however, the consecutive lane drops near Chapman Avenue would result in challenging weaving maneuvers and exacerbate the operations of the weaving segment at this location. In addition, bridge widening above Santiago Creek would be required for this design option. Because all properties adjacent to SR 55 at Santiago Creek were previously part of a landfill and are currently an active site in the Department of Toxic Substance Control program, additional soil investigations of potentially previously contaminated properties would be needed. This design option would also require right-of-way impacts to approximately 22 properties along Jennifer Lane. Therefore, this design option was withdrawn from further evaluation and will not be included in the one build alternative.

1.3.4.3 Design Option C: Chapman Avenue Southbound Ramp Improvements

Design Option C proposed to improve weaving on the mainline by restricting traffic entering on the Chapman Avenue direct southbound SR 55 on-ramp to westbound SR 22 only and introducing a left turn pocket for traffic to enter the existing westbound Chapman Avenue loop on-ramp to southbound SR 55. Several different ramp restrictions were analyzed, including installing a concrete barrier and adding only signing and striping. Placing a concrete barrier would require 19 feet of right-of-way, 19 full parcel takes and 7 partial parcel takes, bridge widening, and possible abutment adjustments for La Veta Avenue. Several signing and striping restrictions were considered and were deemed difficult to enforce. This design option provided

limited traffic benefits and would worsen existing operations on the Chapman Avenue and southbound SR 55 intersection. The significant delays from traffic waiting to turn left onto the loop ramp may impact access to local businesses. Similar to Design Option B, several properties around Santiago Creek were previously a landfill; and additional environmental investigation would be needed. Therefore, this design option was withdrawn from further evaluation and will not be included in the one build alternative.

1.3.4.4 Design Option D: Northbound Fifth General Purpose Lane from Lincoln Avenue to SR 91

Design Option D proposed to extend the Fifth Street general purpose lane on northbound SR 55 from Lincoln Avenue to SR 91. This design option would improve operations on the mainline. Extending the Fifth Street general purpose lane introduced weaving issues from the northbound Lincoln Avenue on-ramp attempting to merge onto the eastbound SR 91 connector. Removed access, limited access, and non-limited access to eastbound SR 91 were considered. Each design variation has different challenges. Some of these challenges included changes to traffic patterns resulting in impacts on local interchanges within and outside the project footprint. In the "removed access" design variation, a majority of the Lincoln Avenue on-ramp to eastbound SR 91 traffic would utilize Santiago Boulevard to Lakeview Avenue to get onto eastbound SR 91, further burdening the SR 91 and Lakeview Avenue interchange. For the "limited access" design variation, preliminary traffic analysis concluded minimal improvements would be seen to eastbound SR 91 and westbound SR 91. A "non-limited" access was not entertained by Caltrans due to limited weaving length between the on-ramp and SR 91 connectors. Additionally, a full standard design would have right-of-way impacts east of the northbound on-ramp and impact a local business. After evaluating several design variations with Caltrans and the affected cities, Design Option D was withdrawn from further evaluation and will not be included in the one build alternative.

1.3.5 Other Alternatives Considered

1.3.5.1 Assembly Bill 2542 Reversible Lanes

Assembly Bill (AB) 2542 requires any state or local project that would increase automobile capacity or a highway realignment project approved by the California Transportation Commission to have considered reversible lanes in the design of the project.

FHWA guidance notes that "To warrant reversible lanes, peak-period traffic volumes should exhibit or anticipate to exhibit significant direction imbalance (e.g., 70/30 percent)." The FHWA guidance also requires that "If reversing a traffic lane is considered, the basic requirement is that off-peak traffic can be accommodated in the remaining lanes." Based on the project traffic volumes, SR 55 from I-5 to SR 91 currently and is anticipated in the future to exhibit a significant directional imbalance of peak-hour traffic volumes under present conditions. Should reversing a traffic lane be implemented, the remaining lanes cannot accommodate existing or future traffic volumes, as severe traffic congestion presently exists in both directions. No further consideration of reversible lanes is required.

1.3.5.2 Transportation Systems Management, Transportation Demand Management, and Transit Alternatives

Alternative travel modes were considered during the early planning studies for improvements to SR 55. TSM strives to maximize the efficiency of the existing system through operational modifications such as ridesharing, reversible lanes, ramp metering, and traffic signal optimization. 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. 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, multi-modal transportation alternatives integrate multiple transportation modes, such as pedestrian, bicycle, automobile, rail, and mass transit.

TSM, TDM, and multi-modal transportation strategies have been and would continue to be provided in the SR 55 corridor area. As previously discussed, the existing on-ramps along the project segment of SR 55 are all currently metered. Several bus routes operate on SR 55 and the surrounding areas. The Build Alternative would maintain the existing ramp metering and would not permanently impact the bus lines. In addition, there is currently one HOV lane in each direction that operates with continuous access. 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 and would not fulfill OCTA's Freeway Chokepoint Program. As a result, these alternatives were withdrawn from further consideration and are not evaluated in detail in this IS/EA.

1.3.5.3 Full Standard Alternative

A full standard Build Alternative, with no mandatory or advisory design exceptions, was considered during the early planning studies for improvements to SR 55. A full standard alternative would not be cost effective, would require extensive rebuild of the existing freeway, and would have extensive right-of-way and environmental impacts. As a result, this alternative was withdrawn from further consideration and is not evaluated in detail in this IS/EA.

1.4 Permits and Approvals Needed

The proposed project is anticipated to require the permits, reviews, and approvals listed in Table 1.4-1.

Table 1.4-1: Permits and Approvals Needed

Permit/Approval	Agency	Status
NPDES Construction General-Permit Order No. 2009-009-DWQ, NPDES No. CAS000003 (Section 402 of the CWA)	SWRCB	Application and Notice of Intent will be submitted prior to construction

Permit/Approval	Agency	Status
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	SWRCB	If dewatering is required, the project should demonstrated that groundwater being discharged to surface waters does not contain pollutants of concern.
Caltrans NPDES Permit Order No. 2012-0011-DWQ No. CAS000002 (Section 402 of the CWA)	SWRCB	General discharge permit has already been issued for all discharges on Caltrans projects and the project must comply with the permit requirements.
Streambed Alteration Agreement (Fish and Game Code Section 1602)	California Department of Fish and Wildlife (CDFW)	OCTA/Caltrans will coordinate application with CDFW
Water Quality Certification (Section 401 of the CWA)	Santa Ana RWQCB	OCTA/Caltrans will coordinate application with RWQCB.
Individual permit (Section 404 of the CWA)	USACE	OCTA/Caltrans will coordinate application with USACE.
Construction Encroachment Permit	Caltrans District 12	Contractor will obtain Encroachment permit prior to construction
Project Level Air Quality Conformity Approval Letter	FHWA	Caltrans to coordinate with FHWA prior to approval of final environmental document

Notes: CWA: Clean Water Act; DWQ: Division of Water Quality; FHWA: Federal Highway Administration; NPDES: National Pollutant Discharge Elimination System; OCTA: Orange County Transportation Authority; RWQCB: Regional Water Quality Control Board; SWRCB: State Water Resources Control Board; USACE: United States Army Corps of Engineers.