Chapter 1 Project

1.1 Introduction

1.1.1 Environmental Lead Agency

Effective July 1, 2007, the Department has been assigned environmental review and consultation responsibilities under NEPA pursuant to Section 6005 of SAFETEA-LU (23 USC 327). On projects for which the Department has assumed NEPA responsibilities, the Department has also assumed responsibility for environmental review and consultation under other federal environmental laws.

The Department is the lead agency under NEPA and CEQA for this project.

FHWA, the Department, and the RCTC are planned signatory parties to a High Profile Project Agreement that will outline the roles and responsibilities of these three major participants to the project. These roles and responsibilities are in relation to FHWA's charge with stewardship and oversight responsibilities for all federally funded programs under the Federal-Aid Highway Program. FHWA's roles and responsibilities and the status of these approvals are provided in Table 1.1. RCTC has initiated work with FHWA to move the project forward and entered into a Section 129 Toll Agreement for the project on August 18, 2009.

Table 1.1 Federal Highway Administration Approvals

Approval Required	Actual or Anticipated Approval Date
Cost Estimate Review – Approved by FHWA	Approved March 23, 2012
Draft Project Management Plan – Submitted to FHWA	May 16, 2012
Air Quality Conformity Determination (Program and Project Level)	June 4, 2012 (Program Level) and June 6, 2012 (Project Level)
OINCC – Formal Approval	June 2012
Plan of Finance (in lieu of Initial Financial Plan)	July 2012
Modified Access to the Interstate System	Conceptual Approval 2011, Final Approval 60 days after ROD
Final Project Management Plan – Approved by FHWA	October 2012
Close of Finance/Financial Plan Annual Update	May 2013

Source: Riverside County Transportation Commission (2012).
FHWA = Federal Highway Administration
OINCC = Operational Independence and Non-Concurrent Construction

1.1.2 Overview of the Project

1.1.2.1 Project Limits

The project limits extend on SR-91 from approximately SR-241 to just east of I-15 and on I-15 from approximately Hidden Valley Parkway to the north and Cajalco Road to the south. SR-91, within the project limits, currently has four GP lanes accommodating travel in each direction, with those lanes varying in width from 11 to 12 ft from the SR-241/SR-91 interchange to the SR-91/I-15 interchange, and three 12 ft wide GP lanes in each direction from the SR-91/I-15 interchange to Pierce Street. In addition, there are two tolled express lanes (within Orange County) and one HOV lane (within Riverside County) in each direction within the project limits. The tolled express lanes, which are 11 to 12 ft wide depending on the location, begin in Orange County west of the SR-91/SR-55 interchange and end at the Orange/Riverside County line. The two HOV lanes, which are 11 to 12 ft wide depending on the location, begin where the tolled express lanes end just east of the Orange/Riverside County line and extend to Mary Street in the City of Riverside. Figure 1-1 shows the project vicinity and the project limits on SR-91 and I-15.

The RCTC, in cooperation with the Department, is proposing capacity, operational, and safety improvements on segments of SR-91 and I-15 designated as the SR-91 CIP. The project is intended to widen the existing SR-91 from the junction of the SR-91 and SR-241 interchange in the Cities of Anaheim and Yorba Linda in Orange County to Pierce Street in the City of Riverside in Riverside County. The project also includes improvements to I-15 in Riverside County between the I-15 and Cajalco Road interchange in the City of Corona and the I-15 and Hidden Valley Parkway interchange, also in the City of Corona. The project is subject to State and federal environmental review requirements.

1.1.2.2 FHWA Major Project Deliverables

The SR-91 CIP is designated as an FHWA Major Project due to the project cost exceeding $500 million. Based on SAFETEA-LU, a major project is defined as a project with a total estimated cost of $500 million or more that is receiving federal financial assistance. In order for federal funding to be authorized for the financing of Major Projects such as the SR-91 CIP, the project owner (i.e., RCTC for the SR-91 CIP) must demonstrate to the FHWA that the project has been carefully planned out (i.e., costs have been estimated as accurately and meticulously as possible; risks have been carefully considered and mitigated; financing requirements and strategies have been clearly defined; and the implementation of the project delivery has been carefully planned). Through the different phases of project delivery and as required

LEGEND

- SR-91 Project Limits
- City Boundary
- County Boundary

0 5 10
MILES

SOURCE: ESRI (2006); TBM (2007), PB (2008)

I:\PAZ0701\GIS\Basemap\Project_Vicinity_EIR.mxd (4/11/2011)

FIGURE 1-1

SR-91 Corridor Improvement Project

Project Vicinity

12-Ora-91-R14.43/R18.91
08-Riv-91-R0.00/R13.04
08-Riv-15-35.64/45.14
EA 0F540

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under SAFETEA-LU, the FHWA Major Project designation triggers a number of deliverables for submittal to FHWA for approval on the SR-91 CIP, including: (1) a Cost Estimate Review (CER), which must be approved prior to approval of a Final EIS; (2) an Operational Independence and Non-Concurrent Construction (OINCC) Determination; (3) an Initial Financial Plan (IFP); and (4) a Draft and Final Project Management Plan (PMP). The Draft PMP should be submitted to FHWA 60 days prior to approval of an ROD, and the Final PMP must be submitted no later than 90 days after approval of the ROD. The Plan of Finance (POF) required with RCTC's application for Transportation Infrastructure Finance and Innovation Act (TIFIA) funds will be submitted in lieu of the IFP per FHWA financial plan guidance. The FHWA Major Project deliverables schedule of approvals is provided in Table 1.1.

1.1.2.3 Programming Status

The project is currently programmed in the 2012 RTP, which was found to conform by the FHWA/FTA on June 4, 2012. The project is also programmed in the SCAG financially constrained 2011 FTIP (through Amendment 24), which was also found to be conforming by the FHWA/FTA on June 4, 2012. The description of the project in the 2012 RTP is as follows: Project ID No. RIV071250; Description: Phase 1: On SR-91/I-15: SR91 – Construct 1 mixed flow lane (SR-71 through I-15)/1 aux lane at various locations (SR-241 through Pierce)(OC PM 14.43-18.91), CD system (2/3/4 lanes from Main Street to I-15), 1 toll express lane (TEL) and convert HOV to TEL in each direction (OC to I-15); I-15 – construct TEL median direct connector NB I-15 to WB SR-91 and EB SR-91 to SB I-15, 1 TEL in each direction (SR-91 direct connector – Ontario Interchange)(I-15 PM 37.56-42.94). Phase 2: on SR-91/I-15: SR91 – Add 1 mixed flow lane in each direction (SR241 – SR71)(I15 – Pierce); I15 – add toll express lane (TEL) median direct connector (SB15 to WB91 & EB91 to NB15), 1 TEL each direction from Hidden Valley –SR-91 direct connector and from Ontario Interchange to Cajalco Interchange.

The description of the Initial Phase (Phase 1 as described in the RTP) in the 2011 FTIP (Amendment 24) is as follows: Project ID No. RIV071250; Description: On SR-91/I-15: SR91 – Construct 1 mixed flow lane (SR-71 through I-15)/1 aux lane at various locations (SR-241 through Pierce)(OC PM 14.43-18.91), CD system (2/3/4 lanes from Main Street to I-15), 1 TEL and convert HOV to TEL in each direction (OC to I-15); I-15 – construct TEL median direct connector NB I-15 to WB SR-91 and EB SR-91 to SB I-15, 1 TEL in each direction (SR-91 direct connector – Ontario Interchange)(I-15 PM 37.56-42.94).

The approved 2012 RTP and 2011 FTIP (Amendment 24) project listings are provided in Appendix K.

1.1.2.4 Funding Status

Alternative 1 would be funded by Measure A, which is a one-half-cent sales tax that was originally approved by Riverside County voters in 1998 and was extended in 2002. Alternative 2 would be funded by Measure A and toll revenue bonds. Toll revenues generated under Alternative 2 would be used as the funding source for the tolled express lanes. Refer to Section 2.3.4, Phasing Plans for the Build Alternatives, for a description of how the Initial Phase and Ultimate Project of the Preferred Alternative (Alternative 2f) would be funded.

1.1.3 Planning History of the Project

1.1.3.1 Route Concept Report

The approved *Route Concept Report* (Department, October 25, 1989) designated the ultimate concept facility for this segment of SR-91 as a 10-lane freeway with 8 GP lanes and 2 HOV lanes. The existing SR-91 meets or exceeds the ultimate concept facility defined in that report. However, the existing facility does not accommodate the existing demand in this corridor and generally operates under breakdown conditions during the morning and evening peak periods.

1.1.3.2 State Route 91 Congestion Relief Alternatives Analysis

The *State Route 91 Congestion Relief Alternatives Analysis* (Department, January 2003) outlined short-, mid-, and long-term alternatives to relieve congestion on SR-91 between SR-55 in Orange County and I-15 in Riverside County. This study was sponsored and conducted by Department Districts 8 and 12.

1.1.3.3 State Route 91 Implementation Plan

The *State Route 91 Implementation Plan* was completed by OCTA in June 2003, as required by Assembly Bill (AB) 1010, which was signed into law in September 2002. AB 1010 required OCTA, in consultation with the Department and RCTC, to issue a plan and a proposed completion schedule for improvements to SR-91 from I-15 to SR-55 to the State Legislature prior to July 1, 2003. The scope of the *2003 State Route 91 Implementation Plan* reiterated the alternatives in the *State Route 91 Congestion Relief Alternatives Analysis* and provided additional approaches, including the development of an MIS to evaluate potential new corridors and multimodal alternatives. Since 2003, this Plan has been updated annually to the current *State Route 91 Implementation Plan* (OCTA 2010).

1.1.3.4 Riverside County-Orange County Major Investment Study

The development of the MIS for Riverside and Orange Counties was initiated in June 2004 and was completed in December 2005. OCTA, in cooperation with the RCTC and Foothill-Eastern Transportation Corridor Agency, prepared the MIS. The purpose of the MIS was to address planning, environmental, and transportation issues that would result from the anticipated doubling of population in Riverside County (from 1.5 million residents in the early 2000s to approximately 3.1 million residents by 2035[1]) by developing an LPS that meets five key goals, to the extent feasible:

1. Provide improvements to SR-91 to improve mobility between counties.
2. Improve travel time and safety on existing facilities.
3. Improve goods movement capability through the corridor.
4. Reduce and manage the diversion of intercounty traffic from SR-91 to local streets.
5. Expand modal options throughout the corridor.

The scope of the MIS relied heavily on recommendations for improvements to SR-91 based on the earlier studies described above. The MIS examined a comprehensive range of capital and operational improvement alternatives to SR-91 and identified other intercounty multimodal transportation corridor opportunities. The MIS analyzed the potential benefits, costs, and consequences (economic, social, and environmental) of alternative transportation investment strategies in Orange and Riverside Counties. The MIS planning process was a cooperative and collaborative process whereby public agencies and the community assisted in the development of a definition and general scope of potential solutions and the development of evaluation criteria culminating in a recommendation for a preferred transportation strategy.

The project was identified as a key east-west transportation corridor improvement based on the environmental and transportation analyses conducted for the MIS. The MIS led to the development of the alternatives for the current project.

On October 28, 2005, the MIS Policy Committee provided guidance as to which components of the alternatives might best move forward towards an LPS for subsequent approval by the OCTA Board of Directors and the RCTC Board of Commissioners. Pertinent findings from the detailed evaluation of alternatives were presented at an Elected Officials Briefing on November 3, 2005, to the MIS Policy

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1 *Regional Transportation Plan* (SCAG 2008).

Committee on November 18, 2005, and to the MIS PDT on December 7, 2005. The preliminary LPS was refined on the basis of input received at these meetings and then presented to the OCTA Board of Directors and RCTC Board of Commissioners for approval.

At their respective December 12, 2005, and December 14, 2005, meetings, the OCTA Board of Directors and RCTC Board of Commissioners unanimously approved the recommendations for the refined LPS. Figure 1-2 shows the Riverside County-Orange County MIS LPS. The LPS includes the following projects:

- *Immediate Capacity Enhancements to SR-91* – Add one new lane in each direction between I-15 and SR-241 and make additional improvements.
- *Lower Toll on Foothill Transportation Corridor (SR-241)* – Encourage more drivers on SR-241 by lowering the existing toll and adding new lanes.
- *Build 4-Lane or 6-Lane Elevated Highway (Corridor A)* – Build an entirely new elevated highway (viaduct) parallel to and within the existing right-of-way of SR-91 between I-15 and SR-241.
- *Build 4-Lane or 6-Lane Tunnel (Corridor B)* – Build an entirely new tunnel highway between I-15 at Cajalco Road in Riverside County and the vicinity of the SR-241 and State Route 133 (SR-133) interchange in Orange County.
- *Maximize Transit System* – Expand transit service by increasing Metrolink service through the corridor and evaluate the addition of express buses and high-speed trains such as Maglev. The goal of the LPS transit enhancements is to capture an equivalent 10,000 daily vehicle trips. The expanded transit network would incorporate a new Intermodal Transportation Center in Corona near Serfas Club Road with a park-and-ride facility (estimated at 3,000 parking spaces), shuttle/ circulator feeder buses, local and express buses including bus rapid transit, preferential treatment for HOVs, and linkages to the proposed Maglev train if a station is ultimately developed in Corona along the Ontario-Anaheim segment. Additional Metrolink services are also proposed. These transit enhancements are proposed in the LPS as separate projects.
- *Operational Improvements to SR-74* – Identify specific operational improvements to State Route 74 (SR-74) between Interstate 5 (I-5) and I-15.

The project satisfies the initial component of the MIS LPS of immediate capacity enhancements to SR-91.

Major Investment Study
Recommended Locally Preferred Strategy

- Maximize transit stystem
- Maximum and feasible widening to SR-91*
- Possible managed lane changes for SR-91 or Corridor A (Including reversible lanes)
- Continued study of Corridor A
- Continued study of Corridor B
- SR-74 operational improvements

LEGEND

- Existing Highway
- Proposed SR-91 Improvements
- Proposed Extension of SR-241
- Proposed Corridor A Alignment
- Proposed Corridor B Route
- Proposed SR-74 Improvements
- Proposed Maglev Alignment (By others)**
- (# Total) Number of Total SR-91 Lanes (Include baseline*)
- (# - # Added) Number of Added SR-91 Project Lanes (Exclude baseline*. Does not include auxiliary lanes)

NOTES

*Baseline SR-91 improvements include two lanes from SR-241 to I-15, and an EB lane addition from SR-241 to SR-71 (not shown on diagram).

**Maglev representative seed alignment shown (illustrative only).

FIGURE 1-2

SR-91 Corridor Improvement Project
Major Investment Study
Recommended Locally Preferred Strategy
Ora-91-R14.43/R18.91
Riv-91-R0.00/R13.04
Riv-15-35.64/45.14
EA 0F540

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The improvements identified in the *SR-91 Project Study Report/Project Development Support* (PSR/PDS; Department, December 4, 2006) are consistent with the recommendations in the three studies discussed above.

1.2 Purpose of the Project

The project is intended to achieve the following purposes:

1. Improve the vehicle, person, and goods movement within the SR-91 corridor to more effectively serve existing and future travel demand between and within Riverside and Orange Counties.
2. Provide improvements along the SR-91 and I-15 transportation corridors as well as to related local roads, and to reduce diversion of regional traffic from the freeways into the surrounding communities.

1.3 Need for the Project

SR-91 is currently used by more than 280,000 vpd at the Orange/Riverside County line, and this volume continues to grow. At the same time, travel speeds on SR-91 are well below 30 mph during the lengthy morning (westbound) and evening (eastbound) peak travel periods in this corridor. Existing congestion and delays on SR-91 and I-15 during peak travel periods result in freeway traffic diverting to adjacent local roads to avoid congestion and delays. This diversion of freeway traffic is particularly prevalent in the City of Corona as motorists on westbound SR-91 and motorists transitioning from northbound I-15 to westbound SR-91 seek less congested routes in the morning (westbound) peak travel period. Similarly, diversion of freeway traffic into the City occurs as motorists on eastbound SR-91 and motorists transitioning from eastbound SR-91 to southbound I-15 seek less congested routes in the evening (eastbound) peak travel period.

SR-91 is continuing to experience increased congestion as a result of population growth in Riverside County and the increase in jobs in Orange County. Based on demographic projections for the SCAG region (Orange, Los Angeles, Ventura, Santa Barbara, and Riverside Counties) shown in Table 1.2, the numbers of vehicles on SR-91 are expected to increase by approximately 50 percent by 2035, which would result in continuing congestion and delays on SR-91. Those projections show that population and employment in Riverside and Orange Counties are forecast to increase substantially by 2035, as shown in Table 1.2. The existing travel demand on SR-91

Table 1.2 Regional Demographics

County	Resident Population	Households	Residents Employed	Employment		
				Retail	Service	Other
2007						
Orange	3,088,805	995,930	1,505,733	262,032	477,904	925,564
Los Angeles	10,150,878	3,353,688	4,350,670	745,294	1,949,761	2,110,727
Ventura	812,061	266,104	386,654	62,084	128,067	178,518
San Bernardino	1,896,234	593,927	785,714	150,508	225,648	334,636
Riverside	1,891,540	637,532	794,215	135,454	233,947	284,111
Total	**17,839,517**	**5,847,181**	**7,822,986**	**1,355,370**	**3,015,327**	**3,833,555**
2015						
Orange	3,355,771	1,052,763	1,667,209	284,872	520,114	1,011,401
Los Angeles	10,901,484	3,571,573	4,622,575	787,575	2,181,953	2,194,690
Ventura	879,328	287,731	414,104	67,113	144,948	188,016
San Bernardino	2,140,551	665,213	895,098	176,196	266,544	389,473
Riverside	2,282,363	771,633	973,711	167,649	297,903	326,008
Total	**19,559,497**	**6,348,913**	**8,572,697**	**1,483,405**	**3,411,462**	**4,109,588**
Percent Growth from 2007 to 2015						
Orange	9%	6%	11%	9%	9%	9%
Los Angeles	7%	6%	6%	6%	12%	4%
Ventura	8%	8%	7%	8%	13%	5%
San Bernardino	13%	12%	14%	17%	18%	16%
Riverside	21%	21%	23%	24%	27%	15%
Total	**10%**	**9%**	**10%**	**9%**	**13%**	**7%**
2035						
Orange	3,503,759	1,097,869	1,726,017	301,217	549,765	1,070,818
Los Angeles	12,218,726	4,075,232	5,010,587	854,881	2,365,214	2,321,531
Ventura	984,349	324,772	448,240	77,940	169,147	206,694
San Bernardino	2,678,172	831,100	1,073,448	235,974	340,935	478,223
Riverside	3,068,667	1,035,610	1,253,044	226,329	390,592	414,226
Total	**22,503,353**	**7,364,583**	**9,511,336**	**1,696,341**	**3,815,653**	**4,491,492**
Percent Growth from 2007 to 2035						
Orange	4%	4%	4%	6%	6%	6%
Los Angeles	12%	14%	8%	9%	8%	6%
Ventura	12%	13%	8%	16%	17%	10%
San Bernardino	25%	25%	20%	34%	28%	23%
Riverside	34%	34%	29%	35%	31%	27%
Total	**15%**	**16%**	**11%**	**14%**	**12%**	**9%**

Source: Riverside County Transportation Commission Model inputs for the SR-91 CIP, as disclosed in the *Traffic Study Report* (July 2010).
SR-91 CIP = State Route 91 Corridor Improvement Project

has led to a heavy directional commute pattern between Riverside and Orange/Los Angeles Counties that is projected to continue into the future.

Improvements are necessary to address existing and projected deficiencies regarding mobility, access, goods movement, and freeway capacity on the project segment of SR-91, which is the only major highway that links Riverside and Orange Counties.

1.3.1 Capacity, Transportation Demand, and Safety

1.3.1.1 Traffic Impact Study Areas and Traffic Analysis Years

Traffic Impact Study Areas

The project is a capacity-enhancing State Highway System project and, therefore, the project limits determined the traffic analysis study area. The project limits define the

adjacent interchanges that may be impacted by the capacity enhancements. As such, those interchanges at the project limits defined the extent of the traffic study area.

Because the project focuses on mainline capacity enhancements, all interchanges within the project limits were included in the traffic study area. The mainline refers to the through travel lanes on the freeway. In addition, all ramp intersections and adjacent intersections were included in the study area because they may be impacted by the project alternatives. Adjacent local roadway intersections were included in the study area to measure the effect of reducing traffic diversion from SR-91 to local roads.

For the ramp closure study, the study area was expanded to evaluate all intersections potentially impacted by closures of ramps during project construction.

The detour study area was defined through application of the regional model to evaluate where traffic diversion may occur as a result of ramp closures and through close coordination with the City of Corona.

Traffic Analysis Years

The traffic analysis for the SR-91 CIP described in this EIR/EIS considered traffic conditions for 3 years: Baseline/Existing (2007), 2015, and 2035. Typically, the traffic analysis year for existing conditions would be the year the NOP of an EIR/EIS was published. The NOP for the SR-91 CIP EIR/EIS was published in July 2008. Existing traffic counts were conducted in October 2007, less than 9 months before the publication of the SR-91 CIP EIR/EIS NOP in July 2008. However, as explained in detail later in this section, 2007 was selected as the Baseline/Existing (2007) analysis year because the 2007 traffic volumes were considered to more accurately reflect demand in the SR-91 corridor.

The Initial Phases under Alternatives 1 and 2 were originally programmed to be open for operation in 2015. However, the opening dates for the Initial Phases have been changed to 2017 as a result of RCTC's proposed amendment to the 2011 FTIP (Amendment 24) and the 2012 RTP. The traffic analysis described in this EIR/EIS is based on 2015 and 2035 forecasts developed from the adopted regional traffic forecasting model. Per the Supplemental Request for 20-year Period Design Exception approved by the Department on January 26, 2012, forecast volumes for 2017 were estimated based on existing traffic counts for 2010. Because 2010 traffic counts are approximately 4 percent lower than 2007 traffic counts, 2017 forecast volumes will be generally lower than the 2015 forecast volumes used for the analysis

of the SR-91 CIP. Because the opening year traffic volumes analyzed for 2015 are more conservative when compared to those for 2017, updating the traffic analysis for an opening year of 2017 was not necessary. Therefore, the opening year traffic analysis discussed in Sections 1.3.1.5, 2015 Traffic Projections – No Build, and in Section 3.6, Traffic and Transportation/Bicycle and Pedestrian Facilities, uses the original analysis of the 2015 opening year conditions. In addition, there have not been any regional or local transportation improvement projects implemented that would have an effect on the opening year traffic analysis. The SR-241/SR-91 Direct Connector Project being sponsored by the TCA is currently planned for an opening year of 2018. In addition, the County of Riverside's Cajalco Road Widening Project from Temescal Canyon Road to Interstate 215 (I-215) is currently planned for an opening year of 2019.

1.3.1.2 Existing Facilities and Capacity

The existing major east-west facilities in western Riverside County are State Route 60 (SR-60), SR-74, and SR-91. These facilities provide links with the following major north-south facilities in Riverside County: State Route 79 (SR-79), I-15, and I-215.

SR-91 is the major east-west corridor connecting Orange and Riverside Counties. In Orange County, SR-91 provides connections to SR-55, SR-241, SR-57, and I-5. These existing facilities serve all vehicles in western Riverside County and Orange County.

1.3.1.3 Level of Service

The quality of traffic flow can be defined in terms of levels of service (LOS). The measure used to provide an estimate of LOS on a transportation facility is the density of vehicles traveling on the facility at a specific time. There are six grades of LOS, ranging from LOS A (representing free-flow traffic conditions with low volumes and high speeds, resulting in low densities) to LOS F (representing conditions where the traffic volumes exceed capacity and result in forced flow operations at low speeds, resulting in high densities and delays). The defined LOS for a basic freeway segment are shown graphically and are described in text on Figure 1-3.

1.3.1.4 Baseline/Existing (2007) Traffic Volumes

To evaluate existing corridor conditions for SR-91 and I-15 in the traffic study area, Baseline/Existing (2007) daily and peak-hour traffic count data (numbers of vehicles) were collected. Fall 2007 traffic counts represent existing conditions. The traffic study area is SR-91 from SR-241 at the west to Pierce Street at the east, and I-15 from

Figure 1-3 LOS Thresholds for a Basic Freeway Segment

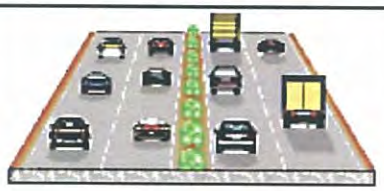
Level of Service	Flow Conditions	Operating Speed (mph)	Technical Descriptions
A		70	Highest quality of service. Traffic flows freely with little or no restrictions on speed or maneuverability. **No delays**
B		70	Traffic is stable and flows freely. The ability to maneuver in traffic is only slightly 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**

FIGURE 1-3

SR-91 Corridor Improvement Project

LOS Thresholds for a Basic Freeway Segment

Ora-91-R14.43/R18.91
Riv-91-R0.00/R13.04
Riv-15-35.64/45.14
EA 0F540

SOURCE: Caltrans Standard Environmental Reference, 2008

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Hidden Valley Parkway at the north to Cajalco Road at the south. The traffic study area includes the area of improvements plus the adjacent interchanges on SR-91 and I-15 so that impacts from the transition to and from the freeways within the project limits can be evaluated.

The Baseline/Existing (2007) traffic conditions were used to represent the existing conditions because they more closely represent normal conditions. Based on traffic counts from the Department's Traffic Data branch from the Average Annual Daily Traffic (AADT) Reports, traffic volumes on SR-91 at the Orange County/Riverside County line increased between 2000 and 2007 from 224,000 to 280,000 vehicles. The 2007 traffic conditions are approximately 5 percent higher than the 2008 conditions and are a more accurate estimate of the existing setting for comparative analysis than the 2008. The 2007 was selected as the Baseline/Existing analysis year because those traffic volumes were considered to more accurately reflect demand in the SR-91 corridor because historically (2000–2007) traffic numbers/volumes have steadily increased and the approximate 5 percent less difference from 2008 is negligible. The variation between 2007 and 2008 is considered negligible because the difference in the peak hour volumes has a minimal effect on the operating conditions (LOS) between those years. Also according to the Interim Guidance on the Application of Travel and Land Use Forecasting in NEPA (FHWA, March 2010), the "Base model year" (the calibration year for the travel model) and the "Base project year" (an updated base year that is validated and is as close as possible to the current year) do not necessarily need to be the same.

The year 2015 was selected as an interim analysis year to reflect traffic conditions with and without the Initial Phases under Alternatives 1 and 2. The year 2035 was selected as the planning horizon year to reflect traffic conditions with and without the Ultimate Projects under Alternatives 1 and 2. The *SR-91 Corridor Improvement Project Traffic Study Report* (January 2010) was based on the SCAG RTP 2004 model and the Orange County Traffic Analysis Model (OCTAM) 3.2. The trends of the model show increases in travel demand, and Section 2.4, Horizon Year Traffic Forecasts, and Table 2-2 in the SR-91 CIP *Traffic Study Report* show positive growth rates. Traffic data for 2007 were collected from various sources, including the Performance Monitoring System (PeMS) website, Department annual traffic volumes, City of Corona traffic count database, and actual ground counts performed at ramp intersections during the a.m. and p.m. peak periods.

The 2007 daily traffic volume (number of vehicles) at the Orange/Riverside County line was approximately 280,000 vpd. Table 1.3 presents the existing mainline and HOV/tolled express lane volumes, and Table 1.4 presents the Baseline/Existing (2007) freeway mainline peak-hour LOS. As shown in Table 1.4, at least six segments of SR-91 performed deficiently under Baseline/Existing (2007) conditions with four segments operating at LOS F in the peak direction of travel (both a.m. and p.m. peak hours). As noted in Table 1.3, several segments of the HOV lanes currently operate with volumes exceeding 1,700 vehicles per hour (vph). As volumes increase beyond 1,700 vph, increased travel times are experienced. Segments on I-15 operate at acceptable LOS during both peak hours with the exception of one southbound segment that performs deficiently in the p.m. peak hour.

Freeway mainline LOS is determined through the application of *Highway Capacity Manual*[1] (HCM) methodology for basic freeway segments. The LOS is determined through the density of vehicles within each roadway segment, or how many passenger cars per mile per lane (pc/mi/ln) are within the segment. The higher the density of vehicles, the higher the degree of congestion within the segment. For segments that operate at LOS F, density measurements are not provided. In this case, Table 1.4 presents volume-to-capacity (v/c) ratios to identify the level of congestion. The v/c ratios provide an assessment of how much of the capacity is utilized by the actual volume. The v/c ratios over 1.0 illustrate extreme congestion. The higher the v/c value, the more congestion occurs within a specific segment.

1.3.1.5 2015 Traffic Projections – No Build

Riverside County is forecast to continue to experience substantial growth in population and housing, based on the adopted General Plans for the study area cities and Riverside County. Refer to Sections 3.1, Land Use, and 3.2, Growth, later in this EIR/EIS for discussion of existing and General Plan-designated land uses in the project study area and the adopted demographic projections for the study area and the region. The growth is forecasted to increase both truck and general automobile traffic on SR-91 and I-15. The traffic forecasting process was initiated with the development of a regional model specifically for application in Riverside County and considering tolling activity.

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[1] The *Highway Capacity Manual* (2000) is a publication of the Transportation Research Board that is used for a variety of transportation facility and traffic engineering applications, including LOS concepts (pages 23-2 and 23-3).

Table 1.3 Baseline/Existing (2007) Mainline Traffic Volumes[1]

SR-91 Segment	Eastbound GP Lanes			Eastbound Toll/HOV Lanes			Westbound GP Lanes			Westbound Toll/HOV Lanes		
	AM	PM	ADT	AM	PM	ADT	AM	PM	ADT	AM	PM	ADT
SR-241 to Gypsum Canyon Rd	4,800	6,000	92,170	720	3,380	18,400	9,130	6,130	99,230	2,420	1,070	18,500
Gypsum Canyon Rd to Green River Rd	5,820	8,280	121,600	720	3,380	18,400	10,830	6,990	121,500	2,420	1,070	18,500
Green River Rd to SR-71	5,810	8,780	116,800	800	1,750	14,800	10,400	7,040	119,400	1,780	1,130	12,500
SR-71 to Auto Center Dr	5,980	8,630	117,100	390	1,940	15,900	10,180	6,880	116,600	1,850	1,030	16,700
Auto Center Dr to Maple St/Sixth St	5,390	8,970	118,400	880	1,650	16,000	9,300	6,680	120,600	1,860	1,030	12,500
Maple St/Sixth St to Lincoln Ave	4,810	8,090	113,800	900	1,620	15,800	8,640	6,690	116,500	1,590	810	12,000
Lincoln Ave to Grand Blvd	5,070	8,000	121,600	900	1,580	12,800	8,290	6,780	116,600	1,450	940	15,100
Grand Blvd to Main St	4,820	7,570	119,200	900	1,580	11,200	7,905	6,420	116,600	1,325	900	11,600
Main St to I-15	5,370	8,715	125,700	800	1,125	11,100	8,400	6,530	122,200	970	870	12,500
I-15 to McKinley St	4,270	7,440	100,900	780	940	11,100	8,245	5,360	99,900	665	630	11,600
McKinley St to Pierce St	4,160	7,380	93,500	790	1,090	11,100	8,350	4,990	92,700	920	780	11,900
Pierce St to Magnolia Ave	3,600	6,430	79,600	640	900	11,100	7,590	4,260	79,600	790	670	11,000

I-15 Segment	Northbound GP Lanes				Southbound GP Lanes			
	AM	PM	ADT		AM	PM	ADT	
North of Hidden Valley Pkwy	4,780	5,310	84,000		5,680	5,990	86,700	
Hidden Valley Pkwy to SR-91	4,680	5,210	85,500		5,290	5,830	85,300	
SR-91 to Magnolia Ave	5,020	6,030	99,700	Not Applicable	6,220	6,890	101,100	Not Applicable
Magnolia Ave to Ontario Ave	5,690	5,360	89,600		5,090	6,430	89,600	
Ontario Ave to El Cerrito Rd	5,890	5,020	83,600		4,500	6,360	84,000	
El Cerrito Rd to Cajalco Rd	5,630	4,940	80,800		4,500	6,490	81,600	
South of Cajalco Rd	5,050	4,640	75,700		4,160	6,670	77,300	

Source: California Department of Transportation, Performance Monitoring System as disclosed in the *Traffic Study Report* (July 2010).

[1] Numbers of vehicles in the a.m. and p.m. peak hours and total daily numbers of vehicles.

ADT = average daily traffic
GP = general purpose
HOV = high-occupancy vehicle
I-15 = Interstate 15
SR-71 = State Route 71
SR-91 = State Route 91
SR-241 = State Route 241

Table 1.4 Baseline/Existing (2007) Mainline Peak-Hour Performance

SR-91 Segment	Lane Type	AM Peak Hour						PM Peak Hour					
		Eastbound			Westbound			Eastbound			Westbound		
		Density, pc/mi/ln	LOS	V/C	Density, pc/mi/ln	LOS	V/C	Density, pc/mi/ln	LOS	V/C	Density, pc/mi/ln	LOS	V/C
SR-241 to Gypsum Canyon Rd	General Purpose	20.7	C			F	1.10	25.4	C		27.1	D	
Gypsum Canyon Rd to Green River Rd		25.4	C			F	1.31	43.5	E		23.8	C	
Green River Rd to SR-71		19.6	C			F	1.25	30.9	D		33.1	D	
SR-71 to Auto Center Dr		25.9	C			F	1.23		F	1.04	30.2	D	
Auto Center Dr to Maple St/Sixth St		23.9	C			F	1.12		F	1.08	31.0	D	
Maple St/Sixth St to Lincoln Ave		21.3	C			F	1.04	41.7	E		31.1	D	
Lincoln Ave to Grand Blvd		22.4	C		44.3	E		40.6	E		31.7	D	
Grand Blvd to Main St		21.3	C		39.6	E		31.6	E		29.3	D	
Main St to I-15		23.8	C			F	1.01		F	1.05	30.0	D	
I-15 to McKinley St		18.4	C		43.0	E		34.2	D		23.2	C	
McKinley St to Pierce St		24.6	C			F	1.34		F	1.19	30.7	D	
Pierce St to Magnolia Ave		23.6	C			F	1.22		F	1.03	27.9	D	
SR-241 to Green River Road	Toll/HOV	6.0	A		19.6	C		27.5	D		8.9	A	
Green River Road to Auto Center Drive		13.9	B		31.6	D		33.7	D		19.6	C	
Auto Center Drive to Lincoln Avenue		15.6	B		31.8	D		27.7	D		17.8	B	
Lincoln Avenue to Main Street		16.2	B		31.8	D		27.7	D		17.8	B	
Main Street to I-15		13.9	B		16.3	B		18.9	B		15.1	B	
I-15 to Pierce Street		13.7	B		15.4	B		18.3	B		13.5	B	
East of Pierce Street		11.1	A		13.3	B		15.1	B		11.6	B	

I-15 Segment	Lane Type	AM Peak Hour						PM Peak Hour					
		Northbound			Southbound			Northbound			Southbound		
		Density, pc/mi/ln	LOS	V/C	Density, pc/mi/ln	LOS	V/C	Density, pc/mi/ln	LOS	V/C	Density, pc/mi/ln	LOS	V/C
North of Hidden Valley Pkwy	General Purpose	22.3	C		26.9	D		24.9	C		28.7	D	
Hidden Valley Pkwy to SR-91		21.3	C		24.2	C		23.8	C		27.2	D	
SR-91 to Magnolia Ave		21.9	C		27.7	D		26.7	D		31.8	D	
Magnolia Ave to Ontario Ave		24.4	C		21.7	C		22.9	C		28.3	D	
Ontario Ave to El Cerrito Rd		38.6	E		19.7	C		29.8	D		28.6	D	
El Cerrito Rd to Cajalco Rd		35.4	E		26.1	D		29.1	D			F	1.03
South of Cajalco Rd		30.0	D		24.0	C		35.5	E			F	1.06

Source: Highway Capacity software results, as disclosed in the *Traffic Study Report* (July 2010).

Note 1: The Highway Capacity Software does not report a performance density greater than 45 pc/mi/ln. For mainline segments that experience densities greater than 45 pc/mi/ln, the V/C ratio is provided instead of density. The segments where V/C ratios are shown in this table were calculated to operate at LOS F. For mainline segments with densities less than 45 pc/mi/ln, the densities and LOS are shown, but no V/C ratios are provided.

Note 2: A black box (F) represents a deficient segment.

I-15 = Interstate 15 pc/mi/ln = passenger cars per mile per lane SR-91 = State Route 91 V/C = volume-to-capacity ratio

LOS = level of service SR-71 = State Route 71 SR-241 = State Route 241

This regional model, the RCTC traffic model, was developed based on a combination of the SCAG RTP 2004 model and the Orange County Transportation Analysis Model (OCTAM) Version 3.2. The RCTC model takes the mode choice component from OCTAM, which accounts for tolling activity. Traffic counts (numbers of vehicles) collected in fall 2007 were used to calibrate and validate the RCTC model for existing conditions. The SCAG RTP 2008 demographic data were applied to forecast future traffic activity throughout the SCAG region. Future interim year and horizon year no build and build conditions were analyzed through application of the model consistent with other future highway and transit system improvements identified in the RTP.

Table 1.5 summarizes vehicle trip generation projections for 2007 and build-out (2035) conditions for these southern California counties. As shown in Table 1.5, ADT generation in Riverside and Orange Counties is forecast to increase by an average of 14 percent between 2007 and 2015 and by an average of 29 percent between 2007 and 2035. As a result of the forecast increases in population, employment, and traffic generation by 2035, the daily number of vehicles traveling the project segment of SR-91 is also forecast to increase, which would increase traffic congestion in the study area under the existing lane configuration. As discussed in detail in the following section, without any improvements to existing SR-91, traffic volumes in the study area are forecast to increase by 2035, resulting in further decreases in the LOS.

Table 1.5 Regional Vehicle Trip Generation Projections

County	AM Peak Period	PM Peak Period	Daily
2007			
Orange County	2,266,565	3,444,428	10,893,861
Los Angeles	5,844,423	8,937,368	28,358,667
Ventura	577,148	905,054	2,865,211
San Bernardino	1,251,078	1,933,159	6,138,482
Riverside	1,134,826	1,774,288	5,631,613
Total	**11,074,040**	**16,994,297**	**53,887,834**
2015			
Orange County	2,458,009	3,730,682	11,834,622
Los Angeles	6,305,107	9,662,893	30,756,939
Ventura	620,137	977,761	3,107,388
San Bernardino	1,405,828	2,206,896	7,013,599
Riverside	1,421,219	2,195,474	6,983,611
Total	**12,210,300**	**18,773,706**	**59,696,159**
2035			
Orange County	2,544,506	3,860,647	12,205,429
Los Angeles	6,920,673	10,616,879	33,806,837
Ventura	700,621	1,105,922	3,500,385
San Bernardino	1,768,435	2,733,155	8,673,549
Riverside	1,829,235	2,888,410	9,170,997
Total	**13,763,470**	**21,205,013**	**67,357,197**

Source: Speed Surveys and the Riverside County Transportation Commission Model Results for the SR-91 CIP (2007).
CIP = Corridor Improvement Project
SR-91 = State Route 91

Tables 1.6 and 1.7 present the forecasted 2015 freeway mainline peak-hour LOS for SR-91 and I-15, respectively, without any improvements to SR-91 or I-15. As shown for SR-91, a total of 21 segments are forecast to operate at LOS F, with 8 of the segments operating at LOS F in the peak hours in both directions of travel (i.e., westbound in the a.m. peak hour and eastbound in the p.m. peak hour). As shown in Table 1.7, one segment on I-15 (El Cerrito to Cajalco Road) is forecast to operate at LOS F in both the a.m. and p.m. peak hours. In addition, the Ontario Avenue to El Cerrito Road segment is forecast to operate at LOS F in the a.m. peak hour, and the segment south of Cajalco Road is forecast to operate at LOS F in the p.m. peak hour. The HOV lane performance is forecast to deteriorate from current levels of service as HOV lane volumes increase. One HOV lane segment is forecast to operate at LOS F in the p.m. peak hour (eastbound HOV lane at the current SR-91 tolled express lanes terminus between Green River Road and Auto Center Drive), and two additional segments are forecast to operate at LOS E in the p.m. peak hour (the segments between SR-241 and Green River Road, and between Auto Center Drive and Lincoln Avenue) as volumes approach and exceed 2,000 vehicles per lane per hour (vplph).

1.3.1.6 2035 Future Traffic Volumes – No Build

Key projects identified in the 2008 RTP and included in the No Build Alternative have the potential to impact traffic activity throughout the study area. These projects include:

- Corridor A –1 RTP ID 3CO1MA03: Community and Environmental Transportation Acceptability Process (CETAP) – Riverside County to Orange County – Construct a new intercounty transportation corridor – 2 toll lanes in each direction on a new facility parallel to SR-91 from SR-241 to I-15
- SR-241/SR-91 Toll-to-Toll Direct Connectors – RTP ID 2T01135 – HOV/HOT Connector northbound SR-241 to eastbound SR-91 and westbound SR-91 to southbound SR-241
- I-15 HOV/Express Lanes – RTP ID 3HL0402 – Build HOV/HOT lanes: 2 HOV + Build 2 HOT lanes in each direction from SR-74 to the San Bernardino County line
- SR-71 Widening – RTP ID 3M01MA09 – Widen to 3 mixed-flow lanes in each direction from SR-91 to the San Bernardino County line
- Mid County Parkway (MCP) – RTP ID RIV031218: CETAP – Mid County Parkway Corridor: Construct a 4-8 lane limited access parkway from Corona (slightly west of I-15) to San Jacinto (to SR-79) and construct local interchanges at 15 locations.

Table 1.6 2015 No Build Alternative SR-91 Peak-Hour LOS

Segment	Lane Type	No. of Lanes	AM Peak Hour				PM Peak Hour			
			Volume[1]	Density, pc/mi/ln	LOS	V/C	Volume[1]	Density, pc/mi/ln	LOS	V/C
SR-91 Eastbound										
SR-241 to Gypsum Canyon Road	General Purpose	4	4,880	21.4	C		7,920	39.1	E	
Gypsum Canyon Road to Green River Road		5	6,600	22.4	C		10,900	> 45.0	F	1.05
Green River Road to SR-71		5	5,040	17	B		8,320	28.5	D	
SR-71 to Auto Center Drive		4	6,320	27.9	D		10,650	> 45.0	F	1.28
Auto Center Drive to Maple Street		4	6,020	27	D		11,390	> 45.0	F	1.37
Maple Street to Lincoln Avenue		4	5,440	24.1	C		10,340	> 45.0	F	1.37
Lincoln Avenue to Grand Boulevard		4	6,010	27	D		10,160	> 45.0	F	1.23
Grand Boulevard to Main Street		4	5,530	24.6	C		9,450	> 45.0	F	1.14
Main Street to I-15		4	5,840	26.1	D		10,190	> 45.0	F	1.23
I-15 to McKinley Street		4	4,130	17.8	B		8,770	> 45.0	F	1.06
McKinley Street to Pierce Street		3	3,790	22.3	C		8,290	> 45.0	F	1.33
Pierce Street to Magnolia Avenue		3	3,140	20.6	C		7,170	> 45.0	F	1.15
SR-241 to Green River Road	Toll/HOV	2	1,000	8.3	A		4,200	37.4	E	
Green River Road to Auto Center Drive		1	900	15.6	B		2,900	> 45.0	F	1.26
Auto Center Drive to Lincoln Avenue		1	1,000	17.3	B		2,000	35.3	E	
Lincoln Avenue to Main Street		1	900	16.2	B		1,900	33.8	D	
Main Street to I-15		1	800	13.9	B		1,900	32.7	D	
I-15 to Pierce Street		1	1,000	17.3	B		1,800	30.5	D	
Pierce Street to Magnolia Avenue		1	900	15.6	B		1,700	28.6	D	
SR-91 Westbound										
SR-241 to Gypsum Canyon Road	General Purpose	4	10,620	> 45.0	F	1.28	6,200	27.5	D	
Gypsum Canyon Road to Green River Road		5	12,900	> 45.0	F	1.24	7,500	25.9	C	
Green River Road to SR-71		4	11,250	> 45.0	F	1.36	7,530	37.5	E	
SR-71 to Auto Center Drive		4	11,340	> 45.0	F	1.37	7,490	36.8	E	
Auto Center Drive to Maple Street		4	10,360	> 45.0	F	1.25	7,630	39.2	E	
Maple Street to Lincoln Avenue		4	9,030	> 45.0	F	1.09	7,420	37	E	
Lincoln Avenue to Grand Boulevard		4	8,760	> 45.0	F	1.06	7,510	37.9	E	
Grand Boulevard to Main Street		4	8,250	43.8	E		6,850	32.2	D	
Main Street to I-15		4	8,630	> 45.0	F	1.04	7,110	34.2	D	
I-15 to McKinley Street		4	8,300	43.7	E		5,600	24.4	C	
McKinley Street to Pierce Street		3	8,530	> 45.0	F	1.37	5,360	34.5	D	
Pierce Street to Magnolia Avenue		3	7,660	> 45.0	F	1.23	4,440	29.1	D	

Table 1.6 2015 No Build Alternative SR-91 Peak-Hour LOS

Segment	Lane Type	No. of Lanes	AM Peak Hour				PM Peak Hour			
			Volume[1]	Density, pc/mi/ln	LOS	V/C	Volume[1]	Density, pc/mi/ln	LOS	V/C
SR-241 to Green River Road	Toll/HOV	2	2,900	23.4	C		1,500	12.5	B	
Green River Road to Auto Center Drive		1	2,000	35.3	E		1,300	22.5	C	
Auto Center Drive to Grand Boulevard		1	1,900	32.7	D		1,200	20.8	C	
Grand Boulevard to I-15		1	1,200	20.1	C		1,000	17.3	B	
I-15 to Pierce Street		1	1,100	18.5	B		900	15.6	B	
Pierce Street to Magnolia Avenue		1	1,000	16.8	B		900	15.6	B	

Source: Highway Capacity software results, as disclosed in the *Traffic Study Report* (July 2010).

Note 1: The Highway Capacity Software does not report a performance density greater than 45 pc/mi/ln. For mainline segments that experience densities greater than 45 pc/mi/ln, the V/C ratio is provided instead of density. The segments where V/C ratios are shown in this table were calculated to operate at LOS F. For mainline segments with densities less than 45 pc/mi/ln, the densities and LOS are shown, but no V/C ratios are provided.

Note 2: A black box (F) represents a deficient segment.

[1] Number of vehicles per peak hour.

HOV = high-occupancy vehicle
I-15 = Interstate 15
LOS = levels of service
pc/mi/ln = passenger cars per mile per lane
SR-71 = State Route 71
SR-91 = State Route 91
SR-241 = State Route 241
V/C = volume-to-capacity ratio

Table 1.7 2015 No Build Alternative I-15 Peak-Hour LOS

Segment	Lane Type	No. of Lanes	AM Peak Hour				PM Peak Hour			
			Volume[1]	Density, pc/mi/ln	LOS	V/C	Volume[1]	Density, pc/mi/ln	LOS	V/C
I-15 Northbound										
North of Hidden Valley Parkway	General Purpose	4	5,630	26.6	D		6,230	30.3	D	
Hidden Valley Parkway to SR-91		4	5,790	26.9	D		6,300	30.2	D	
SR-91 to Magnolia Avenue		4	6,330	28.3	D		7,340	35.4	E	
Magnolia Avenue to Ontario Avenue		4	6,900	31.3	D		6,500	28.7	D	
Ontario Avenue to El Cerrito Road		3	7,290	> 45.0	F	1.16	6,000	40.1	E	
El Cerrito Road to Cajalco Road		3	7,040	> 45.0	F	1.12	5,650	35.6	E	
South of Cajalco Road		3	5,960	39.5	E		5,490	33.9	D	
I-15 Southbound										
North of Hidden Valley Parkway	General Purpose	4	6,190	30	D		6,780	34.6	D	
Hidden Valley Parkway to SR-91		4	5,900	27.6	D		6,810	34.2	D	
SR-91 to Magnolia Avenue		4	7,420	36.1	E		8,010	42.5	E	
Magnolia Avenue to Ontario Avenue		4	6,000	26	C		7,400	35.3	E	
Ontario Avenue to El Cerrito Road		4	5,380	23.5	C		7,550	37.3	E	
El Cerrito Road to Cajalco Road		3	5,440	33.4	D		7,820	> 45.0	F	1.24
South of Cajalco Road		3	4,510	26.2	D		7,340	> 45.0	F	1.17

Source: Highway Capacity software results, as disclosed in the *Traffic Study Report* (July 2010).

Note 1: The Highway Capacity Software does not report a performance density greater than 45 pc/mi/ln. For mainline segments that experience densities greater than 45 pc/mi/ln, the V/C ratio is provided instead of density. The segments where V/C ratios are shown in this table were calculated to operate at LOS F. For mainline segments with densities less than 45 pc/mi/ln, the densities and LOS are shown, but no V/C ratios are provided.

Note 2: A black box (F) represents a deficient segment.

[1] Number of vehicles per peak hour.

I-15 = Interstate 15
LOS = levels of service
pc/mi/ln = passenger cars per mile per lane
SR-91 = State Route 91
V/C = volume-to-capacity ratio

These transportation improvements are included in all future scenarios, including the No Build Alternative. In general, it is anticipated that the Corridor A project could relieve some congestion on SR-91 by providing an alternate route connecting Riverside and Orange Counties. The SR-241/SR-91 direct connectors could help to relieve the chokepoint at the SR-241 northbound to SR-91 eastbound connector. The I-15 HOV/express lanes would not directly affect traffic on SR-91. The SR-71 additional lanes could help to relieve the chokepoint at the SR-71/SR-91 interchange. Although the MCP would be east and south of SR-91, it would substantially affect the traffic conditions on SR-91 in the project area. Because Corridor A is assumed in the 2035 No Build and Build Alternatives, some 2035 forecast volumes along SR-91 decrease from the corresponding volumes in 2015. This occurs as a result of the shift of SR-91 traffic onto Corridor A, which is assumed to be a four-lane divided toll facility parallel to SR-91 between I-15 and SR-241. Table 1.8 presents total traffic growth from Baseline/Existing (2007) to 2035 No Build conditions and includes traffic demand for Corridor A. That growth throughout the study area ranges from approximately 22 to 90 percent.

Table 1.8 2035 No Build Alternative Daily Traffic Growth[1]

Segment	Baseline/ Existing (2007) ADT	2035 No Build Alternative		
		ADT	Growth	% Growth
SR-91 at Orange/Riverside County line	280,000	409,100	129,100	46.1%
SR-91 west of I-15	271,500	390,700	119,200	43.9%
SR-91 east of I-15	223,500	273,200	49,700	22.2%
I-15 north of SR-91	170,800	323,800	153,000	89.6%
I-15 south of SR-91	200,800	336,900	136,100	67.8%

Source: Speed surveys and the Riverside County Transportation Commission Model Results for the SR-91 CIP, as disclosed in the *Traffic Study Report* (July 2010).
[1] In total vehicles per day.
ADT = average daily traffic
CIP = Corridor Improvement Project
I-15 = Interstate 15
SR-91 = State Route 91

Table 1.9 summarizes the No Build Alternative peak-hour and daily traffic volumes on SR-91 and I-15 under build out (2035) conditions. The segment of SR-91 between Gypsum Canyon Road and Green River Road is at the eastern terminus of the existing tolled express lanes. The volume of 1,400 vph in the eastbound direction between SR-241 and Gypsum Canyon Road represents traffic conditions prior to the merge of the SR-241/SR-91 direct toll connector (a future project in the No Build condition). With the addition of the direct toll connector, the volume increases to 3,600 vph just east of this connection point. The segments of the tolled express lanes between

Table 1.9 2035 No Build Alternative SR-91 and I-15 Traffic Volumes[1]

SR-91 Segment	Eastbound GP			Eastbound Toll/HOV			Westbound GP			Westbound Toll/HOV		
	AM	PM	ADT	AM	PM	ADT	AM	PM	ADT	AM	PM	ADT
SR-241 to Gypsum Canyon Rd	4,880	10,020	118,100	900	1,400	12,400	11,670	5,760	120,800	1,300	900	11,300
Gypsum Canyon Rd to Green River Rd	6,100	13,500	136,200	1,700	3,600	30,400	14,100	6,900	130,000	3,600	2,000	28,600
Green River Rd to SR-71	5,030	9,720	94,000	1,300	3,600	33,600	12,730	7,060	118,200	2,500	1,700	30,500
SR-71 to Auto Center Dr	6,020	12,720	127,700	1,400	2,300	24,800	13,050	6,970	118,700	2,100	1,600	28,900
Auto Center Dr to Maple St/Sixth St	5,850	12,780	127,200	1,400	2,100	26,100	11,920	7,110	117,300	2,100	1,500	29,300
Maple St/Sixth St to Lincoln Ave	5,340	12,270	120,800	1,400	1,800	25,600	10,650	6,820	111,700	2,100	1,400	27,800
Lincoln Ave to Grand Blvd	6,300	12,200	125,400	1,300	1,700	26,300	10,270	6,870	114,400	1,900	1,500	28,300
Grand Blvd to Main St	6,020	11,460	120,100	1,300	1,700	26,800	9,750	6,380	109,300	1,700	1,300	28,900
Main St to I-15	6,390	12,400	134,600	1,000	1,700	21,200	9,880	6,470	128,000	1,700	1,300	22,100
I-15 to McKinley St	5,410	11,160	120,100	1,000	1,600	17,100	9,840	5,300	115,400	950	950	20,600
McKinley St to Pierce St	5,070	10,670	113,300	1,300	2,000	19,800	9,710	4,800	111,500	1,400	1,200	19,800
Pierce St to Magnolia Ave	4,390	9,620	96,500	1,200	1,800	19,300	8,440	3,880	94,300	1,600	1,100	20,100

I-15 Segment	Northbound GP			Northbound Toll			Southbound GP			Southbound Toll		
	AM	PM	ADT	AM	PM	ADT	AM	PM	ADT	AM	PM	ADT
North of Hidden Valley Pkwy	10,220	7,890	148,100	1,900	600	13,700	8,930	11,050	146,600	600	1,800	12,600
Hidden Valley Pkwy to SR-91	9,210	7,650	143,600	3,200	1,000	21,100	8,230	10,150	138,500	900	2,700	20,600
SR-91 to Magnolia Ave	9,350	8,660	147,900	3,200	1,000	21,100	8,560	10,980	147,300	900	2,700	20,600
Magnolia Ave to Ontario Ave	10,100	7,700	137,000	3,200	1,000	21,100	7,000	10,200	139,500	900	2,700	20,600
Ontario Ave to El Cerrito Rd	10,160	7,380	131,900	3,200	1,000	21,100	6,200	10,420	136,300	900	2,700	20,600
El Cerrito Rd to Cajalco Rd	11,260	7,420	134,200	1,300	300	10,900	6,540	11,320	139,500	300	1,200	11,000
South of Mid County Pkwy	6,760	6,290	106,300	1,300	300	10,900	4,780	7,610	112,500	300	1,200	11,000

Source: Speed surveys and the Riverside County Transportation Commission Model Results for the SR-91 CIP, as disclosed in the *Traffic Study Report* (July 2010).

[1] In numbers of vehicles in the a.m. and p.m. peak hours and total daily number of vehicles.

ADT = average daily traffic
CIP = Corridor Improvement Project
GP = general-purpose lanes
HOV = high-occupancy vehicle lanes
I-15 = Interstate 15
SR-71 = State Route 71
SR-91 = State Route 91
SR-241 = State Route 241

SR-241 and Gypsum Canyon Road and between Gypsum Canyon Road and Green River Road are two-lane toll segments. The direct toll connectors from SR-241 join between these segments, resulting in an increase in toll activity east of that connection. East of Green River Road, the existing tolled express lanes terminate into the innermost GP lane and HOV lane.

Table 1.10 summarizes the SR-91 GP and HOV/tolled express lane peak-hour LOS under 2035 No Build conditions. As shown in Table 1.10, during the a.m. peak hour, all the westbound general-purpose SR-91 segments and one HOV/toll lane segment are forecast to operate at LOS F with densities greater than 45 pc/mi/ln. LOS F is used to identify segments operating deficiently (i.e., segments on which the traffic volumes exceed the road capacity) because LOS E is identified as the minimum traffic LOS standard for regional highways (except for highways that operated at LOS F in 1991) in the approved *Riverside County Congestion Management Program* (December 14, 2011). Because the densities are not reported for segments operating at LOS F, the v/c ratios provide a planning level quantitative analysis of the relative deficiency for the segments. A review of the v/c ratios suggests that substantial capacity deficiencies occur, with the segment from SR-71 to Auto Center Drive experiencing the highest v/c ratio (i.e., 1.57).

No segments are forecast to operate deficiently in the eastbound direction during the a.m. peak hour.

Table 1.11 summarizes the I-15 GP and HOV/tolled express lane peak-hour LOS under 2035 No Build conditions. Along I-15 in 2035, all northbound mainline segments are forecast to operate at LOS F during the a.m. peak hour, while four of the seven segments are anticipated to operate at LOS F during the p.m. peak hour. A review of the v/c ratios reveals that the most substantial congestion is forecast to occur on the two segments between Cajalco Road and Ontario Avenue in the a.m. peak hour, where v/c ratios are forecast to be 1.79 and 1.61, respectively. Four southbound mainline segments are forecast to operate at LOS F in the a.m. peak hour. All the mainline southbound segments on I-15 are forecast to operate at LOS F during the p.m. peak hour, with the segment between El Cerrito Road and Cajalco Road experiencing the highest v/c ratio (i.e., 1.80).

Table 1.10 2035 No Build Alternative SR-91 Peak-Hour LOS[1]

Segment	Lane Type	No. of Lanes	AM Peak Hour				PM Peak Hour			
			Volume	Density, pc/mi/ln	LOS	V/C	Volume	Density, pc/mi/ln	LOS	V/C
SR-91 Eastbound										
SR-241 to Gypsum Canyon Road	General Purpose	4	4,880	21.1	C		10,020	> 45.0	F	1.21
Gypsum Canyon Road to Green River Road		5	6,100	20.1	C		13,500	> 45.0	F	1.30
Green River Road to SR-71		5	5,030	17.0	B		9,720	37.0	E	
SR-71 to Auto Center Drive		4	6,020	26.2	D		12,720	> 45.0	F	1.53
Auto Center Drive to Maple Street		4	5,850	26.1	D		12,780	> 45.0	F	1.54
Maple Street to Lincoln Avenue		4	5,340	23.7	C		12,270	> 45.0	F	1.48
Lincoln Avenue to Grand Boulevard		4	6,300	28.6	D		12,200	> 45.0	F	1.47
Grand Boulevard to Main Street		4	6,020	27.0	D		11,460	> 45.0	F	1.38
Main Street to I-15		4	6,390	29.2	D		12,400	> 45.0	F	1.50
I-15 to McKinley Street		4	5,410	23.5	C		11,160	> 45.0	F	1.35
McKinley Street to Pierce Street		3	5,070	31.5	D		10,670	> 45.0	F	1.72
Pierce Street to Magnolia Avenue		3	4,390	28.8	D		9,620	> 45.0	F	1.55
SR-241 to Green River Road	Toll/HOV	2	1,700	14.2	B		3,600	29.6	D	
Green River Road to Auto Center Drive		1	1,400	24.2	C		3,600	> 45.0	F	1.57
Auto Center Drive to Lincoln Avenue		1	1,400	24.2	C		2,100	38.3	E	
Lincoln Avenue to Main Street		1	1,300	23.5	C		1,700	29.8	D	
Main Street to I-15		1	1,000	17.3	B		1,700	28.6	D	
I-15 to Pierce Street		1	1,300	22.5	C		2,000	35.3	E	
Pierce Street to Magnolia Avenue		1	1,200	20.8	C		1,800	30.5	D	
SR-91 Westbound										
SR-241 to Gypsum Canyon Road	General Purpose	4	11,670	> 45.0	F	1.41	5,760	25.2	C	
Gypsum Canyon Road to Green River Road		5	14,100	> 45.0	F	1.36	6,900	23.5	C	
Green River Road to SR-71		4	12,730	> 45.0	F	1.54	7,060	33.2	D	
SR-71 to Auto Center Drive		4	13,050	> 45.0	F	1.57	6,970	32.2	D	
Auto Center Drive to Maple Street		4	11,920	> 45.0	F	1.44	7,110	34.2	D	
Maple Street to Lincoln Avenue		4	10,650	> 45.0	F	1.28	6,820	32.0	D	
Lincoln Avenue to Grand Boulevard		4	10,270	> 45.0	F	1.24	6,870	32.4	D	
Grand Boulevard to Main Street		4	9,750	> 45.0	F	1.18	6,380	29.1	D	
Main Street to I-15		4	9,880	> 45.0	F	1.19	6,470	29.6	D	
I-15 to McKinley Street		4	9,840	> 45.0	F	1.19	5,300	22.9	C	
McKinley Street to Pierce Street		3	9,710	> 45.0	F	1.56	4,800	29.2	D	
Pierce Street to Magnolia Avenue		3	8,440	> 45.0	F	1.36	3,880	25.4	C	

Table 1.10 2035 No Build Alternative SR-91 Peak-Hour LOS[1]

Segment	Lane Type	No. of Lanes	AM Peak Hour				PM Peak Hour			
			Volume	Density, pc/mi/ln	LOS	V/C	Volume	Density, pc/mi/ln	LOS	V/C
SR-241 to Green River Road	Toll/HOV	2	3,600	29.6	D		2,000	16.7	B	
Green River Road to Auto Center Drive		1	2,500	> 45.0	F	1.09	1,700	29.6	D	
Auto Center Drive to Grand Boulevard		1	2,100	38.3	E		1,500	26.0	C	
Grand Boulevard to I-15		1	1,700	28.6	D		1,300	22.5	C	
I-15 to Pierce Street		1	1,400	23.5	C		1,200	20.8	C	
Pierce Street to Magnolia Avenue		1	1,600	26.9	D		1,100	19.0	B	

Source: Highway Capacity software results, as disclosed in the *Traffic Study Report* (July 2010).

Note 1: The Highway Capacity Software does not report a performance density greater than 45 pc/mi/ln. For mainline segments that experience densities greater than 45 pc/mi/ln, the V/C ratio is provided instead of density. The segments where V/C ratios are shown in this table were calculated to operate at LOS F. For mainline segments with densities less than 45 pc/mi/ln, the densities and LOS are shown, but no V/C ratios are provided.

Note 2: A black box (F) represents a deficient segment.

[1] In numbers of vehicles in the a.m. and p.m. peak hours.

HOV = high-occupancy vehicle
I-15 = Interstate 15
LOS = levels of service
pc/mi/ln = passenger cars per mile per lane
SR-71 = State Route 71
SR-91 = State Route 91
SR-241 = State Route 241
V/C = volume-to-capacity ratio

Table 1.11 2035 No Build Alternative I-15 Peak-Hour LOS[1]

Segment	Lane Type	No. of Lanes	AM Peak Hour				PM Peak Hour			
			Volume	Density, pc/mi/ln	LOS	V/C	Volume	Density, pc/mi/ln	LOS	V/C
I-15 Northbound										
North of Hidden Valley Parkway	General Purpose	4	10,220	> 45.0	F	1.30	7,890	> 45.0	F	1.00
Hidden Valley Parkway to SR-91		4	9,210	> 45.0	F	1.17	7,650	43.9	E	
SR-91 to Magnolia Avenue		4	9,350	> 45.0	F	1.11	8,660	> 45.0	F	1.03
Magnolia Avenue to Ontario Avenue		4	10,100	> 45.0	F	1.20	7,700	38.2	E	
Ontario Avenue to El Cerrito Road		3	10,160	> 45.0	F	1.61	7,380	> 45.0	F	1.17
El Cerrito Road to Cajalco Road		3	11,260	> 45.0	F	1.79	7,420	> 45.0	F	1.18
South of Cajalco Road		3	6,760	> 45.0	F	1.07	6,290	44.9	E	
North of Hidden Valley Parkway	Toll/HOV	2	1,900	15.3	B		600	4.8	A	
El Cerrito Road to Hidden Valley Parkway		2	3,200	25.9	C		1,000	8.0	A	
South of El Cerrito Road		2	1,300	10.1	A		300	2.3	A	
I-15 Southbound										
North of Hidden Valley Parkway	General Purpose	4	8,930	> 45.0	F	1.14	11,050	> 45.0	F	1.40
Hidden Valley Parkway to SR-91		4	8,230	> 45.0	F	1.05	10,150	> 45.0	F	1.29
SR-91 to Magnolia Avenue		4	8,560	> 45.0	F	1.02	10,980	> 45.0	F	1.31
Magnolia Avenue to Ontario Avenue		4	7,000	32.1	D		10,200	> 45.0	F	1.21
Ontario Avenue to El Cerrito Road		4	6,200	27.6	D		10,420	> 45.0	F	1.24
El Cerrito Road to Cajalco Road		3	6,540	> 45.0	F	1.04	11,320	> 45.0	F	1.80
South of Cajalco Road		3	4,780	28.0	D		7,610	> 45.0	F	1.21
North of Hidden Valley Parkway	Toll/HOV	2	600	4.8	A		1,800	14.5	B	
El Cerrito Road to Hidden Valley Parkway		2	900	7.2	A		2,700	21.7	C	
South of El Cerrito Road		2	300	2.3	A		1,200	9.3	A	

Source: Highway Capacity software results, as disclosed in the *Traffic Study Report* (July 2010).

Note 1: The Highway Capacity Software does not report a performance density greater than 45 pc/mi/ln. For mainline segments that experience densities greater than 45 pc/mi/ln, the V/C ratio is provided instead of density. The segments where V/C ratios are shown in this table were calculated to operate at LOS F. For mainline segments with densities less than 45 pc/mi/ln, the densities and LOS are shown, but no V/C ratios are provided.

Note 2: A black box (F) represents a deficient segment.

[1] In numbers of vehicles in the a.m. and p.m. peak hours.

HOV = high-occupancy vehicle
I-15 = Interstate 15
LOS = levels of service
pc/mi/ln = passenger cars per mile per lane
SR-71 = State Route 71
SR-91 = State Route 91
SR-241 = State Route 241
V/C = volume-to-capacity ratio

HOV lane performance is forecast to continue to deteriorate under 2035 conditions, with two segments operating at LOS E and one segment (Green River Road to Auto Center Drive) continuing to operate at LOS F during the p.m. peak hour in the eastbound direction. One segment operates at LOS F during the a.m. Peak Hour In The Westbound Direction (Green River Road To Auto Center Drive).

1.3.1.7 Traffic Diversion

When the segment of SR-91 between Green River Road and Main Street in the City of Corona operates at LOS F, local and regional traffic avoids using the freeway and travels on local roads in the City of Corona paralleling SR-91, adding additional trips on those roads. This existing traffic behavior has been substantiated by the City of Corona Traffic Management Center, which monitors traffic through video cameras mounted at 50 intersections in the City.

In the future No Build condition, traffic shifting from SR-91 to the parallel arterials to avoid freeway congestion is verified based on the 2015 model results. Sixth Street from Main Street to I-15 will operate at LOS E under No Build conditions and will be improved to LOS D under the Initial Phases of the SR-91 CIP. Based on the 2035 model results, Sixth Street from Maple Street to Smith Avenue and from Main Street to I-15 will operate at LOS E and F under No Build conditions and will be improved to LOS D and E under SR-91 CIP Ultimate Project conditions, respectively. These results indicate that the SR-91 CIP Build Alternatives will divert local traffic back to the freeway and improve the arterial levels of service.

Using data from the RCTC traffic model (used in the approved Traffic Study Report [2010]), Table 1.12 shows that the reduced congestion on SR-91 with the Build Alternatives reduces traffic volumes along key local roads that parallel SR-91. For example, as shown in Table 1.12, Alternatives 1 and 2 would reduce the diversion of traffic onto Sixth Street Road which is one-half mile south of SR-91 by 7 percent and 13 percent, respectively, in 2015, and by 8 percent and 9 percent, respectively, in 2035.

Table 1.12 Local Street Traffic Diversion Percentages

Location	2015 Difference[1]		2035 Difference[1]	
	Change with Alternative 1	Change with Alternative 2	Change with Alternative 1	Change with Alternative 2
Segments between SR-241 and SR-71				
Green River Road	-9%	-25%	0%	-4%
Segments between SR-71 and I-15				
6th Street (e/o Main St.)	-7%	-13%	-8%	-9%
Ontario Blvd. (w/o Magnolia)	-28%	-40%	-5%	-7%
Railroad Street (w/o Main St.)	-29%	-27%	-20%	-22%
Segments between I-15 and Pierce Street				
Magnolia Ave. (w/o McKinley)	-35%	-36%	-10%	-10%
Hidden Valley (e/o I-15)	-19%	-21%	-3%	-3%

Source: RCTC Traffic Model (*Traffic Study Report*, 2010).

[1] Change in traffic volumes on local roads when comparing the SR-91Build Alternatives to the No Build Alternative.

Blvd. = Boulevard
e/o = east of
EB = eastbound
GP = general-purpose lane
I-15 = Interstate 15
SR-91 = State Route 91
St. = Street
w/o = west of
WB = westbound

1.3.1.8 Travel Time and Travel Speeds

Table 1.13 summarizes travel times and speeds on SR-91 between SR-241 and I-15 for the Baseline/Existing (2007) condition, and for 2015 and 2035 with the No Build and Build Alternatives based on the peak directions and hours of travel (i.e., westbound in the a.m. peak hour and eastbound in the p.m. peak hour). The a.m. peak hour direction of travel is on westbound SR-91. The p.m. peak hour direction of travel is eastbound on SR-91. A travel time and speed comparison of the 2015 and 2035 conditions (No Build and project alternatives) with Baseline/Existing (2007) conditions is provided in the following sections. As shown in the following discussion regarding travel times and travel speeds, the additional lane provided in each direction in Alternative 2 compared to Alternative 1 generally results in reduced travel times and increased travel speeds under Alternative 2 compared to both Alternative 1 and the No Build Alternative.

SR-241 and Gypsum Canyon Road and between Gypsum Canyon Road and Green River Road are two-lane toll segments. The direct toll connectors from SR-241 join between these segments, resulting in an increase in toll activity east of that connection. East of Green River Road, the existing tolled express lanes terminate into the innermost GP lane and HOV lane.

Table 1.13 SR-91 Travel Time and Travel Speed Summary[1]

Lanes	Baseline/ Existing (2007)	2015				2035		
		No Build	Alt 1 Ultimate Project	Alt 2 Ultimate Project	Alt 2 Initial Phase[2]	No Build	Alt 1 Ultimate Project	Alt 2 Ultimate Project
SR-91 Westbound (AM Peak Hour)								
Travel Time (minutes)								
General Purpose	28.5	36.1	30.7	28.9	32.6	43.2	36.6	37.3
Percent change compared to Baseline/Existing (2007)	--	26.7%	7.7%	1.4%	14.4%	51.6%	28.4%	30.9%
HOV/Tolled Express	12.1	18.4	15.5	13.1	12.0	25.9	23.5	12.6
Percent change compared to Baseline/Existing (2007)	--	52.1%	28.1%	8.3%	-0.8%	114.0%	94.2%	4.1%
Travel Speed (mph)								
General Purpose	24.2	19.1	22.5	23.8	21.2	16.0	18.9	18.5
Percent change compared to Baseline/Existing (2007)	--	-21.1%	-7.0%	-1.7%	-12.4%	-33.9%	-21.9%	-23.6%
HOV/Tolled Express	56.8	37.5	44.4	52.8	57.3	26.6	29.4	55.0
Percent change compared to Baseline/Existing (2007)	--	-34.0%	-21.8%	-7.0%	0.9%	-53.2%	-48.2%	-3.2%
SR-91 Eastbound (PM Peak Hour)								
Travel Time (minutes)								
General Purpose	44.0	79.1	66.3	63.7	70.6	86.4	73.3	73.7
Percent change compared to Baseline/Existing (2007)	--	79.8%	50.7%	44.8%	60.5%	96.4%	66.6%	67.5%
HOV/Tolled Express	30.0	39.7	31.2	13.0	12.5	47.0	48.1	13.8
Percent change compared to Baseline/Existing (2007)	--	32.3%	4.0%	-56.7%	-58.3%	56.7%	60.3%	-54.0%
Travel Speed (mph)								
General Purpose	15.7	8.7	10.4	10.8	9.8	8.0	9.4	9.4
Percent change compared to Baseline/Existing (2007)	--	-44.6%	-33.8%	-31.2%	-37.6%	-49.0%	-40.1%	-40.1%
HOV/Tolled Express	23.0	17.4	22.1	53.0	55.0	14.7	14.4	50.0
Percent change compared to Baseline/Existing (2007)	--	-24.3%	-3.9%	130.4%	139.1%	-36.1%	-37.4%	117.4%

Source: Speed surveys and the RCTC Model Results for the SR-91 CIP, as disclosed in Table 4-64 in the *Traffic Study Report* (July 2010).

[1] Travel times and speeds are for SR-91 between SR-241 and I-15.

[2] The 2015 conditions under the Initial Phase of Alternative 1 are considered to be the same as for the Initial Phase of Alternative 2.

Alt = Alternative
CIP = Corridor Improvement Project
HOV = high-occupancy vehicle
I-15 = Interstate 15
mph = miles per hour
RCTC = Riverside County Transportation Commission
SR-241 = State Route 241
SR-91 = State Route 91

No Build Conditions In the AM Peak Hour (Westbound SR-91)

In the a.m. peak hour, the westbound travel time in the GP lanes on SR-91 is forecast to increase by approximately 8 minutes (or an increase of 26.7 percent) from Baseline/Existing (2007) to 2015 No Build conditions, and by approximately 15 minutes (or an increase of 51.6 percent) to 2035 No Build conditions.

In the a.m. peak hour, the westbound travel speed in the GP lanes on SR-91 is forecast to decrease by approximately 5 mph (or a decrease of 21.1 percent) from Baseline/Existing (2007) to 2015 No Build conditions, and by approximately 8 mph (or a decrease of 33.9 percent) to 2035 No Build conditions.

In the a.m. peak hour, the westbound travel time in the HOV/tolled express lanes on SR-91 is forecast to increase by approximately 6 minutes (or an increase of 52.1 percent) from Baseline/Existing (2007) to 2015 No Build conditions, and by approximately 14 minutes (or an increase of 114.0 percent) to 2035 No Build conditions.

In the a.m. peak hour, the westbound travel speed in the HOV/tolled express lanes on SR-91 is forecast to decrease by approximately 19 mph (or a decrease of 34.0 percent) from Baseline/Existing (2007) to 2015 No Build conditions, and by approximately 30 mph (or a decrease of 53.2 percent) to 2035 No Build conditions.

No Build Conditions in the PM Peak Hour (Eastbound SR-91)

In the p.m. peak hour, the eastbound travel time in the GP lanes on SR-91 is forecast to increase by approximately 35 minutes (or an increase of 79.8 percent) from Baseline/Existing (2007) to 2015 No Build conditions, and by approximately 42 minutes (or an increase of 96.4 percent) to 2035 No Build conditions.

In the p.m. peak hour, the eastbound travel speed in the GP lanes on SR-91 is forecast to decrease by approximately 7 mph (or a decrease of 44.6 percent) from Baseline/ Existing (2007) to 2015 No Build conditions, and by approximately 8 mph (or a decrease of 49.0 percent) to 2035 No Build conditions.

In the p.m. peak hour, the eastbound travel time in the HOV/tolled express lanes on SR-91 is forecast to increase by approximately 10 minutes (or an increase of 32.3 percent) from Baseline/Existing (2007) to 2015 No Build conditions, and by approximately 17 minutes (or an increase of 56.7 percent) to 2035 No Build conditions.

In the p.m. peak hour, the eastbound travel speed in the HOV/tolled express lanes on SR-91 is forecast to decrease by approximately 6 mph (or a decrease of 24.3 percent) from Baseline/Existing (2007) to 2015 No Build conditions, and by approximately 8 mph (or a decrease of 36.1 percent) to 2035 No Build conditions.

Alternative 1 in the AM Peak Hour (Westbound SR-91)

In the a.m. peak hour, the westbound travel time in the GP lanes on SR-91 is forecast to increase by approximately 2 minutes (or an increase of 7.7 percent) from Baseline/ Existing (2007) conditions to 2015 with Alternative 1, and by approximately 8 minutes (or an increase of 28.4 percent) to 2035 with Alternative 1.

In the a.m. peak hour, the westbound travel speed in the GP lanes on SR-91 is forecast to decrease by approximately 2 mph (or a decrease of 7.0 percent) from Baseline/Existing (2007) conditions to 2015 with Alternative 1 conditions, and by approximately 5 mph (or a decrease of 21.9 percent) to 2035 with Alternative 1 conditions.

In the a.m. peak hour, the westbound travel time in the HOV/tolled express lanes on SR-91 is forecast to increase by approximately 3 minutes (or an increase of 28.1 percent) from Baseline/Existing (2007) conditions to 2015 with Alternative 1, and by approximately 11 minutes (or an increase of 94.2 percent) to 2035 with Alternative 1.

In the a.m. peak hour, the westbound travel speed in the HOV/tolled express lanes on SR-91 is forecast to decrease by approximately 12 mph (or a decrease of 21.8 percent) from Baseline/Existing (2007) conditions to 2015 with Alternative 1, and by approximately 27 mph (or a decrease of 48.2 percent) to 2035 with Alternative 1.

Alternative 1 in the PM Peak Hour (Eastbound SR-91)

In the p.m. peak hour, the eastbound travel time in the GP lanes on SR-91 is forecast to increase by approximately 22 minutes (or an increase of 50.7 percent) from Baseline/Existing (2007) conditions to 2015 with Alternative 1 and by approximately 29 minutes (or an increase of 66.6 percent) to 2035 with Alternative 1.

In the p.m. peak hour, the eastbound travel speed in the GP lanes on SR-91 is forecast to decrease by approximately 5 mph (or a decrease of 33.8 percent) from Baseline/Existing (2007) conditions to 2015 with Alternative 1, and by approximately 6 mph (or a decrease of 40.1 percent) to 2035 with Alternative 1.

In the p.m. peak hour, the eastbound travel time in the HOV/tolled express lanes on SR-91 is forecast to increase by approximately 1 minute (or an increase of 4.0 percent) from Baseline/Existing (2007) conditions to 2015 with Alternative 1, and by approximately 18 minutes (or an increase of 60.3 percent) to 2035 with Alternative 1.

In the p.m. peak hour, the eastbound travel speed in the HOV/tolled express lanes on SR-91 is forecast to decrease by approximately 1 mph (or a decrease of 3.9 percent) from Baseline/Existing (2007) conditions to 2015 with Alternative 1, and by approximately 9 mph (or a decrease of 37.4 percent) to 2035 with Alternative 1.

Alternative 2 in the AM Peak Hour (Westbound SR-91)

In the a.m. peak hour, the westbound travel time in the GP lanes on SR-91 is forecast to increase by approximately 0.5 minute (or an increase of 1.4 percent) from Baseline/Existing (2007) conditions to 2015 with Alternative 2, and by approximately 9 minutes (or an increase of 30.9 percent) to 2035 with Alternative 2.

In the a.m. peak hour, the westbound travel speed in the GP lanes on SR-91 is forecast to decrease by approximately 0.5 mph (or a decrease of 1.7 percent) from Baseline/Existing (2007) conditions to 2015 with Alternative 2, and by approximately 6 mph (or a decrease of 23.6 percent) to 2035 with Alternative 2.

In the a.m. peak hour, the westbound travel time in the HOV/tolled express lanes on SR-91 is forecast to increase by approximately 1 minute (or an increase of 8.3 percent) from Baseline/Existing (2007) conditions to 2015 with Alternative 2, and by approximately 0.5 minute (or an increase of 4.1 percent) to 2035 with Alternative 2.

In the a.m. peak hour, the westbound travel speed in the HOV/tolled express lanes on SR-91 is forecast to decrease by approximately 4 mph (or a decrease of 7.0 percent) from Baseline/Existing (2007) conditions to 2015 with Alternative 2, and by approximately 2 mph (or a decrease of 3.2 percent) to 2035 with Alternative 2.

Alternative 2 in the PM Peak Hour (Eastbound SR-91)

In the p.m. peak hour, the eastbound travel time in the GP lanes on SR-91 is forecast to increase by approximately 20 minutes (or an increase of 44.8 percent) from Baseline/Existing (2007) to 2015 with Alternative 2, and by approximately 30 minutes (or an increase of 67.5 percent) to 2035 with Alternative 2.

In the p.m. peak hour, the eastbound travel speed in the GP lanes is forecast to decrease by approximately 5 mph (or a decrease of 31.2 percent) from Baseline/ Existing (2007) conditions to 2015 with Alternative 2, and by approximately 6 mph (or a decrease of 40.1 percent) to 2035 with Alternative 2.

In the p.m. peak hour, the eastbound travel time in the HOV/tolled express lanes on SR-91 is forecast to decrease by approximately 17 minutes (or a decrease of 56.7 percent) from Baseline/Existing (2007) conditions to 2015 with Alternative 2, and by approximately 16 minutes (or a decrease of 54.0 percent) to 2035 with Alternative 2.

In the p.m. peak hour, the eastbound travel speed in the HOV/tolled express lanes on SR-91 is forecast to increase by approximately 30 mph (or an increase of 130.4 percent) from Baseline/Existing (2007) conditions to 2015 with Alternative 2, and by approximately 27 mph (or an increase of 117.4 percent) to 2035 with Alternative 2.

Initial Phase of Alternative 2 in the AM Peak Hour (Westbound SR-91)

In the a.m. peak hour, the westbound travel time in the GP lanes on SR-91 is forecast to increase by approximately 4 minutes (or an increase of 14.4 percent) from Baseline/Existing (2007) to 2015 with the Initial Phase of Alternative 2.

In the a.m. peak hour, the westbound travel speed in the GP lanes on SR-91 is forecast to decrease by approximately 3 mph (or a decrease of 12.4 percent) from Baseline/Existing (2007) to 2015 with the Initial Phase of Alternative 2.

In the a.m. peak hour, the westbound travel time in the HOV/tolled express lanes on SR-91 is forecast to be relatively unchanged (or a decrease of 0.8 percent) from Baseline/Existing (2007) to 2015 with the Initial Phase of Alternative 2.

In the a.m. peak hour, the westbound travel speed in the HOV/tolled express lanes on SR-91 is forecast to increase by approximately 1 mph (or an increase of 0.9 percent) from Baseline/Existing (2007) to 2015 with the Initial Phase of Alternative 2.

Initial Phase of Alternative 2 in the PM Peak Hour (Eastbound SR-91)

In the p.m. peak hour, the eastbound travel time in the GP lanes on SR-91 is forecast to increase by approximately 27 minutes (or an increase of 60.5 percent) from Baseline/Existing (2007) to 2015 with the Initial Phase of Alternative 2.

In the p.m. peak hour, the eastbound travel speed in the GP lanes is forecast to decrease by approximately 6 mph (or a decrease of 37.6 percent) from Baseline/ Existing (2007) to 2015 with the Initial Phase of Alternative 2.

In the p.m. peak hour, the eastbound travel time in the HOV/tolled express lanes on SR-91 is forecast to decrease by approximately 18 minutes (or a decrease of 58.3 percent) from Baseline/Existing (2007) to 2015 with the Initial Phase of Alternative 2.

In the p.m. peak hour, the eastbound travel speed in the HOV/tolled express lanes on SR-91 is forecast to increase by approximately 32 mph (or an increase of 139.1 percent) from Baseline/Existing (2007) to 2015 with the Initial Phase of Alternative 2.

1.3.1.9 Safety

Accident data for individual segments on SR-91 and I-15 were reviewed for the 3-year period from November 1, 2004, to October 31, 2007[1]. Those data are summarized in Table 1.14 for accident rates on the mainline freeways, on freeway-to-freeway connector ramps, and on SR-91 and I-15 local road interchange ramps. The actual accident rates were compared with the Statewide average accident rates for similar facilities. The actual accident rate on the eastbound SR-91 mainline is higher than the Statewide average. Actual accident rates on the westbound direction of the SR-91 mainline and on both directions of the I-15 mainline are below the Statewide average. The Caltrans District 8 2004–2007 Traffic Accident and Surveillance and Analysis System (TASAS) data provided in The *Traffic Study Report* (July 2010)

indicate that the predominant types of these accidents are rear-end and sideswipe crashes, which account for approximately 50 percent and 25 percent of all accident types, respectively.

As shown on Table 1.14, the "Total" columns show the total accident rates. The other columns are the fatal accidents ("F") and fatal + injury accidents ("F+I"). The totals include property-damage-only accidents (which are not shown in Table 1.14) so they are not just a sum of the "F" and "F+I" columns.

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[1] The Department TASAS data are compiled in 3-year increments. At the time the *Traffic Study Report* (July 2010) was approved, the 2004–2007 TASAS data were the most current data available.

Table 1.14 Summary of Accident Rates

Segment	Actual Accident Rate[1]			Statewide Average Accident Rate[1]		
	F	F+I	Total	F	F+I	Total
Freeway Mainline Segments						
SR-91 EB: SR-241 to Riverside County Line	0.003	0.39	***1.60***	0.006	0.39	1.23
SR-91 WB: SR-241 to Riverside County Line	0.010	0.27	0.98	0.006	0.39	1.23
SR-91 EB: Orange County Line to Pierce St	0.004	0.35	***1.18***	0.006	0.36	1.13
SR-91 WB: Orange County Line to Pierce St	0.005	0.26	0.89	0.006	0.36	1.13
I-15 NB: Cajalco Rd to Hidden Valley Pkwy	0.004	0.25	0.95	0.011	0.37	1.07
I-15 SB: Cajalco Rd to Hidden Valley Pkwy	0.006	0.17	0.61	0.011	0.37	1.07
Freeway-to-Freeway Direct Connectors						
SR-91 EB to SB SR-241	0.000	0.00	0.00	0.004	0.15	0.45
SR-91 WB to NB SR-241	0.000	0.26	0.26	0.006	0.19	0.55
SR-91 EB to NB SR-241	0.000	0.14	***0.92***	0.006	0.33	0.90
SR-91 WB to SB SR-241	0.000	0.04	0.24	0.006	0.21	0.60
SR-91 WB to SR-71 SB	0.076	0.38	***0.91***	0.004	0.13	0.40
SR-91 EB to SR-71 NB	0.000	0.00	0.37	0.004	0.26	0.90
SR-91 WB to SR-71 NB	0.065	0.20	0.39	0.004	0.15	0.45
SR-91 EB to SR-71 SB	0.000	0.00	***0.63***	0.006	0.19	0.55
SR-91 WB to SB I-15	0.000	0.05	0.20	0.006	0.19	0.55
I-15 NB to SR-91 (both EB & WB)	0.000	0.22	***1.10***	0.002	0.08	0.25
SR-91 EB to I-15 SB	0.000	0.00	***0.06***	0.004	0.13	0.04
I-15 SB to SR-91 EB	0.000	0.07	0.33	0.004	0.26	0.90
SR-91 WB to I-15 NB	0.064	0.13	0.32	0.004	0.13	0.40
I-15 SB to SR-91 WB	0.000	0.18	0.42	0.004	0.15	0.45
SR-91 EB to I-15 NB	0.000	0.03	0.13	0.006	0.19	0.55
SR-91 Freeway-to-Arterial Ramps						
Gypsum Canyon Rd EB off-ramp	0.000	0.38	0.38	0.005	0.61	1.50
Gypsum Canyon Rd WB on-ramp	0.000	0.00	0.00	0.003	0.22	0.60
Gypsum Canyon Rd EB on-ramp	0.000	0.20	0.20	0.001	0.24	0.70
Gypsum Canyon Rd WB on-ramp	0.000	0.00	0.00	0.001	0.24	0.70
Gypsum Canyon Rd EB on-ramp	0.000	0.00	***1.53***	0.003	0.22	0.60
Gypsum Canyon Rd WB off-ramp	0.000	0.24	0.24	0.005	0.61	1.50
Green River Rd EB off-ramp	0.000	0.15	0.46	0.005	0.61	1.50
Green River Rd WB on-ramp	0.000	0.00	0.10	0.002	0.32	0.80
Green River Rd WB off-ramp	0.000	0.23	***1.87***	0.005	0.61	1.50
Green River Rd EB on-ramp	0.000	0.51	0.51	0.002	0.32	0.80
SR-91 Freeway-to-Arterial Ramps						
Auto Center Dr WB on-ramp	0.000	0.00	0.69	0.002	0.32	0.80
Auto Center Dr EB off-ramp	0.000	0.42	0.69	0.005	0.61	1.50
Auto Center Dr EB on-ramp	0.000	0.11	0.34	0.002	0.32	0.80
Auto Center Dr WB off-ramp	0.000	0.43	1.14	0.005	0.61	1.50
Maple St EB off-ramp	0.083	0,83	1.49	0.005	0.61	1.50
Maple St WB on-ramp	0.000	0.09	0.60	0.003	0.32	0.85
Maple St EB on-ramp	0.000	0.29	0.44	0.003	0.17	0.45
Maple St WB off-ramp	0.000	0.46	1.22	0.005	0.61	1.50
Lincoln Ave WB on-ramp	0.000	0.00	0.42	0.002	0.32	0.80
Lincoln Ave EB off-ramp	0.000	1.27	***3.68***	0.004	0.50	1.35
Lincoln Ave WB off-ramp	0.000	0.08	0.38	0.005	0.61	1.50
Lincoln Ave EB on-ramp	0.000	0.61	***1.98***	0.002	0.32	0.80
Vicentia Ave EB off-ramp	0.000	0.00	0.23	0.003	0.31	0.90
School St (Grand) WB on-ramp	0.000	0.00	0.00	0.002	0.19	0.55
Main St WB on-ramp	0.000	0.32	***0.86***	0.003	0.17	0.45
Main St EB off-ramp	0.000	0.27	***2.15***	0.006	0.33	0.90
Main St WB off-ramp	0.000	0.30	***1.04***	0.006	0.35	0.90
Main St EB on-ramp	0.000	0.55	***1.34***	0.002	0.32	0.80
McKinley St WB on-ramp	0.000	0.21	0.66	0.002	0.32	0.80
McKinley St EB off-ramp	0.000	0.13	0.87	0.005	0.61	1.50
McKinley St WB off-ramp (loop)	0.000	0.44	**1.31**	0.003	0.42	1.25
McKinley St EB on-ramp (loop)	0.000	0.00	0.31	0.001	0.24	0.70
McKinley St EB on-ramp	0.000	0.19	***1.33***	0.003	0.22	0.60
McKinley St WB off-ramp	0.000	0.00	0.34	0.006	0.33	0.90

Table 1.14 Summary of Accident Rates

Segment	Actual Accident Rate[1]			Statewide Average Accident Rate[1]		
	F	F+I	Total	F	F+I	Total
Pierce St WB on-ramp	0.000	0.39	0.52	0.002	0.32	0.80
Pierce St EB off-ramp	0.000	0.20	0.92	0.005	0.61	1.50
Magnolia Ave WB on-ramp	0.000	0.83	***1.04***	0.003	0.22	0.60
Magnolia Ave EB off-ramp	0.000	0.00	1.22	0.003	0.42	1.25
Magnolia Ave WB off-ramp	0.000	0.57	0.71	0.003	0.42	1.25
Magnolia Ave EB on-ramp	0.000	0.00	0.45	0.003	0.22	0.60
I-15 Freeway-to-Arterial Ramps						
Cajalco Rd NB off-ramp	0.000	0.55	***1.46***	0.006	0.19	0.60
Cajalco Rd NB on-ramp	0.000	0.36	***0.54***	0.005	0.16	0.45
Cajalco Rd SB on-ramp	0.000	0.00	0.30	0.009	0.35	0.85
Cajalco Rd SB off-ramp	0.000	0.18	***0.71***	0.007	0.24	0.70
El Cerrito Rd NB off-ramp	0.000	1.28	***2.88***	0.005	0.61	1.50
El Cerrito Rd SB on-ramp	0.000	0.27	0.54	0.002	0.32	0.80
I-15 Freeway-to-Arterial Ramps						
El Cerrito Rd NB on-ramp	0.000	0.00	0.32	0.002	0.32	0.80
El Cerrito Rd SB off-ramp	0.000	0.63	***2.99***	0.005	0.61	1.50
Ontario Ave NB off-ramp	0.000	0.24	0.96	0.005	0.61	1.50
Ontario Ave SB on-ramp	0.000	0.56	***0.89***	0.002	0.32	0.80
Ontario Ave NB on-ramp	0.000	0.13	0.67	0.002	0.32	0.80
Ontario Ave SB off-ramp	0.000	0.13	0.79	0.005	0.61	1.50
Magnolia Ave SB on-ramp	0.000	0.46	***1.70***	0.002	0.32	0.80
Magnolia Ave NB off-ramp	0.000	1.72	***3.65***	0.005	0.61	1.50
Magnolia Ave NB on-ramp	0.000	0.05	***1.57***	0.002	0.32	0.80
Magnolia Ave SB off-ramp	0.000	0.23	1.01	0.005	0.61	1.50
Hidden Valley Pkwy NB off-ramp	0.000	0.37	0.73	0.005	0.61	1.50
Hidden Valley Pkwy SB on-ramp	0.000	0.21	***1.27***	0.002	0.32	0.80
Hidden Valley Pkwy NB on-ramp	0.000	0.11	0.75	0.002	0.32	0.80
Hidden Valley Pkwy SB off-ramp	0.000	0.18	***2.01***	0.005	0.61	1.50

Source: Caltrans District 8 2004–2007 Traffic Accident and Surveillance and Analysis System (TASAS).
Note 1: The Department TASAS data are compiled in 3-year increments. At the time the *Traffic Study Report* (July 2010) was approved, the 2004–2007 TASAS data were the most current data available.
Note 2: ***Bold italics*** indicate segments that have higher accident rates than the Statewide average for similar facilities.

[1] Accidents are reported as: (1) number of accidents per million vehicle miles (MVM) on the freeway mainline, and (2) number of accidents per million vehicles (MV) on freeway ramps. The totals are totals of Property Damage Only (PDO) accidents.

Ave = Avenue
Dr = Drive
EB = eastbound
F = Number of fatal accidents per million vehicle miles traveled
F+I = Number of accidents with both fatalities and injuries per million vehicle miles traveled
I-15 = Interstate 15
NB = northbound
Pkwy = Parkway
PM = Post Mile
Rd = Road
SB = southbound
SR-71 = State Route 71
SR-91 = State Route 91
SR-241 = State Route 241
St = Street
Total = total number of accidents (including non-fatal and non-injury) per million vehicle miles traveled
WB = westbound

Table 1.14 shows that the accident rates for 4 of 6 mainline segments and 10 of 15 connectors are similar to or below the statewide average for similar facilities. Several project elements that are described below would be expected to improve overall corridor safety and potentially reduce accidents.

- The accident rate on the southbound SR-71 to westbound SR-91 connector is more than twice the State average for highway connectors. This connector would be improved under Alternatives 1 and 2 because the SR-71/SR-91 system interchange would be modified to accommodate the project improvements on SR-91.
- The accident rate on the northbound I-15 to SR-91 westbound and eastbound connectors is more than four times the statewide average. These connectors would be improved under Alternatives 1 and 2. The collector-distributor facility in the westbound direction on SR-91 between I-15 and Main Street that would be constructed as part of the project is expected to reduce congestion and related accidents on the connectors.

The fatality rate on the westbound SR-91 to northbound I-15 connector is above the statewide average, likely due to weaving constraints from the Main Street ramps. Braiding the ramps at Main Street under the Build Alternatives is expected to improve safety on this segment of the freeway as the weaves would be eliminated (a "weave" is where traffic entering the freeway conflicts with traffic exiting the freeway) and a longer separation of connector and mainline traffic would be provided.

Table 1.14 shows that 40 of 60 ramps experience accident rates that are similar to or below the statewide average for similar facilities. As a result, 20 (approximately 33 percent) of the local interchange ramps in the study area have reported accident rates higher than the statewide average. In addition, some interchange ramps have reported fatality rates above the statewide average. However, for the time period covered in the accident analysis, several interchanges, including Green River Road on SR-91 and Magnolia Avenue and El Cerrito Road on I-15, were under construction. Alternatives 1 and 2 incorporate local interchange improvements at virtually all interchange ramps on the project segment of SR-91. These improvements are forecast to improve operations, efficiency, and safety on the project segment of SR-91 as follows:

- Enhanced ramp capacity (extended ramps to ensure sufficient stopping distance for off-ramps and adequate storage at ramp meters for on-ramps) and improved interchange geometrics are expected to improve safety and potentially reduce accidents associated with the SR-91 corridor ramps.
- Two ramp braids (a braid is where on- and off-ramps are grade separated so that there is not a merging conflict between vehicles entering and exiting the freeway) are incorporated into the project, specifically the SR-91 eastbound ramp braids between Auto Center Drive and Maple Street and the eastbound Main Street on-ramp to SR-91 under the I-15 corridor connectors. The ramp braids eliminate short weaves and reduce the potential for sideswipe accidents.

1.3.2 Existing Roadway Operational Deficiencies

SR-91 passes through Santa Ana Canyon immediately south of the Santa Ana River. The topography of the canyon is a constraint to the two major transportation corridors that run through it: SR-91 and the Burlington Northern Santa Fe (BNSF) rail line. The result is that nearly all surface and rail traffic between Riverside and Orange Counties is funneled into this single corridor, which has limited physical opportunity for expansion as a result of the substantial slopes on the north and south sides of the Santa Ana Canyon and the Santa Ana River in the canyon bottom. In addition, the topography of the canyon limits the opportunities for arterial road connections to SR-91.

Specific structural and other limitations on the project segment of SR-91 are discussed in detail in the following sections.

1.3.2.1 Freeway Geometry

The existing SR-91 GP lanes within the project limits were constructed beginning in 1959 as a four-lane divided facility at a lower design speed than current standards. Two additional GP lanes (one in each direction) were completed in 1974. The HOV lanes within the project limits completed in 1993 were designed to fit within the existing roadway width. Other freeway improvements in the SR-91 corridor study area include the construction of SR-241 in the late 1990s, the addition of toll lanes on SR-91 within Orange County in the early 1990s, the Eastbound Lane Addition (which opened for operation in 2011), and the construction of I-15 on the western end of the SR-91 corridor study area.

Two primary considerations have resulted in a facility that does not meet current freeway geometric standards: (1) design and construction of the original SR-91

facility as a lower design speed than the current design speed standard (Chapter 2 of the Caltrans Highway Design Manual [May 2012] requires the design speed of freeways to be 10–15 mph greater than the posted speeds); when the existing facility was constructed, the posted speed was 10 mph less than the current posted speed limits; and (2) construction of the existing HOV lanes within the limited right-of-way available at that time. The existing nonstandard geometric features include:

- Sight distance
- Design speed
- Weaving distance
- Deceleration distance
- Grade of local road at ramp connection
- Horizontal clearance
- HOV preferred lane (on-ramp)
- Interchange spacing
- Intersection spacing
- Lane width
- Length of single-lane branch connectors
- Outer separation
- Ramp gore geometry
- Shoulder width
- Side slope steepness
- Standards for curvature
- Superelevation rate/transition/runoff

1.3.2.2 Pavement

Sections of the SR-91 that are on embankments through the City of Corona between Lincoln Avenue and Main Street have experienced localized settlement, resulting in areas of uneven pavement surfaces. This situation has required maintenance efforts over the past 10 years, specifically the use of pavement overlays, to maintain the structural integrity of the pavement and the ride quality. Potential settlement remains a matter of continuing concern that would be considered during the design/build phase for the project. Re-evaluation of the existing pavement condition would be appropriate during the design/build phase regardless of any localized problem areas. Based on the latest pavement condition survey conducted by the Department in 2006 along I-15 and in 2007 along SR-91 (refer to Tables B-1 and B-2 in the *Preliminary Geotechnical Design Report* [July 2010]), the predominant pavement distress

observed in the jointed plain concrete pavement was faulting at the pavement panel joints, which results in poor ride quality.

1.3.2.3 Drainage

The majority of the existing drainage system for SR-91 was constructed in the 1960s, and in certain locations the system is reaching the end of its expected 50-year service life. Although specific deficiencies in the existing drainage system have not been identified, RCTC and the Department have agreed to work together in an effort to assess the structural integrity of the system. RCTC would investigate the necessary locations and propose a fix prior to or during the design-build phase for the project. A sample investigation process to address these drainage concerns could include:

- All culvert inlets and outlets within the project limits and the outlets of any laterals coming from the median would be photographed. The condition of the pipe material at these locations would be described.
- If needed for visibility, a strong flashlight may be used to examine each culvert. Any noticeable deformations would be noted. The presence of standing water would be noted.
- Based on what is seen at each inlet and outlet, a more detailed investigation may be warranted. Those culverts may be remotely videoed, which may in turn require clearing/cleaning of the culvert.
- Special consideration would be given to larger culverts because they present the greatest threat to safety.
- Based on the investigation, a determination would be made regarding culvert rehabilitation (following Department Design Information Bulletin No. 83) or replacement.
- Improvements to failing culverts would be made where necessary. Funding issues would be discussed with the Department depending on the nature of repairs, and the Department and RCTC would develop a mutually acceptable plan to fix the problem areas during the construction phase of the project.

The drainage structures under Alternatives 1 and 2 are listed in detail later in Table 2.5.

1.3.2.4 Structures

Bridge inspection reports provided by the Department in 2006 were reviewed in conjunction with advance planning studies for structures. The reports determined that

the McKinley Street undercrossing of SR-91 is designated "Functionally Obsolete[1]" because of the nonstandard 14.75 ft vertical clearance at the north edge of the bridge over the local street below. The proposed SR-91 CIP westbound widening would be on a new higher off-ramp structure that meets the minimal vertical clearance standard of 15 ft.

The Temescal Wash bridge and overhead on SR-91 are designated "Structurally Deficient"[2] as a result of the deck condition on that structure. Because the deck was sealed with methacrylate in 2009 which corrected/improved the deck condition, the "Structurally Deficient" designation would likely be removed from the new bridge inspection report for this structure.

Several structures have been identified for seismic retrofit in conjunction with the widening. The bridge structure work, including construction of new structures and replacement, widening, and retrofitting of existing structures, is detailed later in Tables 2.3 and 2.4, respectively, for Alternatives 1 and 2.

1.3.3 Social Demands and Economic Development

There is substantial existing development along the project segments of SR-91 and I-15. Those existing land uses, which contribute to the traffic demand in this corridor, include residential, commercial, industrial, and institutional uses in the cities along the corridor (Anaheim, Yorba Linda, Corona, Riverside, and Norco) and in unincorporated areas in Orange and Riverside Counties. While these areas are largely built out or are protected open space, such as Featherly Regional Park, CHSP, and the New Orange County Park (National Natural Landmark) (New OC Park [NNL]), additional development is planned in other areas along the alignments of SR-91 and I-15. That proposed development is based on these cities' and counties' adopted General Plans as well as a number of Specific Plans. This future development would

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1 The National Bridge Inventory, General Condition Ratings is a coding system developed by FHWA to evaluate the condition of existing, in-place bridges or culverts. A bridge designated as "Structurally Deficient (SD)" is considered to have load carrying elements that are found to be in poor condition due to deterioration and/or damage. A bridge designated as "Functionally Obsolete (FO)" is considered to have deck geometry, load carrying capacity, clearance, or approach roadway alignment that no longer meets the current building standards for bridges.

2 Ibid.

contribute to demand in the SR-91 corridor for work as well as other trips between Riverside and Orange Counties. The existing and planned land uses, the adopted General Plans, and a number of Specific Plans in the Cities of Anaheim, Yorba Linda, Corona, Riverside, and Norco, and Orange and Riverside Counties in the vicinity of the project segment of SR-91 are discussed in more detail later in Sections 3.1, Land Use, and 3.25, Cumulative Impacts.

1.3.4 Legislation

California Senate Bill 1316 (SB 1316) (2008) authorizes OCTA to eliminate its rights, interests, and obligations in the Riverside County part of the existing SR-91 toll lanes by partial assignment to the RCTC. It further deletes the 2030 limitation on the issuance of bonds and the collection of tolls by OCTA. It authorizes the use of toll revenues for the toll lane and other related transportation purposes in the Orange County part of the SR-91 corridor.

SB 1316 also authorizes the RCTC to impose tolls for 50 years on the transportation facilities in its part of the SR-91 corridor. SB 1316 authorizes the use of toll revenues for capital and operating costs, including debt service, of those facilities and related transportation purposes in the SR-91 corridor.

1.3.5 Modal Interrelationships and System Linkages

The existing public transit linkages between Riverside and Orange Counties are bus and commuter rail. Metrolink commuter rail services between Riverside and Orange Counties operate on railroad tracks owned by BNSF. Metrolink commuter rail service between the two counties is nearing capacity on existing equipment.

As identified in the MIS LPS, all transit components within the Riverside to Orange County study area were to be maximized as part of all future transportation improvements. The project improvements do not specifically identify these transit improvements, but they are part of the overall background of transit improvements required through the extensive elected officials, interested stakeholders, and public outreach process implemented as part of the MIS process by RCTC, OCTA, and the Department.

Currently, express bus service operating on SR-91 provides connections from Riverside County to employment centers in Anaheim, Costa Mesa, Fullerton, and Irvine in Orange County. This service is provided on the Galleria at Tyler in Riverside to South Coast Metro in Costa Mesa line, which was implemented in fall 2006. Four additional express bus routes are planned for implementation in 2016.

These routes would originate in the Riverside and Temecula areas with destinations to employment centers in Anaheim and Orange in Orange County.

The North Main Street Corona MetroLink parking structure improvements were completed in June 2009. These improvements increased the parking capacity at this station adjacent to SR-91 and allowed commuter rail ridership to increase, thereby diverting trips from SR-91.

Metrolink currently operates 23 trips daily on the IEOC Line between downtown Riverside, Laguna Niguel/Mission Viejo, and Oceanside. The 91-Line operates between Riverside and Los Angeles via Corona, Fullerton, and Norwalk. Future service improvements to Metrolink are envisioned in the Southern California Regional Rail Authority (SCRRA) *Strategic Assessment* (Metrolink, January 19, 2007). It is anticipated there will be at least 40 daily trips each on the IEOC Line and 91-Line by 2020. Additional information on planned bus and rail transit improvements between Riverside and Orange Counties is provided later in Table 2.21. The project would not preclude implementation of any existing or future transit projects between the two counties.

No commercial or cargo airports are adjacent to or in the immediate vicinity of the project segments of SR-91 and I-15. The nearest airport is Corona Municipal Airport, a general aviation airport approximately 0.8 mi north of SR-91. The nearest commercial airports are Ontario International Airport (located in Ontario in western San Bernardino County), John Wayne Airport (located in Santa Ana in central Orange County), and March Air Reserve Base (located in Riverside County, south of SR-91 and east of and adjacent to I-215). The Build Alternatives would not provide for any direct interface with any airport.

1.3.5.1 Corridor System Linkages

The SR-91 corridor is an integral component of the regional transportation system. It provides a key linkage between the Inland Empire and Orange County and a gateway into southern Los Angeles County. The corridor connects a burgeoning residential population to substantial employment opportunities. As a result of topography, there are few viable transportation alternatives between Riverside and Orange Counties. The project provides enhanced mobility between the two counties as well as additional connectivity between I-15 and SR-91 through direct connections to the tolled express lanes or HOV lanes within the region.

Information concerning related projects provides contextual information for the project and identifies how the transportation agencies have coordinated transportation planning efforts. The SR-91 CIP will be implemented in a manner that is consistent with the programmed and planned improvements as identified later in Table 3.25.1 and shown on Figure 3.25-1, which represents system linkages within the overall two-county regional transportation system. These related system improvements are on facilities that represent future connections or are complementary to the project.

1.3.5.2 Regional Goods Movement

Regional goods movement is concerned with the movement of all types of goods and materials across and through the southern California region. Specifically, SCAG has identified goods movement as a critical component of transportation system planning in southern California. The *Southern California Strategy for Goods Movement: A Plan for Action* (SCAG, March 2005) identified the existing and projected volumes of goods transported through the Ports of Los Angeles and Long Beach. The Plan also identified strategies to address the movement of these goods from the ports to their eventual destinations in the United States via both rail and surface transportation facilities. According to that Plan, over one-third of waterborne freight container traffic at United States' ports is handled by the Ports of Los Angeles and Long Beach, with 50 to 60 percent of this freight then transported to destinations outside the southern California region via rail or truck.

In summary, the key component to addressing regional goods movement in southern California is providing appropriate infrastructure and facilities to support the ship, rail, and surface transportation movement of goods. SR-91, as a major east-west freeway, provides critical connections between trucks coming from/going to the Ports of Los Angeles and Long Beach, and destinations across southern California and points to the east. In addition to high volumes of goods being shipped to/from the two ports, goods movement truck traffic is also generated at rail/truck transfer yards at several locations in southern California and in the general area around the March Air Reserve Base. As a result, it is important for regional goods movement that the freeways in southern California, including SR-91, provide adequate capacity to accommodate goods movement truck traffic in the region in the future. For example, on SR-91, truck trips are approximately 6.7 percent of the Existing 2007 total daily traffic volumes on the study area segments of SR-91 and I-15, as shown on Table 1.15. The context for comparing the percentage of trucks in total traffic is for informational purposes and is related to the analysis of the corridor and potential impacts of trucks on mainline performance (i.e., the greater the number of trucks,

Table 1.15 Baseline/Existing (2007) Truck Volumes

Segment	Daily Trucks	Truck Percentage of Total Traffic
SR-91 at Orange/Riverside County line	15,500	5.5
SR-91 west of I-15	14,500	5.3
SR-91 east of I-15	16,300	7.3
I-15 north of SR-91	17,900	10.5
I-15 south of SR-91	10,300	5.1

Source: Speed surveys and the Riverside County Transportation Commission Model Results for the SR-91 CIP, as disclosed in the *Traffic Study Report* (July 2010).
CIP = Corridor Improvement Project
I-15 = Interstate 15
SR-91 = State Route 91

the worse the LOS and operations of the facility become). The average truck volume percentage of 6.7 percent of total traffic on the SR-91 and I-15 study area segment is consistent with the average percentage of freeway truck volumes of 6.9 percent for the SCAG region (SCAG, Regional Screenline Traffic Count Program, June 24, 2004).

As shown on Table 1.15, the volumes that have been reported on I-15 would be considered high at 10.5 percent compared to the regional average of 6.9 percent, but because this is a key truck trade corridor (based on the SCAG 2012 RTP/SCS Goods Movement Appendix, Exhibit 1), they are not atypical. Truck activity on I-15 is not forecast to increase with implementation of the project. As shown in Table 1.15, the 10.5 percent of trucks on I-15 might indicate the need for a truck climbing lane. However, because the project does not interfere with truck operations on I-15 north of SR-91, a truck climbing lane is not proposed with this project.

1.3.6 Air Quality Improvements

The Build Alternatives include HOV lanes or tolled express lanes. Most of the ramps on the project segments of SR-91 and I-15 are already metered, and those ramp meters would be retained in the Build Alternatives. These project features would contribute to air quality emissions reductions in the long term. While the Build Alternatives do not include any specific transit-related improvements, the preferential lanes (HOV and tolled express lanes) and the ramp metering would directly benefit transit vehicles (and their passengers) traveling on the project segments of SR-91 and I-15. Specifically, RCTC and OCTA offer rideshare services and programs, including commuter and local bus services; commuter rail services; and assistance in forming, joining, and managing carpools and vanpools. Commuter assistance or programs to reduce the number of drive-alone travelers in Riverside County is a mandated part of

RCTC's Measure A program.[1] The carpool, vanpool, and bus services in the SR-91 corridor would benefit from the time savings as a result of using the preferential lanes (HOV and tolled express lanes) provided by the Build Alternatives. RCTC has been coordinating with the Riverside Transit Agency on enhanced express bus service for the SR-91 corridor. The addition of tolled express lanes on SR-91 under Alternative 2 provides the opportunity to nearly double the amount of express bus service that is currently offered in this corridor (to a total of 41 trips per day). While this service is not a specific component of the SR-91 CIP, it is an important element of RCTC's plan for improved mobility in the corridor. The express bus service would benefit from the SR-91 CIP because, without the project, future congestion in the corridor would be severe and express bus service would not be viable.

Although the Build Alternatives do not include specific transit, Transportation Systems Management (TSM), or Transportation Demand Management (TDM) components, they are supportive of the various shared-ride modes currently offered by RCTC and OCTA. Refer to Chapter 2, Project Alternatives, for additional discussion of TSM and mass transit services in the project area.

1.3.7 Independent Utility and Logical Termini

1.3.7.1 Logical Termini

The project limits for the SR-91 CIP were defined based on providing a logical and independent set of improvements. Logical termini are defined as rational end points for a transportation improvement and rational end points for a review of the environmental impacts of a proposed project. Refer to Figures 2.14 and 2.17, provided later in Chapter 2, Project Alternatives, which show the improvements in the Alternative 1 and 2 Initial Phases and Alternative 1 and 2 Ultimate Projects, respectively.

Logical Termini for the Alternative 1 and 2 Ultimate Projects

The Alternative 1 and 2 Ultimate Projects provide logical termini because they connect to major transportation facilities (SR-241, SR-71, and I-15) that are destinations of major traffic volumes along SR-91 and terminate at major arterial interchanges (SR-241 on the west and Pierce Street on the east on SR-91, and Hidden Valley Parkway on the north and Cajalco Road on the south on I-15).

Under Alternatives 1 and 2, the western project terminus is at the SR-241 interchange because that interchange represents the western point of substantial change in traffic

[1] http://www.rctc.org/commuterassistance.asp (accessed August 13, 2010).

demand on SR-91. Specifically, as shown in detail on Figure 3-2 in the Traffic Study Report (page 46), approximately 18 percent of the westbound SR-91 traffic exits to southbound SR-241, and approximately 18 percent of the eastbound SR-91 traffic, east of SR-241, is traffic that exits from northbound SR-241 to eastbound SR-91. Although I-15 represents the eastern point of substantial change, where approximately 30 percent of the traffic leaves or enters on SR-91, the eastern project terminus is farther east on SR-91, at the Pierce Street interchange. That endpoint was based on being able to facilitate traffic operations by providing a sufficient distance from I-15 to transition the SR-91 CIP lane configuration back to the existing lane configuration on SR-91.

Under Alternatives 1 and 2, the southern project terminus on I-15 at the Cajalco Road interchange was based on being able to facilitate traffic operations by providing a distance from SR-91 to convert the SR-91 CIP lane configuration back to the existing lane configuration on I-15 and to provide access to the I-15 northbound to SR-91 westbound direct Express Lane connector. The northern terminus on I-15 at the Hidden Valley Parkway interchange was based on being able to facilitate traffic operations by providing a sufficient distance from SR-91 to transition the SR-91 CIP lane configuration back to the existing lane configuration on I-15.

The SR-91 CIP Build Alternatives can be implemented without being dependent on any other improvements, and they would provide substantial benefits to the traveling public between the project termini described without other improvements. Alternatives 1 and 2 for the SR-91 CIP have logical termini that allow for evaluation of potential environmental effects for a project large enough to address the defined traffic need in the affected part of the corridor.

The SR-91 CIP Build Alternatives can be implemented without being dependent on any other improvements, and they would provide substantial benefits to the traveling public between the project termini described without other improvements. Alternatives 1 and 2 for the SR-91 CIP have logical termini that allow for evaluation of potential environmental effects for a project large enough to address the defined traffic need in the affected part of the corridor.

Logical Termini for the Alternative 1 and 2 Initial Phases

Similar to the Ultimate Projects for Alternatives 1 and 2, the limits for the Initial Phases of those Build Alternatives were also defined based on providing a logical and independent set of improvements.

The Initial Phase of Alternative 1 provides logical termini because it connects to major transportation facilities (SR-71 and I-15) and terminates at major arterial or freeway interchanges (Green River Road on the west on SR-91, at I-15 on the east on SR-91, and at Ontario Avenue on I-15). The western terminus for the Initial Phase of Alternative 1 is west of SR-71 at Green River Road to provide a sufficient distance from the SR-71 interchange to convert the SR-91 CIP lane configuration back to the existing lane configuration on SR-91. SR-71 is the western point where a fifth general-purpose lane will be added to eliminate the existing capacity reduction from five to four general-purpose lanes in each direction. The eastern terminus is at I-15, with the direct HOV lane connectors from eastbound SR-91 to southbound I-15 and from northbound I-15 to westbound SR-91. I-15 represents the eastern point of substantial change in traffic demand on SR-91. The southern terminus on I-15 is at Ontario Avenue to facilitate traffic operations by providing a sufficient distance from SR-91 to convert the SR-91 CIP lane configuration back to the existing lane configuration on I-15.

As shown on Figure 2-16, the Initial Phase of Alternative 2 also provides logical termini because it connects to major transportation facilities (SR-241, SR-71, and I-15) and terminates at major arterial or freeway interchanges (SR-241, Pierce Street on SR-91, and Hidden Valley Parkway and Ontario Avenue on I-15). The western terminus for the Initial Phase of Alternative 2 is at the SR-241 interchange because that interchange represents the western point that encompasses the extension of tolled express lanes from the Orange/Riverside County line, including the transition lane required for access to and from the tolled express lanes. Although I-15 represents the eastern point of substantial change in traffic demand on SR-91, the eastern terminus for the Initial Phase of Alternative 2 is farther east on SR-91, at the Pierce Street interchange. That endpoint was based on being able to facilitate traffic operations by providing a sufficient distance from I-15 to convert the SR-91 CIP lane configuration back to the existing lane configuration on SR-91. The southern terminus on I-15 at the Ontario Avenue interchange was based on being able to facilitate traffic operations by providing a sufficient distance from SR-91 to convert the SR-91 CIP lane configuration back to the existing lane configuration on I-15.

1.3.7.2 Independent Utility

A project has independent utility if it meets a project purpose in the absence of other improvements in the project segment or in other parts of the corridor. The Initial Phases of Alternatives 1 and 2 include improvements on SR-91 from approximately the Orange/Riverside County line to the I-15 interchange (a distance of about 8 mi)

and single-lane direct connectors to and from the I-15 south of SR-91, extending from SR-91 to the Ontario Avenue interchange (a distance of about 3 mi). The Initial Phases of Alternatives 1 and 2 would generally implement shorter segments of the Alternative 1 and 2 Ultimate Projects on SR-91 and I-15. A key component of the Initial Phases is the extension of the HOV or tolled express lanes from the Orange/Riverside County line to I-15. I-15 is a logical terminus for the HOV or tolled express lanes extending through a major bottleneck location along this corridor to the next major system interchange. The HOV or tolled express lane direct connectors to and from I-15 south of SR-91 are also a logical connection for the Initial Phases of Alternatives 1 and 2 due to current congestion experienced for these movements. A GP lane in each direction would also be constructed through the City of Corona along with substantial improvements to four local interchanges and the SR-91/I-15 system interchange. The GP lane addition extends an existing GP lane that currently starts/ends at SR-71 east to I-15, which is a logical terminus for these lane extensions. The improvements proposed with the Initial Phases of Alternatives 1 and 2 represent approximately 70 percent of the improvements in the Alternative 1 and 2 Ultimate Projects. The traffic analyses for the Initial Phases of Alternatives 1 and 2 that were prepared for a 2015 opening year demonstrate substantial benefits in travel time savings and increases in travel speed through the SR-91 corridor compared to the 2015 No Build condition. A comparative summary of these performance measures was shown previously in Table 1.13.

Based on the above discussion, the SR-91 CIP has independent utility because the Alternative 1 and 2 Initial Phases and Ultimate Projects meet the project purpose by improving the vehicle, person, and goods movement in the SR-91 corridor and providing usable improvements along the SR-91 and I-15 transportation corridors. In addition, the Alternative 1 and 2 Initial Phases and Ultimate Projects represent a reasonable expenditure even if no additional transportation improvements are made in the area, 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 SR-91 and I-15 corridors. As a result, because the Alternative 1 and 2 Initial Phases and Ultimate Projects meet the project purpose in the absence of other improvements in the SR-91 and I-15 corridors, the SR-91 CIP would have independent utility.

Chapter 2 Project Alternatives

2.1 Project Description

This chapter describes the proposed action and the alternatives that were developed to meet the identified purpose and need for the project, while avoiding or minimizing the potential for adverse environmental impacts. The alternatives described in detail in this chapter and evaluated in this EIR/EIS are shown on Figure 2-1 and all described briefly below:

- **No Build Alternative**
  - Would maintain existing SR-91 and I-15 in the project area.
  - No additional GP lanes and no change in the existing tolled express or HOV lanes on SR-91.
  - Provides a benchmark by which the public and decision-makers can compare the magnitude of the effects of the Build Alternatives.
- **Alternative 1: Add General-Purpose Lanes and Maintain HOV Lanes (GP + HOV Lanes)**
  - Would add one GP lane in each direction on SR-91 from the SR-91/SR-241 interchange to Pierce Street.
  - Would maintain the existing tolled express lanes in Orange County and the existing HOV lanes on SR-91 between the Orange/Riverside County line and Pierce Street.
  - Would add one HOV lane on I-15 in each direction from Ontario Avenue in Corona to HOV lane direct connectors from eastbound SR-91 to southbound I-15 and from northbound I-15 to westbound SR-91.
- **Alternative 2: Add General-Purpose Lanes and Extend Tolled Express Lanes (GP + Tolled Express Lanes)**
  - Would add one GP lane in each direction on SR-91, from the SR-91/SR-241 interchange to Pierce Street in the City of Riverside.
  - Would extend the existing tolled express lanes and would add one tolled express lane in each direction from Orange County east to I-15 in Corona (express lanes are separate lanes with limited access/egress points that provide long-lasting, reliable, free flow travel for eligible users in an otherwise per vehicle congested corridor; users pay tolls but buses, HOVs with three or more persons, motorcycles, zero-emission vehicles, and vehicles driven by

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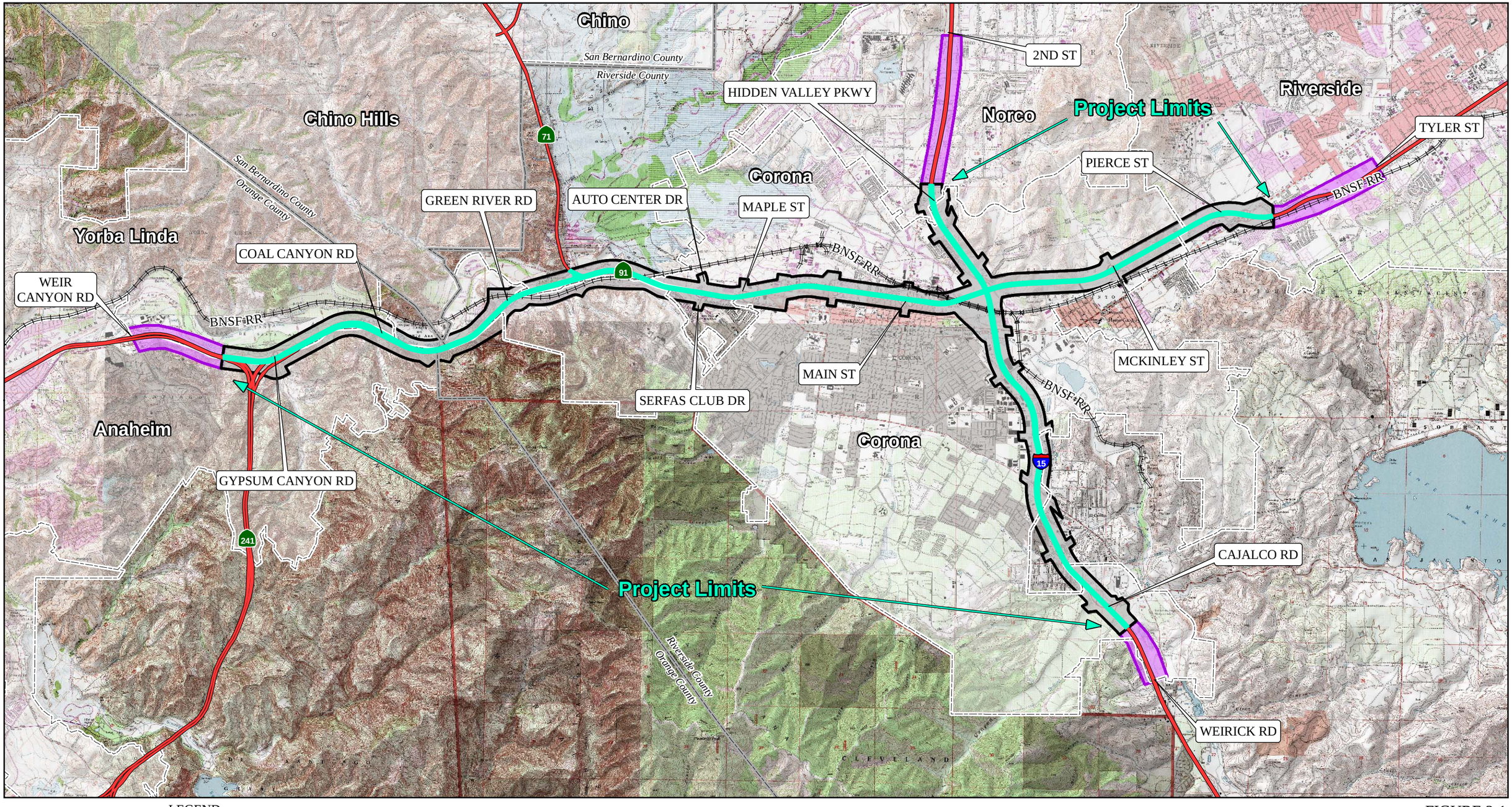

LEGEND

- Project Limits (the construction limits for the Alternative 1 and 2 improvements, excluding the Advanced Signage Areas)
- Advanced Signage Area (part of project; signing installation in the freeway right-of-way only, and no other project construction)
- SR-91 Study Area for the Build Alternatives
- City Boundaries
- County Boundaries

0 0.625 1.25 Miles

SOURCE: USGS 7.5'QUAD - BLACK STAR CANYON ('88), CORONA NORTH ('81), CORONA SOUTH ('88), PRADO DAM ('81), RIVERSIDE WEST ('81); CALIF.

I:\PAZ0701\GIS\Basemap\SR91_I15_ProjectAlignments.mxd (4/11/2011)

FIGURE 2-1

SR-91 Corridor Improvement Project

Project Location on SR-91 and I-15

Ora-91-R14.43/R18.91
Riv-91-R0.00/R13.04
Riv-15-35.64/45.14
EA 0F540

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handicapped persons, including disabled veterans, would pay a reduced or no toll).

- Would convert the existing SR-91 HOV lanes to tolled express lanes.
- Would provide express lane direct connectors between the express lanes on SR-91 and I-15.
- Would extend one tolled express lane in each direction on I-15 from the express lane connectors north to Hidden Valley Parkway and south to Cajalco Road.

This chapter also provides a brief history of the project; describes the proposed action and the alternatives developed to meet the identified purpose and need, while avoiding or minimizing the potential for adverse environmental impacts; discusses phasing for the two Build Alternatives; and discusses other alternatives that were considered but were eliminated from further evaluation in this EIR/EIS.

The project is in Orange and Riverside Counties along the existing SR-91 corridor and includes connections to I-15 in Riverside County. Figure 1-1, provided in Chapter 1, shows the project vicinity. Figure 2-1 shows the project location on SR-91 and I-15. The western project limit on SR-91 is at the SR-91/SR-241 interchange in the east part of the City of Anaheim in northeast Orange County. The eastern project limit on SR-91 is Pierce Street in the City of Riverside, just east of the City of Corona. The project limits extend approximately 14 mi along SR-91.

The project limits on I-15 begin at Cajalco Road and extend approximately north 5 mi on I-15 to Hidden Valley Parkway in the City of Corona.

The project study area extends approximately 2 mi beyond the project limits on SR-91 and I-15 to allow for the placement of advance signage for construction areas and tolled express lane access. The advanced signage areas, as the ends of the project limits on SR-91 and I-15, are shown on Figure 2-1.

The improvements in Alternatives 1 and 2 will be implemented in phases: the Initial Phase and the Ultimate Project.

2.2 Project Background

2.2.1 State Route 91

SR-91 is one of the major surface transportation facilities connecting Orange and Riverside Counties. SR-91 begins in Los Angeles County at the junction with SR-1 in

Hermosa Beach and continues east through Los Angeles, Orange, and Riverside Counties, terminating at the SR-91/SR-60/I-215 interchange in the City of Riverside. Traveling west on SR-91, the freeway ends at I-110, but SR-91 continues on Artesia Boulevard as a highway until it terminates at SR-1.

The existing SR-91 GP lanes within the project limits were constructed beginning in 1959 as a four-lane divided facility. Two additional GP lanes (one each direction) were completed in 1974. The construction of the HOV lanes within the project limits was completed in 1993. The construction of the tolled express lanes within the project limits was completed in 1995. Within the project limits, SR-91 currently has three to four GP lanes in each direction, which vary in width from 11 to 12 feet (ft) from the SR-241/SR-91 interchange to the SR-91/I-15 interchange, and three 12 ft wide GP lanes in each direction from the SR-91/I-15 interchange to Pierce Street. There are two tolled express lanes in each direction within the project limits. Those tolled express lanes begin west of the SR-91/SR-55 interchange and end at the Riverside/ Orange County line. Two HOV lanes, one in each direction, extend from the terminus of the existing tolled express lanes to beyond the project limits at approximately Marshall Street on the eastbound side and McKinley Street on the westbound side.

An Initial Study with Proposed Mitigated Negative Declaration/Environmental Assessment was prepared and approved in December 2007 by Department Districts 8 and 12, in conjunction with OCTA and RCTC, for the SR-91 Eastbound Lane Addition Project. This project along SR-91 is between SR-241 in eastern Orange County and SR-71 in western Riverside County and construction of this project began in 2010. The project added an additional GP lane and widened all lanes and shoulders to standard widths on eastbound SR-91 by widening SR-91 to the south. This project is now operational.

2.2.2 Interstate 15

I-15 starts in San Diego, extends north-northwest through the States of California, Nevada, Utah, Idaho, and Montana, and continues north as Alberta Highway 4 in Canada. Regionally, I-15 is an important intercounty link between San Diego, Riverside, and San Bernardino Counties. In the project area, I-15 is an eight-lane divided highway with a center median. I-15 converts to a six-lane divided facility north and south of SR-91. As it proceeds across the Mojave Desert, it converts to a four-lane facility.

2.2.3 Other Major Projects In the Project Area

One transportation project is operational, and several approved or planned transportation projects and one water pipeline project in the general area of the project may affect or require design coordination with the project. These projects, described in Table 2.1, are each independent of the project and the other projects listed in the table. Each of the transportation projects would function effectively as an individual project and would provide specific benefits to the traveling public regardless of whether or not the other projects are implemented.

In addition to those projects listed in Table 2.1, many other transportation and land use projects are within the cumulative study area, including projects identified in the *State Route 91 Implementation Plan* (OCTA 2010). Refer to Section 3.25, Cumulative Impacts, for a description of the cumulative impact study area and a full listing and evaluation of cumulative projects relevant to the project.

The Corps and local sponsors (Orange County Flood Control and Riverside County Flood Control Districts) are implementing a series of Santa Ana River Bank Protection projects north of SR-91 between Gypsum Canyon Road and SR-71. Those Corps projects will be completed as follows:

- **Reach 9 Phase 2B:** From east of Coal Canyon to west of Green River Road; completion in 2012
- **Reach 9 Phase 2A:** From Prado Road to SR-71; completion in 2014
- **Reach 9 Phase 3:** From Gypsum Canyon Road to Coal Canyon Road; completion in 2015

2.3 Range of Alternatives

The two Build Alternatives for the project were developed to implement one component of the MIS LPS. Section 2.3.5.3, Major Investment Study Build Alternatives, provides additional information regarding the MIS alternatives and the LPS.

The two Build Alternatives are:

- **Alternative 1:** Add General-Purpose Lanes and Maintain HOV Lanes (GP + HOV Lanes) Alternative; and
- **Alternative 2:** Add General-Purpose Lanes and extend Tolled Express Lanes (GP + Tolled Express Lanes) Alternative.

Table 2.1 Other Related Major Projects

Project Title[1]	Summary	Completion Time Frame
SR-91 Eastbound Lane Addition Project Between SR-241 and SR-71	The project will add one additional GP lane and widen the existing lanes and shoulders to standard widths on eastbound SR-91 between SR-241 in eastern Orange County and SR-71 in western Riverside County. This project is being accommodated in the SR-91 CIP design. This project is now operational.	Operational
Santa Ana Mainstem Project – Santa Ana River Reach 9, Phases 2A and 2B/Santa Ana River Interceptor Pipeline Reaches III and IV	These projects will reinforce the banks of the Santa Ana River by providing grouted stone bank protection and sheet pile to protect river bank below the Prado Dam (Phase IIA) and near the Riverside/Orange County line (Phase IIB) from damage that would be caused by a full release of stored water from Prado Dam and also relocate the SARI pipeline currently located in the river channel. These projects will accommodate the SR-91 CIP design.	Reach 9, 2B–2012 SARI Line–2013 Reach 9, 2A–2014
SR-91/SR-71 Interchange Improvement Project	This project proposes replacing the existing single-lane connection between eastbound SR-91 and northbound SR-71 with a two-lane, direct flyover ramp. It also proposes a new, separate eastbound road just south of and parallel to SR-91 to provide improved access between the Green River Road interchange and the SR-91/SR-71 interchange. This project will accommodate the SR-91 CIP design.	Post-2018
I-15 Corridor Improvement Project	As part of other congestion relief projects in Riverside County, RCTC is planning improvements to I-15 from just north of the I-15/I-215 separation in the City of Murrieta, north to the San Bernardino County line. The I-15 CIP extends approximately 44 mi along I-15. Two Build Alternatives are under consideration: an HOV lane and mixed-flow lane alternative, and a tolled express lane and mixed-flow lane alternative. The SR-91 CIP and the I-15 CIP Build Alternatives each accommodate the design of the improvements on the other freeway.	2018
SR-241/SR-91 Direct Connectors	This project would allow SR-241 toll road users to transition directly onto the SR-91 tolled express lanes and vice versa. This project will accommodate the SR-91 CIP design. This project will be constructed after the Initial Phase of the SR-91 CIP.	Late 2018
SR-91 between SR-55 and SR-241	This project will add one GP lane in each direction on SR-91. This project is west of the limits for the SR-91 CIP and would not affect the SR-91 CIP. This project is under construction.	Mid-2013
SR-91 Westbound Lane Addition at Tustin Avenue	This project would add a westbound auxiliary lane on SR-91 from the northbound SR-55 to the westbound SR-91 connector through the Tustin Avenue interchange. The project would include the reconstruction of the Tustin Avenue overcrossing structure. The total project length is 1.6 mi. The primary features of this project are: widening of the SR-91 bridge over the Santa Ana River (by adding either one or two GP lanes over the Santa Ana River), the addition of GP lanes from northbound SR-55 to westbound SR-91 through Tustin Avenue (by adding either one or two GP lanes), and realignment of the westbound SR-91 Tustin Avenue off- and on-ramps.	2018

Table 2.1 Other Related Major Projects

SR-57 Northbound Lane Addition Project	This project will add a lane on SR-57 from north of SR-91 near Orangethorpe Avenue in Placentia to Lambert Road in Brea, and Katella Avenue and Lincoln Avenue in Anaheim. The environmental phase was completed in December 2007, and construction on the Orangethorpe Avenue to Lambert Road segment began construction in January 2011. The environmental phase for the Katella Avenue to Lincoln Avenue segment was completed in November 2009, design was completed in spring 2011, and construction is expected to begin in early 2012.	2014
Cajalco Road Widening and Safety Enhancement Project between Temescal Canyon Road and I-15	This project would widen Cajalco Road from two to four lanes between Harvill Avenue on the east and Temescal Canyon Road on the west, and from four to six lanes between the I-215 southbound ramps and Harvill Avenue. Additional proposed improvements include traffic signals, bus turnouts, additional turn lanes, and watercourse crossing and drainage improvements.	2019

Source: Riverside County Transportation Commission (2010 and 2011).

[1] The locations of these projects, except the SR-57 Northbound Lane Addition Project, which is several miles west of the project limits, are shown later on Figure 2-16.

CIP = Corridor Improvement Project
GP = general-purpose
HOV = high-occupancy vehicle
I-15 = Interstate 15
I-215 = Interstate 215
mi = mile/miles
RCTC = Riverside County Transportation Commission
SARI = Santa Ana River Interceptor
SR-55 = State Route 55
SR-57 = State Route 57
SR-71 = State Route 71
SR-91 = State Route 91
SR-241 = State Route 241

Alternative 1 includes four design variations (1a through 1d) and Alternative 2 includes eight design variations (2a through 2h). These alternatives are described in detail in the following sections.

2.3.1 Project Build Alternatives

Each Build Alternative would add one GP lane in each direction on SR-91. These lane additions would be continuous throughout the project limits. Both Build Alternatives would provide auxiliary lanes or collector-distributor roads at interchanges and would modify the existing interchange geometrics within the project limits to improve traffic operations. Existing local access to/from all the existing interchanges would be maintained except at West Grand Boulevard, where the existing half-diamond interchange ramps would be removed and replaced with improved local connectivity to the Lincoln Avenue interchange. The Build Alternatives include upgrades to existing SR-91 standard shoulder, lane, and buffer widths where those upgrades can be accommodated.

Alternative 1 would maintain one median HOV lane in each direction on SR-91 within the project limits. It would also construct two HOV lane connectors: from eastbound SR-91 to southbound I-15, and from northbound I-15 to westbound SR-91.

Alternative 1 would add one HOV lane in each direction on I-15 extending from the new HOV lane connectors south to Ontario Avenue.

Alternative 2 would convert the existing HOV lanes to two tolled express lanes in each direction on the SR-91 from the Orange/Riverside County line to I-15, including two tolled express lane connectors, one from eastbound SR-91 to southbound I-15 and one from northbound I-15 to westbound SR-91. Alternative 2 also proposes to add tolled express lane connectors from eastbound SR-91 to northbound I-15 and from southbound I-15 to westbound SR-91. Alternative 2 would also add one tolled express lane in each direction on I-15 extending north to Hidden Valley Parkway and south to Cajalco Road.

In addition to the schematic figures of Alternatives 1 and 2 provided in this chapter, detailed preliminary design plans on an aerial photograph base for the two Build Alternatives and their design variations are provided in Appendix L, Project Features. The figures in Appendix L show the existing and proposed State and City rights-of-way; freeway lanes, centerlines, and ramps; permanent easements and temporary construction easements (TCEs); retaining walls, concrete barriers, and sound barriers; limits on existing and proposed bridges; storm water best management practices (BMPs); and the boundaries of individual land parcels.

The project alignments on SR-91 and I-15 are shown on Figure 2-1.

2.3.2 Common Features of the Build Alternatives

Alternatives 1 and 2 have a number of permanent features and components that are the same or very similar. In addition, these alternatives have the same or similar temporary project features that would occur during construction. These common features of the Build Alternatives are described in this section.

Typical mainline one-directional cross sections on SR-91 and I-15 for the No Build Alternative and Alternatives 1 and 2 are shown in Table 2.2.

2.3.2.1 Nonstandard Mandatory and Advisory Design Features

The following categories of nonstandard mandatory and advisory design features are common to Alternatives 1 and 2:

- Clear width to bridge rails
- Compound/reverse curves
- Corner/decision sight distance

Table 2.2 Typical Mainline One-Directional Cross Sections for the No Build Alternative and Alternatives 1 and 2

Freeway Segments	No Build Alternative	Alternative 1[1]	Alternative 2[2]
Typical Cross Sections on SR-91			
SR-241 to the Orange/Riverside County line	• 2 tolled express lanes • 5 general-purpose lanes	• 2 tolled express lanes • **6 general-purpose lanes**	• 2 tolled express lanes • **6 general-purpose lanes** • **1 express auxiliary lane**[3]
Orange/Riverside County line to SR-71	• 2 HOV lanes • 5 general-purpose lanes	• 2 HOV lanes • **6 general-purpose lanes**	• **2 tolled express lanes** • **6 general-purpose lanes** • **1 express auxiliary lane**[3]
SR-71 to I-15	• 1 HOV lane • 4 general-purpose lanes	• 1 HOV lane • **5 general-purpose lanes** • **1 auxiliary lane**	• **2 tolled express lanes** • **5 general-purpose lanes** • **1 auxiliary lane**
I-15 to Pierce Street	• 1 HOV lane • 3 general-purpose lanes	• 1 HOV lane • **4 general-purpose lanes**	• **1 tolled express lane** • **4 general-purpose lanes**
Typical Cross Sections on I-15			
Cajalco Road to Ontario Avenue	• 3 general-purpose lanes	• 3 general-purpose lanes	• **1 tolled express lane** • 3 general-purpose lanes
Ontario Avenue to SR-91	• 4 general-purpose lanes	• **1 HOV lane** • 4 general-purpose lanes	• **1 tolled express lane** • 4 general-purpose lanes
SR-91 Interchange to Hidden Valley Parkway	• 4 general-purpose lanes	• 4 general-purpose lanes	• **1 tolled express lane** • 4 general-purpose lanes

Source: *Project Report* Attachment 8 (September 2011).
Note: **Bold** indicates a change in the cross section when compared to the cross section under the No Build Alternative.
[1] Refer to Figures 2-2 and 2-3 for figures showing the typical sections on SR-91 and I-15, respectfully, under Alternative 1.
[2] Refer to Figures 2-10 and 2-11 for figures showing the typical sections on SR-91 and I-15, respectfully, under Alternative 2.
[3] An express auxiliary lane is provided as a weaving lane for traffic entering and exiting the express lane facility.
HOV = high-occupancy vehicle
I-15 = Interstate 15
SR-71 = State Route 71
SR-91 = State Route 91
SR-241 = State Route 241

- Design speed standards
- Grade of local road at ramp connection
- Horizontal clearance to wall
- Horizontal curve radius
- HOV preferred lane (on-ramp)
- Interchange spacing
- Lane width
- Length of single lane/branch connectors
- Mainline reduction at interchange
- Minimum clearances
- Outer separation
- Superelevation rates and transitions
- Ramp gore geometry
- Shoulder width
- Side slope
- Standards for curvature
- Standard freeway entrance/exit
- Stopping sight distance (horizontal and vertical)
- Superelevation rate/transition/runoff
- Through/ramp lane drop
- Vertical curve length

All nonstandard design exceptions identified during the preliminary engineering phase and the development of the Project Report have been or will be approved and signed by the appropriate Department staff, in accordance with the procedures and standards described in the Department's Design Manual, prior to approval of the final Project Report by the Department's District Director. The design exception fact sheets and geometric approval drawings for the Initial Phase and Ultimate Project designs for Alternative 2f, which has been identified as the Preferred Alternative, will be included in the final Project Report.

2.3.2.2 Permanent Project Features

Bridges

Alternative 1 would require bridge work involving up to 27 structures and Alternative 2 would require bridge work involving up to 34 structures. For both Build Alternatives, this work would be a combination of modifications to existing structures, replacement of existing structures, and construction of new bridges. Some

existing bridges that would be widened would also be seismically retrofitted. The structures work under Alternatives 1 and 2 is summarized in Tables 2.3 and 2.4, respectively.

Table 2.3 Structures Work under Alternative 1

PM	Bridge Name	Bridge No.	New	Replace	Widen	Retrofit
Ora-91-R17.95	Coal Canyon Road UC	55-0507 L/R			X	
Riv-91- R0.07	County Line Creek	56-0366			X	
Riv-91-TBA	Green River WB Off-ramp OH	TBA	X			
Riv-91-R1.14	West Prado OH	56-0634 L			X	
Riv-91-R2.08	Rte 91/71 Sep	56-0587			X	
Riv-91-R2.08	E91-N71 Conn Sep	56-0635			X	X
Riv-91-R2.84	Prado OH	56-0637 L/R			X	
Riv-91-R3.71	Serfas Club Drive UC	56-0368 L/R			X	X
Riv-91-TBA	Westbound Maple On-ramp	TBA	X[1]			
Riv-91-TBA	Eastbound Maple Off-ramp	TBA	X			
Riv-91-4.16	Maple Street OC	56-0344		X		
Riv-91-5.38	Lincoln Avenue OC	56-0362			X	
Riv-91-5.70	Buena Vista Avenue UC	56-0373 L/R			X	
Riv-91-5.99	West Grand Boulevard UC	56-0445 L/R			X	X
Riv-91-6.34	Main Street UC	56-0448 L/R		X		
Riv-91-TBA	Main Street EB On-Ramp BOH	TBA	X			
Riv-91-6.65	East Grand Boulevard UC	56-0364 L/R			X	X
Riv-91-TBA	EB On-ramp E Grand Blvd UC	TBA	X			
Riv-91-6.93	Temescal Wash BOH	56-0446 L/R			X	X
Riv-91-TBA	E91-N15/S15 Connector BOH	TBA	X			
Riv-91-TBA	N15/S15-W91 Connector BOH	TBA	X			
Riv-91-9.18	McKinley Street UC	56-0365 L/R			X	X
Riv-91-10.29	Buchanan Street OC	56-0368		X		
Riv-91-TBA	91-15 Express Viaduct	TBA	X			
Riv-91-TBA	S-W Express Viaduct (15/91)	TBA	X			
Riv-38.69	Ontario Avenue UC	56-0498 L R			X	X
Riv-39.40	Old Temescal Rd UC	56-0644 L/R			X	X

Source: *Project Report* (September 2011).
[1] Selected design variations only.
BOH = bridge and overhead
Conn Sep = Connector Separation
EB = eastbound
L/R = left/right
OC = overcrossing
OH = overhead
Ora = Orange County
R = realigned
RCB = reinforced concrete box
Riv = Riverside County
Rte = Route
SW = southwest
TBA = to be assigned
UC = undercrossing
WB = westbound

Table 2.4 Structures Work under Alternative 2

PM	Bridge Name	Bridge No.	New	Replace	Widen	Retrofit
Ora-91-R17.95	Coal Canyon Road UC	55-0507 L/R			X	
Riv-91- R0.07	County Line Creek	56-0366			X	
Riv-91-TBA	Green River WB Off-ramp OH	TBA	X			
Riv-91-R1.14	West Prado OH	56-0634 L			X	
Riv-91-R2.08	Rte 91/71 Sep	56-0587			X	
Riv-91-R2.08	E91-N71 Conn Sep	56-0635			X	X
Riv-91-R2.84	Prado OH	56-0637 L/R			X	
Riv-91-R3.71	Serfas Club Drive UC	56-0368 L/R			X	X
Riv-91-TBA	Westbound Maple On-ramp	TBA	X[1]			
Riv-91-TBA	Eastbound Maple Off-ramp	TBA	X			
Riv-91-4.16	Maple Street OC	56-0344		X		
Riv-91-4.71	***Smith Avenue OC***	***56-0357***		***X[1]***		
Riv-91-TBA	***Smith Avenue Drop-ramp***	***TBA***	***X[1]***			
Riv-91-5.38	Lincoln Avenue OC	56-0362			X	
Riv-91-5.70	Buena Vista Avenue UC	56-0373 L/R			X	
Riv-91-5.99	West Grand Boulevard UC	56-0445 L/R			X	X
Riv-91-6.34	Main Street UC	56-0448 L/R		X		
Riv-91-TBA	Main Street EB On-Ramp BOH	TBA	X			
Riv-91-6.65	East Grand Boulevard UC	56-0364 L/R			X	X
Riv-91-TBA	EB On-ramp E Grand Blvd UC	TBA	X			
Riv-91-6.93	Temescal Wash BOH	56-0446 L/R			X	X
Riv-91-TBA	E91-N15/S15 Connector BOH	TBA	X			
Riv-91-TBA	N15/S15-W91 Connector BOH	TBA	X			
Riv-91-9.18	McKinley Street UC	56-0365 L/R			X	X
Riv-91-10.29	Buchanan Street OC	56-0368		X		
Riv-91-10.81	***Pierce Street UC***	***56-0369 L/R***			***X***	***X***
Riv-91-TBA	91-15 Express Viaduct	TBA[2]	X			
Riv-91-TBA	S-W Express Viaduct (15/91)	TBA[2]	X			
Riv-91-TBA	***E91-N15 Express Connector***	***TBA***[2]	***X***			
Riv-15-TBA	***N-W Express Viaduct (15/91)***	***TBA***[2]	***X***			
Riv 37.82	***El Cerrito Road UC***	***56-0558 L/R***			***X***	***X***
Riv-38.69	Ontario Avenue UC	56-0498 L R			X	X
Riv-39.40	Old Temescal Rd UC	56-0644 L/R			X	X
Riv-42.45	***Corona Ave UC***	***56-0644 L/R***			***X***	***X***

Source: *Project Report* (September 2011).
Note: ***Bold italics*** indicate structures work that is required under Alternative 2 but not under Alternative 1.
[1] Selected design variations only.
[2] These are new structures that do not have assigned bridge numbers yet.
BOH = bridge and overhead
Conn Sep = Connector Separation
EB = eastbound
L/R = left/right
OC = overcrossing
OH = overhead
Ora = Orange County
R = realigned
RCB = reinforced concrete box
Riv = Riverside County
Rte = Route
SW = southwest
TBA = to be assigned
UC = undercrossing
WB = westbound

As shown in Table 2.4, Alternative 2 requires work on seven more structures than Alternative 1.

It is important to note that the Smith Avenue overcrossing replacement and new Smith Avenue drop ramp structure would be required in only four of the eight design variations (2c, 2d, 2g, and 2h) under Alternative 2 where access to the tolled express lanes will be from Smith Avenue. For the other 27 structures, the bridge work in Alternatives 1 and 2 is similar. However, in Alternative 2, the undercrossing and bridge structures generally would be widened an additional 12 ft on either side of SR-91 compared to Alternative 1.

Interchanges

The existing local road interchanges on SR-91 at Gypsum Canyon Road, Green River Road, Auto Center Drive, Maple Street, Lincoln Avenue, West Grand Boulevard, Main Street, McKinley Street, and Pierce Street would be modified to accommodate the improvements on SR-91 under Alternatives 1 and 2. The existing system interchanges with SR-91 at SR-241, SR-71, and I-15 would also be modified to accommodate the improvements on SR-91 under Alternatives 1 and 2. The specific modifications at these local road interchanges and system interchanges are described in detail by alternative later in this section.

Major Drainage and Culvert Facilities

There are over 105 major cross-drainage structures and numerous inlets and contributory structures on the alignments of Alternatives 1 and 2. The potential project changes at each crossing under Alternatives 1 and 2 are summarized in Table 2.5. There are 32 locations where the anticipated project changes differ slightly between Alternatives 1 and 2, with approximately 12 ft (on average) of additional culvert lengthening on either side of SR-91 under Alternative 2 compared to Alternative 1. Those locations are highlighted in Table 2.5.

Water Quality/Erosion Control

Erosion control will be required for Alternatives 1 and 2 to assure storm water quality compliance and minimize long-term facility maintenance requirements. For slopes steeper than 4:1, an erosion control plan will be developed under the supervision of the Department District Landscape Architect stating how the steeper slopes will be stabilized. For slopes steeper than 2:1, the erosion control plan will include a Geotechnical Report that addresses the stability of slopes steeper than 2:1 and will have concurrence by the District Maintenance Storm Water Coordinator.

Table 2.5 Drainage Structures Work Under Alternatives 1 and 2

Post Mile	Alternative 1 Drainage Structure Impacts			Alternative 2 Drainage Structure Impacts		
	Existing Drainage Structure	Impact	Modification	Existing Drainage Structure	Impact	Modification
SR-91 – Orange County						
R16.4	Trpl 12'x10' RCB	Protect In Place	None	Trpl 12'x10' RCB	Protect In Place	None
R16.61	60" RCP	Protect In Place	None	60" RCP	Protect In Place	None
R17.00	60" RCP	Extend Rt	2' Rt	60" RCP	Extend Rt	2' Rt
R17.09	60" CMP	Protect In Place	None	60" CMP	Protect In Place	None
R17.38	5'x5' RCB	Protect In Place	None	5'x5' RCB	Protect In Place	None
R17.43	5'x5' RCB	Protect In Place	None	5'x5' RCB	Protect In Place	None
R17.70	3'X3' RCB	Protect In Place	None	3'x3' RCB	Protect In Place	None
R17.94	Dbl. 10'x8' RCB	Protect In Place	None	Dbl 10'x8' RCB	Protect In Place	None
R18.16	36" RCP	None	See Note 1	36" RCP	None	See Note 1
R18.25	36" RCP	Extend Rt	27' Rt	36" RCP	Extend Rt	27' Rt
R18.37	36" RCP	None	See Note 1	36" RCP	None	See Note 1
R18.55	48" RCP	None	See Note 1	48" RCP	None	See Note 1
R18.66	48" RCP	None	See Note 1	48" RCP	None	See Note 1
R18.72	60" RCP	None	See Note 1	60" RCP	None	See Note 1
R18.82	30" RCP	None	See Note 1	30" RCP	None	See Note 1
R18.89	54" RCP	None	See Note 1	54" RCP	None	See Note 1
SR-91 – Riverside County						
R0.07	Tunnel	None	See Note 1	Tunnel	None	See Note 1
R0.12	54" RCP	None	See Note 1	54" RCP	None	See Note 1
R0.21	36" CMP	None	See Note 1	36" CMP	None	See Note 1
R0.35	12'x12' RCB	None	See Note 1	12'x12' RCB	None	See Note 1
R0.47	36" CMP	Extend Rt	32' Rt	36" CMP	Extend Rt	32' Rt
R0.59	36" CMP	Extend Rt	27' Rt	36" CMP	Extend Rt	27' Rt
R0.78	36" CMP	Extend Rt	70' Rt	36" CMP	Extend Rt	70' Rt
R0.91	24" CMP	Abandon Portion	Remove 13'	24" CMP	Abandon Portion	Remove 13'
R1.13	24" CMP	Protect In Place	None	24" CMP	Protect In Place	None
R1.22	54" CMP	Protect In Place	None	54" CMP	Protect In Place	None
R1.38	72" CMP	Protect In Place	None	72" CMP	Protect In Place	None
R1.52	72" CMP	Protect In Place	None	72" CMP	Protect In Place	None
R1.73	12'x9' RCB	Protect In Place	None	12'x9' RCB	Protect In Place	None
R2.55	24" CMP	Protect In Place	None	24" CMP	Protect In Place	None
R3.13	***24" CMP***	***Extend Rt***	***21' Rt***	***24" CMP***	***Extend Rt***	***33' Rt***
R3.26	24" CMP	Protect In Place	None	24" CMP	Protect In Place	None
R3.41	24" CMP	Protect In Place	None	24" CMP	Protect In Place	None

Table 2.5 Drainage Structures Work Under Alternatives 1 and 2

Post Mile	Alternative 1 Drainage Structure Impacts			Alternative 2 Drainage Structure Impacts		
	Existing Drainage Structure	Impact	Modification	Existing Drainage Structure	Impact	Modification
R3.47	***8'x8' RCB***	***Extend Rt***	***75' Rt***	***8'x8' RCB***	***Extend Rt***	***87' Rt***
R3.98	***42" RCP***	***Protect In Place***	***None***	***42" RCP***	***Extend Rt & Lt***	***17' Rt & 4' Lt***
4.24	***42" RCP***	***Extend Rt & Lt***	***16' Rt & 27' Lt***	***42" RCP***	***Extend Rt & Lt***	***28' Rt & 39' Lt***
4.39	***30" RCP***	***Extend Rt & Lt***	***31' Rt & 40' Lt***	***30" RCP***	***Extend Rt & Lt***	***55' Rt & 64' Lt***
4.44	***24" RCP***	***Extend Rt & Lt***	***50' Rt & 51' Lt***	***24" RCP***	***Extend Rt & Lt***	***62' Rt & 63' Lt***
4.51	***4'x3' RCB***	***Extend Rt***	***54' Rt***	***4'x3' RCB***	***Extend Rt***	***66' Rt***
4.65	***Dbl 4'x3' RCB***	***Extend Rt***	***48' Rt***	***Dbl 4'x3' RCB***	***Extend Rt***	***60' Rt***
4.71	***24" RCP***	***Extend Rt & Lt***	***29' Rt & 34' Lt***	***24" RCP***	***Extend Rt & Lt***	***41' Rt & 46' Lt***
4.74	***24" RCP***	***Extend Rt & Lt***	***27' Rt & 13' Lt***	***24" RCP***	***Extend Rt & Lt***	***39' Rt & 25' Lt***
4.91	***24" RCP***	***Extend Rt***	***15' Rt***	***24" RCP***	***Extend Rt***	***25' Rt***
5.05	2–3" RCP	Extend Rt	36' Rt	2-30" RCP	Extend Rt	36' Rt
5.20	***24" RCP***	***Extend Rt & Lt***	***50' Rt & 45' Lt***	***24" RCP***	***Extend Rt & Lt***	***50' Rt & 50' Lt***
5.39	30" RCP	Abandon Portion Rt	Abandon 40' Rt	30" RCP	Abandon Portion Rt	Abandon 40' Rt
5.43	12'x7.5' RCB	Extend Rt & Lt	110' Rt & 32' Lt	12'x7.5' RCB	Extend Rt & Lt	110' Rt & 32' Lt
5.45	17'x14' RCB	Protect In Place	None	17'x14' RCB	Protect In Place	None
5.50	***24" RCP***	***Extend Lt***	***10' Lt***	***24" RCP***	***Extend Lt***	***20' Lt***
5.58	***24" RCP***	***Extend Rt & Lt***	***75' Rt & 50' Lt***	***24" RCP***	***Extend Rt & Lt***	***65' Rt & 60' Lt***
5.71	54" RCP	Protect In Place	None	54" RCP	Protect In Place	None
5.72	***18" RCP***	***Extend Rt & Lt***	***35' Rt & 40' Lt New 24" RCP***	***18" RCP***	***Extend Rt & Lt***	***78' Rt & 75' Lt***
5.84	***30" RCP***	***Abandon Portion Rt***	***50' New 30" RCP Rt***	***30" RCP***	***Abandon Portion Rt***	***60' New 30" RCP Rt***
5.85	***30" RCP***	***Abandon Portion Rt***	***50' New 30" RCP Rt***	***30" RCP***	***Abandon Portion Rt***	***55' New 30" RCP Rt***
6.00	36" RCP	Protect In Place	None	36" RCP	Protect In Place	None
6.02	18" RCP	Abandon Entire	Abandon 270'	18" RCP	Abandon Entire	Abandon 270'
6.06	84" RCP	Protect In Place	None	84" RCP	Protect In Place	None
6.08	36" RCP	Protect In Place	None	36" RCP	Protect In Place	None
6.14	36" RCP	Extend Rt & Lt	5' Rt & 226' Lt	36" RCP	Extend Rt & Lt	5' Rt & 226' Lt
6.22	***48" RCP***	***Extend Rt***	***25' Rt***	***48" RCP***	***Extend Rt***	***30' Rt***
6.29	***48" RCP***	***Extend Rt***	***12' Rt***	***48" RCP***	***Extend Rt***	***25' Rt***
6.32	***18" RCP***	***Extend Lt***	***40' New 24" RCP Lt***	***18" RCP***	***Extend Lt***	***50' New 24" RCP Lt***
6.35	48" RCP	Protect In Place	None	48" RCP	Protect In Place	None
6.37	48" RCP	Protect In Place	None	48" RCP	Protect In Place	None
6.38	***18" RCP***	***Extend Lt***	***70' New 24" RCP Lt***	***18" RCP***	***Extend Lt***	***90' Lt***
6.43	48" RCP	Protect In Place	None	48" RCP	Protect In Place	None

Table 2.5 Drainage Structures Work Under Alternatives 1 and 2

Post Mile	Alternative 1 Drainage Structure Impacts			Alternative 2 Drainage Structure Impacts		
	Existing Drainage Structure	Impact	Modification	Existing Drainage Structure	Impact	Modification
6.50	***30" RCP***	***Extend Rt***	***112' Rt***	***30" RCP***	***Extend Rt***	***125' Rt***
6.58	***48" RCP***	***Extend Rt & Lt***	***90' Rt & 178' Lt***	***48" RCP***	***Extend Rt & Lt***	***110' Rt & 190' Lt***
6.63	30" RCP	Extend Rt	70' Rt	30" RCP	Extend Rt	70' Rt
6.68	18" RCP	Protect In Place	None	18" RCP	Protect In Place	None
6.82	18" RCP	Abandon Entire	Abandon 146'	18" RCP	Abandon Entire	Abandon 146'
6.92	***18" RCP***	***Extend Lt***	***36' New 24" RCP Lt***	***18" RCP***	***Extend Lt***	***40' New 24" RCP Lt***
7.29	24" RCP	Protect In Place	None	24" RCP	Protect In Place	None
7.33	18" RCP	Extend Lt	30' New 24" RCP Lt	18" RCP	Extend Lt	30' New 24" RCP Lt
7.38	24" RCP	Extend Rt & Lt	20' Rt & 15' Lt	24" RCP	Extend Rt & Lt	20' Rt & 15' Lt
7.49	24" RCP	Extend Rt & Lt	40' Rt & 40' Lt	24" RCP	Extend Rt & Lt	40' Rt & 40' Lt
7.56	18" RCP	Protect In Place	None	18" RCP	Protect In Place	None
7.78	18" CSP	Extend Lt	30' New 24" CSP Lt	18" CSP	Extend Lt	30' New 24" CSP Lt
7.88	54" RCP	Extend Rt & Lt	40' Rt & 15' Lt	54" RCP	Extend Rt & Lt	40' Rt & 15' Lt
8.26	8'x6' RCB	Protect In Place	None	8'x6' RCB	Protect In Place	None
8.64	18" RCP	Abandon Entire	Abandon 90'	18" RCP	Abandon Entire	Abandon 90'
8.74	Dbl 8'x5' RCB	Protect In Place	None	Dbl 8'x5' RCB	Protect In Place	None
8.79	18" RCP	Protect In Place	None	18" RCP	Protect In Place	None
8.91	30" RCP	Extend Lt	10' Lt	30" RCP	Extend Lt	10' Lt
9.05	18" RCP	Extend Lt	20' New 24" RCP Lt	18" RCP	Extend Lt	20' New 24" RCP Lt
9.12	24" RCP	Protect In Place	None	24" RCP	Protect In Place	None
9.19	48" RCP	Protect In Place	None	48" RCP	Protect In Place	None
9.19	48" RCP	Protect In Place	None	48" RCP	Protect In Place	None
9.21	18" RCP	Extend Rt	70' New 24" RCP	18" RCP	Extend Rt	70' New 24" RCP
9.38	18" RCP	Extend Rt	35' New 24" RCP Rt	18" RCP	Extend Rt	35' New 24" RCP Rt
9.55	24" RCP	Protect In Place	None	24" RCP	Protect In Place	None
9.60	30" RCP	Protect In Place	None	30" RCP	Protect In Place	None
9.73	36" RCP	Extend Lt	10' Lt	36" RCP	Extend Lt	10' Lt
10.00	Trpl 5'x3' RCB	Protect In Place	None	Trpl 5'x3' RCB	Protect In Place	None
10.08	18" RCP	Extend Lt	18' New 24" RCP Lt	18" RCP	Extend Lt	18' New 24" RCP Lt
10.14	18" RCP	Protect In Place	None	18" RCP	Protect In Place	None
10.18	***48" RCP***	***Extend Rt & Lt***	***4' Rt & 12' Lt***	***48" RCP***	***Extend Rt & Lt***	***15' Rt & 25' Lt***
10.47	***18" RCP***	***Extend Rt***	***24' New 24" RCP Rt***	***18" RCP***	***Extend Rt***	***40' New 24" RCP Rt***
10.52	***18" RCP***	***Protect In Place***	***None***	***18" RCP***	***Extend Rt***	***10' New 24" RCP Rt***
10.59	***Trpl 4'x2' RCB***	***Extend Rt***	***10' Rt***	***3-4'X2' RCB***	***Extend Rt***	***40' Rt***
10.70	***Trpl 12'x9' RCB***	***Extend Rt***	***12' Rt***	***3-12'X9' RCB***	***Extend Rt***	***65' Rt***

Table 2.5 Drainage Structures Work Under Alternatives 1 and 2

Post Mile	Alternative 1 Drainage Structure Impacts			Alternative 2 Drainage Structure Impacts		
	Existing Drainage Structure	Impact	Modification	Existing Drainage Structure	Impact	Modification
10.72	***18" RCP***	***Extend Rt***	***30' Rt***	***18" RCP***	***Extend Rt***	***40' Rt***
10.82	***18" RCP***	***Protect In Place***	***None***	***18" RCP***	***Extend Rt***	***65' New 24" RCP Rt***
10.86	18" RCP	Protect In Place	None	18" RCP	Protect In Place	None
10.94	***18" RCP***	***Protect In Place***	***None***	***18" RCP***	***Extend Rt***	***25' New 24" RCP Rt***

Source: *Project Report* (September 2011).
Note: ***Bold italics*** indicate drainage structures where the work required under Alternative 2 would differ from the work required under Alternative 1.
[1] These cross culverts will be extended as part of the SR-91 Eastbound Lane Addition Project on the south side of SR-91 and the United States Army Corps of Engineers' Santa Ana River Reach 9 Phase 2B Project on the north side of SR-91.

CMP = corrugated metal pipe
CSP = corrugated steel pipe
Dbl = double
Lt = left
N/A = not applicable
R = realigned
RCB = reinforced concrete box
RCP = reinforced concrete pipe
Rt = right
SR-91 = State Route 91
Trpl = triple

In addition, temporary BMPs will be implemented during construction of Alternatives 1 and 2. Permanent BMPs for long-term operations of Alternatives 1 and 2 would include biofiltration swales, infiltration basins, detention basins, and/or media filters (also referred to as Austin Sand Filters).

The increased impervious surface areas and disturbed soil areas under Alternatives 1 and 2 are summarized in Table 2.6. Alternative 2 results in a larger increase in new impervious surfaces than Alternative 1 because it has a larger footprint which results in a larger total disturbed soil area. The quantities of treatment BMPs estimated for Alternatives 1 and 2 are listed in Table 2.7. Alternative 2 requires more BMPs and greater costs for BMPs than Alternative 1 because it results in a larger area of disturbed soil and increased new impervious surfaces.

Table 2.6 Storm Water Effect Areas for Alternatives 1 and 2

	Alternative 1		Alternative 2[1]	
	New Impervious Surface Area (acres)	Disturbed Soil Area (acres)	New Impervious Surface Area (acres)	Disturbed Soil Area (acres)
Total	**117**	**351**	**173**	**503**

Source: *Project Report* (September 2011).
[1] Including Alternative 2f.

Table 2.7 Estimated Quantities of Treatment Best Management Practices for Alternatives 1 and 2

	Alternative 1				Alternative 2			
	Biofiltration Swales/ Strips (Each)	Infiltration Devices (Each)	Detention Devices (Each)	Austin Sand Filters (Each)	Biofiltration Swales/ Strips (Each)	Infiltration Devices (Each)	Detention Devices (Each)	Austin Sand Filters (Each)
Total	**18**	**13**	**16**	**16**	**25**	**19**	**22**	**22**

Source: *Project Report* (September 2011).
Note: The design variations would not impact the implementation or number of the best management practices listed in the table above.

Refer to Table 3.11.2 in Section 3.11, Geology/Soils/Seismic/Topography, for the estimated cut and fill amounts under Alternatives 1 and 2.

Existing runoff from SR-91 and I-15 in the project study area is currently untreated. The BMPs under Alternatives 1 and 2 would be implemented to target pollutants of concern in runoff from the additional freeway facilities. As noted, drainage from the new freeway facilities would be treated by biofiltration swales, infiltration basins,

detention basins, and/or media filters under Alternatives 1 and 2. All of the runoff from the new net impervious surface areas under Alternatives 1 and 2 would be treated; in addition, those BMPs would treat some part of the current untreated runoff from the existing SR-91 and I-15 facilities. The amount of runoff from the existing facilities that would be treated by the project BMPs would be determined during the final design of those BMPs.

The preliminary estimated costs for the temporary (construction) and permanent BMPs for Alternatives 1 and 2 are listed in Table 2.8. The costs for temporary BMPs for Alternative 2 would be slightly higher than for Alternative 1 because the ground disturbance for construction of Alternative 2 would be slightly greater than for Alternative 1.

Table 2.8 Cost Estimates for Temporary and Permanent Best Management Practices for Alternatives 1 and 2

	Alternative 1		Alternative 2	
	Temporary BMPs	Permanent BMPs	Temporary BMPs	Permanent BMPs
Total	**$4,390,000**	**$5,775,000**	**$5,716,000**	**$10,148,250**

Source: *Project Report* (September 2011).
BMPs = best management practices

The costs for permanent BMPs are estimated based on the increased impervious area. The large difference in estimated costs for permanent BMPs between Alternatives 1 and 2 reflects the additional lane widening (impervious area) in each direction with Alternative 2 along most of the project limits.

Prior to and during construction of the Initial Phases and Ultimate Projects for the SR-91 CIP Build Alternatives, the design/build contractor will be required to comply with the provisions of the following:

- National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, NPDES No. CAS000002), and any subsequent permit, as they relate to project construction activities.
- General Waste Discharge Requirements for Discharges to Surface Waters that Pose an Insignificant (De Minimus) Threat to Water Quality, Order No. R8-2009-0003, NPDES No. CAG998001, as they relate to discharge of non-storm-water dewatering wastes for the project.

- Procedures outlined in the Caltrans Storm Water Quality Handbooks, Project Planning and Design Guide (July 2010 or subsequent issuance) for implementing Design Pollution Prevention and Treatment BMPs for the project.
- NPDES Permit, Statewide Storm Water Permit, and Waste Discharge Requirements for the State of California, Department of Transportation (Order No. 99-06-DWQ**,** NPDES No. CAS000003)
- NPDES Permit and Waste Discharge Requirements for the Riverside County Flood Control and Water Conservation District, the County of Riverside, and the incorporated cities of Riverside County within the Santa Ana Region (Order No. R8-2010-0033, NPDES No. CAS618033); and for the County of Orange, Orange County Flood Control District, and the incorporated cities of Orange County within the Santa Ana Region (Order No. R8-2009-0030), as applicable.

Retaining Walls

Retaining walls are required to retain fill or cut slopes along the alignment of Alternatives 1 and 2. The approximate wall locations and average heights of the retaining walls on SR-91 and I-15 are listed in Tables 2.9 and 2.10 for Alternatives 1 and 2, respectively. The Alternative 2 retaining walls are generally a little longer and higher than under Alternative 1 due to the additional 12 ft of outside widening in each direction with Alternative 2. Shorter retaining walls will be constructed in Alternative 2 where the additional widening intersects slopes that are not encountered in Alternative 1. In many locations, however, the retaining walls are similar for Alternatives 1 and 2 where the additional widening occurs over level ground and, therefore, has little impact on the height or length of the retaining wall.

One particular wall where there is a noticeable difference is Wall No. 599, located west of the SR-91/Green River Road westbound on-ramp. As shown in ***bold italics*** in Tables 2.9 and 2.10, under Alternative 1, Wall No. 599 will measure 1,894 ft long and 28 ft high, but under Alternative 2 the wall will measure 2,376 ft long and 40 ft high. In this location, the centerline of SR-91 will be shifted so that all of the widening would occur on the north side of SR-91 to minimize impacts to the large slopes on the south side of SR-91 through the canyon. This equates to an additional 24 ft of widening on the north side of SR-91 to accommodate the additional lane in each direction under Alternative 2, which requires a higher and longer retaining wall.

Table 2.9 Alternative 1 Average Retaining Wall Heights on SR-91 and I-15

Wall Name	Location	Wall Type	Begin PM	End PM	Average Length (ft)	Average Height (ft)
Eastbound SR-91						
482	Mainline	Tieback	O17.12	O17.26	750	5
502	Mainline	1	O17.46	O17.69	1250	3
536	Mainline	1	O18.11	O18.15	200	2
538	Mainline	Tieback	O18.15	O18.19	200	6
24	Mainline	Tieback	0.55	0.65	50	5
28	Mainline & Green River off-ramp	Tieback	0.53	0.69	850	20
38	Green River off-ramp	Tieback	0.74	0.97	1200	20
166	Mainline & Auto Center off-ramp	1	3.22	3.70	2550	4
192	Auto Center on-ramp	1	3.73	4.01	1500	10
198	Maple off-ramp LT between Mainline	1	3.84	3.98	700	14
200	Maple off ramp RT between Auto Center on-ramp	1	3.84	3.97	650	11
212	Auto Center on-ramp/Maple off-ramp & Mainline	1	4.09	4.12	138	6
216 (Var1)	Maple St. off-ramp	1	4.07	4.16	500	12
222 (Var1)	Maple on-ramp & Mainline	1	4.19	4.80	3200	2
216 (Var2)	Maple off-ramp	1	4.07	4.15	450	12
228 (Var2)	Maple on-ramp & Mainline	1	4.29	4.80	2700	2
228	Mainline	1	4.80	4.83	200	5
273 (Var 1)	Lincoln off-ramp	1	5.14	5.22	450	4
279 (Var 1)	Lincoln off-ramp	1	5.24	5.38	745	9
278 (Var 2)	Mainline/Lincoln off-ramp	1	5.22	5.40	956	5
285 (Var 2)	Mainline	Tieback	5.37	5.40	125	11
287.1 (Var 1)	Lincoln on-ramp	1	5.40	5.47	376	18
295 (Var 1)	Lincoln on-ramp	1	5.56	5.69	690	13
299 (Var 2)	Lincoln on-ramp	1	5.62	5.72	488	13
303	Mainline	1	5.73	6.01	1459	22
321	Mainline & Main St off-ramp	1	6.05	6.29	1263	20
334.1	Mainline	1	6.28	6.35	332	13
334.2	Main St off-ramp	1	6.29	6.34	252	5
338.1	Mainline	1	6.38	6.55	907	15
342	HOT Connectors	MSE	6.44	6.58	705	
343	Main St on-ramp & braid on-ramp	1	6.46	6.70	1234	16
351	Mainline	1	6.60	6.67	343	6
355	Mainline	1	6.69	6.72	127	6
356.1	SR-91 CD road to I-15	1	6.71	6.90	1023	20
356.2	Main St braid on-ramp	1	6.72	6.77	247	19
357	Mainline	1	6.74	6.79	254	6
361	Main St braid on-ramp	1	6.80	6.92	612	8
381	EB SR-91 to SB I-15 conn	1	7.20	7.28	425	6
383	Mainline	1	7.24	7.30	283	6
394	I-15/SR-91 Sep	Tieback	7.43	7.48	266	6
424	Mainline	1	8.01	8.06	300	10
441	Mainline	1	8.32	8.38	300	6
448	Mainline	1	8.45	8.62	900	10
457	Mainline	1	8.62	9.13	2700	8
487	McKinley St loop on-ramp	1	9.19	9.37	929	5
494	McKinley St on-ramp	1	9.32	9.35	150	8
496	McKinley St on-ramp	1	9.36	9.39	150	7
498	McKinley St on-ramp	1	9.40	9.51	600	15
504	Mainline & McKinley St on-ramp	1	9.51	9.63	600	4
510	Mainline	1	9.63	9.68	261	4
513	Mainline	1	9.68	9.75	399	6
517	Mainline	1	9.75	9.93	925	6
527	Mainline	1	9.93	10.22	1550	5
553	Pierce St off-ramp	1	10.43	10.56	699	5

Table 2.9 Alternative 1 Average Retaining Wall Heights on SR-91 and I-15

Wall Name	Location	Wall Type	Begin PM	End PM	Average Length (ft)	Average Height (ft)
Westbound SR-91						
463	Mainline	1	O16.71	O17.76	5550	6
537	Mainline	1	O18.16	O18.90	3910	8
1	Mainline	1	0.00	0.50	2643	10
599	***Mainline & Green River on-ramp***	***MSE***	***0.44***	***0.79***	***1894***	***28***
37	Green River on-ramp	1	0.79	0.96	850	8
33	Between Mainline & Green River on-ramp	1	0.72	0.94	1125	3
61	Mainline & Green River off-ramp	1	1.24	1.90	3500	15
101	Mainline	1	1.98	2.04	350	4
105	Mainline	1	2.08	2.18	500	3
115	Mainline and 71 W-N Connector	Tieback	2.23	2.76	2800	4
141	Mainline	1	2.76	2.88	600	2
153	Mainline & Auto Center on-ramp	1	2.94	3.62	3550	2
193 (Var 1)	Auto Center off-ramp & Maple on-ramp	1	3.74	4.27	2800	8
197 (Var 1)	Between Mainline & Maple WB on loop	1	3.82	4.32	2600	2
223 (Var 1)	Maple off-ramp & Mainline	1	4.30	4.78	2550	4
193 (Var 2)	Auto Center off-ramp	1	3.74	4.26	2750	8
199 (Var 2)	Maple on-ramp LT between Auto Center on-ramp	1	3.85	3.95	500	9
201 (Var 2)	Maple on-ramp RT between Mainline	1	3.85	3.95	500	7
223 (Var 2)	Maple off-ramp & Mainline	1	4.31	4.78	2500	4
223	Mainline	1	4.80	5.36	3000	10
284	Mainline	1	5.35	5.41	315	6
287.2	Lincoln Ave off-ramp	1	5.40	5.69	1500	17
304	Mainline & Main St on-ramp	1	5.72	6.02	1616	23
325	Main St on-ramp	1	6.12	6.31	992	22
333	Mainline	1	6.26	6.34	398	19
338.2	Mainline	1	6.38	6.52	783	21
339	Main St off-ramp	1	6.39	6.59	1058	22
342	HOT Connectors	MSE	6.44	6.58	705	7
353	Mainline	1	6.66	6.90	1262	28
375	NB I-15 to WB SR-91 conn	1	7.05	7.16	591	8
385	SB I-15 to WB SR-91 conn	1	7.24	7.26	95	4
393	I-15/SR-91 Sep	Tieback	7.42	7.47	279	6
406	WB SR-91 to NB I-15 conn	1	7.59	7.73	760	9
421	Mainline	1	7.94	7.98	200	6
425	Mainline	1	8.03	8.09	350	6
433	Mainline	1	8.16	8.22	350	6
444	Mainline	1	8.37	8.62	1326	9
458	Mainline	1	8.65	8.74	467	7
473	Mainline	1	8.92	9.07	789	5
488	McKinley St loop off-ramp	1	9.20	9.32	619	13
511	Mainline	1	9.66	9.78	649	7
520	Mainline	1	9.81	9.87	300	9
Northbound I-15						
2149	HOT Connectors	MSE	40.71	40.82	586	8
Southbound I-15						
2149	HOT Connectors	MSE	40.71	40.82	586	8

Source: *Project Report* (September 2011).

CD = collector-distributor
conn = connector
EB = eastbound
ft = feet
HOT = high-occupancy toll road
I-15 = Interstate 15
LT = left turn
MSE = Mechanically Stabilized Earth
NB = northbound
PM = Post Mile
O = Orange County
RT = right turn
SB = southbound
Sep = Separation
SR-91 = State Route 91
St = Street
Var = design variation
WB = westbound
W-N = west to north

Table 2.10 Alternative 2 Average Retaining Wall Heights on SR-91 and I-15

Wall Name	Location	Wall Type	Begin PM	End PM	Average Length (ft)	Average Height (ft)
Eastbound SR-91						
482	Mainline	Tieback	O17.08	O17.30	1150	12
502	Mainline	1	O17.47	O17.75	1500	9
536	Mainline	1	O18.07	O18.11	200	2
538	Mainline	Tieback	O18.11	O18.15	200	2
22	Mainline	1	0.42	0.46	250	10
28	Mainline and Green River off-ramp	Tieback	0.60	0.78	900	20
48	Green River off-ramp & Mainline	Tieback	0.81	1.04	1200	20
66	Mainline & SR-71 NE Conn	1	1.32	1.45	650	18
148	Mainline	1	2.89	3.02	700	2
162	Mainline & Auto Center off-ramp	1	3.17	3.70	2800	7
192 (Var 1/3)	Auto Center on-ramp & Mainline	1	3.73	3.98	1300	6
TBA	Serfas Club Dr. UC	Tieback	3.68	3.75	400	11
TBA	Maple St. OC	Tieback	4.13	4.14	98	12.4
198 (Var 1-4)	Maple off-ramp LT between Mainline	1	3.83	3.97	700	9
200 (Var 1-4)	Maple off-ramp RT between Auto Center on-ramp	1	3.83	3.97	700	6
216 (Var 1/2)	Maple off-ramp at intersection	1	4.18	4.28	550	14
224 (Var 1)	Mainline & Maple St. on-ramp	1	4.20	4.80	3150	4
192 (Var 2)	Auto Center on-ramp & Mainline		3.73	4.01	1500	6
224 (Var 2)	Mainline & Maple St. on-ramp	1	4.20	4.80	3150	4
235 (Var 2)	Smith Drop Ramp	1	4.43	4.56	700	22
251 (Var 2)	West side of Smith OC	1	4.68	4.70	100	6
253 (Var 2)	East side of Smith OC	1	4.70	4.72	100	6
216 (Var 3)	Maple off-ramp at intersection	1	4.18	4.27	450	9
220 (Var 3)	Mainline	1	4.26	4.34	438	7
228 (Var 3)	Maple on-ramp & Mainline	1	4.29	4.80	2700	2
192 (Var 4)	Auto Center on-ramp & Mainline	1	3.73	4.02	1550	9
216 (Var 4)	Maple Off Ramp at intersection	1	4.18	4.13	-312	19
222 (Var 4)	Mainline	1	4.27	4.35	438	9
228 (Var 4)	Maple on-ramp & Mainline	1	4.29	4.80	2700	4
235 (Var 4)	Smith Drop Ramp	1	4.43	4.56	700	22
251 (Var 4)	West side of Smith OC	1	4.71	4.72	50	6
253 (Var 4)	East side of Smith OC	1	4.73	4.74	50	6
228	Mainline	1	4.80	4.83	200	5
273 (Var 1/2)	Lincoln off-ramp	1	5.14	5.22	450	4
279 (Var 1/2)	Lincoln off-ramp	1	5.24	5.38	745	9
278 (Var 3/4)	Mainline/Lincoln off-ramp	1	5.22	5.40	956	5
285 (Var 3/4)	Mainline	Tieback	5.37	5.40	125	11
287.1 (Var 1/2)	Lincoln on-ramp	1	5.40	5.47	376	18
295 (Var 1/2)	Lincoln on-ramp	1	5.56	5.69	690	13
299 (Var 3/4)	Lincoln on-ramp	1	5.62	5.72	488	13
303	Mainline	1	5.73	6.01	1459	22
321	Mainline & Main St off-ramp	1	6.05	6.29	1263	20
334.1	Mainline	1	6.28	6.35	332	13
334.2	Main St off-ramp	1	6.29	6.34	252	5
338.1	Mainline	1	6.38	6.55	907	15
342	HOT Connectors	MSE	6.44	6.58	705	7
343	Main St on-ramp & braid on-ramp	1	6.46	6.70	1234	16
351	Mainline	1	6.60	6.67	343	6
355	Mainline	1	6.69	6.72	127	6
356.1	SR-91 CD road to I-15	1	6.71	6.90	1023	20
356.2	Main St braid on-ramp	1	6.72	6.77	247	19
357	Mainline	1	6.74	6.79	254	6
361	Main St braid on-ramp	1	6.80	6.92	612	8
381	EB SR-91 to SB I-15 conn	1	7.20	7.28	425	6
383	Mainline	1	7.24	7.30	283	6
394	I-15/SR-91 Sep	Tieback	7.43	7.48	266	6

Table 2.10 Alternative 2 Average Retaining Wall Heights on SR-91 and I-15

Wall Name	Location	Wall Type	Begin PM	End PM	Average Length (ft)	Average Height (ft)
424	Mainline	1	8.01	8.06	300	10
441	Mainline	1	8.32	8.38	300	6
448	Mainline	1	8.45	8.62	900	10
457	Mainline	1	8.62	9.13	2700	8
487	McKinley St loop on-ramp	1	9.19	9.37	929	5
494	McKinley St on-ramp	1	9.32	9.35	150	8
496	McKinley St on-ramp	1	9.36	9.39	150	7
498	McKinley St on-ramp	1	9.40	9.51	600	15
504	Mainline & McKinley St on-ramp	1	9.51	9.63	600	4
510	Mainline	1	9.63	9.68	261	4
513	Mainline	1	9.68	9.75	399	6
517	Mainline	1	9.75	9.93	925	6
527	Mainline	1	9.93	10.22	1550	5
553	Pierce St off-ramp	1	10.43	10.56	699	5
562	Pierce St off-ramp	1	10.62	10.77	799	4
Westbound SR-91						
471	Mainline	1	O16.71	O17.80	5755	9
537	Mainline	1	O18.11	O18.90	4171	19
1	Mainline	1	0.00	0.53	2798	12
599	***Mainline & Green River on-ramp***	***MSE***	***0.44***	***0.89***	***2376***	***40***
37	Green River on-ramp	1	0.89	0.97	422	3
3	Green River and Corps Bankment	1	0.03	0.14	581	4
33	Between Mainline & Green River on-ramp	1	0.72	0.95	1214	8
59	Green River off-ramp & Mainline	1	1.24	1.90	3485	20
115	Mainline and 71 W-N Connector	Tieback	2.23	2.75	2746	10
141	Mainline	1	2.75	2.88	686	4
153	Mainline & Auto Center on-ramp	1	2.94	3.59	3432	7
193 (Var 1)	Auto Center off-ramp & Maple on-ramp	1	3.74	4.28	2850	9
TBA	Serfas Club Dr. UC	Tieback	3.68	3.75	400	11
TBA	Maple St. OC	Tieback	4.12	4.14	115	12.4
197 (Var 1)	Maple Loop on-ramp between mainline	1	3.70	4.20	2650	2
223 (Var 1)	Maple off-ramp & Mainline	1	4.19	4.80	3200	6
193 (Var 2)	Auto Center off-ramp & Maple on-ramp	1	3.74	4.28	2850	9
197 (Var 2)	Maple Loop on-ramp between Mainline	1	3.82	4.32	2650	2
223 (Var 2)	Maple off-ramp & Mainline	1	4.19	4.80	3200	7
235 (Var 2)	Smith Drop Ramp	1	4.43	4.56	700	22
TBA	Smith Ave OC	Tieback	4.70	4.73	124	9.7
251 (Var 2)	West side of Smith OC	1	4.71	4.72	50	6
253 (Var 2)	East side of Smith OC	1	4.73	4.74	50	6
193 (Var 3)	Auto Center off-ramp	1	3.74	4.29	2900	10
199 (Var 3)	Maple off-ramp RT between Mainline	1	3.85	4.01	850	14
201 (Var 3)	Maple off-ramp LT between Auto Center off-ramp	1	3.87	3.95	400	19
223 (Var 3)	Maple off-ramp Mainline	1	4.19	4.80	3200	3
193 (Var 4)	Auto Center off-ramp	1	3.74	4.26	2750	10
199 (Var 4)	Maple off-ramp RT between Mainline	1	3.86	3.95	450	18
201 (Var 4)	Maple off-ramp LT between Auto Center off-ramp	1	3.86	3.95	450	18
223 (Var 4)	Maple off-ramp & Mainline	1	4.31	4.91	3200	6
235 (Var 4)	Smith Drop Ramp	1	4.43	4.56	700	22
251 (Var 4)	West side of Smith OC	1	4.71	4.72	50	6
253 (Var 4)	East side of Smith OC	1	4.73	4.74	50	6
223	Mainline	1	4.80	5.36	3000	10
284	Mainline	1	5.35	5.41	315	6
287.2	Lincoln Ave off-ramp	1	5.40	5.69	1500	17
304	Mainline & Main St on-ramp	1	5.72	6.02	1616	23
325	Main St on-ramp	1	6.12	6.31	992	22

Table 2.10 Alternative 2 Average Retaining Wall Heights on SR-91 and I-15

Wall Name	Location	Wall Type	Begin PM	End PM	Average Length (ft)	Average Height (ft)
333	Mainline	1	6.26	6.34	398	19
338.2	Mainline	1	6.38	6.52	783	21
339	Main St off-ramp	1	6.39	6.59	1058	22
342	HOT Connectors	MSE	6.44	6.58	705	7
353	Mainline	1	6.66	6.90	1262	28
375	NB I-15 to WB SR-91 conn	1	7.05	7.16	591	8
385	SB I-15 to WB SR-91 conn	1	7.24	7.26	95	4
393	I-15/SR-91 Sep	Tieback	7.42	7.47	279	6
406	WB SR-91 to NB I-15 conn	1	7.59	7.73	760	9
421	Mainline	1	7.94	7.98	200	6
425	Mainline	1	8.03	8.09	350	6
433	Mainline	1	8.16	8.22	350	6
444	Mainline	1	8.37	8.62	1326	9
458	Mainline	1	8.65	8.74	467	7
473	Mainline	1	8.92	9.07	789	5
488	McKinley St loop off-ramp	1	9.20	9.32	619	13
511	Mainline	1	9.66	9.78	649	7
520	Mainline	1	9.81	9.87	300	9
Northbound I-15						
2149	HOT Connectors	MSE	40.71	40.82	586	8
2212	HOT Connectors	MSE	41.91	42.00	475	8
Southbound I-15						
2149	HOT Connectors	MSE	40.71	40.82	586	8
2212	HOT Connectors	MSE	41.91	42.00	475	8

Source: *Project Report* (September 2011).

CD = collector-distributor
conn = connector
Dr. = Drive
EB = eastbound
ft = feet
HOT = high-occupancy toll road
I-15 = Interstate 15
LT = left turn
MSE = Mechanically Stabilized Earth
NB = northbound
NE = northeast
O = Orange County
OC = overcrossing
PM = Post Mile
RT = right turn
SB = southbound
Sep = Separation
SR-91 = State Route 91
St = Street
TBA = to be added
UC = undercrossing
Var = design variation
WB = westbound
W-N = west to north

Permanent Features: Noise Barriers

There are existing noise barriers on the north side of the SR-91 mainline in the vicinity of the SR-91/SR-241/Gypsum Canyon Road interchange. Those walls would remain under Alternatives 1 and 2 although some would be reconstructed. Locations for new or replacement noise barriers on SR-91 and I-15 under the Alternatives 1 and 2 Initial Phases and Ultimate Projects are summarized later in Tables 3.13.27 through 3.13.30, and shown later on Figure 3.15-1 in Section 3.15, Noise, and on the detailed project features plans in Appendix L.

Utilities

There are several known utility facilities within the project limits. The following utility companies have facilities within the project limits on SR-91 that will be impacted by Alternatives 1 and 2:

- Southern California Edison Company (SCE)
- Southern California Gas Company (SCG)
- AT&T/PacBell (AT&T)
- City of Corona water, sewer, and communications
- Comcast Cable
- Sprint
- Time Warner Cable
- Questar

Some existing utility facilities would require only encasement or protection in place during construction of Alternatives 1 and 2. However, the relocation of some existing utility facilities would be necessary to accommodate construction of Alternatives 1 and 2. Appendix J, Utility Relocations, summarizes the anticipated utility relocations for Alternatives 1 and 2. Several of these have been identified as "high/low risk" under the Department "Policy on High and Low Risk Underground Facilities Within Highway Rights of Way," as defined in Chapter 13 of the Caltrans *Right-of-Way Manual*. All the utility relocation work needed to construct the improvements under Alternatives 1 and 2 is considered to be part of the project. No utility relocations are anticipated on the project segment of I-15.

Refer to the following tables provided later in Section 3.5, Utilities/Emergency Services, which describe the effects of the Initial Phases and Ultimate Projects for Alternatives 1 and 2 on utilities in detail, including those utilities considered high risk:

- Table 3.5.4: Utility Relocations, Removals, and Protection In-place under Both Alternatives 1 and 2
- Table 3.5.5: Additional Utility Relocations Under Alternative 2

Landscaping and Irrigation Systems

The Department District 8 Landscape Architecture Branch developed the *215/91 Landscape Corridor Master Plan* (Department Master Plan, September 5, 2006) that includes the Riverside County segment of SR-91 within the project limits. That Department Master Plan provides guidance on plant material selection and hardscape elements that consider water use, ease and safety of maintenance, nonnative plant exclusion, corridor continuity, local cultural integration, and other context-sensitive factors.

Most of the existing highway planting and landscaping along SR-91 in the project limits would be removed under Alternatives 1 and 2. Replacement planting, landscaping, and hardscape elements that are consistent with the Department Master Plan would be provided on SR-91 under Alternatives 1 and 2 and would be planted prior to the end of construction. The contract for planting/landscaping would be separate from the prime construction contract.

Replacement planting will be funded with the project construction and will include no less than three years of plant establishment. For each phase of construction, the needed replacement planting will be under construction within two years of acceptance of the highway contract that damaged or removed the existing planting. Refer to Measures V-1 to V-3 in Section 3.7, Visual/Aesthetics, for the detailed language of measures incorporated in Alternatives 1 and 2 to address landscaping commitments.

The improvements on I-15 under Alternatives 1 and 2 would be constructed in the median. There is currently no landscaping or irrigation in the existing median on I-15 within the project limits.

Ramp Metering

The existing ramp metering at ramps on SR-91 and I-15 would be retained under Alternatives 1 and 2. In addition, ramp metering would be provided on all the local on-ramps on SR-91 in the project limits that do not currently have ramp metering. Where feasible, HOV bypass lanes would be constructed on ramps that are modified. Table 2.11 provides a summary of the ramp metering for the SR-91 CIP system interchanges.

Connectors between SR-91 and I-15 (existing and planned) are not planned to be metered; however, the I-15 northbound on-ramp to the eastbound SR-91 connector and the new westbound collector-distributor road where I-15 traffic joins SR-91 would be metered. The existing meters on the southbound SR-71 to eastbound SR-91 connector and the southbound SR-71 to westbound SR-91 connector would be maintained, and storage length would be increased with this project. No new metering will be used for other connectors at the SR-71 and SR-91 interchange.

Table 2.11 Summary of the SR-91 CIP System Interchange Ramp Metering

Name of System Interchange	Connector Name	Existing Ramp Already Metered	Proposed Ramp to be Metered
SR-241	241N-91E	No	Yes
SR-71	71S-91W	Yes	Yes
SR-71	71S-91E	Yes	Yes
SR-71	91W-71N	No	No
SR-71	91E-71N	No	No
I-15	15S-91E loop	No	Yes
I-15	15S-91W and 15N-91W combined CD	No	Yes
I-15	91W-15N	No	No
I-15	91W-15S	No	No
I-15	15N-91E	No	Yes
I-15	91E-15S and 91E-15N combined CD	No	No
I-15	15N-91W and 91E-15S Tolled Express	N/A new connector	No
I-15	15S-91W and 91E-15N Tolled Express	N/A new connector	No

Source: SR-91 System Interchange Ramp Metering Overview for Ultimate Project (2011).
CD = collector-distributor
E = eastbound
I-15 = Interstate 15
N = northbound
N/A = not applicable
S = southbound
SR-71 = State Route 71
SR-241 = State Route 241
W = westbound

California Highway Patrol Enforcement Activities

California Highway Patrol (CHP) enforcement areas will be provided at new ramp meter installations and along the mainline. The locations of the CHP enforcement areas on mainline SR-91 are shown in Table 2.12 for Alternatives 1 and 2. As shown, Alternatives 1 and 2 would each provide four CHP enforcement areas.

Table 2.12 California Highway Patrol Median Refuge Locations for Alternatives 1 and 2

Co-Rte-PM	SR-91 Eastbound	SR-91 Westbound	Existing or New	Occurs in Alternative 1	Occurs in Alternative 2
Ora-91-17.0	X	X	Existing	Yes	Yes
Ora-91-17.7	X	X	New	No	Yes
Ora-91-18.0	X	X	Existing	Yes	No
Riv-91-3.2	X	X	New	Yes	Yes
Riv-91-9.7	X	X	Existing	Yes	Yes

Source: *Project Report* (September 2011).
Co = County
Ora = Orange County
PM = Post Mile
Riv = Riverside County
Rte = Route
SR-91 = State Route 91

Non-Motorized and Pedestrian Features

Existing local road interchanges with SR-91 would be modified as a result of the Build Alternatives. Construction of improvements at the local road connections would implement current Americans with Disabilities Act (ADA) standards for curb ramp and sidewalks as feasible. These types of modifications are planned at the Auto Center Drive, Maple Street, Lincoln Avenue, and Main Street interchanges in the City of Corona.

Under the Build Alternatives, on-street bike lanes would be provided at Maple Street, Lincoln Avenue, and Main Street. One segment of the Santa Ana River Trail/Bike Lane within the right-of-way for SR-91 (at Green River Road) would be relocated to the north as part of the Initial Phases of Alternatives 1 and 2. Specifically, a 200 ft long segment of the existing Trail/Bike Lane that is approximately 1,200 ft east of the Green River Golf Club access road at Green River Road would be relocated as part of the construction of the Initial Phases of Alternatives 1 and 2. The Trail/Bike Lane would be relocated parallel to the Corps maintenance road between Coal Canyon and Green River Road as a Class II bike lane. This has been approved by the City of Corona and the Corps.

Graffiti Control

Public structures are often the target of graffiti. The permanent structures under Alternatives 1 and 2, including bridges, overcrossings, structural supports, retaining and sound walls, and traffic control devices, may be attractive to taggers. Alternatives 1 and 2 will include treatments on many of those structures that help deter graffiti. Depending on the agency/local jurisdiction responsible for those structures, the treatments will include anti-graffiti coatings, wall texturing and aesthetic surface treatments, and/or landscaping/plantings (e.g., ivy, vines).

Modifications to Corps Facilities

Alternatives 1 and 2 may permanently or temporarily modify portions of the Corps-constructed flood control facilities or Corps-owned properties listed below. The modifications described here are for Alternative 2, including Alternative 2f; the modifications required under Alternative 1 would be similar to but less extensive than those described below. These modifications would require approval by the Corps through a Section 408 permit. The modifications to Corps facilities and properties described below have always been part of the preliminary design of Alternatives 1 and 2 and were included in the project footprints of Alternatives 1 and 2 that were evaluated in the Draft EIR/EIS for the SR-91 CIP. The additional descriptive

information is provided below in the event the Corps would use all or part of this Final EIS for the approval of the Section 408 permits under NEPA.

Area 1: SR-91 CIP and Corps Reach 9 Phase 2B Project

In Corps Facility Area 1, located on the north side of SR-91 near the Green River Golf Course, the following features will be constructed for SR-91 CIP:

- Additional GP lane in each direction
- Additional express auxiliary lane in each direction
- Retaining walls and associated maintenance road
- Access roadway to Star Ranch
- Realignment of existing Green River Road that will end in a cul-de-sac
- Bicyclist parking lot

The following features of the Corps-constructed Reach 9 Phase 2B project may be affected by the SR-91 CIP project:

- **Maintenance Road and Fill Slope:** Between Post Miles 0.0 and 0.5, a retaining wall (with sound wall) and Star Ranch access road will be built adjacent to this feature.
- **Maintenance Road and Access to Green River Road:** To build the Star Ranch access road, the channel maintenance access road entrance from Green River Road will need to be relocated.
- **Maintenance Road and Fill Slope on Eastern End of Reach 9 Phase 2B Project:** A parking lot for bicyclists and other Trail/Bike Lane users will be built adjacent to this feature, including retaining walls and a bicycle access ramp.
- **Maintenance Road and Fill Slopes:** A TCE will be needed on the eastern end of the Reach 9 Phase 2B project for SR-91 CIP construction equipment access and staging for the retaining walls, the realignment of Green River Road, and the bicyclist parking lot.

Area 2: SR-91 CIP and Corps Reach 9 Phase 2A Project

In Corps Facility Area 2, located near Prado Road and the SR-91/SR-71 interchange, the following features will be constructed for the SR-91 CIP:

- Additional GP lane in each direction
- Two tolled express lanes in each direction
- One westbound express auxiliary lane

- Retaining walls
- Realignment of the Green River Road westbound off-ramp
- Extension of culverts

The features described above will be constructed in the Department and the Riverside County Flood Control District (RCFCD) joint use maintenance area. As part of the SR-91 CIP construction, the following features of the Corps Reach 9 Phase 2A project may be affected:

- **The Prado Road Entrance of the Channel Maintenance Access Road:** This segment of the road will be removed during construction of the Green River Road off-ramp structure and then rebuilt.
- **Embankment Slopes and Maintenance Access Road:** The SR-91 CIP will require construction of a retaining wall, which will result in some temporary effects to the channel access road and embankment slopes.

Area 3: SR-91 CIP, Corps Properties, and Corps Auxiliary Berm/Floodwall

In Corps Facility Area 3, located near the SR-91/SR-71 interchange and Prado Dam, the following features will be constructed for SR-91 CIP:

- An additional GP lane in each direction
- Two express lanes in each direction
- One three-plus express lane in each direction
- An auxiliary lane
- Retaining walls
- Drainage improvements
- Realignment and widening of the SR-71 southbound to SR-91 westbound ramp
- Widening of the SR-71 southbound to SR-91 eastbound ramp
- A maintenance access road and staging area
- Storm water treatment infiltration basins

The features described above will be constructed in an existing easement that the Department has with the Corps. As part of its construction, the SR-91 CIP will change the highway footprint within the existing easement in the following areas:

- **Department Easement on Corps Property Assessor's Parcel Number (APN) 101-140-006:** In the northwest quadrant of the SR-91/SR-71 interchange, the realignment of the SR-71 southbound to SR-91 westbound ramp will be moved to

the west and require some fill slopes. In addition, this area will require construction of a storm water treatment infiltration basin.

- **Department Easement on Corps Property APN 101-170-001:** The maintenance access and staging area will be placed in the northeast quadrant of the SR-91/ SR-71 interchange and require some fill slopes.
- **Department Easement on Corps Property APN 101-170-009:** In the southwest quadrant of the SR-91/SR-71 interchange, the widening of the SR-71 southbound to SR-91 eastbound ramp will need additional pavement and fill slopes to accommodate an additional lane. In addition, a storm water treatment infiltration basin will be built in this area.
- **Eastern End of the Department Easement on Corps Property APN 101-170-001:** The project will require a TCE for staging and access for widening the SR-91 and building a retaining wall that will extend beyond the existing easement. The SR-91 CIP may have temporary effects on the slopes of the Corps auxiliary berm/floodwall project.

Area 4: SR-91 CIP and Oak Street Channel (Corps-constructed and RCFCD-maintained Channel)

In Corps Facility Area 4, located near the Oak Street Channel in the City of Corona, the following features will be constructed for SR-91 CIP:

- An additional GP lane in each direction
- Two express lanes in each direction
- An auxiliary lane
- Modifications to the SR-91/Lincoln Avenue interchange
- Retaining walls
- Drainage improvements
- Relocation of an existing maintenance turnaround area
- Two storm water infiltration basins

As part of the construction, the SR-91 CIP may affect the following Corps-constructed facility:

- **Oak Street Channel:** Currently, this channel is an open concrete channel that runs north and south within the SR-91/Lincoln Avenue interchange. The reconfiguration of the SR-91/Lincoln Avenue interchange will require placing the open concrete channel into a boxed concrete channel north and south of SR-91. In addition, the boxed culvert will be extended to the north of the proposed

westbound SR-91/Lincoln Avenue off-ramp to accommodate the relocation of an existing maintenance turnaround area.

2.3.2.3 Design, Preconstruction, and Construction Activities and Features

Design and Construction Activities

As described later in Section 2.3.4.5, Design/Build Process, Alternatives 1 and 2 would be implemented in a best value design/build process. In this process, design and construction activities will occur concurrently. The design/build phases of Alternatives 1 and 2 will include the activities described in the following sections. Many of these activities will occur concurrently and may also occur intermittently throughout the design and construction period and throughout the construction areas. The activities described here were included in the analysis of the potential project impacts provided in this EIR/EIS.

- **Design and Pre-Construction Activities**
  - Preparation of final design
  - Preparation of modifications to the final design over time, as appropriate, based on updated knowledge about conditions in the field and other factors to result in an improved design and the most efficient construction process
  - Development of a project management plan
  - Development of a project baseline schedule
  - Coordination with the BNSF Railroad
  - Coordination with the City of Corona
  - Aerial mapping of the project limits
  - Development of a project aesthetics plan
  - Development of project transportation plan
  - Development and implementation of a project outreach program
  - Coordination with utility providers and appropriate potholing and other activities to locate and clearly mark the types and locations of all utility facilities in the project disturbance limits
  - Coordination with utility providers on protection in-place, relocation, and/or removal of utility facilities in the disturbance limits
  - Ongoing coordination with emergency services providers (police, fire, medical, and CHP) and local jurisdictions regarding detours and other traffic conditions during construction
  - Execution of detailed soils and geotechnical testing

- Execution of hazardous waste contamination testing, as needed
- Execution of detailed property surveys
- Conducting existing project site survey and photo documentation

- **Construction Activities**
  - Installation of fencing around construction and staging areas
  - Delineation of disturbance limits and any Environmentally Sensitive Areas (ESAs) or other areas to be avoided
  - Clearing, grading, and preparation of the field office location(s) and staging areas
  - The setup of field office(s) and staging areas for equipment, materials, waste materials, etc.
  - Moving construction equipment to the staging areas and around the construction areas
  - Importing construction materials to the staging areas and moving materials to where they are needed during construction of specific project components
  - Remediation of known hazardous waste contamination within the State right-of-way
  - Implementation of BMPs on an ongoing basis, consistent with the needs of each construction activity
  - Protection in-place, relocation, and removal of utility facilities in the project disturbance limits
  - Ongoing coordination with emergency services providers and local jurisdictions regarding detours and other traffic conditions and installation of appropriate signing, lane marking, and other information to direct traffic around and through the construction areas
  - Implementation of ramp and lane closures, as needed, throughout the construction period
  - Clearing of vegetation from construction areas
  - Construction of noise walls
  - Excavating and filling in the construction areas
  - Construction of bridges and overpasses
  - Construction of ramps
  - Construction of local access roads
  - Construction of water pollution control facilities
  - Construction of project aesthetics and landscaping
  - Construction of drainage facilities

- Construction of retaining walls
- Construction of travel lanes and shoulders
- Installation of directional lighting, traffic control systems, and signs
- Construction of improvements on local roads
- Construction of toll facilities

Construction Staging

Construction staging would be required for all ramp reconstruction, freeway widening, and profile adjustments under Alternatives 1 and 2. The existing number of mainline through lanes would be maintained during construction by restriping the existing lanes and shifting traffic within the corridor to maintain existing capacity. Complete closures of SR-91 and I-15 are not anticipated during construction of Alternatives 1 and 2.

A *Final Work Zone Mainline Analysis* (February 2010) for the SR-91 corridor was conducted to minimize congestion along the corridor during the construction of Alternatives 1 and 2. That analysis was used to compare and select optimal construction staging strategies. The work zone analysis examined ramp and connector closures in addition to two SR-91 mainline construction scenarios. With either mainline scenario, Stage 1 would construct outside improvements without impacting the mainline traffic lanes. Lane restrictions during Stage 2 would vary between the two scenarios.

The first mainline work zone scenario for SR-91 consisted of narrowing the existing mainline through lanes to 10.5 ft wide and maintaining a total of four GP lanes and one HOV lane in each direction. The second scenario consisted of converting the HOV lane to a GP lane and maintaining the three other GP lanes on weekends only. Both weekend and weekday peak periods were examined.

Congestion would occur with both scenarios and neither scenario demonstrated a clear advantage from a traffic impact perspective. Under the second scenario, the tradeoffs involve avoidance of weekday impacts with greatly increased construction duration and costs. The first scenario is favored because it results in shorter construction duration, lower construction costs, and earlier project completion.

Ramp and connector closures would be required on SR-91 during construction of Alternatives 1 and 2. Preliminary recommendations for the duration of, and detours for, ramp and connector closures on eastbound and westbound SR-91 are summarized in Table 2.13.

Table 2.13 Ramp and Connector Closures along SR-91

Interchange	Ramps (Off/On)	Closure ID	Time of Closure	Duration of Closure
SR-91 Eastbound				
SR-241 NB – SR-91 EB	On	X1	Weekends	3 weekends
SR-71 SB – SR-91 EB	On	X2	Weekends	2 weekends
Auto Center Drive	On	X3	Weekdays	6 months
2nd Street/Grand Boulevard	Off	X4	Permanent	--
Main Street	On	X5	Weekdays & Weekends	12 months
SR-91 EB – I-15 NB	Off	X6	Weekends	2 weekends
SR-91 EB – I-15 SB	Off	X7	Weekends	2 weekends
I-15 SB –SR-91 EB	On	X8	Weekends	2 weekends
McKinley Street	On (SB)	X9	Weekdays & Weekends	2 months
	On (NB)	X10	Weekdays & Weekends	2 months
Magnolia Avenue	Off	X11	Weekdays & Weekends	2 months
SR-91 EB – SR-71 NB	Off	X12	Weekends	2 weekends
SR-91 Westbound				
Gypsum Canyon Road	Off	Y1	Weekdays & Weekends	2 weeks
SR-91 WB – SR-241 SB	Off	Y2	Weekends	6 weekends
SR-71 SB – SR-91 WB	On	Y3	Weekends	1 weekend
SR-91 WB – SR-71 NB	Off	Y4	Weekends	4 weekends
Auto Center Drive	Off	Y5	Weekdays & Weekends	6 months
Maple Street	Off	Y6	Weekdays & Weekends	2 months
Grand Boulevard	On	Y7	Permanent	--
Main Street	Off	Y8	Weekdays & Weekends	12 months
I-15 SB – SR-91 WB	On	Y9	Weekends	1 weekend
SR-91 WB – I-15 SB	Off	Y10	Weekends	2 weekends
SR-91 WB – I-15 NB	Off	Y11	Evenings	5 nights
McKinley Street	Off (NB)	Y12	Weekdays & Weekends	2 months

Source: *Final Ramp Closure Study* (February 2010).
EB = eastbound
I-15 = Interstate 15
ID = identification number
NB = northbound
SB = southbound
SR-241 = State Route 241
SR-71 = State Route 71
SR-91 = State Route 91
WB = westbound

Construction Vehicle Access and Material Staging

Under Alternatives 1 and 2, construction vehicle access and staging of construction materials would occur within existing disturbed or developed areas inside the existing right-of-way or within the additional right-of-way for the project. Vehicle access and materials staging during construction of walls outside and adjacent to the State right-of-way would occur in approved designated areas. Both alternatives also require that material be imported to the project from outside the project limits. Identification of off-site material source sites would be the responsibility of the design/build contractor. Imported material would come from environmentally cleared sites and be transported to the project on environmentally cleared access/haul routes and public roads. Once within the project limits, all construction vehicle access, materials

staging and storage, and other construction activities would occur within the defined limits for Alternatives 1 and 2.

The TCEs and permanent right-of-way limits for the Build Alternatives and their design features, which include areas for construction vehicle access and material staging, are shown on the detailed figures provided in Appendix L.

Transportation Management Plan During Construction

A *Preliminary Transportation Management Plan* (TMP; May 2010) was prepared to address transportation management during construction of Alternatives 1 and 2. During final design, the *Final Transportation Management Plan* will be developed by the Project Engineer, based on the Preliminary TMP developed for the Project Report and the EIR/EIS. Key elements in the TMP include:

- Public Information/Public Awareness Campaign (PAC)
- Motorist information strategies
- Incident management
- Construction strategies
- Demand management
- Alternate route strategies
- Other strategies

Temporary Construction Easements

TCEs would be necessary under Alternatives 1 and 2 for constructing walls along the right-of-way, for extending major drainage facilities and culverts, utility relocation/ modifications, and widening bridges. Land used as a TCE would be returned to its original or better condition prior to the return of that land to the original owner after completion of the construction activities requiring that TCE. No permanent project features will be constructed within the boundaries of the TCEs.

Construction Lighting

Alternatives 1 and 2 would require nighttime construction activities in some areas. If work is conducted at night, lighting would be directed away from land uses outside the freeway rights-of-way.

Conditions for Construction in the Grand Boulevard Historic District

The following conditions will be implemented prior to and during the project design/ build phase regarding the temporary removal and relocation of up to seven existing

acorn-style streetlights within the project disturbance limits in the Grand Boulevard Historic District:

- During final design, the RCTC Project Engineer will verify the locations and numbers of acorn-style streetlights within the project disturbance limits in the Grand Boulevard Historic District. The RCTC Project Engineer will require the design/build contractor to clearly indicate on the final plans any acorn-style streetlights in the project disturbance limits that are to be removed at the beginning of construction in those areas and to identify the locations where the removed streetlights would be reinstalled.
- The RCTC Resident Engineer will require the design/build contractor to remove and, as necessary, dismantle, the affected acorn-style streetlights and to place them in containers appropriate for storing those fixtures during the project construction period.
- The RCTC Resident Engineer will require the design/build contractor to store the containers holding the acorn-style streetlights in a secure location protected from public access and weather.
- The RCTC Project Engineer will require the design/build contractor to verify that the locations identified for the reinstallation of the affected streetlights are acceptable to the City of Corona and consistent with the City's requirements for the siting of streetlights.
- The RCTC Resident Engineer will require the design/build contractor to reinstall the acorn-style streetlights at the locations designated in the final plans when no further construction/disruption will occur at those locations, as follows:
- The streetlights will be reinstalled as close to their original locations as possible based on the project design and available space, in a manner consistent with the other acorn-style streetlights in the Grand Boulevard Historic District and with the City of Corona requirements for the siting of streetlights.
- If any of the acorn-style streetlights cannot be reinstalled at or near their original locations, they will be reinstalled elsewhere within the boundaries of the Grand Boulevard Historic District, focusing on locations where acorn-style lights have previously been removed as long as those locations are consistent with the historic spatial relationships of the Historic District and with the City of Corona requirements for the siting of streetlights.
- If the lights cannot be reinstalled as described above, the RCTC Project Engineer will consult with the City of Corona to identify alternative locations.

- The RCTC Resident Engineer will require the construction contractor to have an architectural historian monitoring on site during the removal, dismantling, and reinstallation of the acorn-style streetlights.

2.3.3 Unique Features of the Build Alternatives

2.3.3.1 Alternative 1: Add General-Purpose Lanes and Maintain HOV Lanes (GP + HOV Lanes)

Under Alternative 1, one GP lane would be constructed in each direction on SR-91 from the SR-91/SR-241 interchange in the City of Anaheim to Pierce Street in the City of Riverside. The existing HOV lanes on SR-91 between the Orange/Riverside County line and Pierce Street would be maintained under this alternative. In addition, one HOV lane would be constructed on I-15 in each direction from Ontario Avenue in the City of Corona to an I-15/SR-91 HOV lane direct connector. The direct connector would provide HOV lane direct access from northbound I-15 to westbound SR-91 and from eastbound SR-91 to southbound I-15. The direct connector would allow vehicles in the HOV lanes to directly move from freeway to freeway, eliminating the need for HOVs to transition through traffic in the GP lanes.

The existing 3 mi long Orange County segment of the SR-91 tolled express lanes, which currently operates as a tolled express lane facility, would continue to serve this function under Alternative 1.

Alternative 1 is included as an alternative for the project because it is a transportation project that was planned as part of the 2002 Measure A, one-half-cent sales tax revenue to construct one GP lane in each direction on SR-91, as described in the RCTC Measure A 10-Year Delivery Plan.

The following sections describe the project components and features of Alternative 1 in more detail. Typical cross sections for Alternative 1 for SR-91 and I-15 are shown on Figures 2-2 and 2-3, respectively. Maps detailing the project components and features of Alternative 1 are provided in Appendix L.

Permanent Improvements at SR-241 Under Alternative 1

Under Alternative 1, in the eastbound direction, the outside lane of the northbound SR-241 to the eastbound SR-91 connector would continue as a new GP lane on SR-91 rather than terminating at SR-91 as it currently does, as shown on Figure 2-4. This new GP lane would extend east on eastbound SR-91 to Pierce Street. In the westbound direction, a new GP lane would terminate just west of the Gypsum Canyon Road westbound off-ramp by dropping the outside lane on the mainline.

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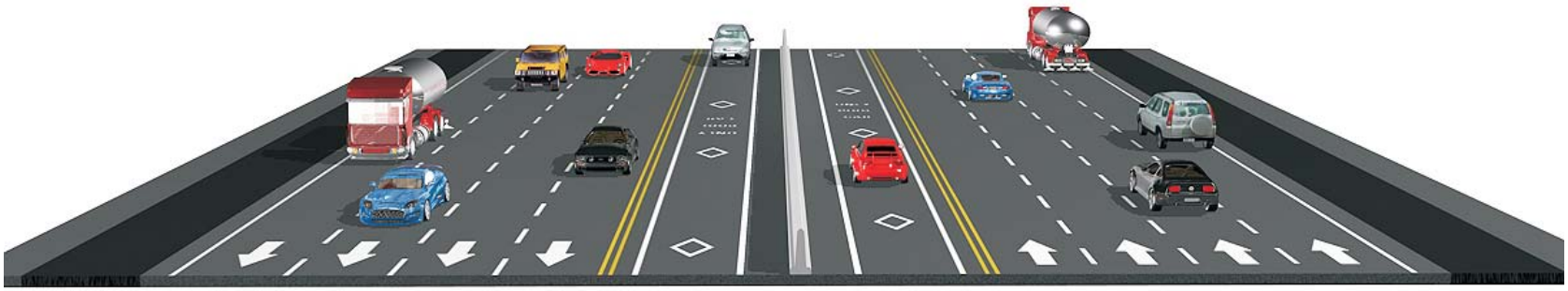
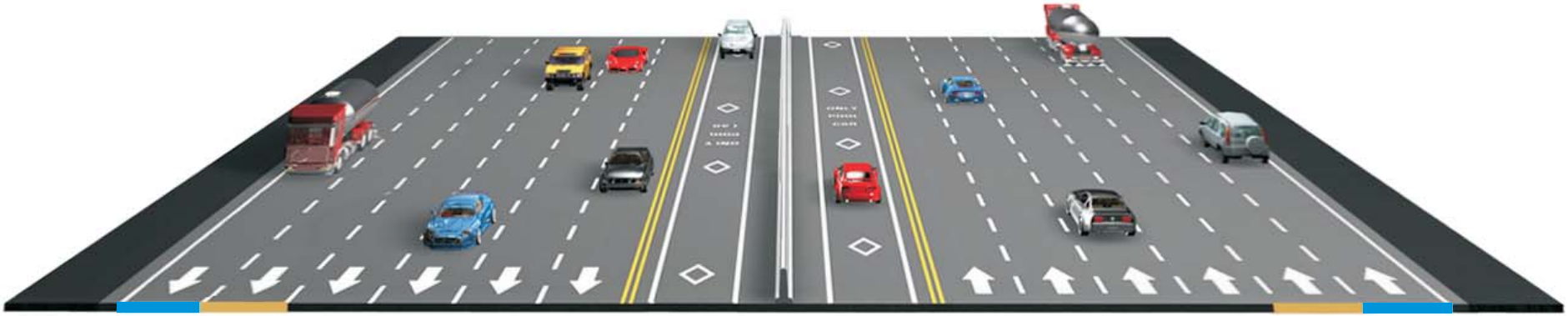


Existing Typical Cross Section



Typical Cross Section for Alternative 1

FIGURE 2-2

LEGEND:

NEW GENERAL PURPOSE LANE

NEW AUXILIARY LANE

State Route 91 Corridor Improvement Project

Typical Cross Section for Alternative 1 on SR-91

12-Ora-91-R14.43/R18.91
08-Riv-91-R0.00/R13.04
08-Riv-15-35.64/45.14
EA 0F540

NOT TO SCALE

I:\PAZ0701\G\Fig 2-2 Typ Sect Alt SR-91 2a_v2.cdr (7/25/11)

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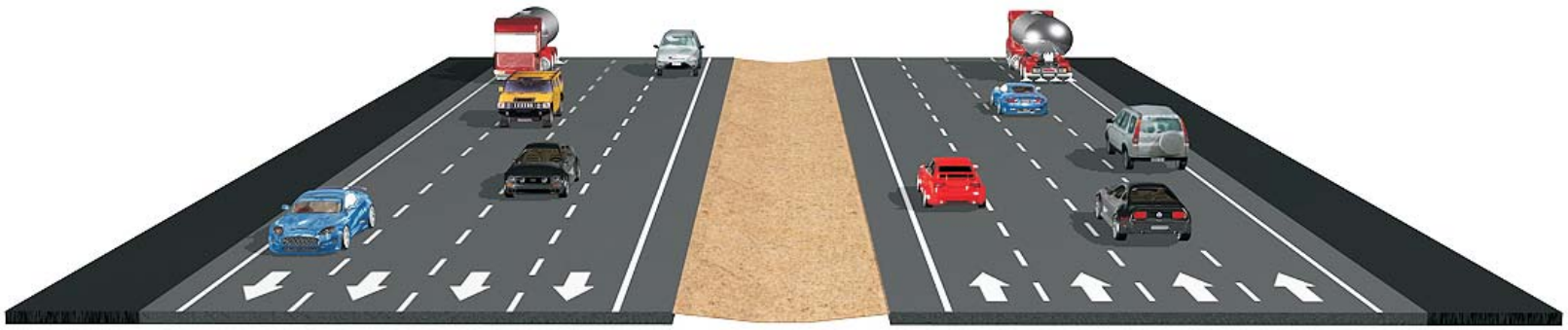

Existing Typical Cross Section

Typical Cross Section for Alternative 1

FIGURE 2-3

LEGEND:
NEW HOV LANE

State Route 91 Corridor Improvement Project

Typical Cross Section for Alternative 1 on I-15

12-Ora-91-R14.43/R18.91
08-Riv-91-R0.00/R13.04
08-Riv-15-35.64/45.14
EA 0F540

NOT TO SCALE

I:\PAZ0701\G\Fig 2-3Typ Sect Alt 1-I-15.cdr (7/25/11)