Interstate 10/Tippecanoe Avenue Interchange Improvement Project

CITIES OF LOMA LINDA AND SAN BERNARDINO
SAN BERNARDINO COUNTY, CALIFORNIA
DISTRICT 08 – SBD – 10, PM 25.3/27.3
EA 08-448100

Draft Initial Study with Proposed Mitigated Negative Declaration/ Environmental Assessment

Prepared by the
State of California Department of Transportation

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

Caltrans

October 2009

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General Information About This Document

What's in this document: The San Bernardino Associated Governments (SANBAG), in cooperation with the California Department of Transportation (Department), and the cities of San Bernardino and Loma Linda, has had this Initial Study/Environmental Assessment (IS/EA) prepared, which examines the potential environmental impacts of the alternatives being considered for the proposed project located in San Bernardino County, California. The document describes why the project is being proposed, alternatives for the project, the existing environment that could be affected by the project, the potential impacts from each of the alternatives, and the proposed avoidance, minimization, and/or compensation measures.

What should you do:

- Please read this Initial Study/Environmental Assessment. Additional copies of this IS/EA as well as the technical studies are available for review at:

San Bernardino Associated Governments
1170 W. 3rd Street, 2nd Floor
San Bernardino, CA 92410-1715

City of Loma Linda City Hall
25541 Barton Road
Loma Linda, CA 92354

City of San Bernardino City Hall
300 North D Street
San Bernardino, California 92418

Loma Linda Branch Library
25581 Barton Road
Loma Linda, CA 92335

San Bernardino County Library
104 W. Fourth Street
San Bernardino, CA 92415-0035

Highland Branch Library
7863 Central Ave.
Highland, CA 92346

- Attend open forum hearing: November 5, 2009 at Victoria Elementary School, 1505 Richardson Street, San Bernardino, CA
- We welcome your comments. If you have any comments regarding the proposed project, please attend the open forum hearing and/or send your written comments to the Department, by the deadline.
    - Submit comments via postal mail to:
      Attention: Aaron Burton, Senior Environmental Planner
      Branch Chief, Environmental Studies "B"
      California Department of Transportation, District 8
      Division of Environmental Planning
      464 West 4th Street, 6th Floor MS 1162
      San Bernardino, CA 92401
    - Submit comments via e-mail to: aaron_burton@dot.ca.gov
- Submit comments by the deadline: November 20, 2009

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

Notwithstanding any other provision of law, a claim arising under federal law seeking judicial review of the permit, license or approval issued by a federal agency for a highway or public transportation project shall be barred unless it is filed within 180 days after publication of a notice in the Federal Register announcing that the permit, license, or approval is final pursuant to the law under which agency action is taken, unless a shorter time is specified in the federal law pursuant to which judicial review is allowed.

For individuals with sensory disabilities, this document can be made available in Braille, large print, on audiocassette, or on computer disc. To obtain a copy in one of these alternate formats, please write to the San Bernardino Associated Governments, Attn: Public Information Officer, 1173 West 3rd Street, San Bernardino, CA 92410-1715; (909) 884-8276.

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08-SBD-010 PM 25.3/27.3
EA 08-448100
SCH # ___________

Reconstruction of the Interstate 10 (I-10)/Tippecanoe Avenue Interchange (post mile 25.3 to 27.3); addition of an eastbound auxiliary lane on I-10 from Waterman Avenue to Tippecanoe Avenue; widening of I-10 bridges over San Timoteo Creek and Tippecanoe Avenue; widening of Anderson Street/Tippecanoe Avenue and Redlands Boulevard; construction of a roadway to connect East Coulston Street, East Lee Street, and East Laurelwood Drive; and elimination of the South Ferree Street connection to East Rosewood Drive in the Cities of San Bernardino and Loma Linda, California.

INITIAL STUDY with Proposed Mitigated Negative Declaration/ Environmental Assessment

Submitted Pursuant to: (State) Division 13, California Public Resources Code and
(Federal) 42 U.S.C. 4332(2)(c)

THE STATE OF CALIFORNIA
Department of Transportation

10/15/09
Date of Approval

David Bricker
Deputy District Director
District 8 Division of Environmental Planning
California Department of Transportation

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Chapter 1 Proposed Project

1.1 Introduction

San Bernardino Associated Governments (SANBAG), in cooperation with the California Department of Transportation District 8 (Department), the City of San Bernardino, and the City of Loma Linda, proposes to reconstruct the Interstate 10 (I-10)/Tippecanoe Avenue interchange. The proposed project includes addition of an eastbound auxiliary lane on I-10 from Waterman Avenue to Tippecanoe Avenue; widening of I-10 bridges over San Timoteo Creek and Tippecanoe Avenue; widening of Anderson Street/Tippecanoe Avenue and Redlands Boulevard; construction of a roadway to connect East Coulston Street, East Lee Street, and East Laurelwood Drive; and elimination of the South Ferree Street connection to East Rosewood Drive. The proposed project passes through the Cities of San Bernardino and Loma Linda in San Bernardino County, California. The total length of the project, along I-10, is approximately 1.5 miles (mi). Figure 1.1 shows the project location and vicinity.

The proposed project is included in the Southern California Association of Governments (SCAG) 2008 Regional Transportation Plan (RTP). The RTP is a long-range plan that identifies multimodal regional transportation needs and investments over the next 25 years in Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura Counties. The Regional Transportation Improvement Program (RTIP), which is updated every 2 years, is derived from the RTP and lists specific capital projects proposed within the next 6 years. The proposed project is included in the 2008 RTIP (Project ID: 44810).

The project funding breakdown is provided in Table 1.1. The estimated cost for the proposed project is approximately $76,268,000, which includes $33,132,000 for construction, $32,908,000 for right-of-way acquisition and utility relocation, and $10,228,000 for final design, right-of-way, and construction management support costs. Construction is anticipated to commence in late spring 2012 with the project open to traffic in late summer 2013.

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Figure 1.1 Project Location

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Table 1.1 Project Funding

Year	Fund	Engineering	Right-of-Way	Construction
Prior	Federal	$515,000	0	0
Prior	Measure I / Local	$125,000	0	0
2008/2009	Federal	$5,250,000	0	0
2008/2009	Measure I / Local	$1,913,000	0	0
2009/2010	Federal DEMO – SAFETEA-LU	0	$7,575,000	$3,925,000
2009/2010	Federal DEMO - PNRS	0	0	$2,951,000
2009/2010	Federal	0	$12,000,000	0
2009/2010	State	0	$2,500,000	0
2009/2010	Measure I / Local	0	$5,493,000	$1,967,000
2009/2010	City Funds / Local	0	0	$6,495,000
2009/2010	Local Advance Construction	0	0	$15,549,000
2012/2013	Federal	0	0	$15,549,000
	Total	**$7,803,000**	**$27,568,000**	**$46,436,000**

DEMO = Demonstration
PNRS = Projects of National and Regional Significance
SAFETEA-LU = Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users

1.1.1 Existing Facility

I-10 is one of the major freeways of the Eisenhower Interstate System, which is a subsystem of the National Highway System. It is a major east-west transcontinental connecting link from California to Florida. I-10 is a major corridor for interstate commerce and movement of people and goods, as well as one of the major commuter routes between Los Angeles and the inland areas of San Bernardino and Riverside Counties. In the project area, I-10 has four mixed-flow lanes in each direction, separated by a median with a concrete barrier. An existing auxiliary lane is provided along westbound I-10 between Tippecanoe and Waterman Avenues.

Tippecanoe Avenue is a major north-south four-lane arterial that becomes Anderson Street south of I-10 in the City of Loma Linda. Within the project limits, there are three major signalized intersections on Tippecanoe Avenue: Redlands Boulevard, the I-10 eastbound ramps, the I-10 westbound ramps, and Harriman Place-Laurelwood Drive.

Anderson Street is a major north-south, four-lane arterial with a two-way center turn lane, or left-turn pockets, from I-10 to Barton Road in the City of Loma Linda. The City of Loma Linda has designated this route as a truck route.

The existing I-10/Tippecanoe Avenue interchange is a compact diamond interchange with single-lane on- and off-ramps. The intersection spacing between the westbound ramps and the eastbound ramps is approximately 330 feet (ft). The intersection spacing between the eastbound ramps and Redlands Boulevard is approximately

200 ft. At the ramp intersections, Tippecanoe Avenue has two through lanes in each direction, with dedicated left-turn lanes for the left-turning on-ramp traffic. There is a dedicated right-turn lane at the I-10 westbound on-ramp.

1.2 Purpose and Need

1.2.1 Purpose

The purpose of the I-10/Tippecanoe Avenue Interchange Improvement project is to improve operational deficiencies and increase capacity at the interchange due to rapidly increasing traffic demand generated by the substantial growth and development that has occurred, and will continue to occur, in the Cities of Loma Linda and San Bernardino. It is also designed to provide adequate access to local businesses, residences, and major facilities served by the interchange (e.g., Loma Linda University Medical Center, Loma Linda University, the Jerry Pettis Veterans Administration Hospital, San Bernardino International Trade Center, and the San Bernardino International Airport).

The objectives of the project are to:

- Reduce congestion at the ramp intersections, thereby providing adequate access to facilities served by the interchange, including the regional hospital, airport, and residences and business facilities; and
- Improve merge/diverge operations and reduce the weave between the Waterman Avenue eastbound on-ramp and the Tippecanoe Avenue eastbound off-ramp.

1.2.2 Need

The proposed project is needed to relieve congestion and improve operational deficiencies at the I-10/Tippecanoe Avenue interchange. The close spacing between the eastbound I-10 ramps and the westbound I-10 ramps creates severe traffic queuing, resulting in deficient operation of these intersections.

1.2.2.1 Capacity and Transportation Demand

In the existing (2009) and 2035 conditions, the peak demand on I-10 in the vicinity of Tippecanoe Avenue is in the eastbound direction during the p.m. peak hour. Heavy weaving occurs between the eastbound on-ramp at Waterman Avenue and the eastbound off-ramp at Tippecanoe Avenue in both the a.m. and p.m. peak hours. An auxiliary lane is needed between these ramps to alleviate the weaving condition.

The daily number of vehicles traveling on I-10 and Tippecanoe Avenue in the project area is forecast to increase over time, which will increase traffic congestion in the project area under the existing lane and ramp configurations. The quality of traffic flow can be defined in terms of level of service (LOS). As shown in the graphic on the following page, there are six LOS, ranging from LOS A (free traffic flow with low volumes and high speeds, resulting in low densities) to LOS F (traffic volumes that exceed capacity and result in forced flow operations at low speeds, resulting in high densities). Traffic counts are recorded for passenger cars, two-axle trucks, three-axle trucks, and four-axle trucks. Trucks are factored into Passenger Car Equivalents (PCEs) that convert traffic volumes to an equivalent number of passenger cars based on the type of truck. As shown in Table 1.2, without any improvements to the existing facility, 2015 (opening year for the proposed project) and 2035 (design year for the proposed project) traffic volumes on the I-10 mainline and ramps in the project area are forecast to increase considerably, which will result in a decrease in LOS on those facilities.

Table 1.2 Existing (2009) and Future No Build (2015 and 2035) Freeway Mainline and Ramp Volumes

Segment	AM Peak Hour			PM Peak Hour		
	2009	2015	2035	2009	2015	2035
I-10 Eastbound						
Waterman Avenue On-Ramp	345	445	778	369	525	1,046
Waterman Avenue On-Ramp to Tippecanoe Avenue Off-Ramp	8,497	9,026	10,791	8,251	9,591	14,060
Tippecanoe Avenue Off-Ramp	1,073	1,437	2,650	870	1,112	1,917
Tippecanoe Avenue Off-Ramp to Tippecanoe Avenue On-Ramp	7,424	7,590	8,141	7,381	8,480	12,143
Tippecanoe Avenue On-Ramp	273	360	648	775	905	1,340
Tippecanoe Avenue On-Ramp to Mountain View Avenue Off-Ramp	7,697	7,949	8,789	8,156	9,385	13,483
I-10 Westbound						
Mountain View Avenue On-Ramp to Tippecanoe Avenue Off-Ramp	7,319	8,539	12,602	7,328	8,252	11,332
Tippecanoe Avenue Off-Ramp	1,005	1,108	1,451	739	821	1,092
Tippecanoe Avenue Off-Ramp to Tippecanoe Avenue On-Ramp	6,314	7,431	11,151	6,589	7,432	10,240
Tippecanoe Avenue On-Ramp	689	855	1,406	1,080	1,244	1,791
Tippecanoe Avenue On-Ramp to Waterman Avenue Off-Ramp	7,003	8,286	10,907	7,669	8,676	10,381
Waterman Avenue Off-Ramp	728	836	1,194	735	865	1,296
Waterman Avenue Off-Ramp to Waterman Avenue On-Ramp	6,276	7,450	9,713	6,934	7,811	9,085

Source: *Traffic Report for the I-10/Tippecanoe Avenue Interchange* (March 2008) and *Supplement to Interstate 10/ Tippecanoe Avenue Traffic Operations Analysis* (August 2009)

Notes: Traffic volumes are in PCEs per hour

2009 freeway segment volumes were developed from linear interpolation between 2007 Department traffic counts and 2035 traffic volumes.

2015 volumes were developed from linear interpolation between 2009 and 2035 volumes.

Department = California Department of Transportation

I-10 = Interstate 10

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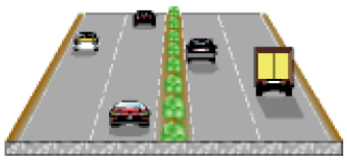
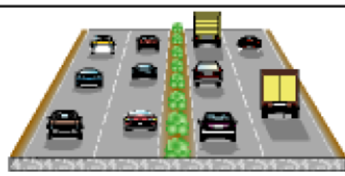
LEVELS OF SERVICE

for Freeways

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

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The eastbound I-10 mainline in the project area currently operates at LOS D to E during the a.m. and p.m. peak hours. The westbound I-10 mainline in the project area currently operates at LOS C to D during the a.m. peak hours and LOS D during the p.m. peak hours. Based on forecast traffic conditions, the I-10 mainline is projected to operate at LOS F in the a.m. and p.m. peak hours in the vicinity of Tippecanoe Avenue in 2035, with the exception of eastbound I-10 east of Tippecanoe Avenue, which is projected to operate at LOS D in the a.m. peak hour.

Table 1.3 shows the LOS and delay in seconds during the a.m. and p.m. peak hours in the existing and future No Build conditions. In 2009 and 2015, all study area intersections would operate at an acceptable LOS except for Tippecanoe Avenue/ eastbound ramps. In 2035, only Tippecanoe Avenue/Laurelwood Drive would operate at an acceptable LOS during the a.m. and p.m. peak hours due to the increased traffic demand. Reconfiguration of the ramps is needed to reduce delays and increase spacing between the closely spaced intersections.

Under existing conditions, the ramp junctions (merges and diverges) operate from LOS C to F. Based on forecast traffic volumes, for 2015 and beyond, all ramp merges and diverges are anticipated to operate at unsatisfactory LOS F during the p.m. peak period. Table 1.4 shows the vehicle density and resultant LOS for the freeway ramp junctions with the I-10 mainline for 2009 and the No Build conditions in 2015 and 2035. Density refers to the number of vehicles per mile per lane. The addition of the westbound loop on-ramp will help alleviate delays by splitting traffic entering I-10 into two locations.

1.2.2.2 Roadway Deficiencies

Intersection Spacing

The existing I-10/Tippecanoe Avenue interchange ramps are closely spaced. This creates severe traffic queuing, resulting in deficient operation of the ramp intersections. Although Table 1.3 indicates that all study area intersections currently operate at satisfactory LOS, field observation indicates that inadequate queuing space between the freeway ramps results in substantial congestion during both the a.m. and p.m. peak hours. As shown in Table 1.3, congestion at this location is forecast to increase in 2015 and 2035. Reconfiguration of the interchange will allow for more distance between the closely spaced intersections, thereby improving operations.

Table 1.3 Existing (2009) and Future No Build-Alternative 2 (2015 and 2035) Intersection Levels of Service

Study Intersection	AM Peak Hour						PM Peak Hour					
	2009		2015 (No Build)		2035 (No Build)		2009		2015 (No Build)		2035 (No Build)	
	Delay (secs)	LOS	Delay (secs)	LOS	Delay (secs)	LOS	Delay (secs)	LOS	Delay (secs)	LOS	Delay (secs)	LOS
Tippecanoe Avenue/ Laurelwood Drive	12.2	B	24.6	C	28.5	C	24.3	C	36.9	D	33.3	C
Tippecanoe Avenue/ Westbound Ramps	19.9	B	31.6	C	65.0	E	24.6	C	21.0	C	106.5	F
Tippecanoe Avenue/ Eastbound Ramps	21.7	C	40.4	D	361.8	F	21.1	C	60.4	F	517.1	F
Anderson Street/ Redlands Boulevard	23.1	C	29.1	C	199.0	F	30.6	C	50.3	D	367.6	F

Source: *Traffic Report for the I-10/Tippecanoe Avenue Interchange* (March 2008) and *Supplement to Interstate 10/ Tippecanoe Avenue Traffic Operations Analysis* (August 2009)
Delay = average control delay
LOS = level of service
secs = seconds

Table 1.4 Existing (2009) and Future No Build-Alternative 2 (2015 and 2035) Ramp Junction LOS

Location	AM Peak Hour						PM Peak Hour					
	2009		2015 (No Build)		2035 (No Build)		2009		2015 (No Build)		2035 (No Build)	
	Density	LOS	Density	LOS	Density	LOS	Density	LOS	Density	LOS	Density	LOS
Eastbound												
Waterman Avenue On-Ramp	24.4	C	—	F[1]	—	F[1]	23.7	C	—	F[1]	—	F[1]
Tippecanoe Avenue Off-Ramp	—	F[1]	—	F[1]	—	F[1]	41.3	E	—	F[1]	—	F[1]
Tippecanoe Avenue On-Ramp	21.7	C	22.6	C	20.0	C	21.5	C	—	F[1]	—	F[1]
Westbound												
Tippecanoe Avenue Off-Ramp	—	F[1]	—	F[1]	—	F[1]	—	F[1]	—	F[1]	—	F[1]
Tippecanoe Avenue On-Ramp	N/A[2]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Waterman Avenue Off-Ramp	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Source: *Traffic Report for the I-10/Tippecanoe Avenue Interchange* (March 2008), *Supplement to Interstate 10/Tippecanoe Avenue Traffic Operations Analysis* (August 2009), and *Draft Project Report, I-10/Tippecanoe Avenue Interchange Improvements* (October 2009).
[1] Demand exceeds capacity
[2] N/A = not applicable; not a merge or diverge area
Density = passenger car equivalent per mile per lane adjusted with 0.95 peak-hour factor
LOS = level of service

Tables 1.5, 1.6, and 1.7 show how the Locally Preferred Alternative (Alternative 1) would reduce congestion at the ramp intersections and improve operational differences in 2015. Tables 1.8, 1.9, and 1.10 show how the Locally Preferred Alternative (Alternative 1) would reduce congestion at the ramp intersections and improve operational differences in 2035. Table 1.11 compares the No Build Alternative with the Locally Preferred Alternative (Alternative 1).

Table 1.5 2015 Mainline Levels of Service – Alternative 1

Freeway Segment	AM Peak Hour			PM Peak Hour		
	V	Density	LOS	V	Density	LOS
Eastbound						
Waterman Avenue On-Ramp to Tippecanoe Avenue Off-Ramp[2]	9,026	35.6	E	9,591	36.7	E
Tippecanoe Avenue Off-Ramp to Tippecanoe Avenue On-Ramp	7,590	32.1	D	8,480	39.3	E
Tippecanoe Avenue On-Ramp to Mountain View Avenue Off-Ramp	7,949	34.7	D	9,385	--	F[1]
Westbound						
Mountain View Avenue On-Ramp to Tippecanoe Avenue Off-Ramp	8,539	39.9	E	8,252	37.2	E
Tippecanoe Avenue Off-Ramp to Tippecanoe Avenue Loop On-Ramp	7,431	31.1	D	7,432	31.1	D
Tippecanoe Avenue Loop On-Ramp to Tippecanoe Avenue On-Ramp	7,850	33.9	D	7,832	33.7	D
Tippecanoe Avenue On-Ramp to Waterman Avenue Off-Ramp[2]	8,285	32.7	D	8,676	35.1	E

Source: *Supplement to Interstate 10/Tippecanoe Avenue Traffic Operations Analysis* (August 2009).
[1] Demand exceeds capacity
[2] Weaving section
Density = PCE Per Mile Per Lane; adjusted with 0.95 peak-hour factor
LOS = level of service
PCE = Passenger Car Equivalent
V = Volume in PCEs per hour

Table 1.6 2015 Intersection Levels of Service – Alternative 1

Intersection	AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS
1. Tippecanoe Avenue/Hospitality Lane-Coulston Street[1]	24.6	C	35.3	D
2. Tippecanoe Avenue/Harriman Place-Laurelwood Drive[1]	16.9	B	23.7	C
3. Tippecanoe Avenue/I-10 Westbound Ramps[1]	*No Conflicting Volume*		*No Conflicting Volume*	
4. Tippecanoe Avenue/I-10 Eastbound Ramps[1]	15.6	B	18.2	B
5. Anderson Street/Baker's Driveway[1]	*Not Analyzed*		*Not Analyzed*	
6. Anderson Street/Redlands Boulevard[1]	21.0	C	30.1	C
7. I-10 Eastbound Ramps/Redlands Boulevard	20.8	C	25.2	C
8. Waterman Avenue/Hospitality Lane	24.2	C	37.6	D
9. Waterman Avenue/I-215 On-Ramp	11.3	B	28.4	D
10. Waterman Avenue/I-10 Eastbound Ramps	219.1	F	60.2	F
11. Waterman Avenue/Redlands Boulevard	31.3	C	63.2	F
12. I-10 Westbound Ramps-Carnegie Drive/Hospitality Lane	14.9	B	15.5	B
13. Mountain View Avenue/I-10 Westbound Ramps	29.8	C	25.1	C
14. Mountain View Avenue/I-10 Eastbound Ramps	26.2	C	20.6	B

Source: *Supplement to I-10/Tippecanoe Avenue Traffic Operations Analysis* (August 2009).
Delay = Average control delay in seconds
I-10 = Interstate 10
I-215 = Interstate 215
LOS = level of service

Table 1.7 2015 Ramp Junction Levels of Service – Alternative 1

Location	AM Peak Hour		PM Peak Hour	
	Density	LOS	Density	LOS
Eastbound				
Waterman Avenue On-Ramp	N/A	N/A	N/A	N/A
Tippecanoe Avenue Off-Ramp	N/A	N/A	N/A	N/A
Tippecanoe Avenue On-Ramp	22.1	C	—	F[1]
Westbound				
Tippecanoe Avenue Off-Ramp	—	F[1]	41.0	E
Tippecanoe Avenue Loop On-Ramp	20.2	C	20.2	C
Tippecanoe Avenue On-Ramp	N/A	N/A	N/A	N/A
Waterman Avenue Off-Ramp	N/A	N/A	N/A	N/A

Source: *Draft Project Report* (October 2009).
[1] Demand exceeds capacity
Density = PCE Per Mile Per Lane; adjusted with 0.95 peak-hour factor
LOS = level of service
N/A = Not a merge or diverge area
PCE = Passenger Car Equivalent

Table 1.8 2035 Mainline Levels of Service – Alternative 1

Freeway Segment	AM Peak Hour			PM Peak Hour		
	V	Density	LOS	V	Density	LOS
Eastbound						
Waterman Avenue On-Ramp to Tippecanoe Avenue Off- Ramp[2]	9,141	—	F[1]	12,410	—	F[1]
Tippecanoe Avenue Off-Ramp to Tippecanoe Avenue On-Ramp	6,491	26.1	D	10,493	—	F[1]
Tippecanoe Avenue On-Ramp to Mountain View Avenue Off-Ramp	7,139	29.4	D	11,833	—	F[1]
Westbound						
Mountain View Avenue On-Ramp to Tippecanoe Avenue Off-Ramp	10,952	—	F[1]	9,682	—	F[1]
Tippecanoe Avenue Off-Ramp to Tippecanoe Avenue Loop On-Ramp	9,501	—	F[1]	8,590	40.5	E
Tippecanoe Avenue Loop On-Ramp to Tippecanoe Avenue On-Ramp	10,235	—	F[1]	9,312	—	F[1]
Tippecanoe Avenue On-Ramp to Waterman Avenue Off-Ramp[2]	10,907	—	F[1]	10,381	—	F[1]

Source: *Traffic Report for the I-10/Tippecanoe Avenue Interchange* (March 2008).
[1] Demand exceeds capacity
[2] Weaving section
Density = PCE Per Mile Per Lane; adjusted with 0.95 peak-hour factor
LOS = level of service
PCE = Passenger Car Equivalent
V = Volume in Passenger Car Equivalents (PCE) per hour

Table 1.9 2035 Intersection Levels of Service – Alternative 1

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	Delay	LOS	Delay	LOS
1. Tippecanoe Avenue/Hospitality Lane-Coulston Street	34.3	C	41.3	D
2. Tippecanoe Avenue/Harriman Place-I-10 Westbound Ramps[1]	29.7	C	34.9	C
3. Tippecanoe Avenue/I-10 Westbound Slip-On Ramp[1]	*No conflicting movement*		*No conflicting movement*	
4. Tippecanoe Avenue/I-10 Eastbound Ramps[1]	33.8	D	34.0	C
6. Anderson Street/Redlands Boulevard[1]	31.0	C	45.9	D
7. I-10 Eastbound Ramps/Redlands Boulevard	21.7	C	32.3	C
8. Waterman Avenue/Hospitality Lane	29.3	C	50.8	D
9. Waterman Avenue/I-215 On-Ramp	18.4	C	127.0	F*
10. Waterman Avenue/I-10 Eastbound Ramps	281.8	F*	**	F*
11. Waterman Avenue/Redlands Boulevard	55.7	E*	220.2	F*
12. I-10 Westbound Ramps-Carnegie Drive/Hospitality Lane	16.3	B	20.4	C
13. Mountain View Avenue/I-10 Westbound Ramps	206.9	F*	160.4	F*
14. Mountain View Avenue/I-10 Eastbound Ramps	166.3	F*	132.1	F*

Source: *Supplement to I-10/Tippecanoe Avenue Traffic Operations Analysis* (August 2009).
LOS and Delay obtained from SANBAG's *I-10/Tippecanoe Avenue Interchange Traffic Operations Analysis* (March 2008).
* Exceeds LOS
** Exceeds HCM calculation abilities
Delay = Average control delay in seconds.
HCM = Highway Capacity Manual
I-10 = Interstate 10
I-215 = Interstate 215
LOS = Level of Service
SANBAG = San Bernardino Associated Governments

Table 1.10 2035 Ramp Junction Levels of Service – Alternative 1

Location	AM Peak Hour		PM Peak Hour	
	Density	LOS	Density	LOS
Eastbound				
Waterman Avenue On-Ramp	N/A	N/A	N/A	N/A
Tippecanoe Avenue Off-Ramp	N/A	N/A	N/A	N/A
Tippecanoe Avenue On-Ramp	20.0	C	—	F[1]
Westbound				
Tippecanoe Avenue Off-Ramp	—	F[1]	—	F[1]
Tippecanoe Avenue Loop On-Ramp	—	F[1]	—	F[1]
Tippecanoe Avenue On-Ramp	N/A	N/A	N/A	N/A
Waterman Avenue Off-Ramp	N/A	N/A	N/A	N/A

Source: *Traffic Report for the I-10/Tippecanoe Avenue Interchange* (March 2008).
[1] Demand exceeds capacity
Density = PCE Per Mile Per Lane; adjusted with 0.95 peak-hour factor
LOS = level of service
N/A = Not a merge or diverge area
PCE = Passenger Car Equivalent

Table 1.11 Operations Improvements of Alternative 1 When Compared to the No Build Alternative

I-10 Segment/Intersection/Ramp Junction	Improve in 2015	Improve in 2035
I-10 Mainline Segment		
I-10 Eastbound Waterman Avenue On-Ramp to Tippecanoe Off-Ramp	YES	Same as No Build
Intersection		
Tippecanoe Avenue/Hospitality Lane-Coulston Street	Same as No Build[1]	YES
Tippecanoe Avenue/Harriman Place-Laurelwood Drive	YES	Same as No Build[1]
Tippecanoe Avenue/Eastbound Ramps	YES	YES
Tippecanoe Avenue/Westbound On-Ramp	YES	YES
Tippecanoe Avenue/Westbound Off-Ramp	Same as No Build	YES
Anderson Street/Redlands Boulevard	YES	YES
Ramp Junction		
I-10 Westbound Tippecanoe Avenue Loop On-Ramp Junction	YES	Same as No Build
I-10 Westbound Tippecanoe Avenue Off-Ramp	YES	Same as No Build
I-10 Eastbound Waterman Avenue On-Ramp Junction	YES	YES
I-10 Eastbound Tippecanoe Avenue Off-Ramp Junction	YES	YES

Source: *Traffic Report for the I-10/Tippecanoe Avenue Interchange* (March 2008) and *Supplement to I-10/ Tippecanoe Avenue Traffic Operations Analysis* (August 2009).
[1] Operates at satisfactory condition.
I-10 = Interstate 10
I-215 = Interstate 215

As seen in Table 1.11, the Build Alternative (Alternative 1) would meet the need to relieve congestion and improve operational deficiencies at the I-10/Tippecanoe Avenue Interchange. The locations where the Alternative 1 condition is the same as the No Build Alternative condition are either functions of congestion on the I-10 freeway or on local streets.

Traffic Accidents

The Department Traffic Accident Surveillance and Analysis System (TASAS) – Transportation System Network (TSN) data were provided by the Department District 8 for accidents that occurred during the 3-year period from July 1, 2005, to June 30, 2008, on I-10 from Post Mile (PM) 24.8 to PM 27.5 and the Tippecanoe Avenue interchange ramps.

As shown in Table 1.12, the accident data indicates that accidents occurred at a higher rate than the statewide average for similar facilities on the eastbound I-10 mainline and the westbound on-ramp. In particular, the accident rate is more than twice the statewide average rate on the westbound on-ramp. Analysis of the TASAS-TSN data for the westbound on-ramp shows that most of the accidents were broadside collisions, and failure to yield was the primary collision factor for most accidents. The majority of accidents on the westbound on-ramp occurred near the ramp

Table 1.12 TASAS-TSN Accident Rates (July 1, 2005, to June 30, 2008)

Location	Actual			Statewide Average		
	Fatal	F+I	Total	Fatal	F+I	Total
Mainline (PM 24.8 to PM 27.5)	0.003	0.38	1.13	0.005	0.34	1.10
Tippecanoe Avenue EB Off-Ramp (PM 26.03)	0.000	0.23	1.10	0.005	0.61	1.50
Tippecanoe Avenue EB On-Ramp (PM 26.53)	0.000	0.17	0.69	0.002	0.32	0.80
Westbound						
Mainline (PM 24.8 to PM 27.5)	0.006	0.32	0.77	0.005	0.34	1.10
Tippecanoe Avenue WB On-Ramp (PM 26.02)	0.000	0.80	1.86	0.002	0.32	0.80
Tippecanoe Avenue WB Off-Ramp (PM 26.51)	0.000	0.21	1.23	0.005	0.61	1.50

Source: *Draft Project Report, I-10/Tippecanoe Avenue Interchange Improvements* (July 2009).
Notes: F+I = Fatal+Injury
Accident rates for mainline expressed as number of accidents/million vehicle miles.
Accident rates for ramps expressed as number of accidents/million vehicles.
EB = eastbound
PM = Post Mile
TASAS = Traffic Accident Surveillance and Analysis System
TSN = Transportation System Network
WB = westbound

terminus, where the southbound and northbound Tippecanoe Avenue turning movements onto the on-ramp may conflict.

1.2.2.3 Social Demand and Economic Development

The I-10/Tippecanoe Avenue interchange provides direct access to Loma Linda University Medical Center and Loma Linda University, which are a few blocks south of the interchange. The Jerry Pettis Veterans Administration Hospital, the San Bernardino International Trade Center, and the new San Bernardino International Airport are within 2 mi of the interchange.

Over the past several years, the former Norton Air Force Base was converted into San Bernardino International Trade Center and the new San Bernardino International Airport. Several actions have been taken by local agencies to facilitate the transition. For instance, the Inland Valley Development Agency (IVDA) was established with the intent to redevelop the former Norton Air Force Base properties and an additional 14,000 acres (ac) within a 3 mi radius of the base, including the I-10/Tippecanoe Avenue interchange vicinity in the Cities of San Bernardino and Loma Linda. The IVDA is a joint powers authority that includes the County of San Bernardino and the Cities of San Bernardino, Colton, and Loma Linda. The goal of the IVDA is to replace the 10,000 jobs that were lost with the closure of the base. The City of San Bernardino has approved the San Bernardino International Trade Center Specific Plan, which identifies redevelopment for this area. In addition, the City of San Bernardino General Plan (2005) identifies appropriate land uses (commercial and industrial) within that airport influence area. The I-10/Tippecanoe Avenue interchange is within the airport influence area. Finally, the City of San Bernardino has established the area around the interchange as a San Bernardino Enterprise Zone; this designation allows tax and other incentives for business development in order to redevelop economically depressed areas.

Because the interchange provides access to regional educational, hospital, trade, and airport areas and is located in a regional redevelopment area, it is important that the interchange accommodate the transportation needs associated with existing and planned development.

1.2.2.4 Legislation

The I-10/Tippecanoe Avenue interchange improvements have been recognized as both locally and regionally important. Funds have been allocated through the 2009/2010 federal Demonstration (DEMO) and federal Projects of National and Regional Significance (PNRS) programs under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). SAFETEA-LU was signed into law by President George W. Bush on August 10, 2005, guaranteeing $244.1 billion for highways, highway safety, and public transportation. The I-10/Tippecanoe Avenue Interchange project is part of the earmark defined as “Improve interstates and roads part of the Inland Empire Goods Movement Gateway project in and around the former Norton Air Force Base.” Under Section 1301 (PNRS), this earmark is defined as Project No. 3. Under Section 1701 (High Priority Projects), the earmark is defined as Project No. 2051, with a total of $20 million allocated. The proposed project is not mentioned in detail in the legislation; the funding from these two earmarks was distributed to specific projects by Congressman Lewis under his Inland Empire Goods Movement Gateway program, in coordination with SANBAG staff.

Matching funds have been allocated through Measure I, the sales tax measure approved by San Bernardino County voters in 1989 and reauthorized in 2004. The Measure I Strategic Plan, approved by the SANBAG Board of Directors April 1, 2009, includes the I-10/Tippecanoe Avenue Interchange as one of the 38 interchanges included in the Valley Freeway Interchange Program.

1.2.2.5 Modal Interrelationships and System Linkages

The project site and its vicinity are served by Omnitrans. Omnitrans provides an extensive fixed-route bus system that includes several bus routes in the interchange area. Omnitrans is designing an additional route along Tippecanoe Avenue/Anderson Street within the project area, which is part of the E Street Corridor sbX Bus Rapid

Transit Project. A meeting was held with Omnitrans on June 18, 2009, to discuss design consistency between the interchange improvement project and the Omnitrans corridor.

Metrolink is a commuter rail line that provides service to the City of San Bernardino and other San Bernardino County cities. The San Bernardino Line connects Union Station in Los Angeles with the San Bernardino station in the City of San Bernardino, just west of Interstate 215 (I-215).

San Bernardino International Airport is a commercial service airport approximately 2 mi from the project site.

I-10 connects to I-215 approximately 2 mi west of Tippecanoe Avenue and to State Route 210 (SR-210) approximately 6.5 mi east of Tippecanoe Avenue. I-215 provides a regional connection between Los Angeles, Orange, Riverside, and San Bernardino Counties through its interchanges with State Route 60 (SR-60) and State Route 91 (SR-91). SR-210 provides a connection to foothill and mountain highways.

1.2.2.6 Independent Utility and Logical Termini

Federal Highway Administration (FHWA) regulations (23 CFR 771.111 (f)) require that a proposed project:

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

As described earlier in this section, the proposed I-10/Tippecanoe Avenue Interchange Improvement project specifically addresses existing and forecast congestion and traffic volumes at the interchange and merge/diverge conflicts as a result of the close spacing of the Waterman and Tippecanoe Avenues ramps. The project proposes improvements on Tippecanoe Avenue at its crossing of I-10 to accommodate the ramp and mainline improvements, with those improvements of sufficient length on the I-10 mainline and the ramp facilities to address the identified purposes of the project. These improvements will be able to function effectively in addressing both the congestion at the interchange and the merge/diverge of the ramp facilities. As a result, the proposed project connects logical termini on Tippecanoe Avenue between the ramps and on the I-10 mainline between the ramps. This project area is large enough to appropriately address the potential environmental impacts of the proposed project. In addition, the proposed project can meet the identified need for congestion relief and merge/diverge improvements as an independent project and is not dependent on any other projects to meet the identified purpose for the interchange improvements. Finally, the proposed improvements will be designed and constructed to minimize the potential conflict with other reasonably foreseeable transportation improvements in the area.

1.3 Project Description

This section describes the proposed action and the design alternatives that were developed by a multidisciplinary team to achieve the project purpose and need while avoiding or minimizing environmental impacts. The alternatives are the Build Alternative (Alternative 1) and the No Build Alternative (Alternative 2).

The project proposes reconstruction of the I-10/Tippecanoe Avenue interchange, including addition of an eastbound auxiliary lane on I-10 from Waterman Avenue to Tippecanoe Avenue; widening of I-10 bridges over San Timoteo Creek and Tippecanoe Avenue; widening of Anderson Street/Tippecanoe Avenue and Redlands Boulevard; construction of a roadway to connect East Coulston Street, East Lee Street, and East Laurelwood Drive; and elimination of the South Ferree Street connection to East Rosewood Drive.

The project site is in San Bernardino County, California, on I-10 at the Tippecanoe Avenue interchange. The project covers a distance of approximately 1.5 mi along I-10. The existing Tippecanoe Avenue/I-10 interchange is a compact diamond configuration with one-lane on- and off-ramps at the freeway diverge and merge areas. In the project area, I-10 has four mixed-flow lanes in each direction separated by a median with a concrete barrier. An existing auxiliary lane is provided along westbound I-10 between Tippecanoe and Waterman Avenues.

The purpose of the proposed project is to improve operational deficiencies and increase capacity at the interchange due to increasing traffic demand generated by the substantial growth and development that have occurred, and will continue to occur, in the Cities of Loma Linda and San Bernardino. It is also designed to provide adequate access to local businesses, residences, and major facilities served by the interchange (e.g., Loma Linda University Medical Center, Loma Linda University, the Jerry Pettis

Veterans Administration Hospital, San Bernardino International Trade Center, and the new San Bernardino International Airport).

1.3.1 Alternatives

For build alternatives to be considered feasible, they must meet the project's purpose and need while not causing other operational deficiencies at the interchange ramps, on the I-10 mainline, or at local intersections. Cost and severity of impacts are also considered.

Other build alternatives considered would improve some interchange operations but would:

- Degrade weaving operations and increase congestion on the I-10 mainline;
- Substantially increase costs;
- Increase right-of-way acquisition;
- Decrease LOS; and/or
- Increase queuing at intersections.

1.3.1.1 Alternative 1 – Build Alternative (Locally Preferred Alternative)

Alternative 1 includes improvements and reconfigurations to the I-10/Tippecanoe Avenue on- and off-ramps. Under this alternative, the eastbound off-ramp would be widened with additional turn lanes, a new westbound loop on-ramp would be constructed, and the westbound off-ramp would be realigned around the proposed westbound loop on-ramp.

Bridge reconstruction, local road improvements, bicycle lanes, and signal modification are also included in the Locally Preferred Alternative (Alternative 1).

The design features of the Locally Preferred Alternative (Alternative 1) are shown on Figure 1.2 and are described in detail below.

Project Components

Mainline Improvements

Improvements to the I-10 mainline under the Build Alternative include the addition of an eastbound auxiliary lane from the eastbound Waterman Avenue on-ramp to the eastbound Tippecanoe Avenue off-ramp.

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Figure 1.2 Alternative 1-Build Alternative (Locally Preferred Alternative)
(Sheet 1 of 4)

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Figure 1.2 Alternative 1-Build Alternative (Locally Preferred Alternative)
(Sheet 2 of 4)

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Figure 1.2 Alternative 1-Build Alternative (Locally Preferred Alternative)
(Sheet 3 of 4)

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Figure 1.2 Alternative 1-Build Alternative (Locally Preferred Alternative)
(Sheet 4 of 4)

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Ramp Improvements

Alternative 1 includes a westbound loop on-ramp at Tippecanoe Avenue. This ramp would eliminate the existing left-turn lane for traffic heading northbound on Tippecanoe Avenue to access westbound I-10. This would provide room for a double left-turn lane for southbound traffic on Tippecanoe Avenue to access the eastbound on-ramp and eastbound Redlands Boulevard.

The westbound Tippecanoe Avenue off-ramp would be reconfigured from a compact diamond to a partial cloverleaf configuration, increasing the intersection spacing over 400 ft between the westbound and eastbound ramps. The ramp intersection would align with the existing Harriman Place/Tippecanoe Avenue intersection.

The eastbound Tippecanoe Avenue off-ramp would be widened to provide an additional left-turn lane and right-turn lane at the ramp intersection.

Local Roadway Improvements

Under the Build Alternative, Tippecanoe Avenue from I-10 to just north of East Lee Street would be widened to provide lane taper length. Anderson Street from I-10 to south of Court Street would be widened to accommodate additional turn lanes at the Anderson Street/eastbound ramps and Anderson Street/Redlands Boulevard intersections.

Redlands Boulevard would be widened to provide a six-lane facility with dual left-turn lanes, striped medians, and sidewalks between approximately 450 ft west and 800 ft east of the intersection at Anderson Street.

The construction of the new westbound loop on-ramp and realignment of the westbound off-ramp would require eliminating direct access to either northbound or southbound Tippecanoe Avenue from East Laurelwood Drive. In order to maintain circulation and emergency and fire access from either side of Laurelwood Drive, a residential road would be constructed to connect East Coulston Street, East Lee Street, and East Laurelwood Drive (refer to Figure 1.2, Sheet 3).

The construction of the new westbound loop on-ramp and realignment of the westbound off-ramp would also require removal of East Rosewood Drive. The South Ferree Street connection to East Rosewood Drive would be eliminated by construction of a knuckle at East Laurelwood Drive and South Ferree Street.

Bridges

The bridge at the I-10 Tippecanoe undercrossing would be widened to accommodate the new westbound Tippecanoe Avenue loop on-ramp. In addition, the I-10 bridge structure over San Timoteo Creek would be seismically retrofitted and widened to accommodate the additional eastbound auxiliary lane.

There are two options for the seismic retrofit of the San Timoteo Creek bridge:

- Retrofit Option 1 would encase the existing pier wall with a steel jacket to increase its confinement and improve its flexural ductility, and to provide additional abutment seat length with the catcher blocks. A 1-inch (in) thick steel plate encasement with anchor bolts is proposed. The portion of the existing channel invert along the existing pier wall would be removed and replaced for the installation of steel jacket.
- Retrofit Option 2 would install cast-in-drilled-hole (CIDH) piles connected with grade beams behind abutments at the median and shoulder of I-10 to reduce the displacement demands. A total of eight 24 in diameter CIDH piles are proposed. The part of the existing approach slab at the median and shoulders would be removed and replaced for the installation of CIDH piles and grade beams.

The determination of which retrofit option would be implemented would be made during final design.

Retaining Walls

Retaining walls would be required along the widened eastbound Tippecanoe Avenue off-ramp and the I-10 eastbound auxiliary lane.

Sound Barriers

A preliminary noise abatement review determined that the proposed project may include the construction of two sound barriers (SB) to reduce traffic noise associated with the proposed project. The recommended sound barrier heights were determined based on the Department's *Traffic Noise Analysis Noise Protocol*. An approximately 708 ft long sound barrier with a maximum height of 14 ft (SB No. 2 on Figure 1.2) is proposed along the residential property line in the northeast quadrant of the I-10/Tippecanoe Avenue interchange, between the proposed westbound off-ramp and East Laurelwood Drive. An approximately 709 ft long sound barrier with a maximum height of 8 ft (SB No. 3 on Figure 1.2) is proposed along the residential property line in the northeast quadrant of the I-10/Tippecanoe Avenue interchange, adjacent to East Sycamore Lane. A maximum 8 ft height for SB No. 3 was recommended to prevent stagnant air created by higher barriers and to reduce a feeling of confinement in the outdoor active use areas, which are relatively shallow.

These proposed sound walls are considered reasonable on the basis of cost and effectiveness. Additional input from affected property owners would be obtained before the start of final design.

Water Quality Best Management Practices

As part of the proposed project, best management practices (BMPs) would be implemented during project construction and operation to target constituents of concern in runoff from the project area. Potential Treatment BMPs include biofiltration strips, media filters, and/or detention basins.

A biofiltration swale is proposed on a vacant lot immediately northeast of where San Timoteo Creek flows beneath Redlands Boulevard. This biofiltration swale would treat runoff from the new I-10 eastbound auxiliary lane. A second biofiltration swale is proposed immediately north of westbound I-10 between the new westbound on- and off-ramps at Tippecanoe Avenue. This biofiltration swale would treat runoff from the existing I-10 westbound paved surfaces and part of the new westbound off-ramp at Tippecanoe Avenue.

An Austin Sand Filter, extended detention basin, or third biofiltration swale is proposed inside the new westbound loop on-ramp to treat runoff in parallel with the second bioswale. The Austin San Filter, extended detention basin, or bioswale would treat flow from the second bioswale as well as runoff from westbound on- and off-ramps at Tippecanoe Avenue. Treatment BMP design would be finalized during the Plans, Specifications, and Estimates (PS&E) stage.

Drainage Facilities

The addition of the eastbound auxiliary lane on I-10 would require modifications to the existing concrete-lined trapezoidal channel parallel to and south of I-10.

Utilities

Facilities owned by the following utility companies were identified in the project area, including overhead and underground lines:

- Southern California Edison transmission and distribution
- The Gas Company

- Verizon
- Time Warner Cable
- Sprint
- Golden State for Time Warner Telecommunication
- City of Loma Linda
- City of San Bernardino (water and sewer)
- The Gage Canal Company
- Loma Linda University Medical Center

Signal Modification and Ramp Metering

The traffic signals would be modified and interconnected at the intersections of Anderson Street and Redlands Boulevard; the eastbound on- and off-ramps; and the intersection of Tippecanoe Avenue and the westbound on- and off-ramps/Harriman Place.

Ramp metering is currently provided on the existing I-10 westbound and eastbound on-ramps. The proposed westbound loop on-ramp would provide the necessary geometry to accommodate ramp metering with a high-occupancy vehicle (HOV) bypass lane.

Bicycle Lanes and Pedestrian Access

Class II bicycle lanes would be provided along Tippecanoe Avenue, with the exception of the segment of Anderson Street between the eastbound ramps and Redlands Boulevard, where 5 ft outside shoulders would be provided. Traffic signal modifications along Tippecanoe Avenue/Anderson Street may include automatic detection systems for bicycles. Street lighting along Tippecanoe Avenue, Anderson Street, and Redlands Boulevard would be provided to improve pedestrian and bicycle visibility and safety. This proposed condition is consistent with the City of Loma Linda General Plan, which shows Class II bicycle lanes on Anderson Street beginning at Redlands Boulevard and continuing to the south, and would allow for continuous bicycle access within constrained right-of-way through the interchange.

The project would remove existing sidewalk along the west side and reconstruct sidewalk along the east side of Tippecanoe Avenue/Anderson Street between Redlands Boulevard and Harriman Place. All access ramps and crosswalks impacted by the proposed improvements would be reconstructed in compliance with Americans with Disabilities Act (ADA) accessibility guidelines. Crosswalk marking removal associated with the removal of the west sidewalk will require 30 days notice to the public prior to removal and will comply with California Vehicle Code 21950.5.

Landscaping and Irrigation Systems

Planting plans would be included in the final design for the proposed project, consistent with the updated I-10 Corridor Planting Master Plan. The planting plan would consist of new warranted highway planting and replacement planting for existing trees, shrubs, and ground cover and/or hydroseed that would be appropriate to the area and enhance the existing indigenous species and plant communities. The replacement planting would likely be similar in character to existing landscaping. The new landscaping would include a maintenance/establishment period during which supplemental watering, thinning, and spraying may be required.

Replacement of irrigation facilities would be required for areas disrupted during construction. Irrigation work would consist of new irrigation systems as required for establishment of the replacement planting. The new irrigation systems would be designed to use reclaimed water (if available). Irrigation crossovers would be provided for all ramps and overcrossing abutments.

Right-of-Way Acquisition

New permanent right-of-way would be required for the proposed improvements. The proposed westbound on- and off-ramps would require the full acquisition of 39 parcels and the partial acquisition of 10 parcels. Widening of local streets would require 17 partial acquisitions. Two partial acquisitions would be required to reconstruct the northwest and southwest corners of the Harriman Place/Tippecanoe Avenue intersection. In general, the partial acquisitions consist of several feet of frontage area along major arterials.

Nonstandard Mandatory and Advisory Design Features

Exceptions to advisory and mandatory design standards are required for this project. Fact Sheets for the following nonstandard features have been reviewed and approved by the Department and FHWA. FHWA issued a finding of “acceptability” letter, constituting preliminary and conditional approval of the modified access request in October 2009.

Mandatory Design Exceptions

- **Stopping Sight Distance.** Nonstandard stopping sight distance is present on the mainline between Station (Sta.) 223+17.79 and Sta. 234+67.79. Based on the 80 mile-per-hour (mph) design speed for the freeway, the standard stopping sight distance is 930 ft. However, the existing vertical crest curve on the freeway at this location provides a stopping sight distance of only 583 ft.

- **Superelevation Rates.** A nonstandard superelevation rate is proposed at the Tippecanoe Avenue westbound off-ramp, "R-3" Line, from Sta. 30+28.93 to Sta. 32+15.49. Based on the curve radius of 335 ft, the standard superelevation rate is 12 percent. However, the proposed superelevation rate for this curve is 10 percent.
- **Corner Sight Distance.** Due to the proposed retaining wall, the driver from the inside left-turn lane on the eastbound off-ramp at Tippecanoe Avenue, "R-1" Line, with a setback distance of 10 ft from the major road edge of shoulder, is allowed a sight line to approaching southbound vehicles on Tippecanoe Avenue with a stopping sight distance of about 127 ft, while the inside right-turn lane provides a stopping sight distance of about 177 ft. This is less than the standard stopping sight distance of 360 ft based on a design speed of 45 mph.
- **Left-turn Lane Width.** Nonstandard left-turn lane widths are proposed along southbound Tippecanoe Avenue and Anderson Street.
- **Location and Design of Ramp Intersections on the Crossroads.** The distance between the Tippecanoe Avenue/eastbound ramps intersection and the Anderson Street/Redlands Boulevard intersection is about 166 ft and 167 ft (curb return to curb return) for northbound and southbound directions, respectively. The distance between the Tippecanoe Avenue/westbound ramps intersection and the Tippecanoe Avenue/East Lee Street intersection is about 238 ft (curb return to curb return).
- **Cross Slope.** The proposed cross slope of the eastbound mainline widening in the tangent section between Waterman Avenue and Tippecanoe Avenue is 3 percent in order to improve drainage flow off the traveled way.

Advisory Design Exceptions

- **Superelevation Transition.** Nonstandard superelevation transitions are proposed at the westbound loop on-ramp and the westbound on-ramp.
- **Superelevation Runoff.** Nonstandard superelevation runoffs are proposed at the westbound loop on-ramp and the westbound on-ramp.
- **Vertical Curves.** Nonstandard minimum vertical curve lengths are proposed at two locations along I-10.
- **Side Slope Standards.** The proposed westbound loop on-ramp does not provide the standard side slope rate 4:1 or flatter starting at the ramp merge with the westbound mainline to the areas adjacent to the Tippecanoe Avenue

Undercrossing. The ramp side slope rates from Sta. “A” 218+00 to Sta. “A” 230+00 will be approximately 2:1.

- **Angle of Intersection.** The existing eastbound on-ramp does not provide the standard intersection angle. The existing intersection angle between the eastbound on-ramp alignment and the Tippecanoe Avenue alignment is about 70 degrees.
- **Distance Between Successive On-ramps.** A nonstandard distance, 840 ft, would exist between the proposed westbound loop on-ramp, “R-4” Line, and the existing westbound on-ramp. After the ultimate widening of the mainline is implemented, the merge point for the westbound loop on-ramp, “R-4” Line, would move farther east, thus providing the standard 1,000 ft distance between successive on-ramps.
- **Weaving Sections.** The proposed project does not provide LOS C or D, during the 2035 PM peak-hour period for the weaving section between the Waterman Avenue eastbound on-ramp and the Tippecanoe Avenue eastbound off-ramp. The traffic analysis shows LOS E during this period.
- **Access Control.** Access rights cannot be acquired on the opposite side of the westbound off-ramp and westbound loop on-ramp at Tippecanoe Avenue. The ramps begin and end at the Harriman Place/Tippecanoe Avenue intersection. At the southeast quadrant of the existing eastbound on-ramp terminus, the overall length of access control is 169.65 ft. However, at 88 ft away from the curb return a break for the driveway entrance to Baker’s Burgers is maintained. The 100 ft access control was obtained at the other three quadrants of the ramp terminus.
- **Superelevation of Compound Curves.** A nonstandard superelevation transition is proposed for the compound horizontal curve on the westbound loop on-ramp (“R-4” Line).

Project Construction

Construction Staging Plan

Detailed stage construction plans would be developed during the final design of the project. The proposed construction sequencing is intended to provide immediate congestion relief to the I-10 eastbound off-ramp to Tippecanoe Avenue and the Anderson Street/Redlands Boulevard intersection by increasing the capacity of these facilities. Five major construction stages are anticipated to construct the proposed project improvements.

Stage 1 construction involves widening the Tippecanoe Avenue undercrossing along westbound I-10 and the San Timoteo Creek structure along eastbound I-10, replacing the existing concrete-lined trapezoidal channel with an underground reinforced concrete box (RCB) culvert, adding an auxiliary lane along the eastbound I-10 mainline, and realigning the Tippecanoe Avenue eastbound off-ramp. In this stage, detours may be required for realignment of the I-10 eastbound off-ramp and construction of the concrete pavement on the off-ramp approaching the Anderson Street intersection. Motorists would be able to use Waterman Avenue, Hospitality Lane, and Redlands Boulevard to bypass the construction sites. Traffic impacts are anticipated to be minor, as the closure of Tippecanoe Avenue and the eastbound off-ramp at Tippecanoe Avenue would be done overnight and during the weekend. Construction of the concrete pavement on the eastbound off-ramp approaching the Anderson Street intersection would require weekend closure.

Stage 2 construction would focus on the widening of Anderson Street and Redlands Boulevard. During construction, driveway access to local businesses and residents would be maintained. Pedestrian access would be maintained during construction by constructing the street widening improvements in halves. Bus stops may need to be relocated temporarily outside the construction area. After the streets are widened, existing medians would be removed and paved/reconstructed in their proposed locations.

Stage 3 construction would comprise the realignment of Laurelwood Drive, construction of the new westbound off-ramp at Tippecanoe Avenue, and widening of Tippecanoe Avenue north of the intersection. No closure is anticipated, as motorists would be able to continue utilizing the existing westbound off-ramp while the new ramp is being constructed.

Stage 4 construction activities would include construction of the new westbound loop on-ramp at Tippecanoe Avenue and widening of the remainder of Tippecanoe Avenue. The existing westbound off-ramp would be removed in this stage after traffic is shifted to the newly constructed westbound off-ramp. No closures are anticipated for this stage of construction.

Stage 5 construction would complete the improvements along Tippecanoe Avenue. After Tippecanoe Avenue is widened, existing medians would be removed and reconstructed in their proposed locations.

Construction Vehicle Access and Materials Staging

Construction vehicle access and staging of construction materials would occur within disturbed or developed areas inside the existing City and State rights-of-way or the proposed additional right-of-way. All construction vehicle access, materials staging and storage, and other construction activities would occur within the defined disturbance limits for the proposed project.

Construction Lighting

The project would require nighttime construction activities in some parts of the project area. Portable equipment would be used to light the work areas. If work is done at night, lighting would be directed away from adjacent land uses.

Temporary Construction Easements

Thirty-two temporary construction easements would be required in the four quadrants of the I-10/Tippecanoe Avenue interchange to construct and widen local streets, construct ramps, construct retaining walls and sound barriers, and widen the I-10 structure over San Timoteo Creek.

Estimated Cost

The estimated cost for Alternative 1 is approximately $74,719,000, which includes $35,881,000 for construction, $32,752,000 for right-of-way acquisition and utility relocation, and $6,086,000 for PS&E and construction management support costs.

1.3.1.2 Alternative 2 – No Build Alternative

The No Build Alternative would not include improvements to the I-10/Tippecanoe Avenue interchange. Except for normal maintenance, there are no committed improvements included in the No Build Alternative, although the Cities of Loma Linda and San Bernardino would be able to make needed local street improvements, consistent with their respective General Plans. This alternative is not consistent with the mobility goals of the Regional Congestion Management Plan.

1.4 Comparison of Alternatives

Table 1.13 provides a comparison between the Build Alternative (Alternative 1) and the No Build Alternative (Alternative 2).

Table 1.13 Comparison of Impacts for the Project Alternatives

Environmental Issue		Build Alternative (Alternative 1)	No Build Alternative (Alternative 2)
Land Use		No Section 4(f) property use. Consistent with applicable transportation plans and General Plans. Land use changes from residential and commercial uses to transportation use.	None
Growth		None	None
Farmlands and Timberlands		None	None
Community Impacts	Community Character and Cohesion	Minor as a result of residential displacements. Potential parking impact at Baker's Burgers; approval of parking plan required.	None
	Relocation	29 full and 6 partial property acquisitions; 10 full and 23 partial commercial property acquisitions; 25 residential displacements and 8 business displacements.	None
	Environmental Justice	None	None
Utilities and Emergency Services		Temporary construction impact for relocation or protection in place.	None
Traffic and Transportation		Temporary construction impact.	Increased permanent traffic congestion, continued LOS deterioration, and increased vehicle density
Visual and Aesthetics		Some improved views, one minor altered view.	None
Cultural Resources		Potential to encounter unknown cultural resources.	None
Hydrology and Floodplains		Temporary construction impact. Minor temporary and permanent floodplain encroachment.	None
Water Quality and Storm Water Runoff		Potential temporary increase in pollutant loading. Potential benefit through addition of Treatment BMPs.	None
Geology, Soils, Seismic, and Topography		Potential temporary erosion and stability impacts.	Potential permanent seismic/earthquake impacts to the I-10 bridge over San Timoteo Creek, which has not been seismically retrofitted
Paleontology		Potential permanent impacts during construction. Paleontological Mitigation Plan required.	None
Hazardous Wastes and Materials		Temporary construction impact.	None
Air Quality		Temporary construction impact.	Potential permanent increase in pollutants associated with increased congestion
Noise		Temporary construction impact. Permanent noise levels approach or exceed FHWA noise abatement criteria; however, long-term abatement is reasonable and feasible. Significant noise impact under CEQA, mitigated with Sound Barrier No. 2.	None
Natural Communities		None	None
Wetlands and Other Waters		Temporary and permanent impacts to potential ACOE, CDFG, and RWQCB jurisdictional waters. Mitigation required. No impacts to wetlands.	None
Plant Species		None	None
Animal Species		Potential temporary construction impact to migratory birds.	None
Threatened and Endangered Species		None	None
Invasive Species		Potential spread of invasive plant species as a result of construction activities. Beneficial impact due to removal of invasive species.	None
Cumulative Impacts		Not substantial for planned projects.	Not substantial
Climate Change		Anticipated permanent reduction due to improved traffic flow.	Not substantial

ACOE = United States Army Corps of Engineers
BMP = Best Management Practice
CDFG = California Department of Fish and Game
CEQA = California Environmental Quality Act
FHWA = Federal Highway Administration
LOS = level of service
RWQCB = Regional Water Quality Control Board

After the public circulation period, all comments will be considered, and the Project Development Team will select a preferred alternative and make the final determination of the project's effect on the environment. In accordance with California Environmental Quality Act (CEQA), if no unmitigable significant adverse impacts are identified, the Department will prepare a Mitigated Negative Declaration (MND). Similarly, if the Department determines the action does not significantly impact the environment, the Department, as assigned by FHWA, will issue a Finding of No Significant Impact (FONSI) in accordance with the National Environmental Policy Act (NEPA).

1.5 Alternatives Considered but Eliminated from Further Discussion

Several Build Alternatives have been studied over the past 8 years, and only Build Alternative 1 was found to be feasible. During preliminary studies, three Build Alternatives were identified and studied in the Project Study Report (PSR) (Project Development Support [PDS]) (August 2002). In addition, the Value Analysis (VA), conducted in 2004, identified two additional Build Alternatives. In 2004 and 2005, the Department conducted internal studies and an internal value analysis, in which an additional four Build Alternatives were identified.

Based on the results of a traffic study prepared in September 2006, two of the three Build Alternatives identified in the PSR (PDS), the two Build Alternatives identified during the VA, and the four Department-proposed Build Alternatives were found not to be viable alternatives. The reasons why these eight Build Alternatives were rejected are provided in the following sections.

1.5.1 PSR (PDS) Alternative 2

This PSR (PDS) Alternative proposed realigning the eastbound Tippecanoe Avenue off-ramp to a hook ramp, which would intersect a realigned Redlands Boulevard. With this configuration, there would be signalized intersections at the hook ramps, realigned Redlands Boulevard, and Evans Street. The westbound Tippecanoe Avenue on- and off-ramps would be realigned to intersect at Tippecanoe Avenue and Laurelwood Drive on the north side of I-10.

Under this alternative, the eastbound weaving distance between the Waterman Avenue on-ramp and the Tippecanoe Avenue off-ramp would be reduced from greater than 1,970 ft in the existing condition to 1,630 ft or less. Even with the addition of an auxiliary lane on eastbound I-10 between Waterman Avenue and Tippecanoe Avenue, the weaving analysis showed this alternative would result in LOS E/F for the a.m. peak hour and LOS E in the p.m. peak hour in 2035 on eastbound I-10 within the project limits. Although the I-10 mainline is already operating at LOS F, the hook ramp option would reduce the weaving length, which would increase congestion and cause the mainline to operate at LOS F for a longer period of time. Due to the degraded weaving operations and increased congestion, this alternative was eliminated from further consideration.

1.5.2 PSR (PDS) Alternative 4

This PSR (PDS) Alternative proposed an offset urban interchange. With this configuration, there would be a four-way intersection where the eastbound and westbound ramps would intersect at a common point on Tippecanoe Avenue, north of the I-10 mainline. The eastbound Tippecanoe Avenue off- and on-ramps would need to be constructed under the I-10 mainline to intersect Tippecanoe Avenue on the north side of the I-10 mainline, which would require tunneling below grade. Under this alternative, the I-10 mainline would also need to be realigned slightly to the north to allow for stage construction, and the bridge at the I-10 Tippecanoe undercrossing would need to be replaced.

An intersection analysis completed in 2002 revealed the need for a triple southbound left-turn to the eastbound on-ramp for this alternative based on 2025 traffic forecasts. Three left-turn lanes would be required to achieve LOS D for that intersection. In addition, this southbound triple left-turn would create a queue of eight vehicles per lane, which would exceed the storage length available on Laurelwood Drive.

On the I-10 mainline, the eastbound on-ramp auxiliary lane to Mountain View Avenue would be reduced from 2,238 ft to 1,811 ft, which would degrade the existing weave conditions on eastbound I-10 between Tippecanoe Avenue and Mountain View Avenue.

Other issues associated with this alternative included the need to provide pump stations to address water issues associated with the eastbound Tippecanoe Avenue off-ramp and on-ramp going below the mainline in tunnels in a high-ground-water area in a fault zone. The profile of the eastbound off- and on-ramps would be as much as 20 ft below ground surface (bgs), and the water table is as shallow as 13 ft to 16.5 ft bgs. Additional easements would be required to accommodate the drainage system. As a result of these factors and the traffic operations issues with the triple left-turn and mainline weaving degradation, this alternative was eliminated from further consideration.

1.5.3 VA Alternative 1 – Conventional Urban Interchange

This alternative would construct a conventional urban interchange that would have a single-point intersection under a realigned I-10 mainline. Each ramp would split traffic, with left turns approaching a common signal and right turns in separate split lanes for a merge/diverge with Tippecanoe Avenue. The right-turn lanes would not necessarily be signalized.

Due to the proximity of I-10 to Redlands Boulevard, there would be insufficient distance for the eastbound Tippecanoe Avenue off-ramp traffic to access the southbound left-turn pocket to Redlands Boulevard. This would result in traffic backing up on the off-ramp and possibly the mainline due to its inability to access an allowable space to merge into that turn pocket.

The realignment of the I-10 mainline would be required to accommodate the required turn pockets and turning movements at the single-point intersection. The realignment of the I-10 mainline would present staging challenges and would degrade freeway operations during construction. The realignment would also require additional right-of-way from the existing commercial properties on the north side of the mainline. In addition, the bridge at the Tippecanoe Avenue undercrossing would have to be reconstructed. Due to the reasons listed above, this alternative was eliminated from further consideration.

1.5.4 VA Alternative 2 – Extension of Evans Street Northward Across I-10

This alternative proposed extending Evans Street north across the I-10 mainline to Laurelwood Drive/Harriman Place. This alternative was developed to serve as a parallel north-south corridor to Tippecanoe Avenue to serve some of the demand on Tippecanoe Avenue. New bridges would be required over the I-10 mainline and over Redlands Boulevard. A new connector from Evans Street back to Redlands Boulevard would also be required. Retaining walls or large embankments would be required along Evans Street south of Redlands Boulevard and north of I-10 to minimize acquisition of the right-of-way for the new Evans Street.

A traffic analysis conducted in 2004 indicated that the additional Evans Street overcrossing would not be sufficient to improve the existing LOS F on the existing ramp intersections to an acceptable level without additional improvements to the

Tippecanoe Avenue/Anderson Street corridor. The construction of a new overcrossing at Evans Street would leave four signalized intersections in close proximity to each other, which would create a queuing problem through the corridor along with unacceptable LOS at these intersections. The tight spacing of the existing intersections would create traffic backups onto the ramp and potentially the mainline. This alternative would result in a relatively small improvement to the traffic operations on Tippecanoe Avenue/Anderson Street and would still result in unacceptable LOS and queuing. The inability of the alternative to provide a meaningful improvement to Tippecanoe Avenue restricts it from meeting the purpose and need of the project. Also, additional right-of-way acquisitions would be required on the north side of I-10. Due to the reasons listed above, this alternative was eliminated from further consideration.

1.5.5 Post-VA Alternative1 – Base Condition

This alternative would keep the eastbound and westbound Tippecanoe Avenue on- and off-ramp locations the same as under the existing condition. The ramps would be widened at the intersections with Tippecanoe Avenue and Anderson Street. Tippecanoe Avenue and Anderson Street would be widened in each direction from Redlands Boulevard to north of Laurelwood Drive. To accommodate the widening, the bridge at the Tippecanoe Avenue undercrossing would need to be replaced.

An analysis of the traffic operations indicated that there would still be queuing problems and operational issues with this alternative, because the Anderson Street/ Redlands Boulevard intersection, the eastbound I-10 ramps/Tippecanoe Avenue intersection, and the westbound I-10 ramps/Tippecanoe Avenue intersection would remain closely spaced. Under this alternative, the intersections would not be able to clear the traffic within the signal cycle length. The queuing would also be unacceptable due to the short distance between the intersections (i.e., the number of vehicles would exceed the storage length available).

An additional through lane in each direction on Tippecanoe Avenue would be required to prevent the oversaturation of the intersections and the queuing problems. A new bridge at the Tippecanoe Avenue undercrossing would be required to accommodate 10 lanes: 3 through lanes in each direction and 2 left-turn lanes in each direction. This would also require Tippecanoe Avenue/Anderson Street to be widened beyond the ramp intersections to allow for a transition to these 10 lanes, which in turn would require additional right-of-way. Even with the widening, there would still be

3 closely spaced intersections and the queuing issues would not be fully resolved. As a result, this alternative was eliminated from further consideration.

1.5.6 Post-VA Alternatives 2a, 2b, and 2c

These alternatives looked at various configurations of the eastbound Tippecanoe Avenue on- and off-ramps. The westbound Tippecanoe Avenue on- and off-ramps would be realigned to loop ramps that would converge at a single point at Laurelwood Drive, which is the same configuration proposed under Build Alternative 1. However, Alternatives 2a, 2b, and 2c would all have a hook ramp for the eastbound off-ramp onto Redlands Boulevard, east of Tippecanoe Avenue. Alternative 2a would have an eastbound on-ramp immediately adjacent to the eastbound off-ramp. Alternative 2b would replace the eastbound hook on-ramp with a loop ramp in the southeast quadrant of the interchange (east of Tippecanoe Avenue, between I-10 and Redlands Boulevard). Alternative 2c would have an additional loop ramp for the Tippecanoe Avenue southbound/eastbound on-ramp in the southwest quadrant of the interchange (west of Tippecanoe Avenue, between I-10 and Redlands Boulevard).

These alternatives would create several traffic operations deficiencies. The Tippecanoe Avenue eastbound hook off-ramp would be closer to the Waterman Avenue eastbound on-ramp than either the existing condition or the currently proposed Build Alternative. As a result, even with an additional auxiliary lane on eastbound I-10 between these two interchanges, weaving operations would be degraded from the existing condition. Under Alternatives 2b and 2c, there would also be a weaving conflict along Tippecanoe Avenue between on-ramp and off-ramp traffic. In addition, there would be queuing problems under Alternative 2a, which would create the potential for traffic backing up onto the I-10 mainline from the eastbound Tippecanoe Avenue off-ramp. Because these alternatives would have additional traffic operational deficiencies compared to the proposed Build Alternative, these alternatives were eliminated from further consideration.

1.5.7 Post-VA Alternative 3 – Split Diamond Alternative

This alternative would connect Tippecanoe Avenue with a northerly extension of Evans Street (across I-10) via east-west frontage roads. The westbound off-ramp and eastbound on-ramp would connect to this frontage road at Tippecanoe Avenue. The eastbound off-ramp and westbound on-ramp would connect to the frontage road at Evans Street. The extension of Evans Street to the north would require a new overcrossing over I-10, which would go through existing businesses north of I-10. The extension over I-10 would also require Evans Street to be raised over Redlands

Boulevard, which would require a new bridge for Evans Street over Redlands Boulevard and a new connector between Evans Street and Redlands Boulevard. In addition, the construction of closely spaced frontage reads would restrict any future expansion of I-10.

Under this alternative, the weaving distance from the westbound on-ramp from Evans Street to the Carnegie Lane/Hospitality Drive off-ramp would reduced by half, resulting in LOS F in the 2035 p.m. peak hour. In the eastbound direction, there would also be a reduction in weave length, which would result in an LOS of borderline E/F in the 2035 p.m. peak hour. Another option would be to grade separate the eastbound Tippecanoe Avenue on- and off-ramps; however, this would be problematic due to the tight spacing with Redlands Boulevard and the relatively short distance between Waterman Avenue and Evans Street. Due to the inadequate westbound weaving distance, the extensive right-of-way acquisitions necessary to construct the frontage road and the Evans Street extension, and the restriction of future expansion of I-10, this alternative was eliminated from further consideration.

1.5.8 Post-VA Alternative 4

This alternative would reconstruct the eastbound Tippecanoe Avenue on- and off-ramps. These ramps would be reconfigured as hook ramps that would converge to Redlands Boulevard east of Anderson Street/Tippecanoe Avenue. The westbound Tippecanoe Avenue on- and off-ramps would remain at their existing locations. The new hook ramps would be located where there are currently several large car dealerships on the north side of Redlands Boulevard in the City of Loma Linda.

The queues for the realigned eastbound off-ramp would back up onto the mainline in the a.m. peak hour. The resulting LOS for the Redlands Boulevard/Anderson Street intersection in the a.m. peak hour would be LOS F. The long queue and the low LOS would cause traffic on Redlands Boulevard to back up beyond the new hook ramp intersection on the off-ramps.

Under this alternative, the eastbound on- and off-ramps would be moved east, which would decrease the distance between the eastbound Tippecanoe Avenue on-ramp and the eastbound Mountain View Avenue off-ramp and degrade weaving operations.

For the above reasons, this alternative was eliminated from further consideration.

1.5.9 Transportation Systems Management and Transportation Demand Management Alternatives

Alternative travel modes were considered during the early planning studies. Transportation Systems Management (TSM) strives to maximize efficiency of the existing system through operational modifications by providing options such as ridesharing, reversible lanes, ramp metering, and traffic-signal optimization. TSM strategy options consist of actions to improve traffic flow and increase the number of vehicle trips without altering the number of through lanes, while Transportation Demand Management (TDM) focuses on the demand side of travel behavior, with regional strategies for reducing the number of vehicle trips and vehicle miles traveled, and increasing vehicle occupancy. It facilitates higher vehicle occupancy or reduces traffic congestion by expanding travelers' transportation choices through initiatives such as telecommuting and changing work schedules to produce a more even pattern of transportation network use, muting the effect of morning and evening rush hours. In addition, multimodal alternatives integrate multiple modes of transportation, such as pedestrian, bicycle, automobile, rail, and transit.

The purpose of the I-10/Tippecanoe Avenue Interchange Improvement project is to improve operational deficiencies and increase capacity at the interchange, as well as enhance local circulation and access. A separate TDM Alternative, such as a Mass Transit Alternative, was not developed because there is substantial existing transit services (i.e., Metrolink [commuter rail], Amtrak [interregional and interstate rail], Omnitrans [local and regional bus], Greyhound [interregional and interstate bus]) provided in this part of the City of Loma Linda, the City of San Bernardino, and the County, and because the proposed interchange improvements are needed to provide improved access to I-10. Omnitrans is currently planning a new transit system (E Street Corridor sbX Bus Rapid Transit Project) in the project area (refer to Table 2.1.A and Figure 2.1.3). A meeting was held with Omnitrans on June 18, 2009, to discuss design consistency between the interchange improvement project and the Omnitrans corridor. In addition, the I-10 HOV Lane Addition is planned along the project segment of I-10. Therefore, no TSM/TDM alternative is evaluated in this Initial Study/Environmental Assessment (IS/EA).

Although TSM/TDM measures alone could not satisfy the purpose and need of the project, TSM/TDM measures, including an auxiliary lane and turning lanes, have been incorporated into the Build Alternative for this project.

1.6 Permits and Approvals Needed

Table 1.14 lists the permits, reviews, and approvals that are or may be required prior to or during construction of the proposed project.

Table 1.14 Permits and/or Approvals Needed

Agency	Permit/Approval	Status
State Water Resources Control Board (SWRCB)	Section 402 NPDES (Construction Activity)	Application and Notice of Intent will be submitted prior to construction.
Santa Ana Regional Water Quality Control Board (RWQCB)	Section 401 Certification or Waiver	Application will be submitted after environmental document approval. SANBAG will coordinate with the RWQCB to obtain water quality certification during final design.
United States Army Corps of Engineers (ACOE)	Section 404 Permit, Nationwide (NWP)	Field meeting was conducted on May 5, 2009, to discuss ACOE jurisdiction. Application will be submitted after environmental document approval. SANBAG will coordinate with ACOE to obtain NWP concurrence after Section 401 certification is received.
California Department of Fish and Game (CDFG)	Section 1602 or Letter of Nonjurisdiction	Application will be submitted after environmental document approval. SANBAG will coordinate with CDFG to obtain agreement regarding riparian habitat impacts and mitigation.
County of San Bernardino Flood Control District	Encroachment Permit and Plan Approval	Encroachment permit application and plan review and approval will occur during final design.
Air Quality Conformity	Air Quality Conformity Approval Letter	Air Quality Conformity report will be submitted to FHWA after receipt of public comments on the IS/EA. FHWA will make a conformity determination prior to MND/FONSI.
Department	Modifications to existing Freeway Agreements	City of San Bernardino and City of Loma Linda will each approve modifications to respective freeway agreements during final design.
California Transportation Commission	Release of State Funds	Draft and Final IS/EA will be sent to CTC for review.

FHWA = Federal Highway Administration
IS/EA = Initial Study/Environmental Assessment
MND/FONSI = Mitigated Negative Declaration/Finding of No Significant Impact
NPDES = National Pollutant Discharge Elimination System
SANBAG = San Bernardino Associated Governments

Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

As part of the scoping and environmental analysis conducted for the project, the following environmental issues were considered, but no adverse impacts were identified. Consequently, there is no further discussion regarding these issues in this environmental document.

- **Coastal Zone:** There is no potential for adverse impacts to a coastal zone because the project site is approximately 50 miles inland from the coast.
- **Wild and Scenic Rivers:** There is no potential for adverse impacts to wild and scenic rivers due to the absence of designated wild and scenic rivers in the vicinity of the project site.
- **Farmlands or Timberlands:** There is no potential for adverse impacts to farmlands or timberlands. The project site is in an urban part of the City of San Bernardino and the City of Loma Linda, and no timberlands are present. The Community Impact Assessment prepared for the project determined that there are no farmlands in the vicinity of the project site.
- **Natural Communities:** There is no potential for adverse impacts to natural communities of special concern. The Natural Environment Study (Minimal Impacts) (NES[MI]) prepared for the project determined that there are no natural communities of special concern in the vicinity of the project site.
- **Plant Species:** There is no potential for adverse impacts to plant species of special concern. The NES(MI) prepared for the project determined that there are no plant species of special concern in the vicinity of the project site.
- **Threatened and Endangered Species:** There is no potential for adverse impacts to threatened and endangered plant or animal species. The NES(MI) prepared for the project determined that there are no threatened or endangered species or habitat for such species in the vicinity of the project site. Based on the absence of threatened and endangered species and habitat in the project area, the Department determined that the project would have no effect on threatened and endangered species.

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Human Environment

2.1 Land Use

This section is based on information from the *Community Impact Assessment* (August 2009).

2.1.1 Existing and Future Land Use

2.1.1.1 Existing Land Uses

The project area (shown previously on Figure 1.2 in Section 1.3.1.1) is in the Cities of San Bernardino and Loma Linda, in San Bernardino County. The project area is the area studied for temporary and permanent project impacts. Specifically, the northern part (north of Interstate 10 [I-10]) of the project area is in the City of San Bernardino and the southern part is in the City of Loma Linda.

Existing land uses in the project area are described below by quadrant:

- **Northwest Quadrant (west of Tippecanoe Avenue and north of I-10):** Located in the City of San Bernardino, this quadrant is designated as Commercial Regional–3 (Tri-City Commercial) in the City of San Bernardino General Plan (adopted November 1, 2005). This designation includes a mixture of offices, restaurants, regional retail, service, tourism, entertainment, and financial establishments. It also supports outdoor dining, hotels/motel, research and development, high technology, business park, warehouse/promotional retail, and supporting services uses that capitalize on the location along the I-10 corridor. Current uses in this quadrant include a Sam's Club between I-10 and Harriman Place and a Costco between Harriman Place and Hospitality Place. Several small businesses and fast-food and chain restaurants are also located in this quadrant.
- **Northeast Quadrant (east of Tippecanoe Avenue and north of I-10):** Also located in the City of San Bernardino, this quadrant is designated in the City of San Bernardino General Plan as Commercial General–1 between I-10 and Rosewood Drive and Residential Medium and Residential Medium High between Rosewood Drive and Coulston Street. The Commercial General–1 designation includes local and regional retail, personal service, entertainment, office, and related commercial uses, and limited residential use. The Residential Medium and Residential Medium High designations are classified as multifamily units. The Residential Medium designation does provide for small-lot single-family residences. A fast-food restaurant and a motel are located between I-10 and

Rosewood Drive. Numerous multifamily and single-family residences are located north of Rosewood Drive.

- **Southwest Quadrant (west of Tippecanoe Avenue and south of I-10):** This quadrant, located in the City of Loma Linda, is designated in the City of Loma Linda General Plan (adopted May 26, 2009) as Commercial, which provides for retail uses such as shopping centers and specialty stores. Office uses are also permitted in this designation. Current uses between I-10 and Redlands Boulevard include several fast-food restaurants and several older, single-family residences. Small businesses, including an auto repair facility and a fast-food restaurant, are located south of Redlands Boulevard.
- **Southeast Quadrant (east of Tippecanoe Avenue and south of I-10):** This quadrant is also in the City of Loma Linda and is designated in the City of Loma Linda General Plan as Commercial. North of Redlands Boulevard to I-10 are a strip mall, a family-style chain restaurant, and several small businesses. South of Redlands Boulevard are a gas station and several small, independent businesses.

2.1.1.2 Future Land Uses

The Land Use Elements in the General Plans for the Cities of Loma Linda and San Bernardino identify the future planned land uses in the Cities. General Plan land uses for the Cities of San Bernardino and Loma Linda are shown in Figures 2.1.1 and 2.1.2, respectively.

The City of San Bernardino’s total planning area encompasses 45,231 acres (ac) (70.67 square miles [sq mi]), with 35,187 ac (54.98 sq mi) of land that can be used or developed in some manner. Developable land uses in the planning area include 18,599 ac (29.00 sq mi) of residential uses, 10,060 ac (15.72 sq mi) of business-related uses, 5.34 sq mi of public/quasi-public uses, and 3,110 total ac (4.86 sq mi) of open space uses (parks or permanent open spaces). The remaining 10,043 ac (15.69 sq mi) not subject to development includes flood control facilities, road rights-of-way, and railroad rights-of-way.

The City of Loma Linda’s total planning area covers approximately 6,662 ac (10.41 sq mi). Of this area, approximately 4,755 ac (7.43 sq mi) is currently within the City limits and the remainder is within the City’s Sphere of Influence. According to the General Plan, 24 percent of land use is residential, 2.9 percent is commercial, 9 percent is institutional, 0.29 percent is industrial, and 63 percent is open space.

Figure 2.1.1 City of San Bernardino General Plan Land Uses

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Figure 2.1.2 City of Loma Linda General Plan Land Uses

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The Inland Valley Development Agency (IVDA) Redevelopment Plan, which is included in the City of San Bernardino General Plan, designates the northeast quadrant of the I-10/Tippecanoe Avenue interchange for commercial and industrial redevelopment to allow appropriate land use types in the vicinity of the San Bernardino International Airport. The residential parcels in the northeast quadrant are designated Commercial General-1, which does not permit single-family residences except by Conditional Use Permit. Therefore, future planned redevelopment of this area would change the land use from residential to commercial or industrial.

2.1.1.3 Development Trends

According to the City of San Bernardino General Plan, the City has over 6,500 ac of vacant residential- and commercial-designated land within its boundaries. However, factoring in lots that do not meet the minimum size or dimensions, are subject to flood hazard/high fire hazard, exceed 5 percent slopes, lack frontage on a paved public street, or lack utilities to the property line, only 37 percent of this vacant land (2,405 ac) is developable.

The Loma Linda General Plan Land Use Element states that approximately 3,867 ac, or 63 percent, of the planning area includes land devoted to open space, agricultural or recreational use, and vacant land that is not developed. Additionally, the Growth Management Element details the City’s plans to maintain the quality of life in Loma Linda by preserving open space and hillsides; maintaining safe, quiet neighborhoods; and reducing traffic.

The proposed project is within the City of Loma Linda’s Merged Project Area (MPA), which has potential for development. However, lack of funding has not allowed for adequate infrastructure development in the MPA. According to the City of Loma Linda General Plan, the City is fiscally sustainable into the future but only at a “maintenance” level. This means that any development with substantial negative fiscal impacts would strain the ability of the City of Loma Linda’s operating budget to provide needed services at current service levels. According to the City of Loma Linda General Plan, the City of Loma Linda is overly dependent on retail sales tax and motor vehicle in-lieu revenue sources, and a substantial decrease in either of these revenue streams could limit the amount of resources available to maintain the City’s existing public services and facilities, let alone fund development of infrastructure for new development.

Both the Cities of San Bernardino and Loma Linda are near build out, with less than half of the land in those Cities suitable for new development. A recent review of aerial photos and a site visit of the project area did not reveal many vacant parcels suitable for development. In addition, Loma Linda's fiscal constraints may limit future development.

Table 2.1.A provides a list of planned projects in project area Census Tracts 72.00 and 73.01. The locations of these projects and the census tracts are shown on Figure 2.1.3.

2.1.2 Consistency with State, Regional, and Local Plans

2.1.2.1 City of San Bernardino General Plan

The City of San Bernardino General Plan functions as a guide to planners, the general public, and decision-makers for the ultimate pattern of development for the City. It designates general site development standards and the distribution, location, and the extent of land uses. Land uses can include residential, business, industry, open space, natural resources, recreation, public/quasi-public uses, road, and the public utility infrastructure. Relevant land use, air quality, and circulation-related goals and policies in the City of San Bernardino General Plan that support the purpose of and need for the proposed project are described below.

Land Use Element

Policy 2.2.1 Ensure compatibility between land uses and quality design through adherence to the standards and regulations in the Development Code and policies and guidelines in the Community Design Element.

Policy 2.2.3 Sensitively integrate regionally beneficial land uses such as transportation corridors, flood control systems, utility corridors, and recreational corridors into the community.

Policy 2.2.5 Establish and maintain an ongoing liaison with the California Department of Transportation (Department), the railroads, and other agencies to help minimize impacts and improve aesthetics of their facilities and operations; including possible noise walls, berms, limitation on hours and types of operations, landscaped setbacks and decorative walls along its periphery.

Table 2.1.A Proposed Projects Within the Study Area Census Tracts

ID Number Shown on Figure 2.1.3	Project Name/Type	Jurisdiction	Proposed Uses	Status
1	Hospitality Retail Center	City of San Bernardino	Commercial Retail	
2	Interstate 10 Carpool Lanes Project	California Department of Transportation/San Bernardino Associated Governments	Freeway Improvement	Environmental Review
3	Hotel – 23 Units	City of Loma Linda	Commercial Hotel	Approved
4	Car Wash/Oil Change Facility	City of Loma Linda	Commercial Retail	Approved
5	Hotel – Holiday Inn	City of Loma Linda	Commercial Hotel	Approved
6	New West Street Addition	City of Loma Linda	Roadway	Future Project [1.]
7	New Stewart Street Addition	City of Loma Linda	Roadway	Planning Process
8	sbX System Wide Bus Transit	Omnitrans	Transit System	Planning Process
9	Pediatric Ambulatory Pavilion (Phase 1)	City of Loma Linda	Institutional	Future Project
10	Pediatric Ambulatory Pavilion (Phase 2)	City of Loma Linda	Institutional	Future Project
11	Children’s Hospital	City of Loma Linda	Institutional	Future Project
12	Faculty Practice	City of Loma Linda	Institutional	Future Project
13	Dental School	City of Loma Linda	Institutional	Future Project
14	Mission and Barton Elementary Schools	City of Loma Linda	Institutional	Future Project
15	California Street Widening Project	City of Loma Linda	Roadway	Future Project
16	Orange Street Extension to Mission Road	City of Loma Linda	Roadway	Future Project
17	Naim Bernaba Condominiums –Three-Story Building	City of Loma Linda	Residential	Approved
18	Veterans Administration Outpatient Clinical Building	City of Loma Linda	Institutional	Future
19	Loma Linda University Historical District	City of Loma Linda	Institutional	Future
20	Loma Linda University Student Housing Phase 2	City of Loma Linda	Institutional	Future Project
21	Loma Linda University New Linda Hall	City of Loma Linda	Institutional	Future Project
22	Loma Linda University Ambulatory Pavilion	City of Loma Linda	Institutional	Future Project
23	Loma Linda University ED Expansion	City of Loma Linda	Institutional	Future Project
24	“Mirror” Office Building	City of Loma Linda	Office	Future Project
25	Elizabeth Iskander – 13-Unit Town Homes	City of Loma Linda	Residential	Approved
26	Decco Properties – 10-Unit Apartments	City of Loma Linda	Residential	Approved

Source: City of Loma Linda Infrastructure Task Force and Planning Department (6-5-09).

[1] Future Projects are those that are indicated in planning documents such as the City’s General Plan or Loma Linda University’s Master Plan.

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Figure 2.1.3 Development Projects

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Policy 2.3.6 Circulation system improvements shall continue to be pursued that facilitate connectivity across freeway and rail corridors.

Policy 2.3.7 Improvements shall be made to transportation corridors that promote physical connectivity and reflect consistently high aesthetic values. (CD-1)

Policy 2.7.4 Reserve lands for the continuation and expansion of public streets and highways in accordance with the Master Plan of Highways.

Policy 2.7.5 Require that development be contingent upon the ability of public infrastructure to provide sufficient capacity to accommodate its demands and mitigate its impacts.

Air Quality Element

Policy 12.5.1 Reduce the emission of pollutants including carbon monoxide, oxides of nitrogen, photochemical smog, and sulfate in accordance with South Coast Air Quality Management District (SCAQMD) standards.

Policy 12.6.1 Promote a pattern of land uses which locates residential uses in close proximity to employment and commercial services and provides, to the fullest extent possible, local job opportunities and commercial service to minimize vehicular travel and associated air emissions.

Policy 12.7.4 Work with the other cities in the South Coast Air Basin to implement regional mechanisms to reduce air emissions and improve air quality.

Circulation Element

Goal 6.1 Provide a well-maintained street system.

Policy 6.1.3 Coordinate maintenance or enhancement of transportation facilities with related infrastructure improvements.

Goal 6.2 Maintain efficient traffic operations on City streets.

Policy 6.2.1 Maintain a peak hour level of service (LOS) D or better at street intersections.

Policy 6.2.2 Design each roadway with sufficient capacity to accommodate anticipated traffic based on intensity of projected and planned land use in the City and the region while maintaining a peak hour LOS C or better.

Policy 6.2.4 Review the functioning of the street system as part of the Capital Improvement Program to identify problems and address them in a timely manner.

Goal 6.4 Minimize the impact of roadways on adjacent land uses and ensure compatibility between land uses and highway facilities to the extent possible.

Policy 6.4.1 Work with the Department to ensure that construction of new facilities includes appropriate sound walls or other mitigating noise barriers to reduce noise impacts on adjacent land uses.

Policy 6.4.2 Require, wherever possible, a buffer zone between residential land uses and highway facilities.

Policy 6.4.3 Continue to participate in forums involving the various governmental agencies such as the Department, the San Bernardino Associated Governments (SANBAG), the Southern California Association of Governments (SCAG), and the County that are intended to evaluate and propose solutions to regional transportation problems.

2.1.2.2 City of Loma Linda General Plan

The City of Loma Linda General Plan provides a comprehensive strategy for managing the community's future. The Land Use Element of the General Plan emphasizes the desired or intended use of land in the community, including future development in the City of Loma Linda and its Sphere of Influence.

Relevant economic development and transportation-related policies in the Loma Linda General Plan that support the purpose of and need for the proposed project are described below.

Economic Development Element

Policy 4.6.1.f Continue to participate in economic development partnerships such as Inland Valley Development Agency (IVDA), recognizing that job creation, both within Loma Linda and surrounding communities will assist in reducing peak hour congestion along the I-10 freeway.

Policy 4.6.1.g Recognize the economic development benefits of, and place emphasis on beautification of major arterials and community entries, street cleaning, and consistent enforcement of City regulations.

Transportation Element

Policy 6.10.1.f Promote the design of arterial and collector roadways to optimize safe traffic flow within established roadway configurations by minimizing driveways and intersections, uncontrolled access to adjacent parcels, on-street parking, and frequent stops to the extent consistent with the character of adjacent land uses.

Policy 6.2.1.g As development occurs, provide adequate capacity at intersections to accommodate future traffic volumes by installing intersection traffic improvements and traffic control devices as needed.

Policy 6.10.1.p Where a series of traffic signals is provided along a route, facilitate the coordination of traffic signals to optimize traffic progression on a given route. Traffic signalization should emphasize facilitating access from neighborhood areas onto the City's primary roadway network, and should work to discourage through traffic from using local streets.

Policy 6.10.1.q Expand intersections to include additional turning and through lanes at intersections where needed to relieve congestion and improve intersection operation, so long as the intersection can continue to accommodate pedestrians and bicyclists. Avoid traffic system improvements that facilitate vehicular turning and bus movements, but that also discourage pedestrian or bicycle movements.

Policy 6.10.1.r Maintain the first priority for public streets of providing safe and efficient travel for the public with on-street parking as a second priority.

2.1.2.3 Southern California Association of Governments

SCAG is the largest regional planning agency in the nation, functioning as the Metropolitan Planning Organization for six counties and 187 cities. SCAG develops long-term solutions for regional challenges such as transportation, air quality, housing, growth, hazardous waste, and water quality. Because these issues cross city and county boundaries, SCAG works with cities, counties, and public agencies in the six-county region to develop those plans and strategies. To address regional-level issues, SCAG has developed strategies that specifically address the growth and transportation issues facing Southern California. These plans include the Regional Transportation Plan (RTP) and the Regional Transportation Improvement Program (RTIP).

2.1.2.4 Regional Transportation Plan

On May 8, 2008, the Regional Council of SCAG adopted the RTP. Amendment #1 to the RTP was subsequently adopted on December 4, 2008. The SCAG 2008 RTP establishes a transportation vision for Los Angeles, Orange, San Bernardino, Riverside, Ventura, and Imperial Counties. The RTP is a comprehensive 20-year transportation plan that represents a vision for a better transportation system integrated with the best possible growth pattern for the region through 2030. The RTP identifies major challenges as well as potential opportunities associated with growth, transportation finances, the future of airports in the region, and impending transportation system deficiencies that could result from growth projections for the region. SCAG updates the RTP every 4 years.

2.1.2.5 Regional Transportation Improvement Program

The 2008 RTIP was adopted by SCAG on July 17, 2008, and was approved by the Federal Transit Administration/Federal Highway Administration (FTA/FHWA) on November 17, 2008. The SCAG 2008 RTIP was prepared to implement projects and programs listed in the RTP. Amendments to the adopted RTIP are prepared and approved on a continual basis.

The RTIP provides a listing of all capital transportation projects proposed over a 6-year period for the SCAG region. These funded projects include highway improvements; transit, rail, and bus facilities; carpool lanes; signal synchronization; intersection improvements; freeway ramps; and other related improvements. A new RTIP is prepared and approved every two years.

2.1.2.6 San Bernardino Associated Governments Congestion Management Program

The SANBAG Congestion Management Program (CMP), last updated in 2007, identifies the goals of the program, defines legal requirements, and provides background information and descriptions of each element, component, and requirement of the program. The CMP defines the network of State highways and arterials, describes LOS standards for major road facilities, and provides technical justification for the approach to congestion management. The decisions in the CMP are continuously reviewed through meetings of the Technical Advisory Committee and its subcommittees, the Plans and Programs Policy Committee, and the SANBAG Board of Directors.

2.1.2.7 Inland Valley Development Agency

IVDA is a joint powers authority that includes the County of San Bernardino and the Cities of San Bernardino, Colton, and Loma Linda. The goal of the IVDA is to redevelop the former Norton Air Force Base properties, which include the San Bernardino International Airport and Trade Center, and an additional 14,000 ac within a 3-mile (mi) radius of the base. The IVDA also endeavors to replace the 10,000 jobs that were lost with the closure of the base. The IVDA uses income from bonds to encourage the development of businesses that generate employment on the properties under their influence. The IVDA plan area, as designated in the City of San Bernardino General Plan, Economic Development Element (2005), is shown on Figure 2.1.4.

2.1.3 Parks and Recreation

There are no parks or recreational facilities within the project area. Recreation resources within 0.5 mi of the project area are shown on Figure B.1, presented in Appendix B, Resources Evaluated Relative to the Requirements of Section 4(f). As shown on Figure B.1, there are six potential Section 4(f) resources (five parks and one school) within 0.5 mi of the project area. As also shown on Figure B.1, Ted and Lila Dawson Park is the only park or resource in the immediate vicinity of the project limits. For a complete discussion of Section 4(f) resources, refer to Appendix B.

2.1.4 Environmental Consequences

2.1.4.1 Temporary Impacts

Alternative 1 – Build Alternative

Temporary impacts may occur to existing land uses, including businesses and residences, as a result of disruptions associated with construction activities. Minor delays in the project area may be encountered during construction; however, construction activities would be coordinated such that access to all properties in the project area would be maintained during construction.

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Figure 2.1.4 IVDA Plan Area

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No detours are anticipated for this project except for temporary closures necessary for the construction staging. Temporary lane reductions or closures may occur when barriers are being moved into position, when lanes are being restriped, when falsework is being installed or removed, or when the freeway is being restored to its completed condition. These temporary closures would likely be limited to nonpeak travel hours.

Substantial disruptions to the local neighborhoods in the project area are not anticipated, and those temporary impacts would be substantially minimized by implementation of a Transportation Management Plan (TMP), as described later in Section 2.5, Traffic and Transportation/Pedestrian and Bicycle Facilities.

Alternative 2 – No Build Alternative

The No Build Alternative would not involve construction activities associated with the Build Alternatives; therefore, no temporary land use impacts would occur.

2.1.4.2 Permanent Impacts

Alternative 1 – Build Alternative

Implementation of the Build Alternative would impact residential and commercial uses. The residential parcels that would be acquired are on land designated Commercial General-1, which does not permit single-family residences except by Conditional Use Permits. This area (northeast quadrant) is also designated for redevelopment in the City of San Bernardino General Plan. Therefore, future redevelopment of this area would occur with or without the project.

The project is consistent with applicable City of San Bernardino General Plan goals and policies to improve transportation corridors, provide adequate infrastructure, maintain efficient traffic operations on city streets, and work with the Department and SANBAG to find solutions for transportation problems.

The project is also consistent with the applicable City of Loma Linda General Plan policies to optimize safe traffic flow and provide safe and efficient travel for the public. The proposed project is identified in the RTP and is programmed in the RTIP to reduce traffic congestion and improve operations. Therefore, the land use changes associated with the proposed project are consistent with the approved land use and transportation plans.

As discussed in detail in Appendix B, there would be no use of Section 4(f) resources as defined in 23 CFR 771.135(p). That is: (1) no land from a Section 4(f) resource would be permanently incorporated into the project right-of-way, (2) the temporary occupancy would not be adverse in terms of the Section 4(f) statute's preservationist purposes, and (3) there would be no constructive use of land that would impair the activities, features, or attributes of a Section 4(f) resource.

Alternative 2 – No Build Alternative

The No Build Alternative would not improve operational deficiencies, increase capacity at the I-10/Tippecanoe Avenue interchange and on local roads, or improve local circulation. Therefore, it is not consistent with the General Plans of the Cities of San Bernardino and Loma Linda, the RTP, or the RTIP.

2.1.5 Avoidance, Minimization, and/or Mitigation Measures

Except for the TMP discussed in Section 2.5, no avoidance or minimization measures are required.

2.2 Growth

2.2.1 Regulatory Setting

The Council on Environmental Quality (CEQ) regulations, which established the steps necessary to comply with the National Environmental Policy Act of 1969, requires evaluation of the potential environmental consequences of all proposed federal activities and programs. This provision includes a requirement to examine indirect consequences, which may occur in areas beyond the immediate influence of a proposed action and at some time in the future. The CEQ regulations, 40 CFR 1508.8, refer to these consequences as secondary impacts. Secondary impacts may include changes in land use, economic vitality, and population density, which are all elements of growth.

The California Environmental Quality Act (CEQA) also requires the analysis of a project's potential to induce growth. CEQA guidelines, Section 15126.2(d), require that environmental documents "…discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment…"

2.2.2 Affected Environment

This section is based on information from the *Community Impact Assessment* (August 2009) and demographic information from the 2008 Southern California Association of Governments (SCAG) Regional Transportation Program (RTP) Growth Forecasts (http://www.scag.ca.gov/forecast/adoptedgrowth.htm). The project area for growth is within the Cities of San Bernardino and Loma Linda, with a focus on Census Tracts 73.01 and 72.00, as presented later on Figure 2.3.1 in Section 2.3.1.2.

Census Tracts 73.01 and 72.00 are in the Cities of San Bernardino and Loma Linda, respectively. Table 2.2.A shows the 2003 populations and projected 2010, 2015, and 2035 populations for San Bernardino County, the Cities of San Bernardino and Loma Linda, and the project area census tracts (shown later on Figure 2.3.1 in Section 2.3.1.2.).

Currently, San Bernardino County is the fifth most populated county in California. According to SCAG population estimates, the population in San Bernardino County totaled approximately 1,864,264 in 2003 and is projected to total 2,182,049 in 2010. SCAG projects that the population in San Bernardino County will increase by approximately 44 percent, to 3,133,801 persons, between 2010 and 2035.

Table 2.2.A Population, Household, and Employment Estimates

City/County/Tract	2003	2010	2015	2035	Percent Increase 2010 to 2035
Population					
County of San Bernardino	1,864,264	2,182,049	2,385,748	3,133,801	43.6
City of San Bernardino	195,368	213,318	224,924	265,515	24.5
Census Tract 73.01 (San Bernardino)	6,556	7,286	7,765	9,490	30.2
City of Loma Linda	20,869	25,481	28,997	41,385	62.4
Census Tract 73.01 (Loma Linda)	11,183	13,886	15,927	23,164	66.8
Households					
County of San Bernardino	552,201	637,250	718,602	972,561	52.6
City of San Bernardino	56,715	60,876	65,144	78,619	29.1
Census Tract 72.00 (San Bernardino)	1,654	1,796	1,942	2,405	33.9
City of Loma Linda	7,893	9,586	11,485	17,286	80.3
Census Tract 73.01 (Loma Linda)	4,411	5,412	6,530	9,951	83.9
Employment					
County of San Bernardino	638,944	810,233	897,489	1,254,749	54.9
City of San Bernardino	86,483	107,023	117,429	157,088	46.8
Census Tract 72.00 (San Bernardino)	9,239	12,813	14,639	21,747	69.7
City of Loma Linda	15,223	19,343	22,170	33,086	71.0
Census Tract 73.01 (Loma Linda)	10,232	13,163	15,157	22,901	74.0

Source: *Community Impact Assessment* (LSA Associates, Inc., August 2009).

In general, as discussed below, the rate of population growth is projected to be lower in the City of San Bernardino and substantially higher in the City of Loma Linda, compared to overall projected growth for the County.

The 2003 population in the City of San Bernardino was 195,368 persons and is projected to be 213,318 persons by 2010. SCAG projects that the population in the City of San Bernardino will increase by approximately 25 percent, to 365,515 persons, between 2010 and 2035. The population in Census Tract 72.00, in the City of San Bernardino, is projected to increase by approximately 30 percent between 2010 and 2035, which is slightly greater than the projected 25 percent increase for the entire City.

The 2003 population in the City of Loma Linda was 20,869 persons and is projected to be 25,481 persons by 2010. SCAG projects that the population in the City of Loma Linda will increase by approximately 63 percent, to 41,385 persons, between 2010 and 2035. The population in Census Tract 73.01 in the City of Loma Linda is projected to increase by approximately 67 percent between 2010 and 2035, which is slightly greater than the projected 63 percent increase for the entire City.

As shown in Table 2.2.A, the number of households in the County of San Bernardino is projected to increase by approximately 53 percent between 2010 and 2035. The number of households in both the City of San Bernardino and Census Tract 72.00 is projected to increase by approximately 30 percent, which is lower than the projected increase for the County. The number of households in both the City of Loma Linda and Census Tract 73.01 is projected to increase by approximately 80 percent, which is substantially higher than the projected increase in households for the entire County.

As shown in Table 2.2.A, employment in the County of San Bernardino is projected to increase by approximately 54.9 percent between 2010 and 2035. Employment in the City of San Bernardino is projected to increase by approximately 47 percent, which is similar to the projected increase for the County. Employment in Census Tract 72.00 is projected to increase by approximately 70 percent, which is substantially higher than the projected increase for the County. Employment in the City of Loma Linda and Census Tract 73.01 is projected to increase by approximately 71 and 74 percent, respectively, which is substantially higher than the projected increase in employment for the entire County.

2.2.3 Environmental Consequences

2.2.3.1 Temporary Impacts

Alternative 1 – Build Alternative

The Build Alternative would introduce jobs within the project area on a temporary basis during the construction period. These jobs would be filled by existing workers in the Southern California area, and therefore would not require additional housing and would therefore not have a temporary impact on growth.

Alternative 2 – No Build Alternative

Under the No Build Alternative, the project would not be constructed. No temporary growth-related impacts would occur.

2.2.3.2 Permanent Impacts

Alternative 1 – Build Alternative

The potential growth-related impacts of the proposed project were considered in the context of the first cut screening analysis approach to assess the likely growth-potential effect of the propose project, and whether further analysis is necessary, based on consideration of the following:

- How, if at all, does the proposed project potentially change accessibility?
- How, if at all, do the project type, project location, and growth-pressure potentially influence growth? Some transportation projects may have very little influence on future growth, whereas other may have a great influence. Some geographic locations are more conducive to influencing growth, whereas other are highly constrained. These differences may result from physical constraints, planning and zoning factors, or local political considerations.
- Is project-related growth reasonably foreseeable as defined in NEPA? Under NEPA, indirect impacts need only be evaluated if they are reasonably foreseeable as opposed to remote and speculative.
- If there is project-related growth, how, if at all, that will impact resources of concern? Identify which resources of concern are likely to be affected by the foreseeable future growth. If a project is likely to influence future growth, but no resources of concern will be affected, then state so here and indicate that no further growth analysis is warranted.

The potential for the proposed I-10/Tippecanoe Avenue Interchange Improvement project to influence growth based on these considerations is described in the following sections.

How, if at all, does the proposed project potentially change accessibility?

The proposed project would improve the operation of the existing interchange and local circulation, enhance safety, alleviate existing deficiencies, and accommodate projected future traffic volumes based on existing and planned development. It would not provide any new transportation facilities and would not create new access points to existing facilities. A large percentage of commuters already spend in excess of 30 minutes commuting to jobs outside the area, and it is unlikely that commuters living outside of Census Tracts 72.00 and 73.01 would extend their commute times to access the improved I-10/Tippecanoe Avenue Interchange Improvement project. Therefore, the proposed I-10/Tippecanoe Interchange Improvements project would not result in changes in accessibility to the transportation system in this area.

How, if at all, do the project type, project location, and growth-pressure potentially influence growth?

The proposed project is consistent with the Regional Transportation Plan (RTP) and the goals and policies of the San Bernardino and Loma Linda General Plans. Growth in the affected Cities and the County is expected to occur with or without the project because an interchange improvement cannot on its own affect variables such as economic opportunities, employment, or housing availability, which directly affect local and regional growth. The project interchange is in an area that is largely developed with relatively few acres available for development.

As an interchange improvement project, the proposed project would accommodate existing, approved, and planned growth in the area. However, because the project would not substantively increase the capacity of either the I-10 mainline or Tippecanoe Avenue, it would not influence amount, timing, or location of growth in the area. Pressure for growth is typically a result of a combination of factors including economic, market, and land use demands and conditions. New transportation facilities in areas without those facilities can influence the amount and location of growth in an area, in combination with other pressures such as economic and market conditions. However, the proposed project does not substantially increase the capacity of transportation system and does not provide new transportation facilities in areas without those facilities, and, therefore, is not expected to influence the amount, timing, or location of growth in the Cities of San Bernardino and Loma Linda and unincorporated San Bernardino County.

Is project-related growth reasonably foreseeable as defined in NEPA? Under NEPA, indirect impacts need only be evaluated if they are reasonably foreseeable as opposed to remote and speculative.

As discussed above, the proposed project is not expected to influence the amount, timing, or location of growth in the area. Therefore, no reasonably foreseeable project-related growth is anticipated as a result of the proposed I-10/Tippecanoe Avenue Interchange Improvement project.

If there is project-related growth, how, if at all, that will impact resources of concern?

As described later in this section, the proposed project would not impact resources of concern, such as biological, visual, cultural, or paleontological resources, with adherence to standard regulations. In addition, as described above, the proposed I-10/Tippecanoe Avenue Interchange Improvement project would not influence the amount, timing, or location of growth in the area. Because the proposed project would not influence growth in the area, it would not result in impacts to resources of concern.

Based on the analysis provided above, it was determined that the proposed project would not result in project-related growth and no further analysis is required.

Alternative 2 – No Build Alternative

Under the No Build Alternative, improvements would not be made to the I-10/ Tippecanoe Avenue Interchange. The existing configuration of the I-10/Tippecanoe Avenue Interchange is not consistent with the regional mobility goals and objectives of the Department, the affected Cities, and the RTP, or the goals and policies of the San Bernardino and Loma Linda General Plans.

The No Build Alternative would not accommodate growth that has already occurred or growth that is forecast in the Cities and County based on adopted land use plans and SCAG projections. While the No Build Alternative would not reduce traffic congestion or improve traffic flow, it also would not induce growth elsewhere in the Cities or County. Therefore, the No Build Alternative is not anticipated to influence the amount, location, and/or distribution of growth in the Cities of San Bernardino and Loma Linda and the County of San Bernardino.

2.2.4 Avoidance, Minimization, and/or Mitigation Measures

No avoidance or minimization measures are required.

2.3 Community Impacts

2.3.1 Community Character and Cohesion

2.3.1.1 Regulatory Setting

The National Environmental Policy Act of 1969 as amended (NEPA), established that the federal government use all practicable means to ensure that all Americans have safe, healthful, productive, and aesthetically and culturally pleasing surroundings (42 U.S.C. 4331[b][2]). The Federal Highway Administration in its implementation of NEPA (23 U.S.C. 109[h]) directs that final decisions regarding projects are to be made in the best overall public interest. This requires taking into account adverse environmental impacts, such as destruction or disruption of human-made resources, community cohesion, and the availability of public facilities and services.

Under the California Environmental Quality Act, an economic or social change by itself is not to be considered a significant effect on the environment. However, if a social or economic change is related to a physical change, then social or economic change may be considered in determining whether the physical change is significant. Since this project would result in physical change to the environment, it is appropriate to consider changes to community character and cohesion in assessing the significance of the project's effects.

2.3.1.2 Affected Environment

This section is based on the information from the *Community Impact Assessment* (August 2009).

Community character refers to the degree to which the human environment is safe, healthy, productive, and aesthetically and culturally pleasing. The project area (refer to Figure 1.2, presented previously in Section 1.3.1.1) is built out and dominated by the Interstate 10 (I-10)/Tippecanoe Avenue interchange. Recent commercial redevelopment has occurred in the northwest quadrant, which provides several retail facilities, restaurants, and big-box stores. The northeast quadrant contains older residences. The southwest and southeast quadrants contain local and franchise businesses that serve the local community. The *Visual Impact Assessment* for the project (February 2009) did not identify any scenic resources in the project area. The *Historic Property Survey Report* for the project (August 2009) did not identify any cultural resources in the project area. The *Natural Environment Study* (Minimal Impacts) (June 2009) did not identify sensitive animal or plant species in the area.

Community cohesion is the degree to which residents have a sense of belonging to their neighborhood, their level of commitment to the community, and/or a strong attachment to neighbors, groups, and institutions, usually as a result of continued association over time. Some specific indicators of community cohesion include:

- **Ethnicity:** Ethnic homogeneity is associated with a higher degree of community cohesion.
- **Household Size:** Households of two or more people tend to correlate with a higher degree of community cohesion.
- **Housing Tenure:** Households that have been part of a community for a longer period of time tend to correlate with a higher degree of community cohesion.
- **Transit-Dependent Population:** Residents who walk or use public transportation for travel tend to correlate with a higher degree of community cohesion.

These indicators of community cohesion in the project area and the applicable local jurisdiction are described in more detail below.

Ethnicity

Table 2.3.A provides the ethnic composition for the Cities of Loma Linda and San Bernardino, San Bernardino County, and the project area census tracts. The project area census tracts are shown in Figure 2.3.1. The County of San Bernardino is predominantly White (59 percent), followed by Hispanic (39 percent) and other (26 percent). The composition of the City of San Bernardino is roughly equally split between White and Hispanic (45 and 47 percent, respectively), and has the highest percentage of Blacks (16 percent) and the lowest percentage of Asians (4 percent). The City of Loma Linda has a lower percentage of Hispanics (16 percent), the lowest percentage of Blacks (6 percent), and the highest percentages of Whites and Asians (53 and 23 percent, respectively).

In the project area census tracts, Census Tract 72.00 has the highest percentage of Hispanics (39 percent) and Blacks (9 percent). Census Tract 73.01 has fewer Hispanics residents (23 percent), but more Whites and Asians (48 and 20 percent, respectively).

Table 2.3.A 2000 Ethnic Composition

Year	Jurisdiction	Percentage[1]						
		White	Black	American Indian/Native Alaskan	Asian	Hawaiian/ Pacific Islanders	Other	Hispanic[2]
Project Area Census Tracts								
2000	Census Tract 72.00	42%	9.2%	2.1%	19.6%	0.3%	26.3%	39.4%
2000	Census Tract 73.01	48.1%	8.4%	1.4%	20.4%	1.0%	20.4%	22.9%
Project Area Cities								
2000	Loma Linda	52.8%	6.2%	0.4%	23.4%	0.6%	16.2%	16.3%
2000	San Bernardino	45.0%	15.9%	1.3%	4.0%	0.4%	33.2%	47.4%
San Bernardino County								
2000	San Bernardino County	58.7%	8.8%	1.1%	4.6%	0.2%	26.3%	39.1%

Source: *Community Impact Assessment* (LSA Associates, Inc., August 2009).

1 Percentages do not add to 100 percent because the White, Black, American Indian and Alaska Native, Hawaiian and Pacific Islander, and Other categories include persons identified with one race only; the Hispanic category overlaps with other categories. Individuals may report more than one race.

2 The 2000 United States Census Bureau recognizes Hispanic heritage as an ethnic group rather than as a separate group. If the percent Hispanic is added to the other racial groups, the total may exceed 100 percent.

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Figure 2.3.1 Study Area Census Tracts

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Housing

Housing Supply

Historically, the available supply of housing in Southern California has not kept pace with the demand, driving the cost of housing to very high levels. This was partly due to Southern California growing eastward, with many people moving from Los Angeles and Orange Counties to San Bernardino and Riverside Counties for lower costs of housing. Since the 2000 United States Census, San Bernardino County has gained 298,366 people, with only 66,467 housing units added over that period. However, since 2008, foreclosures have increased to an all-time high based on recent difficulties with the residential mortgage and financial sectors, and therefore the available supply of housing in San Bernardino County has increased. Table 2.3.B summarizes the housing characteristics for San Bernardino County, the Cities of Loma Linda and San Bernardino, and the project area census tracts. This data does not reflect the recent fluctuations in housing ownership and mortgage financing.

Table 2.3.B Housing Profile

Jurisdiction	Total Housing Units		Type of Occupancy[1]		Housing Affordability Index[2]	Median Home Price[3]	Median Rent[4]
	Occupied	Vacant	Owner	Renter			
Project Area Census Tracts							
Census Tract 72.00	1,848 (89.6%)	214 (10.3%)	48.7%	51.2%	N/A	N/A	N/A
Census Tract 73.01	5,044 (92.4%)	414 (7.5%)	19.4%	80.5%	N/A	N/A	N/A
Project Area Cities							
Loma Linda	7,480 (92.8%)	573 (7.1%)	38.3%	61.5%	46.4%	$350,000	$1,065
San Bernardino	56,174 (88.5%)	7,240 (11.4%)	52.4%	47.6%	21.2%	$150,000	$850
San Bernardino County							
San Bernardino County	528,594 (87.8%)	72,775 (12.1%)	64.5%	35.5%	46.5%	$363,700	$992

Source: *Community Impact Assessment* (LSA Associates, Inc., August 2009).
[1] Percentages do not add up to 100 percent because not all respondents identified whether they owned or rented.
[2] Based on the December 2008 average of $248,200 for a median-priced existing single-family home, *National Association of Realtors, Housing Affordability Index,* www.realtor.org, website accessed January 5, 2009.
[3] Based on 2007 median home prices, *Home Sales in Loma Linda, San Bernardino, and Redlands,* http://www.cita-data.com, website accessed January 6, 2009.
[4] Estimates from the 2005–2007 American Community Survey 3-Year Estimates, http://factfinder.census.gov, website accessed January 5, 2009.
N/A = Information was not available.

As identified in Table 2.3.B, there were 8,053 housing units in the City of Loma Linda in 2000. Of these units, 7,480 were occupied (92.8 percent) and the remaining 573 were vacant (7.1 percent). There were 63,414 housing units in the City of San

Bernardino in 2000. Of these, 56,174 were occupied (88.5 percent) and 7,240 were vacant (11.4 percent).

The percentage of vacant housing units varied from a low of 7.5 percent in Tract 73.01 to a high of 10.3 percent in Tract 72.00.

Household Affordability

Table 2.3.B shows housing affordability in terms of the affordability index, median home price, and median rent. The affordability index refers to the percentage of families earning the median family income that could qualify for a mortgage loan on an existing single-family home priced at the national median. No data is available for the study area census tracts, but the available information is useful to compare the two cities and the County. As shown in Table 2.3.B, the median home value, median rent, and percentage of families that can afford to purchase a home in the City of Loma Linda and County of San Bernardino are comparable. The median home value and median rent are lower in the City of San Bernardino compared to the County of San Bernardino. Even though the median home value is lower, a smaller percentage (21 percent) of families can afford to purchase a home in the City of San Bernardino, compared to the City of Loma Linda and County of San Bernardino, where nearly half the families can afford a home.

Household Size

As shown in Table 2.3.C, the populations of the project area census tracts all increased between 1990 and 2000. Census Tract 73.01 has the fewest persons per household, at 2.37. The City of San Bernardino has more persons per household than the County and State average, at 3.5, while Loma Linda has the fewest, at 3.09.

Table 2.3.C 2000 Population and Household Size

Demographic Characteristics	Census Tract 72.00	Census Tract 73.01	City of Loma Linda	City of San Bernardino	San Bernardino County	California
Total Population	6,800	12,160	18,681	185,401	1,709,434	33,871,648
Population change (1990–2000)	+15%	Not listed[1]	+ 7%	+ 13%	+ 21%	+ 14%
Persons per household	2.87	2.37	3.09	3.72	3.58	3.43

Source: *Community Impact Assessment* (LSA Associates, Inc., August 2009).
[1] Census tract did not exist in 1990 Census.

Housing Tenure

Table 2.3.D provides data on how long homeowners have been residing in their units for the project area census tracts, Cities of San Bernardino and Loma Linda, and San Bernardino County. Approximately 55 percent of occupants in San Bernardino County moved into their housing units between 1995 and 2000. Of these, 32 percent moved into their units between 1995 and 1998, while 23 percent moved into their units between 1999 and 2000.

Table 2.3.D Housing Tenure

Jurisdiction	**Year Householder Moved Into Unit (%)**					
	1999–2000	**1995–1998**	**1990–1994**	**1980–1989**	**1970–1979**	**1969 or earlier**
Project Area Census Tracts						
Census Tract 72.00	28%	31%	14%	13%	7%	7%
Census Tract 73.01	35%	41%	11%	7%	2%	3%
Project Area Cities						
Loma Linda	28%	39%	14%	12%	4%	4%
San Bernardino	27%	30%	10%	12%	8%	8%
San Bernardino County						
San Bernardino County	23%	32%	17%	16%	7%	5%

Source: *Community Impact Assessment* (LSA Associates, Inc., August 2009).

Similar to San Bernardino County, approximately 67 percent of Loma Linda residents moved into their housing units between 1995 and 2000. Forty percent of Loma Linda residents moved into their units between 1995 and 1998, and 28 percent of Loma Linda residents moved in between 1999 and 2000. Approximately 57 percent of San Bernardino City residents moved into their units between 1995 and 2000. Approximately 30 percent of San Bernardino residents moved into their units between 1995 and 1998, and 27 percent of San Bernardino residents moved into their units between 1999 and 2000.

Similarly, approximately 59 percent of Census Tract 72.00 residents moved into their housing units between 1995 and 2000. Thirty-one percent of Census Tract 72.00 residents moved into their units between 1995 and 1998, and 28 percent moved in between 1999 and 2000. Census Tract 73.01 has the shortest housing tenure in the study area. Approximately 76 percent of Census Tract 73.01 residents moved into their units between 1995 and 2000. Approximately 41 percent of Census Tract 73.01 residents moved into their units between 1995 and 1998, and 35 percent moved into their units between 1999 and 2000.

Transit-Dependent Population

In Southern California, the transit-dependent population primarily consists of students, senior citizens, and low-income individuals. The Southern California Association of Governments (SCAG) projects that the percentage of senior citizens in Southern California will continue to rise over the next two decades, with approximately one in six people expected to be over age 64 in 2030. Table 2.3.E provides the age distribution in the project census tracts, the Cities of San Bernardino and Loma Linda, and San Bernardino County.

Table 2.3.E 2000 Age Distribution

Jurisdiction	Median Age	Percentage		
		Population < 18	Population 18–64	Population > 64
Project Area Census Tracts				
Census Tract 72.00	28.5	35	56	9
Census Tract 73.01	29.9	24	64	12
Project Area Cities				
Loma Linda	34	22	63	15
San Bernardino	27.6	35	57	8
San Bernardino County				
San Bernardino County	30.3	32	59	9

Source: *Community Impact Assessment* (LSA Associates, Inc., August 2009).

As shown in Table 2.3.E, the median age for County of San Bernardino residents in 2000 was 30.3 years. Individuals under 18 years of age composed 32 percent of the population in 2000. Senior citizens (age 65 and over) accounted for only 9 percent of the total population in the County in 2000.

As shown in Table 2.3.E, the median age in Loma Linda was 34 years in 2000. Of the city's residents, approximately 22 percent were below age 18 and 15 percent were over age 64. The median age in the City of San Bernardino in 2000 was 27.6 years. San Bernardino has a higher percentage of the population under age 18 (35 percent) than the County and Loma Linda. The City of San Bernardino has the lowest percentage of residents over age 65 (8 percent), compared to the County of San Bernardino and City of Loma Linda.

In the project area census tracts, the median age is comparable to the County average. Compared to the County, Census Tract 73.01 has more residents over age 65 (9 and 12 percent, respectively) and fewer residents under age 18 (32 and 24 percent, respectively). However, the tract is comparable to the City of Loma Linda, where it is located. Census Tract 72.00, in the City of San Bernardino, has a population distribution similar to that of the both that city and the County. It has the fewest residents over age 65 (9 percent), and 35 percent of residents are under age 18.

As discussed above, indicators that a community has a high degree of cohesion are ethnic homogeneity, many households of two or more people, many long-term residents, high rates of homeownership, and a high percentage of elderly residents. Table 2.3.A shows that the population of Tract 72.00 is fairly evenly split between White and Hispanic residents, while Tract 73.01 has substantially more White residents. The City of Loma Linda is predominantly White, while San Bernardino has more Hispanic and Black residents than White residents. Table 2.3.C shows that the household size for the project area census tracts is over two people, but is lower than the household size for the Cities of San Bernardino and Loma Linda, the County, and the State. As shown in Table 2.3.D, housing tenure in 2000 for most residents in the Cities and census tracts is relatively short. There is a lower percentage of homeownership in Tract 73.01 and the City of Loma Linda compared to the City of San Bernardino. As shown in Table 2.3.E, Loma Linda and Tract 73.01 also have more residents over age 64 compared to the rest of the project area. Based on these factors, the project area census tracts have moderately low community cohesion.

Economic Conditions

Employment and Income

According to the United States Census Bureau, the civilian labor force for San Bernardino County in 2000 consisted of 721,185 people, with 661,272 employed people and 59,913 unemployed people. Table 2.3.F provides a breakdown of the civilian labor force in the study area, the County of San Bernardino, and the Cities of Loma Linda and San Bernardino in the study area census tracts.

Based on the information contained in Table 2.3.F, educational, healthcare, and social services; retail trade; and manufacturing account for the highest percentage of employment in the County (21 percent, 13 percent, and 13 percent, respectively). The City of Loma Linda employs most of its civilian labor force in the education, healthcare, and social services sector. This is followed by 8 percent employed in the other/public services sector and 7 percent employed in retail. The City of San Bernardino also employs most of its civilian work force in education, healthcare, and social services (23 percent), followed by retail (13 percent), other/public services (12 percent), and manufacturing (11 percent). Census Tract 73.01 employs the most in the

Table 2.3.F Employment by Sector

Sector	Census Tract 72.00	Census Tract 73.01	City of Loma Linda	City of San Bernardino	San Bernardino County
Construction	110 (5%)	136 (3%)	204 (3%)	4,606 (7%)	49,517 (8%)
Manufacturing	205 (10%)	317 (6%)	360 (4%)	6,656 (11%)	84,166 (13%)
Retail Trade	224 (11%)	413 (8%)	604 (7%)	8,174 (13%)	84,460 (13%)
Finance, Insurance	98 (5%)	213 (4%)	355 (4%)	3,346 (5%)	36,860 (6%)
Professional, Technical	169 (8%)	314 (6%)	485 (6%)	4,633 (7%)	50,726 (8%)
Education, Healthcare, Social Services	522 (26%)	2,485 (48%)	4,445 (54%)	14,361 (23%)	140,063 (21%)
Arts, Lodging, Foodservice	141 (7%)	451 (9%)	478 (6%)	5,149 (8%)	49,494 (8%)
Other Services (including Public Administration)	212 (11%)	426 (8%)	669 (8%)	7,226 (12%)	71,141 (11%)

Source: *Community Impact Assessment* (LSA Associates, Inc., August 2009).

education, healthcare, and social services sector (48 percent); this is comparable to the City of Loma Linda, where the tract is located. Census Tract 72.00 also employs most residents in education, healthcare, and social services (26 percent), followed by retail and manufacturing (11 and 10 percent, respectively).

Median household income is shown in Table 2.3.G. Census Tract 73.01 has the lowest median household income ($28,870) of the study area, while the City of Loma Linda reports the highest ($38,204). However, the Cities of San Bernardino and Loma Linda and the affected census tracts have lower median household incomes compared to the County and State.

Table 2.3.G Income and Other Demographics

Demographic Characteristics	Census Tract 72.00	Census Tract 73.01	City of Loma Linda	City of San Bernardino	San Bernardino County	California
Median household income	$32,483	$28,870	$38,204	$31,140	$42,066	$47,493
Persons below poverty	26%	22%	15%	28%	16%	14%
High school graduate or higher (over age 25)	61%	84%	88%	65%	74%	77%
College graduate or higher (over age 25)	12%	36%	45%	12%	16%	27%
Employed civilian labor force	44%	55%	59%	56%	54%	62%

Source: *Community Impact Assessment* (LSA Associates, Inc., August 2009).

Loma Linda has the highest percentage of high school and college graduates (88 and 45 percent, respectively), and Census Tract 73.01 (within the City of Loma Linda) has 84 percent high school graduates and 36 percent college graduates. The City of San Bernardino and Census Tract 72.00 have similar percentages of high school and college graduates.

The City of Loma Linda and Census Tract 73.01 (within the City of Loma Linda) have similar percentages of residents employed in the civilian labor force (59 and 55 percent, respectively). Census Tract 72.00 has the lowest percentage of residents employed in the civilian labor force.

Commuter Travel

Traffic congestion and long commutes have a negative impact on personal perceptions of quality of life. As employment and population continue to increase, hours of traffic delays and daily vehicle miles traveled are projected to increase. One major transportation and mobility issue that San Bernardino County faces is that many residents work in neighboring counties and cities. The 2000 Census indicated that nearly 30 percent of San Bernardino County residents work outside the County.

Table 2.3.H shows a comparison of residence locations of study area commuters and their travel time to work. The majority of County residents work within the County. Within the Cities of San Bernardino and Loma Linda and the affected census tracts, the majority of residents work within the County. However, most residents work in a different city. Approximately 72 percent of all residents have an average commute time of less than 30 minutes, while 14 percent of all residents have an average commute of 30–44 minutes.

2.3.1.3 Environmental Consequences

Temporary Impacts

Alternative 1 – Build Alternative

Temporary road detours and access restrictions during construction would affect residents living in the area in the vicinity of the project census tract limits. However, substantial disruptions to the local neighborhoods in the project area during construction are not anticipated and those temporary impacts would be substantially minimized by implementation of a Transportation Management Plan (TMP).

Alternative 2 – No Build Alternative

The No Build Alternative would not involve construction activities; therefore, there would be no impacts to community character or cohesion under this alternative.

Table 2.3.H Commuter Travel

	San Bernardino County	City of San Bernardino	City of Loma Linda	Census Tract 72.00	Census Tract 73.01
Work in county of residence	69% (45,568)	80% (48,473)	81% (6,538)	83% (1,649)	83% (4,116)
Work outside county of residence	30% (198,136)	20% (11,867)	19% (1,520)	16% (309)	17% (847)
Work in city of residence	—	39% (23,593)	34% (2,733)	25% (498)	31% (1,516)
Work outside city of residence	—	61% (37,008)	66% (5,359)	75% (1,493)	67% (5,359)
Travel time to work:					
< 30 minutes	69% (1,347)	66% (38,934)	78% (6,110)	70% (1,347)	79% (3,780)
30–44 minutes	16% (314)	17% (10,217)	11% (870)	16% (314)	11% (545)
45–59 minutes	6.6% (129)	6% (3,321)	3% (258)	7% (129)	3% (144)
> 60 minutes	8.4% (164)	11% (6,449)	8% (585)	8% (164)	7% (348)

Source: *Community Impact Assessment* (LSA Associates, Inc., August 2009).

Permanent Impacts

Alternative 1 – Build Alternative

As discussed in detail later in Section 2.3.2, Relocations, the proposed project would require the full acquisition of 29 residential parcels and 10 commercial parcels. The Build Alternative would also require the partial acquisition of 6 residential parcels and 23 commercial parcels. Because the proposed project would require the acquisition of residential and commercial properties, it would result in the displacement of those residents and employees. The project would not divide the community because the acquisitions would occur on properties bordering the I-10 westbound off-ramp or Tippecanoe Avenue/Anderson Street. Additionally, local circulation would be improved. As reported in the 2000 Census and presented previously in Table 2.3.D, the majority of the residents in the project area have lived in the neighborhood less than 5 years, indicating a neighborhood with frequent turnover and only moderate community cohesion. In addition, given the recent downward trends in the housing market, it is anticipated that adequate replacement housing and business properties would be available in the project area cities for residents and businesses displaced by the proposed project.

Alternative 2 – No Build Alternative

The No Build Alternative would not result in physical changes to the community; therefore, no community character or cohesion impacts would occur under this alternative.

2.3.1.4 Avoidance, Minimization, and/or Mitigation Measures

Implementation of a TMP, discussed in further detail in Section 2.5, Traffic and Transportation, would minimize temporary construction-related impacts of the Build Alternative related to community character and cohesion. In addition, there are adequate replacement housing and business properties in the area; refer to Section 2.3.2.4 for a discussion and data regarding available properties.

2.3.2 Relocations and Real Property Acquisition

2.3.2.1 Regulatory Setting

The Department's Relocation Assistance Program (RAP) is based on the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (as amended) and Title 49 Code of Federal Regulations (CFR) Part 24. The purpose of the RAP is to ensure that persons displaced as a result of a transportation project are treated fairly, consistently, and equitably so that such persons will not suffer disproportionately as a result of projects designed for the benefit of the public as a whole. Please see Appendix D for a summary of the RAP.

All relocation services and benefits are administered without regard to race, color, national origin, or sex in compliance with Title VI of the Civil Rights Act (42 U.S.C. 2000d, et seq.). Please see Appendix C for a copy of the Department's Title VI Policy Statement.

2.3.2.2 Affected Environment

This section is based on the information regarding relocations and relocation impacts from the *Community Impact Assessment* (August 2009) and *Draft Relocation Impact Report* (DRIR) (August 2009) prepared for this project.

The study area for the assessment of relocation impacts includes the Cities of Loma Linda and San Bernardino and Census Tracts 72.00 and 73.01. The City of Redlands, just east of San Bernardino and north of Loma Linda, was also included in the potential relocation area. This study area was selected because it covers the entire segment of the proposed project and includes areas likely to be considered for the relocation of displaced residential and nonresidential uses. Land uses in the project area include single- and multifamily residential, commercial, industrial, and vacant land.

2.3.2.3 Environmental Consequences

Temporary Impacts

Alternative 1 – Build Alternative

Construction of the Build Alternative would require 29 temporary construction easements (TCEs), totaling an area of 45,013 square feet (sq ft). TCEs are temporary easements on which construction vehicle access and staging of construction materials would occur. After construction, TCEs would be restored to their original condition and returned to their original owners. However, these TCEs would not require the relocation of residents, businesses, or employees. The TCE parcel owners would be compensated for temporary use of their property during construction.

Alternative 2 – No Build Alternative

The No Build Alternative would require no TCEs, and therefore would not result in temporary impacts related to relocations.

Permanent Impacts

Alternative 1 – Build Alternative

The Build Alternative will result in the acquisition of residential and nonresidential property. Nonresidential properties include retail trade, finance, insurance, services, government/nonprofit, and other types of nonresidential uses. A full acquisition of a property is defined as an area in which occupants of residential and nonresidential units would be displaced by the project and would be expected to relocate. A partial acquisition is when a small area of a property is acquired, but full use of the property and dwelling structures, including multifamily units, remains. Generally, partial acquisitions consist of portions of a back, side, or front yard; landscaping; or parking.

Property Acquisitions

Implementation of the Build Alternative would result in the acquisition of privately owned property, including residential and commercial land and buildings. The anticipated partial and full acquisitions under the Build Alternative are shown on Figure 2.3.2 and summarized in Table 2.3.I. The Build Alternative would require the partial acquisition of 6 residential parcels and 23 commercial parcels, totaling 65,465.18 sq ft. The Build Alternative would also

Figure 2.3.2 Property Acquisitions

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Table 2.3.I Summary of Property Acquisitions

Existing Land Use	Full[1]	Partial[1]
Single-Family Residential	23	5
Multifamily Residential	2	0
Residential: Undeveloped	4	1
Total Residential	29	6
Commercial	6	17[2]
Commercial: Undeveloped	4	6
Total Commercial	10	23
Total Parcels Acquired	39	29
Total Residents Displaced[3]	74	0

Source: *Draft Relocation Impact Report* (LSA Associates, Inc., August 2009).

1 The right-of-way acquisitions identified for the proposed project are based on preliminary design. The actual right-of-way needed for the proposed project would be refined during final design.

2 Two business displacements would occur on two partial acquisitions.

3 Number of households multiplied by 2.73 (average persons per household for the Cities of Loma Linda, San Bernardino, and Redlands). Includes two residential units for each duplex.

require the full acquisition of 29 residential parcels and 10 commercial parcels. Of the 39 full acquisitions, 37 are within the IVDA area that is already planned for redevelopment. Tables 2.3.J and 2.3.K list the full and partial acquisitions for the proposed project, respectively, along with the Assessor's Parcel Number (APN) and amount of affected land in square feet. The 39 full acquisitions would total 456,745.58 sq ft and the 29 partial acquisitions would total 65,465.18 sq ft. The full right-of-way acquisitions identified for the proposed project are based on conceptual design. The actual right-of-way (full and partial acquisitions) for the proposed project would be refined and defined during final design.

The Build Alternative would displace 25 residences (23 single-family residences and 2 multifamily residences) in the northeast quadrant of the interchange (City of San Bernardino). These residences range from 553 to 1,776 sq ft in size and are mostly two-bedroom residences. A total of 74 residents would be displaced as a result of the acquisition of those residential units. Finding replacement dwellings in Loma Linda, San Bernardino, and Redlands for residents displaced by the Build Alternative would be dependent in part on the overall demand for housing in the Inland Empire. In the last couple of decades, the available supply has not kept pace with demand, driving the cost of housing to very high levels. Since the 2000 United States Census, the County has gained 298,366 people, with only

Table 2.3.J Full Acquisitions by Assessor's Parcel Number

APN	Existing Land Use	Permanent Area Acquisition (sq ft)	City
281-133-07	Residential: Undeveloped	10,076.01	San Bernardino
281-133-08	Residential: Undeveloped	4,511.69	San Bernardino
281-151-15	Residential: Undeveloped	3,892.61	San Bernardino
281-151-16	Residential: Single-family	7,785.28	San Bernardino
281-151-17	Residential: Single-family	7,785.30	San Bernardino
281-151-18	Residential: Single-family	7,785.33	San Bernardino
281-151-19	Commercial: Undeveloped	7,785.35	San Bernardino
281-151-20	Commercial: Undeveloped	6,863.32	San Bernardino
281-151-21	Commercial: Undeveloped	7,194.11	San Bernardino
281-151-49	Commercial: Tattoo parlor	1,176.49	San Bernardino
281-151-66	Residential: Duplex	15,046.00	San Bernardino
281-152-02	Residential: Single-family	8,675.43	San Bernardino
281-152-03	Residential: Single-family	8,675.24	San Bernardino
281-152-04	Residential: Single-family	8,675.05	San Bernardino
281-152-05	Residential: Single-family	8,674.86	San Bernardino
281-152-06	Residential: Single-family	8,674.68	San Bernardino
281-152-07	Residential: Single-family	8,674.49	San Bernardino
281-152-08	Residential: Duplex	8,674.30	San Bernardino
281-152-20	Residential: Single-family	8,646.21	San Bernardino
281-152-21	Residential: Single-family	8,672.07	San Bernardino
281-152-22	Residential: Single-family	8,672.28	San Bernardino
281-152-23	Residential: Single-family	8,672.49	San Bernardino
281-152-24	Residential: Single-family	8,672.70	San Bernardino
281-152-25	Residential: Single-family	8,672.91	San Bernardino
281-152-26	Residential: Undeveloped	8,673.12	San Bernardino
281-152-27	Residential: Single-family	8,673.33	San Bernardino
281-152-28	Residential: Single-family	8,673.54	San Bernardino
281-152-29	Residential: Single-family	8,673.75	San Bernardino
281-152-30	Residential: Single-family	8,673.96	San Bernardino
281-152-31	Residential: Single-family	8,674.16	San Bernardino
281-152-32	Residential: Single-family	8,674.37	San Bernardino
281-152-33	Residential: Single-family	8,674.58	San Bernardino
281-152-42	Commercial: Gasoline station[1]	17,215.97	San Bernardino
281-152-43	Commercial: Gasoline station	32,261.11	San Bernardino
281-152-44	Residential: Single-family	17,349.79	San Bernardino
281-161-38	Commercial: Motel	41,080.34	San Bernardino
281-161-41	Commercial: Restaurant	54,972.98	San Bernardino
281-161-42	Commercial: Restaurant[1]	27,174.91	San Bernardino
281-161-44	Commercial: Undeveloped	4,665.47	San Bernardino
	Total	**456,745.58**	

Source: *Community Impact Assessment* (LSA Associates, Inc., August 2009).
[1] Unoccupied
APN = Assessor's Parcel Number
sq ft = square feet

Table 2.3.K Partial Acquisitions by Assessor's Parcel Number

APN	Existing Land Use	Area Acquisition (sq ft)	City
281-081-23	Commercial	662.42	San Bernardino
281-091-31	Commercial	3,816.33	Loma Linda
281-133-09	Residential: Single-family	42.97	San Bernardino
281-151-14	Residential: Single-family	86.35	San Bernardino
281-151-38	Residential: Undeveloped	15,436.80	San Bernardino
281-151-39	Residential: Single-family	4.93	San Bernardino
281-151-50	Commercial: Undeveloped	869.39	San Bernardino
281-151-67	Residential: Single-family	9.99	San Bernardino
281-151-75	Commercial: Undeveloped	3,476.52	San Bernardino
281-152-09	Residential: Single-family	282.15	San Bernardino
281-161-48	Commercial: Undeveloped	22,459.77	San Bernardino
281-162-22	Commercial	267.80	Loma Linda
281-162-24	Commercial	3,104.20	Loma Linda
281-162-26	Commercial	2,662.89	San Bernardino
281-401-08	Commercial	1,689.29	San Bernardino
281-401-13	Commercial	194.04	San Bernardino
281-401-14	Commercial	1,456.78	San Bernardino
283-062-19	Commercial	114.51	Loma Linda
283-062-20	Commercial: Undeveloped	1,190.94	Loma Linda
283-062-21	Commercial	300.00	Loma Linda
283-062-22	Commercial	90.00	Loma Linda
283-062-23	Commercial	1,227.43	Loma Linda
283-062-24	Commercial	943.30	Loma Linda
283-062-26	Commercial: Undeveloped	163.74	Loma Linda
283-082-01	Commercial	1,491.59	Loma Linda
283-082-02	Commercial[1]	449.28	Loma Linda
283-082-03	Commercial[1]	1,713.47	Loma Linda
283-082-04	Commercial	690.00	Loma Linda
283-082-05	Commercial: Undeveloped	568.30	Loma Linda
	Total	**65,465.18**	

Source: *Community Impact Assessment* (LSA Associates, Inc., August 2009).
[1] Results in one business displacement
APN = Assessor's Parcel Number
sq ft = square feet

66,467 residential units having been added. However, since foreclosures have increased to an all-time high based on recent difficulties with the residential mortgage and financial sectors, adequate replacement properties are anticipated to exist for the proposed project. In 2000, the residential vacancy rates in the Cities of Loma Linda, San Bernardino, and Redlands and in the County averaged 7.1, 11.4, 4.8, and 12.1 percent, respectively (refer to Table 2.3.B above). As discussed later in Section 2.3.2.4 and shown in Table 2.3.M, there are approximately 2,381 homes for sale in the Cities of Loma Linda, San Bernardino, and Redlands.

As shown in Tables 2.3.I, 2.3.J, and 2.3.K, the Build Alternative would result in eight business displacements (six displacements on full acquisitions and two displacements on partial acquisitions). Six of these displacements would be in the City of San Bernardino and two would be in the City of Loma Linda. Two of the partial acquisitions under the Build Alternative would require the relocation of two existing businesses, a photo shop on APN 283-082-02 in the City of Loma Linda and a property management building on APN 283-082-03 in the City of Loma Linda. The other structures and businesses on these parcels would not be displaced by the proposed project. The remaining business displacements are a result of full-parcel acquisitions and are listed by APN in Table 2.3.J. These businesses are located within the City of San Bernardino and consist of two gas stations (one vacant), a motel, a tattoo parlor, and two restaurants (one vacant). Based on current vacancy rates in the Cities of Loma Linda, San Bernardino, and Redlands, it is anticipated that these displaced nonresidential uses can be relocated in the three project area cities or the immediately surrounding areas. As discussed later in Section 2.3.2.4 and shown in Tables 2.3.O and 2.3.P, there are approximately 164 businesses for sale and 241 businesses for rent in the Cities of Loma Linda, San Bernardino, and Redlands.

As discussed below in Section 2.3.5.2, all property acquisitions and relocations would be handled in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act) of 1970 (Public Law 91-646, 84 Stat. 1894).

Employee Displacement

The proposed project would require acquisition of eight businesses (six displacements on full acquisitions and two displacements on partial acquisitions). Six businesses would be acquired in the City of San Bernardino and two businesses would be acquired in the City of Loma Linda. All the potential business relocations are on parcels designated as commercial. The number of displaced employees due to business relocations as a result of the proposed project is shown on Table 2.3.L. Relocation of the eight businesses would lead to a displacement of an estimated 34–85 employees, as shown in Table 2.3.L. This displacement would represent 0.04–0.09 and 0.02–0.07 percent of the employed labor force in the City of San Bernardino and the City of Loma Linda, respectively, which is not substantial.

Table 2.3.L Employee Displacement in the Cities of San Bernardino and Loma Linda

Businesses (APNs)	Business Type	Number of Employees Displaced	Percentage of Employees Displaced by City
San Bernardino			
281-152-42	Vacant gas station	0	N/A
281-152-43	Gas station[1]	1–4	0.001–0.005
281-151-49	Tattoo parlor[1]	1–4	0.001–0.005
281-161-38	Motel	10–20	0.01–0.02
281-161-41	Restaurant	20–49	0.02–0.06
281-161-42	Vacant restaurant	0	N/A
	Total	**32–77**	**0.04–0.09**
Loma Linda			
283-082-02	Photo shop[1]	1–4	0.001–0.005
283-082-03	Property mgmt. office	1–4	0.001–0.005
	Total	**2–8**	**0.02–0.07**

Source: *Community Impact Assessment* (LSA Associates, Inc., August 2009).
[1] Data for these businesses were not available at the above-mentioned source; therefore, employee numbers from a business of a similar type and size and from the adjacent area were used as a substitute.
APN = Assessor's Parcel Number
N/A = not applicable

Parking Space Loss

Implementation of the project would result in the loss of parking spaces for area businesses. In the northwest quadrant, 127 parking spaces would be lost due to full acquisitions of commercial properties. Because those businesses would be relocated, parking demand is not anticipated to be affected. Businesses in the southeast quadrant would lose 10 on-site parking spaces; however, 4 of these spaces are associated with two businesses that would require relocation. Eleven on-street parking spaces would be removed from the southwest quadrant. Five parking spaces would be removed in the southeast quadrant at Baker's Burgers to allow reconfiguration of the drive-thru. As specified in Measure COM-1, presented below, a parking lot circulation plan would be prepared and submitted to the City of Loma Linda for approval.

Property Taxes

The proposed project would create secondary fiscal impacts as a result of the right-of-way acquisition and relocations. The Build Alternative would have an impact due to the removal of property from the local tax base. The acquisition of property for conversion to transportation uses would result in a loss of taxable property in each city; however, this would be minimal compared to the total tax assessment base in each city. The northeast quadrant of the interchange, where all but two of the displacements would occur, is within the San Bernardino Valley Enterprise Zone.

The San Bernardino Valley Enterprise Zone (SBVEZ) provides incentives for business development and includes the City of San Bernardino, the City of Colton, and a portion of unincorporated San Bernardino County. The project would improve traffic operations in the area, which may encourage business development in the area. In addition, there is anticipated to be adequate space for relocation of displaced residents and businesses in the Cities of San Bernardino and Loma Linda and the immediately surrounding areas.

The proposed project would involve 37 residential and nonresidential acquisitions in the City of San Bernardino, resulting in an estimated $82,366 in annual property tax loss. These acquisitions would constitute a reduction of approximately 0.07 percent of the total property tax revenue for the city. The project would involve two nonresidential acquisitions in the City of Loma Linda, resulting an estimated $1,419 of annual property tax revenue loss. These acquisitions would constitute a reduction of approximately 0.01 percent of annual property tax revenue for the city, which is not considered substantial.

Sales Taxes

When businesses cease to operate, the State and local jurisdictions lose sales tax revenues. For the businesses in the City of San Bernardino that would be acquired for the Build Alternative, the potential sales tax loss for the City would be an estimated $15,516 if the four displaced businesses are relocated outside the City. This represents a loss of 0.0005 percent of the overall City sales tax revenue. For the City of Loma Linda, the potential sales tax loss for the City would be an estimated $19,145, if the two displaced businesses are relocated outside the City. This represents a loss of 0.006 percent of the overall City sales tax revenue.

Although the Build Alternative would result in the displacement of residences and businesses, it would have positive effects because improved traffic operations may encourage businesses to relocate into the area. Property values in the project area would be expected to increase as a result of improved access, resulting in higher property tax yields. Business sales in the area would also be expected to improve due to improved access for customers, resulting in higher sales tax yields.

Alternative 2 – No Build Alternative

The No Build Alternative would require no residential or commercial displacements or partial acquisitions. Therefore, the No Build Alternative would not result in permanent impacts related to relocations. However, under the No Build Alternative, there could be some reduction in the tax base if increased congestion and poor access discourage consumers from patronizing businesses in the area.

2.3.2.4 Avoidance, Minimization, and/or Mitigation Measures

Availability of Replacement Housing

The search for suitable replacement housing for households that must be relocated was confined to the Cities of Loma Linda, San Bernardino, and Redlands. The affected neighborhoods and the replacement areas are comparable in terms of amenities, public utilities, public services, transportation, and shopping. Residences available for purchase and rent in the three project area cities in January 2009 are summarized in Tables 2.3.M and 2.3.N, respectively.

Table 2.3.M Residential Units Available for Sale in the Project Area Cities

Price Range	Residences Available for Sale			
	Loma Linda	San Bernardino	Redlands	Total
$50,000–$99,999	2	632	15	**649**
$100,000–$199,999	18	849	79	**946**
$200,000–$299,999	36	274	83	**393**
$300,000–$399,999	19	89	64	**172**
$400,000–$499,999	10	34	37	**81**
$500,000 and up	10	35	95	**140**
Total Units	**95**	**1,913**	**373**	**2,381**

Source: *Draft Relocation Impact Report* (LSA Associates, Inc., August 2009).

Table 2.3.N Residential Units Available for Rent in the Project Area Cities

Bedrooms	Rent Range	Units Available for Rent			
		Loma Linda	San Bernardino	Redlands	Total
1 bedroom	$530–$1,295	0	94	31	**125**
2 bedrooms	$590–$1,550	2	47	34	**83**
3 bedrooms	$1,075–$1,805	0	6	11	**17**
4 bedrooms	$1,225 and up	0	3	10	**13**
Total Units		**2**	**150**	**86**	**238**

Source: *Draft Relocation Impact Report* (LSA Associates, Inc., August 2009).

Based on existing market conditions, there currently is adequate replacement housing for the project in the Cities of San Bernardino, Loma Linda, and Redlands even though residential relocations will be restricted to areas outside of the IVDA. The estimated real estate values described above are for a specific period of time and cannot be guaranteed beyond those dates. The actual property acquisitions and subsequent relocations for the project may not occur for some time; actual values at the time of acquisition are subject to variance from those reported here.

Even with the existing soft real estate market, it is possible that adequate relocation resources may not exist for all the residential owners and tenants in the project area at the time of the displacement. As a result, relocation opportunities in other cities in the County, such as Colton, Highland, Fontana, and Rialto, may be used to relocate some residents displaced by the proposed project. It is not anticipated that temporary housing and/or Last Resort Housing would be used if required for the project. However, they will be used in the event that relocating displaced residents requires those benefits.

Availability of Nonresidential Property

Tables 2.3.O and 2.3.P identify available business properties for sale and rent in the Cities of Loma Linda, San Bernardino, and Redlands in January 2009. Based on these tables, facilities are available for the displaced properties, with the exception of the motel. However, a recent search of surrounding communities, including the Cities of Colton, Highland, Fontana, and Rialto, indicated that one 100-room motel is available for sale in the City of Colton near I-10 and Interstate 215 (I-215).

Table 2.3.O Business Properties Available for Sale in the Project Area Cities

Business Property	Business Properties Available for Sale			
	Loma Linda	San Bernardino	Redlands	Total
Motel[1]	0	0	0	**0**
Restaurant/Fast Food	0	4	2	**6**
Gas Station	0	3	0	**3**
Auto Repair/Auto Services	0	10	0	**10**
Retail/Office	2	47	55	**104**
Industrial/Warehouse	0	31	10	**41**
Total Units	**2**	**95**	**67**	**164**

Source: *Draft Relocation Impact Report* (LSA Associates, Inc., August 2009).

[1] A recent (August 20, 2009) search of surrounding communities, including Colton, Highland, Fontana, and Rialto, indicates that one additional 100-room motel is available for sale in Colton near I-10 and I-215.

Table 2.3.P Business Properties Available for Rent in the Project Area Cities

Business Property	Business Properties Available for Rent			
	Loma Linda	San Bernardino	Redlands	Total
Motel[1]	0	0	0	**0**
Restaurant/Fast Food	1	2	2	**5**
Gas Station	0	0	0	**0**
Auto Repair/Auto Services	0	3	0	**3**
Retail/Office	7	102	68	**177**
Industrial/Warehouse	0	36	20	**56**
Total Units	**8**	**143**	**90**	**241**

Source: *Draft Relocation Impact Report* (August 2009).
[1] No motels are currently for rent in San Bernardino County. However, motels are typically sold instead of rented.

Given recent economic conditions, relocation resources for all nonresidential uses are anticipated to be adequate in the relocation area. In addition, adjacent cities (e.g., Colton and Rialto) may be considered for relocations, if necessary.

Relocation Issues

The recent increases in residential foreclosures have resulted in a decrease in the cost of both owner and rental housing in the County, including the area around the proposed project. This is anticipated to have an impact on the housing markets in most communities in the County, including the Cities of Loma Linda, San Bernardino, and Redlands. Although there are several residences available in the immediate vicinity of the proposed project, due to varying project schedules, it is not possible to determine the availability of these residential units relative to the property acquisition process for the proposed project. Actual relocation opportunities would be dependent on which properties are available at the time right-of-way acquisition occurs for the proposed project.

Many of the residents in the project area census tracts have low and moderate incomes. Due to the cost of housing in the Cities of Loma Linda, San Bernardino, and Redlands, some affected residents may need to be relocated to areas outside the three study area cities, such as the Cities of Highland, Colton, or Rialto. Factors such as income level, cultural considerations, and the age of displacees would have to be considered.

Based on current vacancy rates in the Cities of Loma Linda, San Bernardino, and Redlands, it is anticipated that the displaced nonresidential uses can be relocated in the three project area cities or the immediately surrounding areas.

It is not anticipated that the statutory limits for the Last Resort Housing Program would be exceeded; however, the Last Resort Housing Program would be used if required.

The following measures are required to reduce the potential impacts related to property acquisitions and relocations:

REL-1 The San Bernardino Associated Governments (SANBAG) shall comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended in 1987. SANBAG shall provide relocation advisory assistance to any person, business, farm, or nonprofit organization displaced as a result of SANBAG's acquisition of real property for public use. SANBAG shall assist displacees in obtaining replacement housing by providing current and continuing information on the availability and prices of houses for sale and rental units that are comparable, "decent, safe, and sanitary." SANBAG shall provide nonresidential displacees with information on comparable properties for lease or purchase. SANBAG shall provide residential replacement dwellings in equal or better neighborhoods at rents or prices within the financial means of the individuals and families displaced and reasonably accessible to their places of employment. Before any displacement occurs, comparable replacement dwellings shall be offered to displacees that are open to all persons regardless of race, color, religion, sex, or national origin, consistent with the requirements of Title VIII of the Civil Rights Act of 1968.

REL-2 SANBAG shall provide a 90-day written notice to persons who are eligible for relocation payments, who are legally occupying the property required for the project, and who are being asked to move. Occupants eligible for relocation payment(s) shall not be required to move unless at least one comparable decent, safe, and sanitary replacement residence, available on the market, is offered to them by SANBAG.

REL-3 SANBAG shall provide moving expenses to all eligible displacees. SANBAG shall provide payment in lieu of moving expenses to businesses that are expected to suffer a substantial loss of existing patronage as a result of the displacement, or if certain other requirements, such as the inability to find a suitable relocation site, are met. This payment is the amount equal to the average annual net earnings for the last 2 taxable years prior to relocation. Such payment may not be less than $1,000 and not more than $20,000.

REL-4 SANBAG shall relocate displaced residences outside the Inland Valley Development Agency (IVDA) redevelopment zones as these areas are designated for future commercial and industrial development.

REL-5 If comparable replacement housing cannot be found in the Cities of Loma Linda, San Bernardino, or Redlands for displaced residential uses, SANBAG shall implement at least one of the following options: (1) the potential relocation area shall be expanded to include additional cities in the region, including Colton, Highland, Fontana, and Rialto, (2) additional funds shall be provided to the households to enable them to purchase affordable housing in the surrounding area, and/or (3) the Last Resort Housing Program shall be implemented to retrofit/modify existing housing and/or construct new housing.

REL-6 If comparable properties are not available for the potentially displaced nonresidential properties in the Cities of Loma Linda, San Bernardino, and Redlands, SANBAG shall pursue opportunities for relocation outside these Cities in nearby cities with available and similarly General Planned and zoned properties. This could include the Cities of Colton, Highland, Fontana, and Rialto. An estimate of the business costs shall be determined between the implementing agency and each business owner regarding just compensation for the business.

The following measure is required to reduce potential impacts related to loss of parking:

COM-1 A detailed parking lot circulation plan shall be prepared during the final design phase of the proposed project. The parking lot circulation plan shall address parking space loss at Baker’s Burgers. The parking lot circulation plan shall be submitted to the City of Loma Linda for review and approval.

2.3.3 Environmental Justice

2.3.3.1 Regulatory Setting

All projects involving a federal action (funding, permit, or land) must comply with Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, signed by President Clinton on February 11, 1994. This EO directs federal agencies to take the appropriate and necessary steps to identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. Low income is defined based on the Department of Health and Human Services poverty guidelines. For 2009, this was $22,050 for a family of four.

All considerations under Title VI of the Civil Rights Act of 1964 and related statutes have also been included in this project. The Department's commitment to upholding the mandates of Title VI is evidenced by its Title VI Policy Statement, signed by the Director, which can be found in Appendix C of this document.

2.3.3.2 Affected Environment

This section is based on the information from the *Community Impact Assessment* (August 2009).

The five measures to evaluate the potential to environmental justice impacts are:

- Percentage of non-White residents in the project area census tracts;
- Percentage of Hispanic residents (the United States Census Bureau considers Hispanic or Latino ethnicity distinct from racial background) in the project area census tracts;
- Percentage of population below the poverty level in the project area census tracts;
- Median household income in the project area census tracts; and
- Transit-dependent population in the project area census tracts.

Table 2.3.Q summarizes the percentage of minority, below-poverty-level, elderly, and transit-dependent populations in the study area census tracts, and the Cities of San Bernardino and Loma Linda.

Table 2.3.Q Environmental Justice Parameters

Census Tract	Non-White (not including Hispanic)	Hispanic	Percent Below Poverty	Median Household Income	Transit Dependent (<18 and >64)	Population > 64
72.00 (City of San Bernardino)	58%	40%	26%	$32,483	44%	9%
Block Group 2	60%	61%	48%	$13,207	51%	8%
Block Group 3	29%	45%	11%	$36,250	43%	11%
Block Group 5	51%	45%	26%	$33,833	51%	8%
City of San Bernardino	55%	47%	28%	$31,140	43%	8%
73.01 (City of Loma Linda)	52%	23%	22%	$28,870	36%	12%
Block Group 1	44%	23%	23%	$24,688	48%	10%
Block Group 5	47%	27%	21%	$31,683	44%	9%
Block Group 6	37%	20%	6%	$38,242	31%	10%
City of Loma Linda	47%	16%	15%	$38,204	37%	15%

Source: *Community Impact Assessment* (LSA Associates, Inc., August 2009).
Note: The above data are based on the 2000 United States Census. A Block Group is a subdivision of a census tract and is the smallest geographic unit for which the Census Bureau tabulates 100 percent data.

As shown in Table 2.3.Q, the non-White (excluding Hispanic) population comprises 58 percent of the population in Census Tract 72.00 (located in the City of San Bernardino), an average of 46 percent of the population in the block groups of Tract 72.00, and 55 percent of the population of the City of San Bernardino. The non-White (excluding Hispanic) population comprises 52 percent of the population in Census Tract 73.01 (located in the City of Loma Linda), an average of 42 percent of the population in the block groups of Tract 73.01, and 47 percent of the population of the City of Loma Linda. As shown, the percentage of non-White (excluding Hispanic) populations in the census tracts and block groups and the cities in which they are located is relatively similar. As a result, neither census tract, nor its associated block groups, was determined to have a disproportionate number of non-White (excluding Hispanic) residents compared to the city in which it is located. Therefore, those populations were not considered environmental justice populations in this analysis.

As shown in Table 2.3.Q, the Hispanic population comprises 40 percent of the population in Census Tract 72.00, an average of 50 percent of the population in its block groups, and 47 percent of the population of the City of San Bernardino. As a result, because the percentage of Hispanic residents in Census Tract 72.00 and its block groups is comparable to that of the City of San Bernardino (40 percent compared to 50 percent and 47 percent, respectively), the Hispanic population was not considered an environmental justice population for this analysis.

As shown in Table 2.3.Q, the Hispanic population comprises 23 percent of the population in Census Tract 73.01, roughly 23 percent of the population in its block groups, and 16 percent of the population of the City of Loma Linda. As a result, because the percentage of Hispanic residents in Census Tract 73.01 and its block groups is comparable to that of the City of Loma Linda (23 percent compared to 23 percent and 16 percent, respectively), the Hispanic population was not considered an environmental justice population for this analysis.

As shown in Table 2.3.Q, the percentage of residents below the poverty level in Census Tract 72.00 is 26 percent, an average of 28 percent in its block groups, and 28 percent of the population of the City of San Bernardino. Because the percentages of residents below the poverty level are similar for this census tract and city, this population was not considered an environmental justice population for this analysis.

As shown in Table 2.3.Q, the percentage of residents below the poverty level in Census Tract 73.01 is 22 percent, an average of 16 percent in its block groups, and 15 percent of the population of the City of Loma Linda. Because the percentage of residents below the poverty level in this census tract is higher than for the city in which it is located (22 percent compared to 15 percent) and the percentage of residents below the poverty level in the block groups is lower than for this census tract (16 percent compared to 22 percent), the population below the poverty level was not considered an environmental justice population for this analysis.

As shown in Table 2.3.Q, the transit-dependent population comprises 44 percent of the population in Census Tract 72.00, an average of 48 percent in its block groups, and 43 percent of the population of the City of San Bernardino. The transit-dependent population comprises 36 percent of the population in Census Tract 73.01, an average of 41 percent in its block groups, and 37 percent of the population of the City of Loma Linda. As shown, the percentages of transit-dependent population in the census tracts and the cities in which they are located are nearly the same. As a result, neither census tract, nor its associated block groups, was determined to have a disproportionate number of transit-dependent residents compared to the city in which it is located; therefore, those populations were not considered environmental justice populations in this analysis.

As shown in Table 2.3.Q, the elderly (>64) population comprises 9 percent of the population in Census Tract 72.00, an average of 9 percent in its block groups, and 8 percent of the population of the City of San Bernardino. The elderly population comprises 12 percent of the population in Census Tract 73.01, an average of 9.6 percent in its block groups, and 15 percent of the population of the City of Loma Linda. As shown, the percentages of elderly population in the census tracts and the cities in which they are located are nearly the same. As a result, neither census tract was determined to have a disproportionate number of elderly residents compared to the city in which it is located; therefore, those populations were not considered environmental justice populations in this analysis.

2.3.3.3 Environmental Consequences

The percentages of non-White (excluding Hispanic), Hispanic, below-poverty-level, and transit-dependent populations in Census Tracts 72.00 and 73.01 and their associated block groups are comparable to the percentages of those populations in the cities in which they are located (i.e., the Cities of San Bernardino and Loma Linda, respectively). As a result, construction of the Build Alternative (Alternative 1) would not disproportionately result in permanent or temporary impacts to those populations in Census Tracts 72.00 and 73.01.

Temporary Impacts

Alternative 1 – Build Alternative

The construction of the Build Alternative would result in short-term noise and traffic impacts to all residents in Census Tracts 72.00 and 73.01. However, these impacts would not be predominantly borne by these minority or low-income populations, and the project-related construction impacts would not be appreciably more severe to these minority or low-income populations compared to the populations in both cities.

Alternative 2 – No Build Alternative

The No Build Alternative would not result in property acquisition, community disruption, or other changes that could adversely affect environmental justice populations. Therefore, the No Build Alternative would not result in adverse temporary environmental justice impacts to environmental justice populations.

Permanent Impacts

Alternative 1 – Build Alternative

The proposed project would provide beneficial impacts to the area. Traffic congestion in the interchange area would be reduced, which would reduce greenhouse gas emissions when compared to the No Build Alternative (Section 2.19). Traffic noise levels would be reduced at several receiver locations with the construction of sound barriers (Section 2.14). Air quality would not be degraded (Section 2.13). Water quality impacts would be reduced because the proposed project would construct storm water treatment devices (Section 2.9).

Displaced residents and businesses would be relocated to other sites in the area consistent with their land use type. The proposed project is consistent with the IVDA redevelopment plan, which designates areas for redevelopment with commercial and industrial facilities associated with an airport influence area (Section 2.1).

Alternative 2 – No Build Alternative

The No Build Alternative would not result in property acquisition, community disruption, or other changes that could adversely affect environmental justice populations. The No Build Alternative would not result in adverse permanent environmental justice impacts to environmental justice populations.

2.3.3.4 Avoidance, Minimization, and/or Mitigation Measures

Based on the above discussion and analysis, Alternative 1 would not cause disproportionately high or adverse effects to any minority or low-income populations per EO 12898 regarding environmental justice.

No specific avoidance, minimization, and/or mitigation measures are required.

2.4 Utilities and Emergency Services

2.4.1 Affected Environment

This section is based on the information from the *Community Impact Assessment* (August 2009).

2.4.1.1 Utilities

Water and sewer services in the vicinity of the project intersection are provided by the City of Loma Linda and the City of San Bernardino. The Southern California Gas Company provides natural gas. Southern California Edison provides electricity. Cable and telecommunication services are provided by Time Warner and Verizon, respectively. Utilities provided in the project area are summarized in Table 2.4.A.

Table 2.4.A Utility Service Providers

Utility Category	Utility Provider
Water	City of Loma Linda
	City of San Bernardino
	City of Redlands
Sewer	City of Loma Linda
	City of San Bernardino
Gas	Southern California Gas Company
Electricity	Southern California Edison
Cable Television	Time Warner
Telecommunication	Verizon

2.4.1.2 Fire Protection

The City of San Bernardino Fire Department (SBFD) responds to calls in the City of San Bernardino and staffs 12 fire engine companies and 2 aerial truck companies housed in 12 stations in the City. The SBFD also has mutual aid agreements with the San Bernardino County Fire Department, as well as the fire departments of the Cities of Colton, Rialto, and Loma Linda. The City of Loma Linda Fire Department responds to calls in the City of San Bernardino and staffs three chief officers, six captains, six engineers, six firefighters/paramedics, and six firefighter apprentices.

There is one SBFD fire station, Station 231, located less than 0.5 mile (mi) from the project intersection, at 450 East Vanderbilt Drive in San Bernardino.

2.4.1.3 Law Enforcement

The City of San Bernardino Police Department (SBPD) central headquarters facility is located at 710 North D Street, approximately 5 mi from the project intersection, and approximately 4 mi from the project intersection. The City of Loma Linda contracts with the San Bernardino Sheriff's Department for police services, which is located at 655 East 3rd Street.

The California Highway Patrol (CHP) has jurisdiction on freeways in California, including Interstate 10 (I-10). The nearest CHP office is the Inland Communications Center at 847 East Brier Drive, San Bernardino, approximately 0.5 mi from the project intersection. This facility is the Division Office for the CHP's Inland Division and is the communications and dispatch center for the Cities of Arrowhead, Rancho Cucamonga, Riverside, and San Bernardino.

2.4.1.4 Hospitals

There are no hospitals in the immediate vicinity of the project intersection. The following hospitals are located within 5 mi of the project intersection:

- Loma Linda University Medical Center, at 11234 Anderson Street, Loma Linda
- Jerry L. Pettis Memorial Veterans Affairs Medical Center, at 11201 Benton Street, Loma Linda
- Redlands Community Hospital, at 350 Terracina Boulevard, Redlands

2.4.2 Environmental Consequences

2.4.2.1 Temporary Impacts

Alternative 1 – Build Alternative

Construction of the proposed project would require protection in place, removal, replacement, or relocation of existing utility facilities within the project disturbance limits. An updated utility search and potholing, as specified below in Measures UES-1 and UES-2, would be required during final design to determine all utility conflicts that require positive location and/or relocation prior to and during project construction.

The utility facilities that have the potential to be impacted by project construction are listed in Table 2.4.B.

Table 2.4.B Potential Utility Conflicts During Project Construction

Utility Category	Utility Provider	Description	Location	Conflict Resolution
Water	City of Loma Linda	3-12″ CML Steel, 1–8″	Anderson Street from Court Street to Redlands Boulevard	Protect during construction
Water	City of Loma Linda	1-12″ CML Steel, 1–8″	Redlands Boulevard (south side)	Protect during construction
Water	City of San Bernardino	4″ 150 AC, 6″ 100 AC	Rosewood Drive from Tippecanoe Avenue to Ferree Street and Ferree Street	Relocate water line
Water	City of San Bernardino	8″ 150 AC	Laurelwood Drive	Protect during construction
Water	City of San Bernardino	6″ AC	Tippecanoe Avenue (east side)	Protect during construction
Water	City of Redlands	6″, 4″ Steel	Anderson Street, along Redlands Boulevard	Protect during construction
Sewer	City of Loma Linda	8″ VCP	Redlands Boulevard	Protect during construction
Sewer	City of Loma Linda	8″ VCP	Court Street, Anderson Street, and Rosewood Drive	Protect during construction, relocate along Rosewood Drive
Gas	Southern California Gas Company	6″ MP, 4″ PEM	Redlands Boulevard (north side)	Protect during construction
Gas	Southern California Gas Company	2″	Redlands Boulevard (south side)	Protect during construction
Gas	Southern California Gas Company	6″ MP, 2″ MP	Anderson Street from Court Street to Coulston Street	Protect during construction
Gas	Southern California Gas Company	2″ PEM	Rosewood Drive	Relocate prior to construction
Gas	Southern California Gas Company	2″ PU	Laurelwood Drive to Ferree Street	Relocate from Tippecanoe Avenue/ Ferree Street intersection to new realignment of Laurelwood Drive
Electricity	Southern California Edison	Overhead lines	Redlands Boulevard (north side)	Relocate conflicting power poles and overhead lines
Electricity	Southern California Edison	Overhead and underground lines	Redlands Boulevard (south side) and Anderson Street (west side)	Relocate conflicting power poles and overhead lines, and protect underground lines in place
Electricity	Southern California Edison	Overhead lines	Redlands Boulevard (south side) east of Redlands Boulevard/ Anderson Street intersection and along Anderson Street (east side)	Relocate conflicting power poles and overhead lines
Electricity	Southern California Edison	Underground lines	Anderson Street/Tippecanoe Avenue (west side) from Redlands Boulevard/Anderson Street intersection to Rosewood Drive	Protect during construction
Electricity	Southern California Edison	Overhead lines	Rosewood Drive (north and south sides) and Ferree Street	Relocate conflicting power poles and overhead lines
Electricity	Southern California Edison	Underground lines	Rosewood Drive	Relocate prior to construction
Electricity	Southern California Edison	Overhead lines	Laurelwood Drive (north side)	Relocate conflicting power poles and overhead lines

Table 2.4.B Potential Utility Conflicts During Project Construction

Utility Category	Utility Provider	Description	Location	Conflict Resolution
		Underground and overhead line	East Lee Street (north side)	Protect during construction
		Underground	Anderson Street from Redlands Boulevard/Anderson Street intersection to eastbound on-ramp and Redlands Boulevard (north side)	Protect during construction
Cable Television	Time Warner	Overhead and underground lines	Redlands Boulevard (south side), Anderson Street (west side), and Court Street	Relocate conflicting power poles and overhead lines, protect underground lines in place
		Overhead lines	Rosewood Drive (north side)	Relocate conflicting power poles and overhead lines
		Overhead lines	Laurelwood Drive (north side)	Relocate conflicting power poles and overhead lines
Telecommunication	Verizon	2″x3″ underground line	Redlands Boulevard (north side) from San Timoteo Creek to east of the Redlands Boulevard/Anderson Street intersection	Protect during construction
		2″x1″ underground line	Redlands Boulevard (south side)	Protect during construction
		2″x5″, 3–3.5″ ABSD underground line	Redlands Boulevard (north side)	Protect during construction
		12–4″ ACD underground line 3–3.5” MTC	Anderson Street (west side)	Protect during construction
		3″x4″ underground line	Anderson Street (east and west sides)	Protect during construction
		Underground line	Laurelwood Drive	Remove prior to construction

ABSD = air break switch disconnectors
AC = asbestos cement
ACD = automatic call distributor
CML = concrete-mortar-lined
MP = medium pressure
MTD = multiple telephone duct
PEM = proton exchange membrane
PU = polyurethane
VCP = vitrified clay pipe

During construction, some impairment to the delivery of services, including fire and police response times, may occur. These temporary impacts would be substantially minimized through the implementation of a Traffic Management Plan (TMP).

Alternative 2 – No Build Alternative

The No Build Alternative would not involve construction activities; therefore, no temporary impact to utilities or emergency services would occur.

2.4.2.2 Permanent Impacts

Alternative 1 – Build Alternative

Any relocation of utilities as a result of the Build Alternative would occur during the final design or construction phase, such that all utility services are permanently maintained. Additionally, proposed undergrounding of existing utilities would be coordinated and decided upon with the utility companies during the final design phase. If resolution of the location of utilities during final design involves changes to the project footprint, an Environmental Re-Evaluation will be performed, addressing applicable requirements. In addition, the project would not increase the need for domestic water services, wastewater facilities, or solid waste disposal. Therefore, no permanent impacts to utilities would occur.

The proposed project would reduce congestion in the interchange area as shown in Tables 1.5 –1.11 in Section 1.2.2.2. In addition, the improvements would improve access for emergency service vehicles, including fire and police vehicles. Therefore, the Build Alternative would improve the response times of emergency services that utilize the I-10/Tippecanoe Avenue interchange and local roads, compared to the No Build Alternative.

Alternative 2 – No Build Alternative

The No Build Alternative would not result in relocations of utilities, and no permanent utility impacts would occur.

The No Build Alternative would not improve local circulation or access to the Loma Linda Medical Center and the Jerry Pettis Veterans Administration Hospital. In addition, the improvements would not improve access for emergency service vehicles, including fire and police. Therefore, continuous congestion under this alternative has the potential to reduce response times of emergency services that utilize the I-10/Tippecanoe Avenue interchange and local roads.

2.4.3 Avoidance, Minimization, and/or Mitigation Measures

Implementation of a TMP, as discussed in detail in Section 2.5, Traffic and Transportation, would minimize temporary construction-related impacts to emergency services.

UES-1 During the Plans, Specifications, and Estimates (PS&E) stage, the San Bernardino Associated Governments (SANBAG) shall conduct an updated utility search to determine all utility conflicts that require positive location, protection in place, and/or relocation. Proposed undergrounding of existing utilities will be coordinated and decided upon with the utility companies during the final design phase.

UES-2 During the PS&E stage, SANBAG shall obtain encroachment permits from the California Department of Transportation, the City of San Bernardino, and the City of Loma Linda for surveying and utility potholing within and immediately adjacent to the project disturbance limits.

UES-3 Prior to commencement of construction, SANBAG shall coordinate with all affected utility providers to establish exact procedures and specifications for all facilities to be protected in place and relocated during construction to ensure that utility services are not disrupted.

2.5 Traffic and Transportation/Pedestrian and Bicycle Facilities

2.5.1 Regulatory Setting

The Department, as assigned by FHWA, directs that full consideration should be given to the safe accommodation of pedestrians and bicyclists during the development of federal-aid highway projects (see 23 CFR 652). It further directs that the special needs of the elderly and the disabled must be considered in all federal-aid projects that include pedestrian facilities. When current or anticipated pedestrian and/or bicycle traffic presents a potential conflict with motor vehicle traffic, every effort must be made to minimize the detrimental effects on all highway users who share the facility.

The Department is committed to carrying out the 1990 Americans with Disabilities Act (ADA) by building transportation facilities that provide equal access for all persons. The same degree of convenience, accessibility, and safety available to the general public will be provided to persons with disabilities.

2.5.2 Affected Environment

This section is based on the Traffic Report for the Interstate 10 (I-10)/Tippecanoe Avenue Interchange (March 2008) and the Supplement to I-10/Tippecanoe Avenue Traffic Operations Analysis (August 2009). The 2008 report studied the existing traffic conditions (2004) and forecast future traffic demand (2035), and assessed the impact of the proposed improvements on traffic conditions. The supplemental traffic report was prepared to analyze updated existing conditions for 2009 and the opening year (2015).

The study area for the I-10/Tippecanoe Avenue Interchange Improvement project includes the freeway mainline, ramps, and intersections in the vicinity of the interchange as well as adjacent interchanges. In the project area, I-10 has four mixed-flow lanes in each direction, separated by a median with a concrete barrier. An existing auxiliary lane is provided along westbound I-10 between Tippecanoe and Waterman Avenues. The existing I-10/Tippecanoe Avenue interchange is a compact diamond interchange with single-lane on- and off- ramps.

The arterial roadways in the study area are:

1. Tippecanoe Avenue, a four-lane arterial;
2. Anderson Street, a four-lane arterial; and
3. Redlands Boulevard, a four-lane arterial.

Intersections analyzed in the study area are:

1. Tippecanoe Avenue/Hospitality Lane-Coulston Street;
2. Tippecanoe Avenue/Harriman Place-Laurelwood Drive (I-10 westbound ramps under Alternative 1);
3. Tippecanoe Avenue/I-10 westbound ramps (I-10 westbound slip-on ramp);
4. Tippecanoe Avenue/I-10 eastbound ramps;
5. Tippecanoe Avenue/Baker’s driveway;
6. Tippecanoe Avenue/Redlands Boulevard;
7. I-10 eastbound ramps/Redlands Boulevard;
8. Waterman Avenue/Hospitality Lane;
9. Waterman Avenue/I-215 on-ramp;
10. Waterman Avenue/I-10 eastbound ramps;
11. Waterman Avenue/Redlands Boulevard;
12. I-10 westbound ramps-Carnegie Drive/Hospitality Lane;
13. Mountain View Avenue/I-10 westbound ramps; and
14. Mountain View Avenue/I-10 eastbound ramps.

Freeway segments in the study area are as follows:

1. Eastbound:
    a. Waterman Avenue On-Ramp to Tippecanoe Avenue Off-Ramp
    b. Tippecanoe Avenue Off-Ramp to Tippecanoe Avenue On-Ramp
    c. Tippecanoe Avenue On-Ramp to Mountain View Avenue Off-Ramp
2. Westbound:
    a. Mountain View Avenue On-Ramp to Tippecanoe Avenue Off-Ramp
    b. Tippecanoe Avenue Off-Ramp to Tippecanoe Avenue On-Ramp
    c. Tippecanoe Avenue On-Ramp to Waterman Avenue Off-Ramp

Sidewalks are provided on Tippecanoe Avenue, Anderson Street, and Redlands Boulevard within the project area. Tippecanoe Avenue is designated as a Class II or III bicycle route in the City of San Bernardino General Plan, but no lane currently exists. Anderson Street south of Court Street is identified as a Class II bicycle facility in the City of Loma Linda Master Plan of Bikeways; however, the existing bicycle lane on Anderson Street terminates at the Court Street intersection. San Timoteo Creek is designated as a Class I bicycle trail, but based on field observations it currently does not exist within the project limits.

2.5.2.1 Existing (2009) Traffic Conditions

Table 2.5.A shows the existing mainline traffic volumes and densities during the a.m. and p.m. peak hours, and the levels of service (LOS). Traffic counts were recorded for passenger cars, two-axle trucks, three-axle trucks, and four-axle trucks. The trucks were factored into Passenger Car Equivalents (PCEs) that convert traffic volumes to an equivalent number of passenger cars based on the type of truck. Table 2.5.A shows that all freeway mainline segments in the project area currently operate at acceptable LOS.

Table 2.5.B shows the existing LOS and delay in seconds at the intersections during the a.m. and p.m. peak hours. Although the LOS calculations indicate that all intersections in the study area are currently operating at satisfactory LOS, field observation indicated that the signalized intersections operate at LOS F in the p.m. peak hour. This is because the volumes are constrained by the operation of the intersections (i.e., signals at upstream locations would meter vehicles at downstream locations, preventing vehicles from entering the intersection), so the LOS appears better than the actual LOS. This has been confirmed by queue delay studies at the ramp intersections conducted as part of the Traffic Report (March 2008) as described by the San Bernardino Associated Governments (SANBAG).

A turn-pocket queue analysis determined that the length of the turn-pockets at several intersections are not long enough to store vehicles during the peak hours. The extra vehicles block through lanes, increasing the delay for vehicles moving through the affected intersection. As shown in Table 2.5.C, several existing turn-pocket lengths are not adequate.

A Ramp Junction Analysis was performed to assess the merging and diverging of vehicles at entrance and exit ramps. The results of the analysis for 2009 are shown in Table 2.5.D.

In the existing condition, most ramp junctions in the study area operate at acceptable LOS except for the I-10 eastbound Tippecanoe Avenue off-ramp in the a.m. peak hour and the I-10 westbound Tippecanoe off-ramp in the a.m. and p.m. peak hours.

Table 2.5.A Existing (2009) Mainline Levels of Service

Freeway Segment	AM Peak Hour			PM Peak Hour		
	V	Density	LOS	V	Density	LOS
Eastbound						
Waterman Avenue On-Ramp to Tippecanoe Avenue Off-Ramp	8,497	39.3	E	8,251	37.2	E
Tippecanoe Avenue Off-Ramp to Tippecanoe Avenue On-Ramp	7,424	31.1	D	7,381	30.8	D
Tippecanoe Avenue On-Ramp to Mountain View Avenue Off-Ramp	7,697	32.9	D	8,156	36.3	E
Westbound						
Mountain View Avenue On-Ramp to Tippecanoe Avenue Off-Ramp	7,319	30.4	D	7,328	30.5	D
Tippecanoe Avenue Off-Ramp to Tippecanoe Avenue On-Ramp	6,314	25.3	C	6,589	26.6	D
Tippecanoe Avenue On-Ramp to Waterman Avenue Off-Ramp[†]	7,003	27.0	C	7,669	31.1	D

Source: Supplement to I-10/Tippecanoe Avenue Traffic Operations Analysis (August 2009).
[†] Weaving section
V = Volume in PCEs per hour
Density = PCEs Per Mile Per Lane; adjusted with 0.95 peak-hour factor
LOS = level of service
PCE = Passenger Car Equivalents

Table 2.5.B Existing (2009) Intersection Levels of Service

Intersection	AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS
1. Tippecanoe Avenue/Hospitality Lane-Coulston Street[1]	37.8	D	37.1	D
2. Tippecanoe Avenue/Harriman Place-Laurelwood Drive[1]	12.2	B	24.3	C
3. Tippecanoe Avenue/I-10 Westbound Ramps[1]	19.9	B	24.6	C
4. Tippecanoe Avenue/I-10 Eastbound Ramps[1]	21.7	C	21.1	C
5. Anderson Street/Baker's Driveway[1]	11.2	B	11.4	B
6. Anderson Street/Redlands Boulevard[1]	23.1	C	30.6	C
7. I-10 Eastbound Ramps/Redlands Boulevard	20.8	C	24.2	C
8. Waterman Avenue/Hospitality Lane	23.0	C	36.3	D
9. Waterman Avenue/I-215 On-Ramp	10.5	B	22.5	C
10. Waterman Avenue/I-10 Eastbound Ramps	244.9	F[2]	25.7	D
11. Waterman Avenue/Redlands Boulevard	27.8	C	41.9	D
12. I-10 Westbound Ramps-Carnegie Drive/Hospitality Lane	14.7	B	14.8	B
13. Mountain View Avenue/I-10 Westbound Ramps	24.9	C	20.5	C
14. Mountain View Avenue/I-10 Eastbound Ramps	20.8	C	18.1	B

Source: Supplement to I-10/Tippecanoe Avenue Traffic Operations Analysis (August 2009).
[1] Operates at LOS F during the p.m. peak hour based on queue delay study from March 2008, as described by SANBAG.
[2] Exceeds LOS standard
Delay = Average control delay in seconds
LOS = level of service
SANBAG = San Bernardino Associated Governments

Table 2.5.C Existing (2009) Queue Lengths

Intersection	Available Storage (feet)	95th Percentile Queue (feet)		Queue Exceed Pocket?
		AM Peak Hour	PM Peak Hour	
1. Tippecanoe Avenue/Hospitality Lane-Coulston Street				
Eastbound Left Turn	210	47	249	Yes
Eastbound Right Turn	590	30	80	No
Westbound Left Turn	100	81	92	No
Northbound Left Turn	250	188	153	No
Southbound Left Turn	110	35	66	No
2. Tippecanoe Avenue/Harriman Place-Laurelwood Drive				
Eastbound Left Turn	250	32	207	No
Eastbound Right Turn	200	15	101	No
Westbound Left Turn	100	31	32	No
Northbound Left Turn	200	43	283	Yes
Southbound Left Turn	200	4	19	No
3. Tippecanoe Avenue/I-10 Westbound Ramps				
Westbound Left Turn	150	211	154	Yes
Westbound Right Turn	150	169	85	Yes
Northbound Left Turn	260	18	112	No
Southbound Right Turn	520	228	320	No
4. Tippecanoe Avenue/I-10 Eastbound Ramps				
Eastbound Left Turn	991	422	374	No
Eastbound Right Turn	991	367	254	No
Southbound Left Turn	261	16	40	No
5. Anderson Street/Baker's Driveway				
Westbound Right Turn	160	n/a	n/a	n/a
6. Anderson Street/Redlands Boulevard				
Eastbound Left Turn	150	47	166	Yes
Westbound Left Turn	300	81	142	No
Northbound Left Turn	150	188	69	Yes
Southbound Left Turn	210	35	183	No
7. I-10 Eastbound Ramps/Redlands Boulevard				
Westbound Left Turn	172	65	81	No
Northbound Right Turn	220	0	0	No
Southbound Left Turn	305	323	325	Yes
Southbound Right Turn	100	95	198	Yes
8. Waterman Avenue/Hospitality Lane				
Eastbound Left Turn	150	115	177	Yes
Eastbound Right Turn	170	62	277	Yes
Westbound Left Turn	220	114	217	No
Northbound Left Turn	188	124	133	No
Northbound Right Turn	290	24	88	No
Southbound Left Turn	130	90	236	Yes
Southbound Right Turn	226	47	86	No
9. Waterman Avenue/I-215 On-Ramp				
Northbound Left Turn	300	30	113	No
10. Waterman Avenue/I-10 Eastbound Ramps				
Westbound Right Turn	700	1446	210	Yes
11. Waterman Avenue/Redlands Boulevard				
Eastbound Left Turn	408	132	170	No
Westbound Left Turn	125	171	276	Yes
Northbound Left Turn	165	91	142	No
Northbound Right Turn	85	65	59	No
Southbound Left Turn	175	128	289	Yes

Table 2.5.C Existing (2009) Queue Lengths

Intersection	Available Storage (feet)	95th Percentile Queue (feet)		Queue Exceed Pocket?
		AM Peak Hour	PM Peak Hour	
12. I-10 Westbound Ramps-Carnegie Drive/Hospitality Lane				
Eastbound Left Turn	100	185	80	Yes
Eastbound Right Turn	250	39	102	No
Westbound Left Turn	296	28	99	No
Northbound Left Turn	600	147	122	No
Northbound Right Turn	203	15	19	No
Southbound Left Turn	122	12	34	No
Southbound Right Turn	122	14	20	No
13. Mountain View Avenue/I-10 Westbound Ramps				
Westbound Right Turn	70	65	40	No
Northbound Left Turn	100	190	72	Yes
14. Mountain View Avenue/I-10 Eastbound Ramps				
Eastbound Right Turn	132	291	65	Yes
Southbound Left Turn	100	82	78	No

Source: Supplement to I-10/Tippecanoe Avenue Traffic Operations Analysis (August 2009).
I-10 = Interstate 10
I-215 = Interstate 215
n/a = not available

Table 2.5.D Existing (2009) Ramp Junction Levels of Service

Location	AM Peak Hour		PM Peak Hour	
	Density	LOS	Density	LOS
Eastbound				
Waterman Avenue On-Ramp	24.4	C	23.7	C
Tippecanoe Avenue Off-Ramp	--	F[1]	41.3	E
Tippecanoe Avenue On-Ramp	21.7	C	21.5	C
Westbound				
Tippecanoe Avenue Off-Ramp	--	F[1]	--	F[1]
Tippecanoe Avenue On-Ramp	n/a	n/a	n/a	n/a
Waterman Avenue Off-Ramp	n/a	n/a	n/a	n/a

Source: Draft Project Report (October 2009).
[1] Demand exceeds capacity
Density: PCE Per Mile Per Lane; adjusted with 0.95 peak-hour factor
LOS = level of service
n/a = Not a merge or diverge area
PCE = Passenger Car Equivalent

The I-10 weaving section between the westbound Tippecanoe Avenue on-ramp and the westbound Waterman Avenue off-ramp is currently operating at LOS E or better during both the a.m. and p.m. peak hours.

2.5.3 Environmental Consequences

2.5.3.1 Temporary Impacts

Alternative 1 – Build Alternative

Traffic delays are expected during project construction for the ramp widening and reconstruction, freeway widening, and modifications to local intersections.

No extended ramp closures are anticipated for this project. Construction of the proposed project would temporarily impact traffic on Tippecanoe Avenue, Redlands Boulevard, the I-10 mainline, and the I-10 ramps.

Freeway operations may be affected during construction of the ramps, widening of the overpass, and widening of I-10 for the eastbound auxiliary lane. Limiting construction to off-peak hours would minimize impacts to operation of the I-10 mainline and/or ramps during ongoing construction, if necessary. Temporary nighttime closures of mainline lanes and the eastbound off-ramp may be required during construction.

Sidewalk closures on Tippecanoe Avenue and Redlands Boulevard and roadwork during construction would impact pedestrian and bicycle access. Stage construction plans would include provisions for maintaining pedestrian and bicycle access at all times during construction.

Alternative 2 – No Build Alternative

The No Build Alternative would not involve any construction activities, and no temporary impacts would occur.

2.5.3.2 Permanent Impacts

Permanent impacts for Alternative 1 were analyzed for the opening year (2015) and the design year (2035).

Alternative 1 – Build Alternative

Opening Year (2015) Analysis

Table 2.5.E shows the traffic volumes, density, and LOS for mainline I-10 in 2015 with the proposed project. When compared to the 2015 No Build Condition, eastbound I-10 would improve in the segment from the Waterman Avenue on-ramp to the Tippecanoe Avenue off-ramp (change from LOS F to LOS E) because the addition of the eastbound auxiliary lane would add a lane and provide more capacity, thereby improving weave conditions. All freeway segments in the study area are

Table 2.5.E 2015 Mainline Levels of Service – Alternative 1

Freeway Segment	AM Peak Hour			PM Peak Hour		
	V	Density	LOS	V	Density	LOS
Eastbound						
Waterman Avenue On-Ramp to Tippecanoe Avenue Off-Ramp[2]	9,026	35.6	E	9,591	36.7	E
Tippecanoe Avenue Off-Ramp to Tippecanoe Avenue On-Ramp	7,590	32.1	D	8,480	39.3	E
Tippecanoe Avenue On-Ramp to Mountain View Avenue Off-Ramp	7,949	34.7	D	9,385	--	F[1]
Westbound						
Mountain View Avenue On-Ramp to Tippecanoe Avenue Off-Ramp	8,539	39.9	E	8,252	37.2	E
Tippecanoe Avenue Off-Ramp to Tippecanoe Avenue Loop On-Ramp	7,431	31.1	D	7,432	31.1	D
Tippecanoe Avenue Loop On-Ramp to Tippecanoe Avenue On-Ramp	7,850	33.9	D	7,832	33.7	D
Tippecanoe Avenue On-Ramp to Waterman Avenue Off-Ramp[2]	8,285	32.7	D	8,676	35.1	E

Source: *Supplement to Interstate 10/Tippecanoe Avenue Traffic Operations Analysis* (August 2009).
[1] Demand exceeds capacity
[2] Weaving section
V = Volume in PCEs per hour
Density = PCE Per Mile Per Lane; adjusted with 0.95 peak-hour factor
LOS = level of service
PCE = Passenger Car Equivalent

projected to operate at LOS E or better during both the a.m. and p.m. peak hours, with the exception of I-10 eastbound between the Tippecanoe Avenue on-ramp and the Mountain View Avenue off-ramp during the p.m. peak hour. The freeway mainline would be over capacity; however, the impact is not caused or aggravated by the proposed project and this segment is also projected to operate at LOS F under the No Build Alternative.

Table 2.5.F summarizes the 2015 a.m. and p.m. peak-hour LOS for the study intersections under Alternative 1 conditions. As shown in Table 2.5.E, all intersections in the study area are projected to operate at satisfactory LOS in 2015. The Tippecanoe Avenue/I-10 eastbound ramps intersection would improve from LOS D in the a.m. peak hour and LOS F in the p.m. peak hour to LOS B in both peak hours when compared to the No Build condition. Anderson Street/Redlands Boulevard Drive would improve from LOS D in the p.m. peak hour to LOS C when compared to the No Build condition.

Table 2.5.F 2015 Intersection Levels of Service – Alternative 1

Intersection	AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS
1. Tippecanoe Avenue/Hospitality Lane-Coulston Street[1]	24.6	C	35.3	D
2. Tippecanoe Avenue/Harriman Place-Laurelwood Drive[1]	16.9	B	23.7	C
3. Tippecanoe Avenue/I-10 Westbound Ramps[1]	*No Conflicting Volume*		*No Conflicting Volume*	
4. Tippecanoe Avenue/I-10 Eastbound Ramps[1]	15.6	B	18.2	B
5. Anderson Street/Baker's Driveway[1]	*Not Analyzed*		*Not Analyzed*	
6. Anderson Street/Redlands Boulevard[1]	21.0	C	30.1	C
7. I-10 Eastbound Ramps/Redlands Boulevard	20.8	C	25.2	C
8. Waterman Avenue/Hospitality Lane	24.2	C	37.6	D
9. Waterman Avenue/I-215 On-Ramp	11.3	B	28.4	D
10. Waterman Avenue/I-10 Eastbound Ramps	219.1	F	60.2	F
11. Waterman Avenue/Redlands Boulevard	31.3	C	63.2	F
12. I-10 Westbound Ramps-Carnegie Drive/Hospitality Lane	14.9	B	15.5	B
13. Mountain View Avenue/I-10 Westbound Ramps	29.8	C	25.1	C
14. Mountain View Avenue/I-10 Eastbound Ramps	26.2	C	20.6	B

Source: Supplement to I-10/Tippecanoe Avenue Traffic Operations Analysis (August 2009).
Delay = Average control delay in seconds
I-10 = Interstate 10
I-215 = Interstate 215
LOS = level of service

The elimination of the northbound left turns at the westbound ramps under the Build Alternative would provide increased storage space for the southbound left turns from Tippecanoe Avenue onto the eastbound ramps. It is projected that construction of the project would improve the LOS for the southbound approach from LOS E to LOS C during the a.m. peak hour and from LOS F to LOS C during the p.m. peak hour. Similar operational improvements and delay reductions for specific lane groups are also forecast at the intersection of Anderson Street and Redlands Boulevard. In addition, construction of the second storage lane at the on-ramps would provide increased capacity at the on-ramp, reducing the effect of upstream queuing.

Table 2.5.G shows the queue lengths in the 2015 with Alternative 1 conditions. As seen in this table, there is sufficient storage space at the I-10/Tippecanoe Avenue ramps and the local intersections within the project area. Queues would exceed pocket lengths at the adjacent I-10 interchanges (Waterman Avenue and Mountain View Avenue) and at Tippecanoe Avenue/Hospitality Lane-Coulston Street; however, the proposed project will not contribute to these deficiencies.

Table 2.5.G Year 2015 Queue Lengths – Alternative 1

Intersection Movement	Avail. Storage (feet)	95th Percentile Queue (feet)		Queue Exceed Pocket?
		A.M. Peak Hour	P.M. Peak Hour	
1. Tippecanoe Avenue/Hospitality Lane-Coulston Street				
Eastbound Left Turn	210	76	266	Yes
Eastbound Right Turn	590	47	101	No
Westbound Left Turn	100	101	170	Yes
Northbound Left Turn	250	111	164	No
Southbound Left Turn	110	50	98	No
2. Tippecanoe Avenue/Harriman Place-I-10 Westbound Ramps				
Eastbound Left Turn	260	71	251	No
Eastbound Right Turn	500	57	139	No
Westbound Left Turn	330	197	105	No
Westbound Right Turn	330	132	135	No
Northbound Left Turn	220	77	202	No
Northbound Right Turn	500	42	3	No
Southbound Right Turn	500	1	1	No
3. Tippecanoe Avenue/Westbound On-Ramp				n/a
4. Tippecanoe Avenue/I-10 Eastbound Ramps				
Eastbound Left Turn	500	260	216	No
Eastbound Right Turn	500	176	142	No
Northbound Right Turn	100	1	8	No
Southbound Left Turn	550	72	193	No
5. Anderson Street/Baker's Driveway				
Westbound Right Turn	160	n/a	n/a	n/a
6. Anderson Street/Redlands Boulevard				
Eastbound Left Turn	300	44	82	No
Eastbound Right Turn	300	80	36	No
Westbound Left Turn	225	62	88	No
Westbound Right Turn	340	67	105	No
Northbound Left Turn	240	39	47	No
Northbound Right Turn	400	22	27	No
Southbound Left Turn	220	118	164	No
Southbound Right Turn	200	12	47	No
7. I-10 Eastbound Ramps/Redlands Boulevard				
Westbound Left Turn	172	59	76	No
Northbound Right Turn	220	0	0	No
Southbound Left Turn	305	330	342	Yes
Southbound Right Turn	100	242	172	Yes
8. Waterman Avenue/Hospitality Lane				
Eastbound Left Turn	150	139	226	Yes
Eastbound Right Turn	170	89	353	Yes
Westbound Left Turn	220	119	208	No
Northbound Left Turn	188	154	171	No
Northbound Right Turn	290	23	97	No
Southbound Left Turn	130	108	237	Yes
Southbound Right Turn	226	78	101	No
9. Waterman Avenue/I-215 On-Ramp				
Northbound Left Turn	300	34	142	No
10. Waterman Avenue/I-10 Eastbound Ramps				
Westbound Right Turn	700	1272	369	Yes
11. Waterman Avenue/Redlands Boulevard				
Eastbound Left Turn	408	140	220	No
Westbound Left Turn	125	202	377	Yes
Northbound Left Turn	165	79	126	No

Table 2.5.G Year 2015 Queue Lengths – Alternative 1

Intersection Movement	Avail. Storage (feet)	95th Percentile Queue (feet)		Queue Exceed Pocket?
		A.M. Peak Hour	P.M. Peak Hour	
Northbound Right Turn	85	71	68	No
Southbound Left Turn	175	117	307	Yes
12. I-10 Westbound Ramps-Carnegie Drive/Hospitality Lane				
Eastbound Left Turn	100	193	86	Yes
Eastbound Right Turn	250	40	125	No
Westbound Left Turn	296	29	109	No
Northbound Left Turn	600	162	150	No
Northbound Right Turn	203	16	21	No
Southbound Left Turn	122	14	39	No
Southbound Right Turn	122	15	22	No
13. Mountain View Avenue/I-10 Westbound Ramps				
Westbound Right Turn	70	116	96	Yes
Northbound Left Turn	100	212	129	Yes
14. Mountain View Avenue/I-10 Eastbound Ramps				
Eastbound Right Turn	132	460	75	Yes
Southbound Left Turn	100	138	108	Yes

Source: Supplement to I-10/Tippecanoe Avenue Traffic Operations Analysis (August 2009).
I-10 = Interstate 10
I-215 = Interstate 215
n/a = not available

Table 2.5.H summarizes the 2015 a.m. and p.m. peak-hour LOS for the I-10/ Tippecanoe Avenue freeway ramp junction (merge/diverge) influence areas under the Build Alternative. As Table 2.5.H indicates, all freeway ramp junctions are projected to operate at LOS F during one of the peak hours, with the exception of the loop on-ramp from Tippecanoe Avenue to I-10 westbound, which would operate at LOS C. The I-10 eastbound Waterman Avenue on-ramp and the Tippecanoe Avenue off-ramp would cease to be merge/diverge areas when compared to the No Build condition because the proposed eastbound auxiliary lane would eliminate the merge/diverge condition and convert it into a five-lane weaving segment.

The ramp junction (merge/diverge) areas identified above are projected to operate at unsatisfactory LOS because the freeway mainline would be over capacity. These conditions are not caused by or aggravated by the proposed project, but are conditions created as a result of the segments projected to operate at unsatisfactory conditions under the future 2015 conditions.

Table 2.5.H 2015 Ramp Junction Levels of Service – Alternative 1

Location	AM Peak Hour		PM Peak Hour	
	Density	LOS	Density	LOS
Eastbound				
Waterman Avenue On-Ramp	n/a	n/a	n/a	n/a
Tippecanoe Avenue Off-Ramp	n/a	n/a	n/a	n/a
Tippecanoe Avenue On-Ramp	22.1	C	—	F[1]
Westbound				
Tippecanoe Avenue Off-Ramp	—	F[1]	41.0	E
Tippecanoe Avenue Loop On-Ramp	20.2	C	20.2	C
Tippecanoe Avenue On-Ramp	n/a	n/a	n/a	n/a
Waterman Avenue Off-Ramp	n/a	n/a	n/a	n/a

Source: *Draft Project Report* (October 2009).
[1] Demand exceeds capacity
Density = PCE Per Mile Per Lane; adjusted with 0.95 peak-hour factor
LOS = level of service
n/a = Not a merge or diverge area
PCE = Passenger Car Equivalent

The I-10 weaving segments between Tippecanoe Avenue and Waterman Avenue are projected to operate at LOS E or better during both the a.m. and p.m. peak hours. Alternative 1 slightly improves the LOS of the weave in the westbound direction and creates a new weaving segment in the eastbound direction due to the addition of the auxiliary lane between the Waterman Avenue on-ramp and the Tippecanoe Avenue off-ramp. The eastbound weaving segment is expected to operate at a better LOS than the ramp merge/diverge areas that exist without the project.

Design Year (2035) Analysis

Table 2.5.I shows the traffic volumes, density, and LOS for mainline I-10 in 2035 with the proposed project. As Table 2.5.G indicates, all freeway segments are projected to operate at LOS F during at least one of the peak hours. The freeway mainline would be over capacity; however, the impact is not caused by or aggravated by the proposed project, and the volumes, density, and LOS are the same as those for the No Build Condition. As an interchange project, the proposed project is not designed to improve mainline I-10 LOS.

Table 2.5.I 2035 Mainline Levels of Service – Alternative 1

Freeway Segment	AM Peak Hour			PM Peak Hour		
	V	Density	LOS	V	Density	LOS
Eastbound						
Waterman Avenue On-Ramp to Tippecanoe Avenue Off- Ramp[2]	9,141	—	F[1]	12,410	—	F[1]
Tippecanoe Avenue Off-Ramp to Tippecanoe Avenue On-Ramp	6,491	26.1	D	10,493	—	F[1]
Tippecanoe Avenue On-Ramp to Mountain View Avenue Off-Ramp	7,139	29.4	D	11,833	—	F[1]
Westbound						
Mountain View Avenue On-Ramp to Tippecanoe Avenue Off-Ramp	10,952	—	F[1]	9,682	—	F[1]
Tippecanoe Avenue Off-Ramp to Tippecanoe Avenue Loop On-Ramp	9,501	—	F[1]	8,590	40.5	E
Tippecanoe Avenue Loop On-Ramp to Tippecanoe Avenue On-Ramp	10,235	—	F[1]	9,312	—	F[1]
Tippecanoe Avenue On-Ramp to Waterman Avenue Off-Ramp[2]	10,907	—	F[1]	10,381	—	F[1]

Source: Traffic Report for the I-10/Tippecanoe Avenue Interchange (March 2008).
[1] Demand exceeds capacity
[2] Weaving section
Density = PCE Per Mile Per Lane; adjusted with 0.95 peak-hour factor
LOS = level of service
PCE = Passenger Car Equivalent
V = Volume in Passenger Car Equivalents (PCE) per hour

Table 2.5.J summarizes the 2035 a.m. and p.m. peak-hour LOS for the study intersections under the Build Alternative. As shown in Table 2.5.J, all intersections in the project area are projected to operate at satisfactory LOS C or D in 2035. The Tippecanoe Avenue/eastbound ramps intersection would improve from LOS F in both peak hours to LOS D in the a.m. peak hour and LOS C in the p.m. peak hour when compared to the No Build condition. Anderson Street/Redlands Boulevard Drive would improve from LOS F in both peak hours to LOS C in the a.m. peak hour and LOS D in the p.m. peak hour when compared to the No Build condition.

Table 2.5.K summarizes the 2035 a.m. and p.m. peak-hour LOS for the I-10/ Tippecanoe Avenue freeway ramp junction (merge/diverge) influence areas under the Build Alternative. As Table 2.5.K indicates, all freeway ramp junctions are projected to operate at LOS F during all of the peak hours, with the exception of the I-10 eastbound Tippecanoe Avenue on-ramp, which would operate at LOS C in the a.m. peak hour. The I-10 eastbound Waterman Avenue on-ramp and the Tippecanoe off-ramp would cease to be merge/diverge areas when compared to the No Build condition because the proposed eastbound auxiliary lane would eliminate the merge/ diverge condition and convert it into a five-lane weaving segment.

Table 2.5.J 2035 Intersection Levels of Service – Alternative 1

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	Delay	LOS	Delay	LOS
1. Tippecanoe Avenue/Hospitality Lane-Coulston Street	34.3	C	41.3	D
2. Tippecanoe Avenue/Harriman Place-I-10 Westbound Ramps[1]	29.7	C	34.9	C
3. Tippecanoe Avenue/I-10 Westbound Slip-On Ramp[1]	*No conflicting movement*		*No conflicting movement*	
4. Tippecanoe Avenue/I-10 Eastbound Ramps[1]	33.8	D	34.0	C
6. Anderson Street/Redlands Boulevard[1]	31.0	C	45.9	D
7. I-10 Eastbound Ramps/Redlands Boulevard	21.7	C	32.3	C
8. Waterman Avenue/Hospitality Lane	29.3	C	50.8	D
9. Waterman Avenue/I-215 On-Ramp	18.4	C	127.0	F*
10. Waterman Avenue/I-10 Eastbound Ramps	281.8	F*	**	F*
11. Waterman Avenue/Redlands Boulevard	55.7	E*	220.2	F*
12. I-10 Westbound Ramps-Carnegie Drive/Hospitality Lane	16.3	B	20.4	C
13. Mountain View Avenue/I-10 Westbound Ramps	206.9	F*	160.4	F*
14. Mountain View Avenue/I-10 Eastbound Ramps	166.3	F*	132.1	F*

Source: Supplement to I-10/Tippecanoe Avenue Traffic Operations Analysis (August 2009).
[1] LOS and Delay obtained from SANBAG's I-10/Tippecanoe Avenue Interchange Traffic Operations Analysis (March 2008).
* Exceeds LOS
** Exceeds HCM calculation abilities
Delay = Average control delay in seconds.
HCM = Highway Capacity Manual
I-10 = Interstate 10
I-215 = Interstate 215
LOS = Level of Service
SANBAG = San Bernardino Association of Governments

Table 2.5.K 2035 Ramp Junction Levels of Service – Alternative 1

Location	AM Peak Hour		PM Peak Hour	
	Density	LOS	Density	LOS
Eastbound				
Waterman Avenue On-Ramp	n/a	n/a	n/a	n/a
Tippecanoe Avenue Off-Ramp	n/a	n/a	n/a	n/a
Tippecanoe Avenue On-Ramp	20.0	C	—	F[1]
Westbound				
Tippecanoe Avenue Off-Ramp	—	F[1]	—	F[1]
Tippecanoe Avenue Loop On-Ramp	—	F[1]	—	F[1]
Tippecanoe Avenue On-Ramp	n/a	n/a	n/a	n/a
Waterman Avenue Off-Ramp	n/a	n/a	n/a	n/a

Source: *Traffic Report for the I-10/Tippecanoe Avenue Interchange* (March 2008).
[1] Demand exceeds capacity
Density = PCE Per Mile Per Lane; adjusted with 0.95 peak-hour factor
LOS = level of service
n/a = Not a merge or diverge area

The ramp junction (merge/diverge) areas identified above are projected to operate at unsatisfactory LOS because the freeway mainline would be over capacity. These conditions are not caused by or aggravated by the proposed project, and the segments are also projected to operate at unsatisfactory conditions under the No Build Alternative.

Summary

Table 2.5.L provides a comparison of the Build Alternative and the No Build Alternative in 2015 and 2035.

Table 2.5.L Operations Improvements of the Build Alternative When Compared to the No Build Alternative

I-10 Segment/Intersection/Ramp Junction	Improve in 2015	Improve in 2035
I-10 Mainline Segment		
I-10 Eastbound Waterman Avenue On-Ramp to Tippecanoe Off-Ramp	YES	Same as No Build
Intersection		
Tippecanoe Avenue/Hospitality Lane-Coulston Street	Same as No Build[1]	YES
Tippecanoe Avenue/Harriman Place-Laurelwood Drive	YES	Same as No Build[1]
Tippecanoe Avenue/Eastbound Ramps	YES	YES
Tippecanoe Avenue/Westbound On-Ramp	YES	YES
Tippecanoe Avenue/Westbound Off-Ramp	Same as No Build[2]	YES
Anderson Street/Redlands Boulevard	YES	YES
Ramp Junction		
I-10 Westbound Tippecanoe Avenue Loop On-Ramp Junction	YES	Same as No Build[2]
I-10 Westbound Tippecanoe Avenue Off-Ramp	YES	Same as No Build[2]
I-10 Eastbound Waterman Avenue On-Ramp Junction	YES	YES
I-10 Eastbound Tippecanoe Avenue Off-Ramp Junction	YES	YES

Source: Traffic Report for the I-10/Tippecanoe Avenue Interchange (March 2008) and Supplement to I-10/ Tippecanoe Avenue Traffic Operations Analysis (August 2009).

1 Operates at satisfactory condition

2 The locations where the Alternative 1 condition is the same as the No Build Alternative condition are either a function of congestion on the I-10 freeway or on local streets.

I-10 = Interstate 10

I-215 = Interstate 215

Pedestrian Access

Within the project limits, existing nonstandard curb ramps would be upgraded to conform to ADA requirements. New curb ramps would meet ADA requirements. In addition, minimum-width 6 ft sidewalks have been incorporated into the design in order to provide ADA-required access. These features would improve pedestrian access at the interchange.

Bicycle Facilities

Bicycle lanes would be provided as part of the Build Alternative. A Class II bicycle lane would be provided on Tippecanoe Avenue/Anderson Street within the project limits, with the exception of the segment between the eastbound ramps and Redlands Boulevard, where a 5 ft shoulder would be provided. This is consistent with the City of San Bernardino and City of Loma Linda General Plans and would improve bicycle access in the interchange area.

Alternative 2 – No Build Alternative

2015 Analysis

Table 2.5.M shows the traffic volumes, density, and LOS for mainline I-10 in 2015 under the No Build Alternative. All freeway segments in the study area are projected to operate at LOS E or better during both the a.m. and p.m. peak hours, with the exception of I-10 eastbound between the Waterman Avenue on-ramp and the Tippecanoe off-ramp in both peak hours and the Tippecanoe Avenue on-ramp between the Mountain View Avenue off-ramp during the p.m. peak hour. The freeway mainline would be over capacity.

Table 2.5.M 2015 Mainline Levels of Service – No Build Alternative

Freeway Segment	AM Peak Hour			PM Peak Hour		
	V	Density	LOS	V	Density	LOS
Eastbound						
Waterman Avenue On-Ramp to Tippecanoe Avenue Off-Ramp	9,026	—	F[1]	9,591	—	F[1]
Tippecanoe Avenue Off-Ramp to Tippecanoe Avenue On-Ramp	7,590	32.1	D	8,480	39.3	E
Tippecanoe Avenue On-Ramp to Mountain View Avenue Off-Ramp	7,949	34.7	D	9,385	—	F[1]
Westbound						
Mountain View Avenue On-Ramp to Tippecanoe Avenue Off-Ramp	8,539	39.9	E	8,252	37.2	E
Tippecanoe Avenue Off-Ramp to Tippecanoe Avenue On-Ramp	7,431	31.1	D	7,432	31.1	D
Tippecanoe Avenue On-Ramp to Waterman Avenue Off-Ramp[2]	8,285	33.3	D	8,676	39.2	E

Source: Supplement to I-10/Tippecanoe Avenue Traffic Operations Analysis (July 2009).
[1] Demand exceeds capacity
[2] Weaving section
Density = PCE Per Mile Per Lane; adjusted with 0.95 peak-hour factor
LOS = level of service
PCE = Passenger Car Equivalent
V = Volume in Passenger Car Equivalents (PCE) per hour

Table 2.5.N summarizes the 2015 a.m. and p.m. peak-hour LOS for the study intersections under the No Build Alternative. As shown in Table 2.5.N, although LOS decreases when compared to the existing condition (Table 2.5.B), all intersections in the project area are projected to operate at satisfactory LOS in 2035 except for the Tippecanoe Avenue/eastbound ramps in the p.m. peak hour due to inadequate

Table 2.5.N Opening Year (2015) Intersection Levels of Service – No Build Alternative

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	Delay	LOS	Delay	LOS
1. Tippecanoe Avenue/Hospitality Lane-Coulston Street[1]	33.2	C	38.2	D
2. Tippecanoe Avenue/Harriman Place-Laurelwood Drive[1]	24.6	C	36.9	D
3. Tippecanoe Avenue/I-10 Westbound Ramps[1]	31.6	C	21.0	C
4. Tippecanoe Avenue/I-10 Eastbound Ramps[1]	40.4	D	60.4	F[2]
5. Anderson Street/Baker's Driveway[1]	12.0	B	13.0	B
6. Anderson Street/Redlands Boulevard[1]	29.1	C	50.3	D
7. I-10 Eastbound Ramps/Redlands Boulevard	20.8	C	25.2	C
8. Waterman Avenue/Hospitality Lane	24.2	C	37.6	D
9. Waterman Avenue/I-215 On-Ramp	11.3	B	28.4	D
10. Waterman Avenue/I-10 Eastbound Ramps	219.1	F[2]	60.2	F[2]
11. Waterman Avenue/Redlands Boulevard	31.3	C	63.2	F[2]
12. I-10 Westbound Ramps-Carnegie Drive/Hospitality Lane	14.9	B	15.5	B
13. Mountain View Avenue/I-10 Westbound Ramps	29.8	C	25.1	C
14. Mountain View Avenue/I-10 Eastbound Ramps	26.2	C	20.6	B

Source: Supplement to I-10/Tippecanoe Avenue Traffic Operations Analysis (August 2009).

[1] Although the LOS calculations indicate that all intersections on Tippecanoe Avenue, with the exception of Tippecanoe Avenue/I-10 eastbound ramps in the vicinity of the I-10 interchange, are forecast to operate at satisfactory LOS, based on field observation under existing conditions, the signalized intersections operate at LOS F in the p.m. peak hour. Since traffic volumes are generally forecast to increase from existing conditions to 2015 conditions, it is anticipated that this delay will increase under 2015 No Build conditions.

[2] Exceeds LOS standard

Note: Delay = Average control delay in seconds. At TWSC intersections, worst-case approach is reported.

I-10 = Interstate 10 I-215 = Interstate 215 LOS = level of service TWSC = two-way stop controlled

capacity. In addition, Waterman Avenue/I-10 eastbound ramps will operate at unsatisfactory LOS in the a.m. and p.m. peak hours and Waterman Avenue/Redlands Boulevard will operate at LOS F in the p.m. peak hour.

Although the LOS calculations indicate that all intersections on Tippecanoe Avenue (with the exception of Tippecanoe Avenue/I-10 eastbound ramps) in the vicinity of the I-10 interchange are forecast to operate at satisfactory LOS, based on field observation under existing conditions, the signalized intersections operate at LOS F in the p.m. peak hour. Based on delay counts conducted by SANBAG in 2008, the average delay was estimated as 90.2 seconds per vehicle at the intersection of Tippecanoe Avenue/I-10 eastbound ramps. Since traffic volumes are generally forecast to increase from existing conditions to 2015 conditions, it is anticipated that this delay will increase under 2015 No Build conditions.

Table 2.5.O shows the queue lengths in the 2015 No Build conditions. As seen in this table, some queues would exceed available capacity at all of the study area intersections, with the exception of the intersections of Anderson Street/Baker’s driveway and Waterman Avenue/I-215 on-ramp.

Table 2.5.O 2015 Queue Lengths – No Build Alternative

Intersection	Avail. Storage (feet)	95th Percentile Queue (feet)		Queue Exceed Pocket?
		A.M. Peak Hour	P.M. Peak Hour	
1. Tippecanoe Avenue/Hospitality Lane-Coulston Street				
Eastbound Left Turn	210	84	294	Yes
Eastbound Right Turn	590	52	155	No
Westbound Left Turn	100	89	156	Yes
Northbound Left Turn	250	228	196	No
Southbound Left Turn	110	49	90	No
2. Tippecanoe Avenue/Harriman Place-Laurelwood Drive				
Eastbound Left Turn	250	75	268	Yes
Eastbound Right Turn	200	28	163	No
Westbound Left Turn	100	42	43	No
Northbound Left Turn	200	144	403	Yes
Southbound Left Turn	200	6	27	No
3. Tippecanoe Avenue/I-10 Westbound Ramps				
Westbound Left Turn	150	332	274	Yes
Westbound Right Turn	150	272	161	Yes
Northbound Left Turn	260	235	190	No
Southbound Right Turn	520	196	185	No
4. Tippecanoe Avenue/I-10 Eastbound Ramps				
Eastbound Left Turn	991	786	589	No
Eastbound Right Turn	991	704	611	No
Southbound Left Turn	261	173	625	Yes
5. Anderson Street/Baker's Driveway				
Westbound Right Turn	160	n/a	n/a	n/a
6. Anderson Street/Redlands Boulevard				
Eastbound Left Turn	150	123	253	Yes
Westbound Left Turn	300	168	222	No
Northbound Left Turn	150	35	61	No
Southbound Left Turn	210	91	324	Yes
7. I-10 Eastbound Ramps/Redlands Boulevard				
Westbound Left Turn	172	59	76	No
Northbound Right Turn	220	0	0	No
Southbound Left Turn	305	330	342	Yes
Southbound Right Turn	100	242	172	Yes
8. Waterman Avenue/Hospitality Lane				
Eastbound Left Turn	150	139	226	Yes
Eastbound Right Turn	170	89	353	Yes
Westbound Left Turn	220	119	208	No
Northbound Left Turn	188	154	171	No
Northbound Right Turn	290	23	97	No
Southbound Left Turn	130	108	237	Yes
Southbound Right Turn	226	78	101	No
9. Waterman Avenue/I-215 On-Ramp				
Northbound Left Turn	300	34	142	No
10. Waterman Avenue/I-10 Eastbound Ramps				
Westbound Right Turn	700	1272	369	Yes
11. Waterman Avenue/Redlands Boulevard				
Eastbound Left Turn	408	140	220	No
Westbound Left Turn	125	202	377	Yes
Northbound Left Turn	165	79	126	No
Northbound Right Turn	85	71	68	No
Southbound Left Turn	175	117	307	Yes

Table 2.5.O 2015 Queue Lengths – No Build Alternative

Intersection	Avail. Storage (feet)	95th Percentile Queue (feet)		Queue Exceed Pocket?
		A.M. Peak Hour	P.M. Peak Hour	
12. I-10 Westbound Ramps-Carnegie Drive/Hospitality Lane				
Eastbound Left Turn	100	193	86	Yes
Eastbound Right Turn	250	40	125	No
Westbound Left Turn	296	29	109	No
Northbound Left Turn	600	162	150	No
Northbound Right Turn	203	16	21	No
Southbound Left Turn	122	14	39	No
Southbound Right Turn	122	15	22	No
13. Mountain View Avenue/I-10 Westbound Ramps				
Westbound Right Turn	70	116	96	Yes
Northbound Left Turn	100	212	129	Yes
14. Mountain View Avenue/I-10 Eastbound Ramps				
Eastbound Right Turn	132	460	75	Yes
Southbound Left Turn	100	138	108	Yes

Source: Supplement to I-10/Tippecanoe Avenue Traffic Operations Analysis (August 2009).
I-10 = Interstate 10

Table 2.5.P summarizes the 2015 a.m. and p.m. peak-hour LOS for the I-10/ Tippecanoe Avenue freeway ramp junction (merge/diverge) influence areas under the Build Alternative. As Table 2.5.Q indicates, all freeway ramp junctions are projected to operate at LOS F during the peak hours, with the exception of the I-10 eastbound Tippecanoe Avenue on-ramp, which would operate at LOS C in the a.m. peak hour. The ramp junction (merge/diverge) areas are projected to operate at unsatisfactory LOS because the freeway mainline would be over capacity.

Table 2.5.P 2015 Ramp Junction Levels of Service – No Build Alternative

Location	AM Peak Hour		PM Peak Hour	
	Density	LOS	Density	LOS
Eastbound				
Waterman Avenue On-Ramp	—	F[1]	—	F[1]
Tippecanoe Avenue Off-Ramp	—	F[1]	—	F[1]
Tippecanoe Avenue On-Ramp	22.6	C	—	F[1]
Westbound				
Tippecanoe Avenue Off-Ramp	—	F*	—	F*
Tippecanoe Avenue On-Ramp	n/a	n/a	n/a	n/a
Waterman Avenue Off-Ramp	n/a	n/a	n/a	n/a

Source: Supplement to I-10/Tippecanoe Avenue Traffic Operations Analysis (August 2009).
[1] Demand exceeds capacity
Note: Density = PCE Per Mile Per Lane; adjusted with 0.95 peak-hour factor
LOS = level of service
n/a = Not a merge or diverge area
PCE = Passenger Car Equivalent

Table 2.5.Q 2035 Mainline Levels of Service – No Build Alternative

Freeway Segment	AM Peak Hour			PM Peak Hour		
	V	Density	LOS	V	Density	LOS
Eastbound						
Waterman Avenue On-Ramp to Tippecanoe Avenue Off-Ramp	9,141	—	F[1]	12,410	—	F[1]
Tippecanoe Avenue Off-Ramp to Tippecanoe Avenue On-Ramp	6,491	26.1	D	10,493	—	F[1]
Tippecanoe Avenue On-Ramp to Mountain View Avenue Off-Ramp	7,139	29.4	D	11,833	—	F[1]
Westbound						
Mountain View Avenue On-Ramp to Tippecanoe Avenue Off-Ramp	10,952	—	F[1]	9,682	—	F[1]
Tippecanoe Avenue Off-Ramp to Tippecanoe Avenue On-Ramp	9,501	—	F[1]	8,590	40.5	E
Tippecanoe Avenue On-Ramp to Waterman Avenue Off-Ramp[2]	10,907	—	F[1]	10,381	—	F[1]

Source: Traffic Report for the I-10/Tippecanoe Avenue Interchange (March 2008)
[1] Demand exceeds capacity
[2] Weaving section
Density = PCE Per Mile Per Lane; adjusted with 0.95 peak-hour factor
LOS = level of service
PCE = Passenger Car Equivalent
V = Mixed Flow Volume in Passenger Car Equivalents (PCE) per hour

The I-10 weaving segment between Tippecanoe Avenue and Waterman Avenue is projected to operate at LOS E or better during both the a.m. and p.m. peak hours.

2035 Analysis

Table 2.5.Q shows the traffic volumes, density, and LOS for mainline I-10 in 2035 with the proposed project. As Table 2.5.R indicates, all freeway segments are projected to operate at LOS F during at least one of the peak hours because the freeway mainline would be over capacity.

Table 2.5.R summarizes the 2035 a.m. and p.m. peak-hour LOS for the study intersections under the Build Alternative. As shown in Table 2.5.O, Tippecanoe Avenue/I-10 eastbound ramps and Anderson Street/Redlands Boulevard would operate at unsatisfactory LOS in 2035 in both peak hours. In addition, the Mountain Avenue ramps and the Waterman Avenue ramps would operate at LOS F in both peak hours.

Table 2.5.R 2035 Intersection Levels of Service No Build Alternative

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	Delay	LOS	Delay	LOS
1. Tippecanoe Avenue/Hospitality Lane-Coulston Street	36.9	D	45.7	D
2. Tippecanoe Avenue/Harriman Place-Laurelwood Drive[1]	28.5	C	33.3	C
3. Tippecanoe Avenue/I-10 Westbound Ramps[1]	65.0	E*	106.5	E*
4. Anderson Street/I-10 Eastbound Ramps[1]	361.8	F*	517.1	F*
6. Anderson Street/Redlands Boulevard[1]	199.0	F*	367.6	F*
7. I-10 Eastbound Ramps/Redlands Boulevard	21.7	C	32.3	C
8. Waterman Avenue/Hospitality Lane	29.3	C	50.8	D
9. Waterman Avenue/I-215 On-Ramp	18.4	C	127.0	F*
10. Waterman Avenue/I-10 Eastbound Ramps	281.8	F*	**	F*
11. Waterman Avenue/Redlands Boulevard	55.7	E*	220.2	F*
12. I-10 Westbound Ramps-Carnegie Drive/Hospitality Lane	16.3	B	20.4	C
13. Mountain View Avenue/I-10 Westbound Ramps	206.9	F*	160.4	F*
14. Mountain View Avenue/I-10 Eastbound Ramps	166.3	F*	132.1	F*

Source: Supplement to I-10/Tippecanoe Avenue Traffic Operations Analysis (August 2009).
[1] LOS and Delay obtained from SANBAG's I-10/Tippecanoe Avenue Interchange Traffic Operations Analysis (March 2008).
* Exceeds level of service standard
** Exceeds HCM calculation abilities
Delay = Average control delay in seconds. At TWSC intersections, worst-case approach is reported.
HCM = Highway Capacity Manual
I-10 = Interstate 10
I-215 = Interstate 215
LOS = Level of Service
SANBAG = San Bernardino Association of Governments

Table 2.5.S summarizes the 2035 a.m. and p.m. peak-hour LOS for the I-10/ Tippecanoe Avenue freeway ramp junction (merge/diverge) influence areas under the Build Alternative. As Table 2.5.S indicates, all freeway ramp junctions are projected to operate at LOS F during all of the peak hours, with the exception of the I-10 eastbound Tippecanoe Avenue on-ramp, which would operate at LOS C in the a.m. peak hour.

Pedestrian Access

The No Build Alternative would not involve any construction; therefore, existing nonstandard curb ramps would not be upgraded unless they were completed as part of a local project.

Bicycle Facilities

The No Build Alternative would not involve any construction; therefore, the bicycle lane would not be provided unless it was completed as part of a separate local project.

Table 2.5.S 2035 Ramp Junction Levels of Service – No Build Alternative

Location	AM Peak Hour		PM Peak Hour	
	Density	LOS	Density	LOS
Eastbound				
Waterman Avenue On-Ramp	—	F[1]	—	F[1]
Tippecanoe Avenue Off-Ramp	—	F[1]	—	F[1]
Tippecanoe Avenue On-Ramp	20.0	C	—	F[1]
Westbound				
Tippecanoe Avenue Off-Ramp	—	F[1]	—	F[1]
Tippecanoe Avenue On-Ramp	n/a	n/a	n/a	n/a
Waterman Avenue Off-Ramp	n/a	n/a	n/a	n/a

Source: Traffic Report for the I-10/Tippecanoe Avenue Interchange (March 2008).
[1] Demand exceeds capacity
Density = PCE Per Mile Per Lane; adjusted with 0.95 peak-hour factor
LOS = level of service
n/a = Not a merge or diverge area
PCE = Passenger Car Equivalent

2.5.4 Avoidance, Minimization, and/or Mitigation Measures

TR-1 A detailed Traffic Management Plan (TMP) shall be prepared during the final design phase of the proposed project. The objective of the TMP is to minimize the potential impacts that construction activities may have on the traveling public and emergency services providers. Preparation of the TMP shall be coordinated with the emergency services providers in the project vicinity to minimize response delays resulting from traffic delays, temporary ramp and lane closures, and detours during project construction.

The TMP for the proposed project shall include the following elements and strategies:

a) Traffic control plans and related specifications, to be completed during final design of the proposed project, shall be developed in accordance with the Work Area Traffic Control Handbook (also referred to as the WATCH manual), Section 5 of the California Department of Transportation (Department) Traffic Manual, Department Standard Plans, and applicable city requirements. These plans and specifications shall include elements such as: advance roadside signs and portable changeable message signs (CMSs); traffic surveillance; lane/shoulder closures; and temporary signing/striping on local streets, the I-10 ramps, and the I-10 mainline. Temporary overnight lane closures of I-10 and the eastbound off-ramp are anticipated during construction. Lane closures along the mainline, which will be limited to nighttime and will maintain three lanes in each direction, will be coordinated with the Department. Anticipated detour routes during construction for nighttime closure of the eastbound off-ramp include the ramps at Waterman Avenue, Redlands Boulevard, Hospitality Lane, and Harriman Place. Signal timing may be adjusted along the detour routes to enhance traffic operations.

b) The proposed project shall implement a Construction Zone Enhanced Enforcement Program (COZEEP) and use California Highway Patrol (CHP) officers to enforce lane closures and provide a visual deterrent to errant/speeding vehicles.

c) The proposed project shall implement a Public Awareness Campaign (PAC). Although any lane closures will occur at night, there will still be a potential temporary impact to vehicles traveling through the construction zone. The purpose of this PAC is to keep the surrounding community abreast of the proposed project's progress and construction activities that could affect the public's travel plans, and to minimize delays or confusion to the motoring public during construction activities. Mailers/flyers and local newspaper advertising shall be used to disseminate this information.

d) The proposed project shall implement a Construction Freeway Service Patrol (CFSP) program. The CFSP shall provide tow truck service to aid stranded motorists and remove disabled vehicles from the traveled way or shoulders.

e) The proposed project shall implement the following construction strategies to minimize construction-related impacts:

   i) Perform major construction activities at off-peak hours, such as at night or during the weekends, when feasible and reasonable.
   ii) Finalize ramp closure charts during the final design phase. During final design, the proposed lane and ramp closures shall be presented to the Department Lane Closures Review Committee (LCRC) for approval.

iii) Coordinate construction with adjacent projects. Coordination is important to address possible temporary increases in traffic due to detours from adjacent projects. Construction of the adjacent projects is anticipated to be completed prior to construction of the proposed project.

iv) All ramp reconstruction and local street and freeway widening shall be constructed in stages to minimize disruption.

f) The proposed project shall include contingency plans that specify the actions that shall be taken in the event that something unexpected occurs with respect to construction activities or traffic operations. The contractor shall review these plans and incorporate them into the contractor’s contingency plan.

TR-2 Construction of the project will include provisions for maintaining pedestrian and bicycle access at all times during construction.

2.6 Visual/Aesthetics

2.6.1 Regulatory Setting

The National Environmental Policy Act of 1969 as amended (NEPA) establishes that the federal government use all practicable means to ensure all Americans safe, healthful, productive, and aesthetically (emphasis added) and culturally pleasing surroundings (42 U.S.C. 4331[b][2]). To further emphasize this point, the Federal Highway administration in its implementation of NEPA (23 U.S.C. 109[h]) directs that final decisions regarding projects are to be made in the best overall public interest taking into account adverse environmental impacts, including among others, the destruction or disruption of aesthetic values.

Likewise, the California Environmental Quality Act (CEQA) establishes that it is the policy of the state to take all action necessary to provide the people of the state "with…enjoyment of aesthetic, natural, scenic and historic environmental qualities." (CA Public Resources Code Section 21001[b])

2.6.2 Affected Environment

This section is based on the *Visual Impact Assessment* (VIA) (February 2009).

2.6.2.1 Visual Setting

The project area is in the desert region of San Bernardino County. The topography is relatively flat throughout the area, and there are landforms in the area that would draw viewers' attention. The San Bernardino Mountains form a dramatic visual backdrop to the more developed areas unless blocked from view by low-rise buildings or landscaping.

Because of the impact of urbanization, native vegetation on and in the vicinity of the project area has been completely removed and replaced by exotic plant materials that require irrigation, leading to a suburban (cultural) landscape of evergreen and deciduous trees (eucalyptus, palm, pine, sycamore, ash, etc.) and various ornamental shrubs. Groundcovers are predominantly irrigated lawns, gravel, or bare earth.

The project segment of Interstate 10 (I-10) serves as a boundary between the City of Loma Linda to the south and the City of San Bernardino to the north. Loma Linda University Hospital is approximately 1.5 miles (mi) south of the I-10/Tippecanoe Avenue Interchange. Immediately south of and parallel to I-10, Redlands Boulevard is a major east-west arterial road lined with individual low-rise, light industrial, and commercial buildings and car dealerships. North of I-10, in the northeast quadrant of the I-10/Tippecanoe Avenue Interchange, there is a residential area with older, small, single-family residences. The average age of the houses in the neighborhood is 55 years. The majority of the residences in the project area were built in the 1940s and 1950s. In the northwest quadrant of the interchange, newly developed big-box stores have replaced a neighborhood of older residential uses (similar to those described above). The anchor stores in that quadrant include Sam's Club and Costco.

The segment of I-10 in the project area is not designated as a State Scenic Highway or a County Scenic Highway. There are no sensitive visual resources in the project area.

2.6.2.2 Viewer Groups

The existing viewer groups in the vicinity of the project intersection and local streets can be described as follows:

- Local residents traveling to and from area residences. Residential viewers are considered sensitive viewers.
- Local patrons of retail, commercial, and light industrial uses in the area.
- Local residents traveling to and/or on I-10.
- Nonlocal people traveling on I-10 from the project area.

All these viewer groups would be able to view the construction activities as well as the finished improvements to I-10, Tippecanoe Avenue, Anderson Street, and Redlands Boulevard. All viewers would be aware of the construction activities and would be aware of the infrastructure changes in the project area.

2.6.2.3 Landscape Units

For the I-10/Tippecanoe Avenue Interchange Improvement Project, three distinct landscape units were identified. Because I-10 is elevated above grade at the overcrossing of Tippecanoe Avenue, I-10 forms a visual in this area.

The following landscape units were identified in the project area:

- **Landscape Unit 1 – Strip Development:** To the south, Redlands Boulevard, Anderson Street, and the adjoining urban/suburban land uses are typical of commercial/light industrial strip development in Southern California.
- **Landscape Unit 2 – Big-Box Development:** Northwest of the I-10/Tippecanoe Avenue interchange, the land uses are typical of big-box commercial development in Southern California.

- **Landscape Unit 3 – Older Residential Development:** The area of older residences in the northeast quadrant of the I-10/Tippecanoe Avenue interchange is typical of low-/moderate-income housing in older residential areas throughout the region.

2.6.2.4 Visual Character

Visual character is descriptive and nonevaluative, which means it is based on defined attributes that are neither good nor bad. A change in visual character cannot be described as having good or bad attributes until it is compared with the viewer response to that change. If there is public preference for the established visual character of a regional landscape and resistance to a project that would contrast with that character, then changes in the visual character can be evaluated. The visual character of the three landscape units in the vicinity of the project intersection is described below.

Landscape Unit 1 – Strip Development

The buildings in Landscape Unit 1 are small and separate, and do not relate to each other's architectural styles. The styles of landscaping and the landscape are random, distinct, and different for each parcel. Parking is localized around each building and many driveways have access via frontage streets. Redlands Boulevard and Anderson Street are straight and perpendicular to each other (east-west and north-south, respectively).

Landscape Unit 2 – Big-Box Development

The newly developed big-box commercial uses in Landscape Unit 2 are different in visual character from the small commercial/industrial developments along Redlands Boulevard and Anderson Street. This new development has large parking areas, curvilinear roads, and consistent landscaping that lends a unified, modern visual character to these uses.

Landscape Unit 3 – Older Residential Development

The area of older residences in Landscape Unit 3 has a completely different visual character from adjacent areas, and is defined by narrow, two-lane paved and gravel streets with no curbs, gutters, or sidewalks. Earthen shoulders transition into front-yard lawns. Single-story residences on small, single-family lots are defined by low wooden or chain-link fences. Landscaping is large and mature, visually dominated by tall palm, cypress, and eucalyptus trees. In this area, some lots are vacant and covered with weeds. At the northeast corner of I-10 and Tippecanoe

Avenue, there are several existing freeway commercial uses: two small restaurants, an abandoned gas station, and a motel.

2.6.2.5 Visual Quality

Visual quality is evaluated by identifying the vividness, intactness, and unity present in the viewshed, then comparing these three criteria with the view as modified by the proposed Build Alternative. The three criteria for evaluating visual quality are defined as follows:

- **Vividness** is the visual power or memorability of landscape components as they combine in distinctive visual patterns.
- **Intactness** refers to the visual integrity of the natural and man-built landscape and its freedom from encroaching elements. It can be present in well-kept urban and rural landscapes, as well as in natural settings.
- **Unity** is the visual coherence and compositional harmony of the landscape considered as a whole. It frequently attests to the careful design of individual man-made components in the landscape.

The visual quality of the three landscape units in the project area is described below.

Landscape Unit 1 – Strip Development

The existing visual quality in Landscape Unit 1 is low due to the low levels of vividness, unity, and intactness. The random patterns, colors, and forms of commercial/light industrial development and signage along Redlands Boulevard and Anderson Street; the visual prominence of overhead utility poles and lines; and the uniformly flat landform of the valley detract from the broad vistas that extend to the San Bernardino Mountains in the distance. Landscape Unit 1 is visually cluttered and has low visual quality.

Landscape Unit 2 – Big-Box Development

This area has a moderate level of visual quality due to its moderate vividness, intactness, and unity. The architectural features of the commercial buildings are unremarkable and typical of similar big-box developments. The landscape features of this landscape unit are vivid, but the presence of the freeway, the older residences, and the abandoned gas station to the east lowers the unity and intactness of this landscape unit.

Landscape Unit 3 – Older Residential Development

This area has a moderate level of visual quality because of the mature landscaping. The natural features of the viewshed are vivid, but the presence of the freeway and the big-box commercial development to the west lowers the unity and intactness of the viewshed to lower levels. In addition, freeway commercial uses near the interchange detract from the unity of this residential landscape unit.

2.6.2.6 Project Viewshed

A viewshed is a subset of a landscape unit and is composed of all the surface areas visible from an observer's viewpoint. The limits of a viewshed are defined as the visual limits of the views located from the proposed project. The viewshed also includes the locations of viewers likely to be affected by visual changes brought about by project features.

Six viewing locations, called Key Views, were identified. These six Key Views best reveal the existing visual character of the three landscape units. They also best represent the typical visual character of proposed project components and potential visual character changes that would affect viewers. The locations of the six Key Views are shown on Figure 2.6.1.

The following describes six Key Views and the viewer groups that each Key View represents:

- **Key View #1**, as shown on Figure 2.6.2, is on Redlands Boulevard looking west toward Anderson Street. It is located in Landscape Unit 1. Viewers at Key View #1 are generally traveling to the commercial/light industrial developments along Redlands Boulevard or passing through the project area.
- **Key View #2**, as shown on Figure 2.6.3, is on Anderson Street looking north toward Redlands Boulevard. It is in Landscape Unit 1. Viewers at Key View #2 are generally traveling to the commercial developments and schools along Anderson Street or passing through the area.
- **Key View #3**, as shown on Figure 2.6.4, is on the sidewalk along Tippecanoe Avenue looking south toward Laurelwood Drive and Harriman Place. It is in Landscape Unit 2. Viewers at Key View #3 are generally traveling to the restaurants and commercial developments in the area or passing through the area.

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Figure 2.6.1 Key View Locations

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Figure 2.6.2 Key View #1

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Figure 2.6.3 Key View #2

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Figure 2.6.4 Key View #3

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- **Key View #4**, as shown on Figure 2.6.5, is on the sidewalk along Harriman Place looking southeast across Tippecanoe Avenue toward Laurelwood Drive. It is in Landscape Unit 2 and looks onto Landscape Unit 3. Viewers at Key View #4 are generally leaving the restaurants and commercial developments along Harriman Place and traveling to other locations.
- **Key View #5**, as shown on Figure 2.6.6, is on Laurelwood Drive in Landscape Unit 3, looking west toward Tippecanoe Avenue and the big-box development in Landscape Unit 2. Viewers at Key View #5 are generally residents and visitors to Landscape Unit 3.
- **Key View #6** is in the westbound number-one lane of I-10 from the point of view of the motorist. The view from Key View #6 is of the overcrossing of I-10 (straight ahead) and the residential uses in Landscape Unit 3. Viewers at Key View #6 are freeway travelers. The eastbound and westbound views along I-10 in this vicinity are similar.

2.6.3 Environmental Consequences

2.6.3.1 Temporary Impacts

Alternative 1 – Build Alternative

Visual impacts would result from construction activities, including the presence of equipment, materials, and workers at the freeway interchange and staging areas, and along the streets and roads leading to the interchange. Visual impacts due to construction activities would also result from the temporary alteration of landforms and vegetation within the project area. Vehicles such as automobiles, pickup trucks, and dump trucks would be visible. Heavy equipment such as backhoes, graders, and excavators would be prevalent. Project components and workers would be visible during site clearing, grading, lane expansion, bridge construction, site cleanup, and landscape restoration. Construction equipment and activities would be seen by various viewers in proximity to the project area, including adjacent and nearby residents, motorists on I-10 and nearby streets, and pedestrians. View durations would vary from brief to extended periods, depending on the viewer groups and viewer locations. Construction activities would be visible for those elements of the proposed project through the existing residential uses.

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Figure 2.6.5 Key View #4

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Figure 2.6.6 Key View #5

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The construction of the I-10/Tippecanoe Avenue interchange and the construction staging areas would result in views of construction vehicles, equipment, storage materials, and workers. These construction impacts would occur over a relatively short duration (within a projected construction time frame of 12 to 18 months) and would cease upon project completion.

With the implementation of Measure V-1 (presented below in Section 2.6.4), the temporary construction-related visual impacts of the Build Alternative would not be adverse.

Alternative 2 – No Build Alternative

The No Build Alternative would not involve any construction activity, and therefore would not result in temporary visual/aesthetic impacts to existing views to and from adjacent areas.

2.6.3.2 Permanent Impacts

Alternative 1 – Build Alternative

Computerized visual simulations were prepared for the six Key Views to analyze and assess the potential visual effects and impacts of the project. The visual simulations for Key Views #1 through #5 are shown on Figures 2.6.2 though 2.6.6. The visual simulation for Key View #6 was prepared as part of the VIA to show the visual impacts of a sound barrier along State right-of-way. However, this sound barrier would not be constructed because it was found to not be reasonable. The reasonable sound barrier in this area would be along the private property line of the second row of houses (Figure 1.2, presented previously in Section 1.3.1.1). These homes are not visible in this Key View. Therefore, the view at this location would not change appreciably and visual impacts at this location are not discussed further below.

Permanent visual impacts are discussed below for each Key View.

Key View #1

The visual simulation of Key View #1 with the Build Alternative is shown on Figure 2.6.2. The visual quality of Redlands Boulevard would be slightly improved by the project, due to the undergrounding of existing overhead utilities as part of the street widening project. Elimination of these overhead wires and vertical utility poles would improve the visual quality of this streetscape and improve landscape character because the landscape would become more vivid without the overhead utilities. Unity and intactness would remain low because of the individual small businesses along Redlands Boulevard, with their unique colors and separate, indistinctive architectural styles. The loss of a few scattered palm trees on the south side of the street, shown on the left side of the view simulation, would be noticeable. The traffic signals would be relocated to accommodate the widened streets, but the signals would remain visually the same.

Viewer response to the visual changes created by the project is expected to be positive because of improved visual quality and improved traffic flow, resulting in less gridlock and brake lights than are currently experienced.

The resulting visual impact would be an improved visual environment, as compared to the existing visual quality/character of the landscape.

Key View #2

The visual simulation of Key View #2 is shown on Figure 2.6.3. The visual quality of Anderson Street would be slightly improved by the project, due to the undergrounding of the overhead utilities as part of the street widening project. Elimination of these overhead wires and vertical utility poles would improve the visual quality of this streetscape and improve the landscape character. The traffic signals would be relocated to accommodate the widened street, but the signals would remain visually the same. The vividness of this landscape would be improved due to the removal of overhead utilities, but its unity and intactness would remain low because of the small businesses with unrelated architectural styles, colors, and building materials.

Viewer response to the visual changes created by the project is expected to be positive because of the improved visual quality due to undergrounding of the overhead utilities and the improved traffic flow resulting in less gridlock and fewer brake lights compared to the existing condition.

The resulting visual impact at Key View #2 would be an improved visual environment compared to the existing visual quality/character of the landscape in this view.

Key View #3

The visual simulation of Key View #3 is shown on Figure 2.6.4. The visual quality of Tippecanoe Avenue would be greatly improved by the project due to the removal of an existing abandoned gas station and the undergrounding of the existing overhead utilities as part of the street widening project. Elimination of these overhead wires and vertical utility poles would improve the visual quality of this streetscape and improve landscape character. Removal of the existing freeway commercial uses near the existing westbound off-ramp (two restaurants and one motel) would create more visual vacant land and would substantially alter the existing visual character of Tippecanoe Avenue. The traffic signals would be relocated to accommodate the widened streets and on-/off-ramps, but the signals would remain visually the same. The vividness, unity, and intactness of this landscape would be improved due to the creation of more vacant land and the removal of overhead utilities, but the landscape would decrease in visual variety because of the removal of several mature palm trees and several small businesses with unrelated architectural styles, colors, and building materials.

Viewer response to the visual changes created by the project is expected to be positive at Key View #3. The visual quality would be improved due to the removal of the abandoned gas station and undergrounding of the overhead utilities, and there would be less gridlock and fewer brake lights as a result of improved traffic flow.

The resulting visual impact at Key View #3 would be an improved visual environment compared to the existing visual quality/character of the landscape.

Key View #4

The visual simulation of Key View #4 is shown on Figure 2.6.5. The visual quality of Tippecanoe Avenue would be greatly improved by the project due to the removal of the existing abandoned gas station and the undergrounding of the existing overhead utilities as part of the street widening project. Undergrounding of these overhead wires and removal of the vertical utility poles would improve visual quality and improve landscape character. Removal of existing freeway commercial developments near the existing westbound off-ramp (two restaurants and one motel) would create more visual vacant land and would substantially alter the existing visual character of Tippecanoe Avenue. The traffic signals would be relocated to accommodate the widened streets and on-/off-ramps, but the signals would remain visually the same. The vividness, unity, and intactness of this landscape would be improved due to the creation of more vacant land and the undergrounding of utilities, but visual variety would decrease because of the removal of several mature palm trees, several residences, and several small businesses with unrelated architectural styles, colors, and building materials.

Viewer response to the visual changes created by the project at Key View #4 is expected to be positive. The visual quality would be improved due to the removal of the abandoned gas station and the undergrounding of the utilities, and there would be less gridlock and fewer brake lights as a result of improved traffic flow.

The resulting visual impact at Key View #4 would be an improved visual environment compared to the existing visual quality/character of the landscape.

Key View #5

The visual simulation of Key View #5 is shown on Figure 2.6.6. The visual quality of Laurelwood Drive would be altered by the project due to the removal of the existing abandoned gas station. The removal of several existing residences and construction of the interchange would alter the existing visual character of Landscape Unit 3 and Laurelwood Drive. The traffic signals would be relocated to accommodate the widened streets and on-/off-ramps, but the signals would remain visually the same. The vividness, unity, and intactness of this landscape would be altered due to the creation of more vacant land and more vistas to the commercial uses on the west side of Tippecanoe Avenue. Visual variety would be decreased because of the removal of several mature palm trees and several residences at the west end of Laurelwood Drive.

Viewer response to the visual changes created by the project at Key View #5 is expected to be negative for the residents living in Landscape Unit 3 because of the elimination of residences and increased visual penetration of freeway traffic that would now be visible along this street.

For residents in Landscape Unit 3, the resulting visual impact would be a decreased visual environment, compared to the existing visual quality/character of the landscape, because of the loss of the single-family neighborhood character and the imposition of sights of freeway infrastructure.

With implementation of Measure V-2, presented below in Section 2.6.4, the permanent visual impacts of the Build Alternative would not be adverse.

Alternative 2 – No Build Alternative

The No Build Alternative would maintain the existing interchange configuration and would not alter existing views to and from the freeway.

2.6.4 Avoidance, Minimization, and/or Mitigation Measures

The following measure is required to avoid, minimize, and/or mitigate the temporary visual impacts of the Build Alternative during construction:

V-1 The Contractors shall keep construction-related activity clean and inconspicuous by storing building materials and equipment generally away from public view and shall remove construction debris promptly at regular intervals. Materials and construction storage areas shall be selected to minimize views from public roads, from I-10, and especially from nearby residences.

The following measure is required to avoid, minimize, and/or mitigate permanent visual impacts of the Build Alternative during construction:

V-2 The San Bernardino Associated Governments (SANBAG), in conjunction with the Cities of Loma Linda and San Bernardino, shall implement the Interstate 10 (I-10) Corridor Planting Master Plan, which is currently being updated, during engineering design, construction, operation, and maintenance of the I-10/Tippecanoe Avenue Interchange. This shall include replacement of existing vegetation and new landscaping of the modified interchange per the I-10 Corridor Planting Master Plan and current California Department of Transportation (Department) standards. Because the new interchange configuration is different from that shown in the Master Plan, the landscape plan shall be redesigned to include plantings in the new cuphandle part of the interchange and permanent treatment Best Management Practices (BMPs), keeping in mind the concepts, guidelines, themes, and design intents of the Master Plan. During final design, a Department Landscape Architect shall approve the proposed planting and implementing of the I-10 Corridor Planting Master Plan.

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2.7 Cultural Resources

2.7.1 Regulatory Setting

"Cultural resources" as used in this document refers to all historical and archaeological resources, regardless of significance. Laws and regulations dealing with cultural resources include:

The National Historic Preservation Act of 1966, as amended (NHPA), sets forth national policy and procedures regarding historic properties, defined as districts, sites, buildings, structures, and objects included in or eligible for the National Register of Historic Places. Section 106 of NHPA requires federal agencies to take into account the effects of their undertakings on such properties and to allow the Advisory Council on Historic Preservation the opportunity to comment on those undertakings, following regulations issued by the Advisory Council on Historic Preservation (36 CFR 800). On January 1, 2004, a Section 106 Programmatic Agreement (PA) between the Advisory Council, FHWA, State Historic Preservation Officer (SHPO), and the Department went into effect for Department projects, both state and local, with FHWA involvement. The PA implements the Advisory Council's regulations, 36 CFR 800, streamlining the Section 106 process and delegating certain responsibilities to the Department. The FHWA's responsibilities under the PA have been assigned to the Department as part of the Surface Transportation Project Delivery Pilot Program (23 CFR 773) (July 1, 2007).

Historic properties may also be covered under Section 4(f) of the U.S. Department of Transportation Act, which regulates the "use" of land from historic properties. See Appendix B for specific information regarding Section 4(f).

Historical resources are considered under the California Environmental Quality Act (CEQA), as well as California Public Resources Code (PRC) Section 5024.1, which established the California Register of Historical Resources. PRC Section 5024 requires state agencies to identify and protect state-owned resources that meet National Register of Historic Places listing criteria. It further specifically requires the Department to inventory state-owned structures in its rights-of-way.

2.7.2 Affected Environment

This section is based on the *Historic Property Survey Report* (August 2009), *Archaeological Survey Report* (August 2009), and *Historical Resources Evaluation Report* (August 2009).

An Area of Potential Effects (APE) was developed for the project that includes all areas in which the project has the potential to directly or indirectly affect historic properties, if any such properties exist. These include the horizontal and vertical areas proposed for (1) direct effects associated with ground-disturbing activities, including, but not limited to, existing and proposed right-of-way, temporary and permanent construction easements, proposed sound and retaining walls, and staging areas; and (2) indirect effects that are the result of visual, noise, or other effects. The area of indirect effects generally includes all developed properties that are adjacent to the proposed direct effects unless those effects are limited to minor improvements (such as pavement striping) that have no potential to indirectly impact adjacent properties. The APE extends around the entirely of those parcels where the built environment may be directly or indirectly affected and also includes part of the San Timoteo Channel, which is proposed to be used to access the underside of the Interstate 10 (I-10) bridge along the existing canal access road. The APE also includes the advanced signage areas.

2.7.1.1 Records Search

On July 10 and October 13, 2006, a records search was conducted at the San Bernardino Archaeological Information Center (SBAIC) of the California Historical Resources Information System (CHRIS) located at the San Bernardino County Museum, Redlands. On December 16, 2008, a follow-up records search and literature review were conducted at the SBAIC. The following historical resources files, inventories, and listings were consulted:

- 2001 Archaeological Determinations of Eligibility
- 2002 National Register of Historic Places Properties (National Register)
- 1992 California Register of Historical Resources
- 1976 California Inventory of Historic Resources
- 1995 California Historical Landmarks
- 1992 California Points of Historical Interest

In addition, background research on historical/archaeological resources was conducted for the APE using published literature on local and regional history, online sources, historical aerial photographs and maps of the project vicinity, and newspaper articles. In addition, oral interviews with historians, long-time residents, and property owners were conducted. The following repositories and resources were contacted and utilized in 2006, 2008, and 2009 to access historical information pertinent to the parcels within the project APE and the immediate project vicinity:

- San Bernardino Public Library, California Room, 2006
- Loma Linda University, Del E. Webb Memorial Library, 2006
- San Bernardino County Museum, 2006
- San Bernardino County Assessor's records, 2006
- United States Census records, 2006
- Dick Schaefer, historian at Loma Linda University, oral interview on November 30, 2006
- Jim Shipp, Chair, City of Loma Linda Historical Commission, oral interview on December 4, 2006
- Elmer Digneo, local landowner and long-time community member, oral interview on December 4, 2006
- Leland Lubinsky, local landowner and long-time community member, oral interviews on December 4, 2006, and May 28, 2009.
- City of Loma Linda Community Development Department (letter mailed on December 18, 2008; no response received)
- Loma Linda Chamber of Commerce (letter mailed on December 18, 2008; no response received)
- Loma Linda Historical Society (letter mailed on December 18, 2008; no response received)
- Redlands Historical Society (letter mailed on December 18, 2008; no response received)
- Smiley Library Heritage Room (Nathan Gonzalez) email correspondence on January 15 and 28, 2009
- Loma Linda Historical Society (Jim Shipp) email correspondence on January 21, 2009
- Loma Linda History Fair, January 25, 2009, personal communication with: Betty Stark, Loma Linda Historical Society Treasurer; Michael Stewart, Loma Linda Historical Society and owner of the Kool Kactus property; Christine Curry, Redlands artist and historian; Pam Gregory, Colton Historical Society; Bill Winstead, Loma Linda Historical Society; and Nick Cataldo, local historian/ author.

2.7.2.1 Field Survey

A pedestrian field survey of the APE was conducted on May 8, 2006. A follow-up survey of the expanded area of the APE was conducted March 4, 2009. The APE was expanded to include additional sound barriers. No archaeological resources were identified during either field survey.

Architectural surveys of the project APE were conducted on July 10–13, October 11–14 and 31, and November 1, 2006. On October 8, 2008, and January 30, 2009, follow-up surveys of the properties within the original project APE were conducted. On March 4, 2009, an additional survey of areas added to the APE since 2006 was conducted.

2.7.2.2 Historical Consultation

In 2006, Dick Schaefer (historian at Loma Linda University), Jim Shipp (Chair, City of Loma Linda Historical Commission), and Elmer Digneo and Leland Lubinsky (long-time local residents) were interviewed. The Loma Linda Historical Society, Loma Linda Community Development Department, Loma Linda Chamber of Commerce, and Redlands Historical Society were also contacted in 2006. These individuals were contacted again via certified mail in December 2008. No response was received from any of those contacted.

2.7.2.3 Native American Consultation

Native American consultation was initiated in 2006, with 9 Native American groups recommended by the Native American Heritage Commission (NAHC). Consultation was completed with the original 9 Native American groups as well as an additional 3 groups in 2009. Sixteen individuals representing the 12 Native American groups were contacted via certified mail and email on January 23, 2009. Letters were followed by telephone calls and emails during February and March 2009. Goldie Walker (Serrano Band of Indians), Britt Wilson (Cahuilla Band of Indians), and Steven Estrada (Santa Rosa Band of Cahuilla Indians) requested further consultation in the event of archaeological finds. Joe Ontiveros (Luiseño Band of Mission Indians) requested further consultation. Anthony Morales (Gabrieleno/Tongva San Gabriel Band of Mission Indians) expressed concern regarding the archaeological sensitivity of the project. Mr. Morales, Mr. Ontiveros, Mr. Estrada, and Samuel Dunlap (Gabrielino/Tongva) requested archaeological and Native American monitoring of the project. On June 2, 2009, letters were sent indicating that due to the disturbed condition of the APE and the low sensitivity for prehistoric resources, the Department does not support these requests for monitoring. The Department made phone calls to Mr. Morales, Mr. Ontiveros, and Mr. Dunlap on July 8, 2009, and sent email correspondence to Mr. Estrada on July 9, 2009, to offer a final opportunity for feedback. In response, Mr. Morales contacted the Department by telephone on July 9, 2009. He reiterated his concerns about the project area being sensitive for cultural resources, and asked that work be halted in the event of a discovery and also that he be notified. He was assured that this is the Department's policy. No other concerns or requests were expressed by those contacted regarding the project.

2.7.2.4 Cultural Resources within the APE

The records search and literature review indicated that 61 cultural resources studies have been conducted within a 1-mile radius of the APE; 6 included parts of the APE. One historic built environment/archaeological resource (a segment of the historic Gage Canal) transects the horizontal APE. However, it was determined to be outside the vertical extent of the APE and therefore outside the project APE. The Gage Canal was backfilled in 1976 and a subsurface pipeline was constructed within the canal. No archaeological resources were identified within the APE.

Fourteen historic-period (45 years of age or older) architectural resources, consisting of 13 residences and a former gas station, were identified and recorded in the APE. None of these resources appear to be eligible for inclusion in the National Register or to qualify as a "historical resource" pursuant to CEQA. In addition, there are three bridges within the project APE. According to the Department bridge inventories (June 2009), all three of the bridges are Category 5 (not eligible for the National Register); therefore, none of the bridges were evaluated as part of this study. All the other historic-period resources in the APE are Property Types 2, 3, and 6 under the Department Section 106 PA and, as such, are exempt from evaluation.[1] Therefore, the Department has determined a finding of "No Historic Properties Affected." In a letter dated September 9, 2009, SHPO concurred that the historic-period resources evaluated were not eligible for the National Register. The SHPO letter is included in Appendix J.

Research was conducted on the construction history of the Interstate 10 (I-10)/ Tippecanoe Avenue interchange. The interchange was completed in 1962, and the Tippecanoe Avenue undercrossing was widened in 1990. The interchange has not been reconstructed or substantially altered since it was originally built in 1962. It is estimated that excavations for the construction of the interchange were to a depth of at least 7 feet.

[1] Property Type 2 are buildings that are less than 30 years old. Property Type 3 are buildings that have been altered and appear less than 30 years old. Property Type 6 are buildings that are greater than 30 years old and have been substantially altered.

Because no historic properties were identified in the APE, there are no Section 4(f) historic sites or properties.

2.7.3 Environmental Consequences

2.7.3.1 Temporary Impacts

Alternative 1 – Build Alternative

The Build Alternative would require ground disturbance and modification to existing freeway structures. These construction activities could result in impacts to unknown buried cultural materials or human remains. Any impacts to buried resources would be considered permanent; therefore, an analysis of temporary impacts is not applicable.

Alternative 2 – No Build Alternative

The No Build Alternative does not involve any construction activities or improvements; therefore, no temporary impacts to cultural resources would occur.

2.7.3.2 Permanent Impacts

Alternative 1 – Build Alternative

Based on the results of the *Historic Property Survey Report*, *Archaeological Survey Report*, and *Historical Resources Evaluation Report*, it was determined that the only cultural resources within the project APE do not appear to be eligible for inclusion in the National Register, do not qualify as a "historical resource" pursuant to CEQA, or are exempt per the Section 106 PA.

Although considered unlikely, there is the potential to encounter unknown buried cultural materials or human remains within the APE during construction of the Build Alternative. In the event that previously unknown buried cultural materials or human remains are encountered during construction, compliance with standard Measures CR-1 and CR-2, provided below, would avoid and/or minimize potential impacts to previously unknown cultural resources or human remains.

Alternative 2 – No Build Alternative

The No Build Alternative does not include any changes to the physical environment; therefore, no impacts to cultural resources would occur.

2.7.4 Avoidance, Minimization, and/or Mitigation Measures

The measures below are required to reduce the potential project impacts related to the discovery of previously unknown cultural materials and human remains during construction:

CR-1 If cultural materials are discovered during construction, all earthmoving activity within and around the immediate discovery area shall be diverted until a qualified archaeologist can assess the nature and significance of the find.

CR-2 If human remains are discovered, State Health and Safety Code Section 7050.5 states that further disturbances and activities shall cease in any area or nearby area suspected to overlie remains, and the County Coroner shall be contacted. Pursuant to Public Resources Code (PRC) Section 5097.98, if the remains are thought to be Native American, the Coroner shall notify the Native American Heritage Commission, which shall then notify the Most Likely Descendant (MLD). At this time, the person who discovered the remains shall also contact the District 8 Environmental Branch Chief so that they may work with the MLD on the respectful treatment and disposition of the remains. Further provisions of PRC 5097.98 are to be followed as applicable.

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Physical Environment

2.8 Hydrology and Floodplain

2.8.1 Regulatory Setting

Executive Order (EO) 11988 (Floodplain Management) directs all federal agencies to refrain from conducting, supporting, or allowing actions in floodplains unless it is the only practicable alternative. The Federal Highway Administration (FHWA) requirements for compliance with EO 11988 are outlined in 23 CFR 650 Subpart A.

In order to comply, the following must be analyzed:

- The practicability of alternatives to any longitudinal encroachments
- Risks of the action
- Impacts on natural and beneficial floodplain values
- Support of incompatible floodplain development
- Measures to minimize floodplain impacts and to preserve/restore any beneficial floodplain values impacted by the project.

The base floodplain is defined as "the area subject to flooding by the flood or tide having a one percent chance of being exceeded in any given year." An encroachment is defined as "an action within the limits of the base floodplain."

2.8.2 Affected Environment

This section is based on the *Summary of Floodplain Encroachment* (October 2009) and *Location Hydraulics Study* (June 2009).

As shown in Figure 1.2, presented previously in Section 1.3.1.1, San Timoteo Creek (Reach 1A) crosses under Interstate 10 (I-10) in the western project area. Reach 1A of San Timoteo Creek is defined as the portion of the creek from the Santa Ana River confluence to Barton Road in Loma Linda. In the project area, the San Timoteo Creek channel is a reinforced concrete rectangular channel with a base width of 60 feet (ft) and a wall height of 12 ft.

According to Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) No. 06071C8684H, August 28, 2008, the western project area crosses the San Timoteo Creek 100-year floodplain (Zone A is a 1 percent annual chance floodplain with no base flood elevations determined). According to the FIRM, the 100-year flood discharge is contained within the San Timoteo Creek channel. The FEMA FIRM is included as Appendix H.

Floodplains and wetlands in their natural or relatively undisturbed state provide natural and beneficial water resource values (e.g., natural moderation of floods, water quality maintenance, groundwater recharge), living resource values (e.g., fish, wildlife, plant species), and cultural resource values (e.g., open space, archaeological and historical resources, natural beauty, scientific study, outdoor education, recreation). In the project area, the San Timoteo Creek channel is concrete lined and does not support vegetation. The existing channel is not in a natural or relatively undisturbed state; therefore, the channel does not provide natural or beneficial living resource or cultural resource values.

Beneficial water resource values are identified in the Santa Ana Regional Water Quality Control Board's Water Quality Control Plan for the Santa Ana Region (Basin Plan, updated February 2008). There are no defined present beneficial uses in the project area that would be directly affected by the project. Only intermittent uses have been defined in the project area, most likely because the watercourses in the area experience seasonal, intermittent flow and are dry in the summer. The following intermittent beneficial uses are identified in the Basin Plan for Reach 1A of the San Timoteo Creek:

- AGR: Agriculture
- GWR: Groundwater Recharge
- REC1: Body-contact recreation (swimming/wading)
- REC2: Nonbody-contact recreation (boating/fishing)
- WARM: Warm-water habitat for fish amenable for reproduction in warm water
- WILD: Habitat for wild plants and animals

2.8.3 Environmental Consequences

2.8.3.1 Temporary Impacts

Alternative 1 – Build Alternative

The existing San Timoteo Creek Bridge 18-inch-wide pier wall in the center of the San Timoteo Creek channel would be lengthened 42 ft to accommodate the bridge widening. Construction equipment would operate in the floodplain during construction of the longer pier wall.

Construction activities have the potential to impact the intermittent beneficial water resource values of the San Timoteo Creek discussed above by impacting water quality. As discussed in detail later in Section 2.9, Water Quality and Storm Water Runoff, potential impacts to water quality could occur during construction of the proposed project due to increased erosion or accidental spills. However, Best Management Practices (BMPs), including erosion control measures, would be implemented during construction of the proposed project to reduce impacts to water quality and beneficial water resource values. Therefore, construction of the proposed project would not result in short-term adverse impacts to natural and beneficial floodplain values.

Alternative 2 – No Build Alternative

The No Build Alternative would not result in the construction of any improvements to the San Timoteo Creek Channel. Therefore, the No Build Alternative would not result in temporary adverse impacts related to natural and beneficial floodplain values.

2.8.3.2 Permanent Impacts

Alternative 1 – Build Alternative

The extension of the San Timoteo Creek Bridge pier wall would result in a longitudinal encroachment (i.e., parallel to the direction of flow) of the San Timoteo Creek channel 100-year floodplain. Because the proposed project consists of improvements to an existing freeway and associated bridge structure, which are already located in the floodplain, there are no practical alternatives to the proposed widening of the San Timoteo Creek Bridge and the resulting longitudinal encroachment.

The existing San Timoteo Creek channel is capable of conveying the 100-year flood with approximately 6 ft of freeboard (i.e., the distance between the 100-year flood elevation and the top of the channel). The proposed improvements would not increase the 100-year floodplain elevation or reduce the freeboard. After extension of the pier wall, the 100-year flood would continue to be contained within the San Timoteo Creek channel. In addition, the proposed project would not result in flood-related interruption of emergency services or routes. Therefore, there would be no substantial flood-related risks to life or property associated with implementation of the Build Alternative. Based on the assessment of level of risk in the *Location Hydraulics Study*, the project is considered “low” risk.

The Build Alternative includes improvements to an existing transportation facility to improve operational deficiencies, increase interchange capacity, and enhance local circulation. The Build Alternative would reduce congestion by modifying existing facilities and would not promote incompatible floodplain development.

As discussed in detail later in Section 2.9, the Build Alternative would result in a permanent increase in impervious surfaces and a permanent increase in runoff and pollutant loading in the project area. The increased runoff and pollutant loading would have the potential to impact the intermittent beneficial water resource values of the San Timoteo Creek floodplain. However, Treatment BMPs would be implemented during operation of the proposed project to reduce impacts to water quality and beneficial water resource values. Therefore, operation of the proposed project would not result in long-term adverse impacts to natural and beneficial floodplain values.

A “significant encroachment,” as defined in 23 CFR 650.105(q), is a highway encroachment that would result in (1) a significant potential for interruption or termination of a transportation facility that is needed for emergency vehicles or provides a community’s only evacuation, (2) a significant risk, or (3) a significant adverse impact on natural and beneficial floodplain values. The proposed project is a highway widening project that would require the extension of an existing pier wall within the 100-year floodplain in San Timoteo Creek. The proposed project would not change the capacity of the San Timoteo Creek channel to carry water. The proposed project would not result in a measurable impact to the 100-year floodplain elevation or reduce the freeboard in the channel. The proposed encroachment would not result in any adverse impacts on the natural and beneficial floodplain values, would not result in a substantial change in flood risks or damage, and does not have substantial potential for interruption or termination of emergency services or emergency routes. Therefore, the proposed project does not constitute a significant floodplain encroachment as defined in 23 CFR 650.105(q).

Alternative 2 – No Build Alternative

The No Build Alternative would not result in the construction of any improvements to the San Timoteo Creek Channel, which was previously permanently impacted with concrete. Therefore, the No Build Alternative would not result in permanent adverse impacts related to floodplains.

2.8.4 Avoidance, Minimization, and/or Mitigation Measures

Mitigation measures to minimize temporary construction impacts and long-term operational impacts on the natural and beneficial floodplain values related to water quality are discussed in Section 2.9.

HY-1 During final design, the San Bernardino Associated Governments (SANBAG) shall submit plans and an encroachment permit application for bridge modifications within the San Timoteo Creek Channel to the County of San Bernardino Flood Control District for review and approval.

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2.9 Water Quality and Storm Water Runoff

2.9.1 Regulatory Setting

Section 401 of the Clean Water Act requires water quality certification from the State Water Resource Control Board (SWRCB) or a Regional Water Quality Control Board (RWQCB) when the project requires a Federal permit. Typically this means a Clean Water Act Section 404 permit to discharge dredge or fill into a water of the United States, or a permit from the Coast Guard to construct a bridge or causeway over a navigable water of the United States under the Rivers and Harbors Act.

Along with Clean Water Act Section 401, Section 402 establishes the National Pollutant Discharge Elimination System (NPDES) for the discharge of any pollutant into waters of the United States. The federal Environmental Protection Agency has delegated administration of the NPDES program to the SWRCB and the nine RWQCBs. To ensure compliance with Section 402, the SWRCB has developed and issued the Department an NPDES Statewide Storm Water Permit to regulate storm water and non-storm water discharges from Department' right-of-way, properties and facilities. This same permit also allows storm water and non-storm water discharges into waters of the State pursuant to the Porter-Cologne Water Quality Act.

Storm water discharges from the Department's construction activities disturbing one acre or more of soil are permitted under the Department's Statewide Storm Water NPDES permit. These discharges must also comply with the substantive provisions of the SWRCB's Statewide General Construction Permit. Non-Departmental construction projects (encroachments) are permitted and regulated by the SWRCB's Statewide General Construction Permit. All construction projects exceeding one acre or more of disturbed soil require a Storm Water Pollution Prevention Plan (SWPPP) to be prepared and implemented during construction. The SWPPP, which identifies construction activities that may cause discharges of pollutants or waste into waters of the United States or waters of the State, as well as measures to control these pollutants, is prepared by the construction contractor and is subject to Department review and approval.

Finally, the SWRCB and the RWQCBs have jurisdiction to enforce the Porter-Cologne Act to protect groundwater quality. Groundwater is not regulated by Federal law, but is regulated under the state's Porter-Cologne Act. Some projects may involve placement or replacement of on-site treatment systems (OWTS) such as leach fields or septic systems or propose implementation of infiltration or detention treatment systems which may pose a threat to groundwater quality. Currently the OWTS program is without SWRCB regulation but you should be aware of threats to groundwater quality on the project site and evaluate and address accordingly in the environmental document. Design standards for installation and operation of infiltration and detention treatment systems should protect groundwater quality and those protections should also be addressed in the environmental document.

2.9.2 Affected Environment

This section is based on the *Water Quality Assessment Report* (WQAR) (June 2009).

2.9.2.1 Surface Water

The project area is located within the Bunker Hill subwatershed of the Upper Santa Ana River Watershed. San Timoteo Creek (Reach 1A) is south of the project area and crosses under Interstate 10 (I-10) in the western project area (refer to Figure 1.2, presented previously in Section 1.3.1.1, for the limits of the project area). Within the project area, the creek is contained within a concrete flood control channel. After San Timoteo Creek crosses under I-10, it flows into the Santa Ana River (Reach 5), which is located approximately 0.5 miles (mi) northwest of the project area, just west of the Waterman Avenue bridge. The Gage Canal crosses through the project area but is underground. In addition, an unnamed storm drain is located adjacent to the eastbound Tippecanoe Avenue off-ramp.

The following intermittent beneficial uses were identified in the Santa Ana RWQCB's Basin Plan (*Santa Ana River Basin Water Quality Control Plan*, updated February 2008) for Reach 1A of San Timoteo Creek:

- AGR: Agriculture
- GWR: Groundwater recharge
- REC-1: Body-contact recreation (swimming/wading)
- REC-2: Nonbody-contact recreation (boating/fishing)
- WARM: Warm-water habitat for fish amenable for reproduction in warm water
- WILD: Habitat for wild plants and animals

Beneficial uses identified in the Basin Plan for Reach 5 of the Santa Ana River include the following:

- AGR: Agriculture
- GWR: Groundwater recharge
- REC-1: Body-contact recreation (swimming/wading)

- REC-2: Nonbody-contact recreation (boating/fishing)
- WARM: Warm-water habitat for fish amenable for reproduction in warm water
- WILD: Habitat for wild plants and animals
- RARE: Habitat for rare (threatened/endangered) plants and animals

Reach 1A of San Timoteo Creek and Reach 5 of the Santa Ana River are not listed on the 2006 Clean Water Act (CWA) Section 303(d) List of Water Quality Limited Segments. In addition, there are no existing or proposed Total Maximum Daily Loads (TMDLs)[1] for San Timoteo Creek or Reach 5 of the Santa Ana River.

2.9.2.2 Groundwater

As designated by the Santa Ana RWQCB, the project area is within the Bunker Hill B Groundwater Management Zone. Groundwater in this management zone is primarily recharged by rain, runoff from the surrounding mountains, and imported water.

Based on groundwater data from the California Department of Water Resources, the depth to groundwater within the project area is anticipated to range from approximately 22 to 58 feet (ft) below ground surface (bgs).

The beneficial uses identified in the Basin Plan for the Bunker Hill B Groundwater Management Zone include the following:

- MUN: Municipal
- AGR: Agricultural
- IND: Industrial
- PROC: Process Water Supply

The project area is not in a “high-risk” area, which is defined as a location where spills from State-owned rights-of-way, activities, or facilities can discharge directly into municipal or domestic water supply reservoirs or groundwater percolation facilities.

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[1] The TMDL is the total amount of a constituent that can be discharged while meeting water quality objectives and protecting beneficial uses. It is the sum of the individual load allocations for point-source inputs (e.g., an industrial plant), load allocations for nonpoint-source inputs (e.g., runoff from urban areas), and the natural background with a margin of safety included.

2.9.3 Environmental Consequences

2.9.3.1 Temporary Impacts

Alternative 1 – Build Alternative

Pollutants of concern during construction include sediments, trash, petroleum products, concrete waste (dry and wet), sanitary waste, and chemicals. Each of these pollutants on its own or in combination with other pollutants can have a detrimental effect on water quality. During project-related construction activities, excavated soil would be exposed, and there would be an increased potential for soil erosion compared to existing conditions. During construction, the total disturbed area from the Build Alternative would be approximately 20.4 ac. In addition, chemicals, liquid products, and petroleum products (such as paints, solvents, and fuels), and concrete-related waste may be spilled or leaked, and have the potential to be transported off the project site in storm water runoff into receiving waters.

Work within San Timoteo Creek would be required to extend the pier wall and seismically retrofit the I-10 bridge over San Timoteo Creek. However, San Timoteo Creek within the project area is concrete lined; therefore, erosion would not be a concern during construction at this location. However, during construction of the new pier wall, chemicals, liquid products, petroleum products, and concrete-related waste spills would have a higher potential to impact water quality due to the vicinity of surface waters. In addition, undergrounding of the unnamed storm drain would have the potential for increased erosion and introducing sediment and sediment-related pollutants to the storm drain system.

Under the General Construction Activity NPDES Permit, the project would be required to prepare a SWPPP and implement Construction Best Management Practices (BMPs) detailed in the SWPPP during construction activities. Construction BMPs would be designed to minimize erosion and prevent spills. In addition, to minimize erosion and sediment deposition within the drainages, construction within the drainages would be limited to outside the rainy season. When Construction BMPs are properly designed, implemented, and maintained to address pollutants of concern and construction within drainages is limited to outside the rainy season, as presented in Measures WQ-1 and WQ-2 (provided below), no adverse water quality impacts would occur during construction of the proposed project.

Alternative 2 – No Build Alternative

Under the No Build Alternative, no improvements to the I-10/Tippecanoe Avenue interchange, other than routine roadway and bridge maintenance, would be made.

Therefore, the No Build Alternative would result in no short-term water quality impacts from construction-related activities.

2.9.3.2 Permanent Impacts

Alternative 1 – Build Alternative

Pollutants of concern during operation of a transportation facility include sediments, trash, petroleum products, metals, and chemicals. The existing surface area within the project area is 37.81 ac. The Build Alternative would eliminate approximately 7.58 ac of impervious surface area and create approximately 7.30 ac of new impervious surface area. The net decrease in impervious surface area would be approximately 0.28 ac.

The proposed project would alter the land use in the project area, replacing vacant, commercial, and residential uses with transportation uses that would change the concentrations of pollutants in storm water runoff. For example, bacteria, viruses, nutrients, and pesticides are typically higher in runoff from residential areas that have landscaping on site. Oil and grease and metals, from automobiles and machinery, are typically higher in runoff from commercial and transportation land uses. Therefore, runoff from the proposed project would be expected to contain higher concentrations of metals and oil and grease and lower levels of bacteria, viruses, nutrients, and pesticides compared to existing conditions.

Roadway runoff in the project area is currently not treated. As part of the proposed project, BMPs would be implemented to target constituents of concern in runoff from the project area. Potential Treatment BMPs include biofiltration swales, media filters, and/or detention basins. Potential locations for treatment BMPs are described in more detail in Chapter 1. The proposed BMPs would treat runoff from approximately 10.3 ac of impervious surface area. The Treatment BMPs would target constituents of concern from transportation facilities (sediments, trash, petroleum products, metals, and chemicals). Treatment BMP design would be finalized during the Plans, Specifications, and Estimates (PS&E) stage.

When BMPs are implemented in accordance with NPDES Permit requirements, as stipulated in Measure WQ-3 below, operation of the proposed project would not result in adverse impacts to water quality.

Alternative 2 – No Build Alternative

Under the No Build Alternative, there would be no increase in impervious area or change in land use at the interchange. Therefore, the No Build Alternative would not result in an increase in long-term pollutant loading. In addition, roadway runoff would remain untreated, similar to existing conditions.

2.9.4 Avoidance, Minimization, and/or Mitigation Measures

The following measures are required to avoid, minimize, and/or mitigate potential project impacts to water quality:

WQ-1 The San Bernardino Associated Governments (SANBAG) shall comply with the provisions of the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activity (General Permit) Order No. 99-08-DWQ, NPDES No. CAS000002, and any subsequent permit, as they relate to construction activities for the project. This shall include submission of a Notice of Intent to the State Water Resources Control Board at least 30 days prior to the start of construction, preparation, and implementation of a Storm Water Pollution Prevention Plan, and submission of a Notice of Termination to the Santa Ana Regional Water Quality Control Board (RWQCB) upon completion of construction and stabilization of the area.

WQ-2 The construction contractor shall limit construction activities within drainages to outside the rainy season (October to May) to ensure that erosion caused by construction activities does not occur and that sedimentation is not deposited within the storm drain system or any adjacent drainages.

WQ-3 SANBAG shall comply with the California Department of Transportation's Statewide Storm Water Management Plan (SWMP, May 2003 or subsequent issuance) and permit requirements for implementation of Design Pollution Prevention and Treatment Best Management Practices (BMPs) for the project that address pollutants of concern. This shall include coordination with the Santa Ana RWQCB with respect to feasibility, maintenance, and monitoring of Treatment BMPs as set forth in the SWMP.

2.10 Geology/Soils/Seismic/Topography

2.10.1 Regulatory Setting

For geologic and topographic features, the key federal law is the Historic Sites Act of 1935, which establishes a national registry of natural landmarks and protects “outstanding examples of major geological features.” Topographic and geologic features are also protected under the California Environmental Quality Act.

This section also discusses geology, soils, and seismic concerns as they relate to public safety and project design. Earthquakes are prime considerations in the design and retrofit of structures. The California Department of Transportation (Department’s) Office of Earthquake Engineering is responsible for assessing the seismic hazard for Department projects. The current policy is to use the anticipated Maximum Credible Earthquake (MCE), from young faults in and near California. The MCE is defined as the largest earthquake that can be expected to occur on a fault over a particular period of time.

2.10.2 Affected Environment

This section is based on the *Preliminary Geotechnical Report* (June 2009).

2.10.2.1 Topography

In the project area, the topography is generally flat, with elevations varying from about 1,020 to 1,080 feet (ft) above mean sea level (amsl) at the west and east ends of the project area, respectively.

2.10.2.2 Geology

The project area is in the southeastern portion of the Upper Santa Ana River Valley, commonly referred to as the San Bernardino Valley. The San Bernardino Valley has a somewhat triangular configuration between the Fontana Plain on the west, the San Bernardino Mountains on the north and east, and the Crafton Hills on the south.

The San Bernardino Valley is underlain primarily by uncemented (unconsolidated) alluvial sediments, primarily clays, silts, sands, and gravels. In addition, there are local areas covered by windblown sand and fine-grained deposits of former marshes. The bedrock below alluvial sediments consists primarily of Mesozoic-age crystalline igneous (diorite) and metamorphic rocks (Pelona schist, gneiss) similar to those exposed in the nearby hills and in the San Gabriel Mountains. The depth to bedrock in the project area is about 800 ft. In addition, there may be some limited Tertiary-age continental (nonmarine) deposits between the Holocene-Pleistocene alluvium and the bedrock.

Historically, the highest groundwater at the Interstate 10 (I-10)/San Timoteo Creek Bridge was approximately 10 ft below ground surfaces (bgs). The historical depth to groundwater increased toward the east and was approximately 25 ft bgs at Tippecanoe Avenue. As discussed previously in Section 2.9, Water Quality and Storm Water Runoff, based on groundwater data from the California Department of Water Resources, the depth to groundwater in the project area is anticipated to range from approximately 22 to 58 ft bgs. However, groundwater was not encountered during previous borings in the project area at the Tippecanoe Avenue undercrossing and San Timoteo Creek Bridge.

2.10.2.3 Soils

The soils in the project area consist of a wide variety of loose to dense, nonindurated sand and fine gravel alluvium, and soft to stiff silts and clays. Sands and silts are interbedded with clays and a few gravel lenses.

The native soils in this area are predominantly light brown, brown, brownish gray, or gray, silty sands and sandy silts with clay binder; and fine-, medium-, and coarse-grained sands. Occasional pea gravel stringers, some sandy layers containing pea gravel, and scattered cobblestones are also present. The soil density appears to generally increase with depth.

2.10.2.4 Faulting and Seismicity

The two principal seismic considerations for most sites in Southern California are the potential for surface rupture along active fault traces and damage to structures due to seismically induced ground shaking. The San Bernardino Valley area is bounded by major earthquake faults forming the border between the North American and Pacific tectonic plates. The San Andreas Fault is clearly expressed on the east and northeast side of the valley by linear escarpments and offset fans and streams along the base of the San Bernardino Mountains. The San Andreas Fault does not cross the project alignment.

The San Jacinto Fault is along the western edge of the San Bernardino Valley and comprises several splays extending southeasterly from the San Gabriel Mountains. Numerous faults, folds, and tilted blocks occur in a zone about 3 miles (mi) wide, extending from the Rialto-Colton Fault to the Loma Linda Fault. This zone is associated with a dense cluster of earthquakes, suggesting it is highly active. The project area is largely located within this zone of earthquakes. The Loma Linda Fault is just east of the San Jacinto Fault along the east side of a small knoll at Loma Linda University. Based on seismicity information, the Loma Linda Fault appears to extend northwesterly into the San Bernardino Valley, likely intersecting I-10 between Tippecanoe Avenue and San Timoteo Wash.

There are no known active faults that cross the project area; however, the area is within a highly deformed zone along the San Jacinto Fault that is associated with abundant earthquake activity. Geologic, seismologic, and geophysical data indicate several unknown or poorly known faults in the San Bernardino Valley that coincide with the earthquake activity in the area. The faults appear to fan out south of the San Gabriel Mountains, and tectonic strain release may be partitioned among these faults across the width of the valley. Several of these faults, including one designated as the Tippecanoe Fault, project into the project area.

It is estimated that ground motion in the project area can range from about 0.67 g[1] at the east end of the project area to 0.73 g at the west end.

2.10.3 Environmental Consequences

2.10.3.1 Temporary Impacts

Alternative 1 – Build Alternative

Because the native soils in the project area are anticipated to be predominantly sands and silts with relatively minor amounts of clay, the soils may be affected by moderate to severe erosion. These materials would be particularly prone to erosion during construction of the Build Alternative, especially during heavy rains. Therefore, construction of the Build Alternative could result in adverse impacts related to erosion. Erosion impacts related to water quality are evaluated in Section 2.9.

Soils in the project area could undergo “immediate” elastic settlement, which usually occurs during brief earthwork activities and shortly after. For new embankments and widening of existing embankments, elastic settlement is anticipated to range from less than 0.25 inch (in) to 1 in because of the compact to dense nature of the subsurface soils. This settlement is within the tolerable range for most conventional structures. Therefore, impacts related to elastic settlement during construction would be minimal.

1 “g” is a common value of acceleration equal to 32 feet/second^2 (ft/sec^2).

Alternative 2 – No Build Alternative

The No Build Alternative would not result in any soil disturbance; therefore, no temporary impacts related to geology and soils would occur.

2.10.3.2 Permanent Impacts

Alternative 1 – Build Alternative

Fault-Induced Ground Rupture

As discussed above, there are known faults, including the Tippecanoe Fault, that project toward the project area. Although some of these faults may be active, the time between ruptures seems to be very long (several thousand years), so the likelihood of a surface rupture is small. Therefore, no special precautions or restrictions during project operation related to fault-induced ground rupture are required, but the project will be built to current seismic standards.

Seismic Ground Shaking

Faults in the project area have been documented as producing earthquakes with a magnitude greater than moment magnitude (Mw) of 7.0. As discussed above, during an earthquake, ground motion in the project area could range from about 0.67 to 0.73 g. Therefore, the structures constructed for the Build Alternative are potentially subject to adverse impacts related to seismic ground shaking.

Secondary Effects of Seismic Shaking

Secondary effects of seismic shaking are nontectonic processes that are directly related to strong seismic shaking. Ground deformation, including fissures, settlement, displacement, and loss of bearing strength, are common expressions of these processes and are among the leading causes of damage to structures during moderate to large earthquakes. Secondary effects leading to ground deformation include liquefaction, settlement, and landsliding. Other hazards indirectly related to seismic shaking are inundation, tsunamis, and seiches. These potential secondary effects of seismic shaking on the Build Alternative are discussed below.

Liquefaction

Liquefaction is a phenomenon in which loose, saturated soils behave similarly to fluid when subjected to high-intensity ground shaking. Primary factors influencing liquefaction potential include groundwater elevation, soil type and grain size distribution, relative density of soil, initial confining pressure, and intensity and duration of ground shaking. Soils most susceptible to liquefaction are clean, loose, uniformly graded, fine-grained sands and nonplastic silts that are saturated. Silty sands have also been proven susceptible to liquefaction. In addition, soils most susceptible to liquefaction are saturated low-density sands and silts within 50 ft of the ground surface.

Based on United States Geological Survey (USGS) maps, the project area is identified as having a moderate to moderately high potential for ground failure due to potentially liquefiable soils. However, based on a review of previous test borings, the project area has a low liquefaction potential due to the absence of shallow groundwater and the presence of compact to dense soils. Only a few relatively thin layers within 20 ft of the ground surface may be potentially liquefiable. Therefore, the project site would not likely be subject to adverse impacts related to seismically induced liquefaction. However, as detailed in Measure GEO-1, the potential for liquefaction effects on the structures constructed for the Build Alternative would be further investigated during final design.

Seismically Induced Settlement

Strong ground shaking can cause settlement by allowing sediment particles to become more tightly packed, thereby reducing pore space. As stated above, only a few relatively thin layers within 20 ft of the ground surface may be potentially liquefiable. Consequently, seismically induced settlement due to liquefaction is anticipated to be small, if not unlikely, in the project area. Also, because of the compact to dense nature of subsurface soils, seismic settlement of dry in-situ soils is expected to be small. Therefore, the project site would not likely be subject to adverse impacts related to seismically induced settlement. However, as detailed in Measure GEO-1, the potential for seismically induced settlement effects on the structures constructed for the Build Alternative would be further investigated during final design.

Seismically Induced Landslides

Marginally stable slopes may be subject to landsliding caused by seismic shaking. In most cases, this is limited to relatively shallow soil failures on steeper natural slopes, although deep-seated failures of oversteepened, engineered slopes are also possible. There are no natural slopes within the project limits; therefore, there is no potential for landsliding of natural slopes. The only slopes within the project area are graded fill slopes constructed for the existing mainline and ramps, which are presumed to be stable under static gravitational forces and pseudo-static loading conditions. Therefore, the project area would not be subject to impacts related to seismically induced landslides. No special precautions or restrictions during project design and operation of the Build Alternative are required.

Seismically Induced Inundation

Strong seismic ground motion can cause dams and levees to fail, resulting in damage to structures and properties located downstream of those water retention facilities. There are no dams or substantial bodies of water on, in the immediate vicinity of, or immediately upstream of the project site. The project site is not within an inundation zone of a dam. Therefore, the Build Alternative is not anticipated to be adversely impacted by seismically induced inundation. No special precautions or restrictions during project design and operation of the Build Alternative are required.

Tsunamis and Seiches

A tsunami, or seismically generated sea wave, is generally created by a large, distant earthquake occurring near a deep ocean trough. A seiche is an earthquake-induced wave in a confined body of water such as a lake or reservoir. Damage from tsunamis is typically confined to coastal areas that are 20 ft or less above sea level. The project site is not near the coast or any confined bodies of water. Therefore, the Build Alternative is not at risk of inundation from a tsunami or seiche. No special precautions or restrictions during project design and operation of the Build Alternative are required.

Slope Stability

Stability of Natural Slopes

The project site is relatively flat and does not include substantial natural slopes. Therefore, the Build Alternative would not be adversely impacted by instability associated with natural slopes. No special precautions or restrictions during project design and operation of the Build Alternative are required.

Stability of Proposed Slopes

The final design of the Build Alternative may include the construction of manufactured slopes. The final design will incorporate appropriate design features to address slope stability constraints in manufactured slopes, as necessary. Because the Build Alternative would include manufactured slopes, the structures constructed for that alternative are considered to be subject to potential adverse impacts related to the stability of those slopes. As detailed in Measure GEO-1, slope stability would be further investigated during final design.

Subgrade Stability

Compressible Soils

When a load such as fill soils is placed, the underlying soil layers undergo a certain amount of compression due to the deformation and relocation of soil particles and the expulsion of water or air from the void spaces between the grains. Some settlement occurs immediately after a load is applied, and some additional settlement occurs over time after placement of the load. For engineering applications, it is important to estimate the total amount of settlement that will occur following placement of a given load and the rate of compression (consolidation). Because the subsurface soils on the project area are predominantly granular, the soils are not expected to undergo consolidation settlement (settlement over long periods of time). Therefore, the Build Alternative would not be adversely impacted by compressible soils. However, as detailed in Measure GEO-1, the potential for soil-compression-related impacts would be further investigated during final design.

Expansive Soils

Untreated expansive soils underlying a foundation, slab, or road alignment can cause damage, including heaving, tilting, and cracking. The soils on the project area are predominantly sands, with varying amounts of silt and gravel. The clay content of these soils is not substantial. Therefore, the on-site soils are anticipated to be nonexpansive or have a very low expansion potential. However, there may be localized, discontinuous layers of clayey soils with higher expansion potential within the project area. Therefore, the Build Alternative may be subject to adverse impacts associated with expansive soils. As detailed in Measure GEO-1, the potential for soil expansion would be further investigated during final design.

Corrosive Soils

Corrosive soils contain constituents or physical characteristics that react with concrete (water-soluble sulfates) or ferrous metals (chlorides, low percentage of hydrogen levels, and low electrical resistivity). Fine-grained soils (predominantly clays) are the typical soil types responsible for corrosive site conditions. Because the native subsurface soils in the project area are composed predominantly of coarse-grained soils (sand and silty sand) with little clay binder, corrosive soil is not expected. Therefore, the Build Alternative would not be adversely impacted by corrosive soils. However, as detailed in Measure GEO-1, the potential for soil corrosion effects on the project structures would be further investigated during final design.

Erosion

Because the native soils in the project area are anticipated to be predominantly sands and silts with relatively minor amounts of clay, there is the potential for moderate to severe erosion on the slopes. These slopes and materials would be particularly prone to erosion from runoff from the new pavement areas, especially during heavy rains. Therefore, operation of the Build Alternative could result in adverse water quality impacts related to erosion. Erosion impacts are evaluated in Section 2.9.

Alternative 2 – No Build Alternative

The No Build Alternative would not involve new structures; therefore, geology and soils conditions in the project area would not change.

2.10.4 Avoidance, Minimization, and/or Mitigation Measures

The measure below is required to reduce the potential impacts of geotechnical and soils conditions on structures constructed under the Build Alternative to the proposed project:

GEO-1 During the Plans, Specifications, and Estimates (PS&E) Phase, a detailed geotechnical investigation shall be conducted by qualified geotechnical personnel to assess geotechnical conditions at the project area. The geotechnical investigation shall include exploratory borings to investigate site-specific soils and conditions and to collect samples of subsurface soils for laboratory testing. Those soil samples shall be tested to determine soil type, soil shear strength, compressibility characteristics, sand equivalent, R-value, compaction characteristics, expansion potential, permeability, and corrosion potential. The project-specific findings and recommendations of the geotechnical investigation shall be summarized in a Final Geotechnical Report to be submitted to the California Department of Transportation (Department) for review and approval. Those findings and recommendations shall be incorporated in the final design of the Build Alternative.

2.11 Paleontology

2.11.1 Regulatory Setting

Paleontology is the study of life in past geologic time based on fossil plants and animals. A number of federal statutes specifically address paleontological resources, their treatment, and funding for mitigation as a part of federally authorized or funded projects (e.g., Antiquities Act of 1906 [16 USC 431-433], Federal-Aid Highway Act of 1935 [20 USC 78]). Under California law, paleontological resources are protected by the California Environmental Quality Act, the California Code of Regulations, Title 14, Division 3, Chapter 1, Sections 4307 and 4309, and Public Resources Code Section 5097.5.

2.11.2 Affected Environment

This section is based on the *Paleontological Identification and Evaluation Report* (May 2009).

A paleontological literature review was conducted using unpublished reports, paleontological assessment and monitoring reports, field notes, and published literature to locate fossil localities within the project area (refer to Figure 1.2, presented previously in Section 1.3.1.1, for the limits of the project area) and the immediately surrounding area. In addition, a paleontological resource locality search was conducted through the San Bernardino County Museum. Vehicular and pedestrial surveys of the project area and an area up to 300 feet (ft) outside the project area was conducted on January 6, 2009.

The project area is within the northwestern Peninsular Range Province of Southern California. It is in the San Bernardino Basin, which is roughly bounded on the northeast by the San Andreas Fault, on the southwest by the San Jacinto Fault, on the south by the Crafton Hills, and on the north by the mouth of Cajon Canyon. The San Bernardino Basin is an asymmetric basin that at depth contains the same metamorphic and granitic rock units that characterize the San Gabriel Mountains.

Geologic mapping indicates that the project area is located on deposits of late Holocene Alluvium and Holocene to late Pleistocene Alluvium (Qa and Qya) primarily derived from the northwest-flowing San Timoteo Creek and the west-flowing Santa Ana River. These sediments represent a thin veneer overlying late to early Pleistocene alluvial deposits (Qof and Qvoa) that crop out on the surface approximately 2.5 miles (mi) south of the project area.

The vehicle and pedestrian surveys discovered that most of the surface of the project area rests on artificial fill. The remainder, including all proposed staging areas, the surface street improvements, the eastbound lane addition, and the new westbound on- and off-ramps, is situated on Holocene to latest Pleistocene Alluvium. Depth to the middle to late Pleistocene alluvium is not known but, based on nearby fossil occurrences, may be as shallow as 3 ft below ground surface (bgs). No fossils or Pleistocene sediments were observed during the survey within 300 ft of the project area. The observed native sediments were composed of light grey silty sand with cobbles and small boulders. The primary composition of the cobbles and boulders was granite.

2.11.3 Environmental Consequences

2.11.3.1 Temporary Impacts

Alternative 1 – Build Alternative

The Build Alternative would require ground disturbance and modification to existing freeway and local street structures. These construction activities could result in impacts to paleontological resources. The potential impacts to paleontological resources would be permanent impacts and are addressed below. Any analysis of temporary impacts is not applicable.

Alternative 2 – No Build Alternative

The No Build Alternative does not include any changes to the physical environment; therefore, no temporary impacts to paleontological resources would occur.

2.11.3.2 Permanent Impacts

Alternative 1 – Build Alternative

As discussed above, the project area has a potential for significant, unrenewable paleontological resources to be encountered at depths greater than 3 ft bgs. Potentially fossiliferous sediments may be encountered during excavation for the proposed project, which is currently estimated to be up to 7 ft for normal excavation and deeper if cast-in-drilled hole (CIDH) or driven piles are used for bridge supports. However, CIDH piles and driven piles are not conducive to the collection of paleontological resources, as the resources would usually not be visible and there would be no way to safely collect resources. Construction of some part of the proposed project would primarily be restricted to artificial fill or areas that cannot be physically monitored; however, it is very likely that sensitive sediments will be encountered during construction of the westbound off-ramp and on-ramp, the eastbound auxiliary lane, retaining walls and sound walls, modifications to the San Timoteo Creek undercrossing, and local surface street improvements.

To reduce impacts to any paleontological resources that may be present within the project area (refer to Figure 1.2, presented previously in Section 1.3.1.1), where excavation may take place in areas of undisturbed soils, a Paleontological Mitigation Program (PMP), as specified below in Measure PAL-1, would be implemented during construction.

Alternative 2 – No Build Alternative

The No Build Alternative would not include any excavation in the project area. Therefore, the No Build Alternative would not result in adverse impacts related to paleontological resources.

2.11.4 Avoidance, Minimization, and/or Mitigation Measures

The following measure is required to avoid, minimize, and/or mitigate project impacts to paleontological resources:

PAL-1 Prior to construction activities, the San Bernardino Associated Governments (SANBAG) shall ensure that a Paleontological Mitigation Plan (PMP) is prepared and adhered to during construction. The PMP shall include, but not be limited to, the following:

a) A preconstruction field survey shall be conducted, followed by salvage of surface paleontological resources, if necessary.
b) All grading and excavation in sediments with the potential to contain paleontological resources shall be monitored by trained paleontological crews working under the direction of a qualified professional. Monitors shall be empowered to temporarily halt or divert equipment to allow the removal of abundant or large specimens. Paleontological monitors shall be equipped to salvage fossils as they are unearthed to avoid construction delays.
c) The fossils shall be stabilized, salvaged, and removed to safe off-site storage.
d) The fossils shall undergo preparation, identification, and analysis to allow their identification.
e) The fossils shall be curated into the systematic storage system of an established institutional repository.

f) A Paleontological Mitigation Report signifying completion of the PMP shall be prepared and submitted to SANBAG and the California Department of Transportation (Department).

2.12 Hazardous Waste/Materials

2.12.1 Regulatory Setting

Hazardous materials and hazardous wastes are regulated by many state and federal laws. These include not only specific statutes governing hazardous waste, but also a variety of laws regulating air and water quality, human health, and land use.

The primary federal laws regulating hazardous wastes/materials are the Resource Conservation and Recovery Act of 1976 (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). The purpose of CERCLA, often referred to as Superfund, is to clean up contaminated sites so that public health and welfare are not compromised. RCRA provides for "cradle to grave" regulation of hazardous wastes. Other federal laws include:

- Community Environmental Response Facilitation Act (CERFA) of 1992
- Clean Water Act (CWA)
- Clean Air Act (CAA)
- Safe Drinking Water Act
- Occupational Safety and Health Act (OSHA)
- Atomic Energy Act
- Toxic Substances Control Act (TSCA)
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

In addition to the acts listed above, Executive Order 12088, Federal Compliance with Pollution Control, mandates that necessary actions be taken to prevent and control environmental pollution when federal activities or federal facilities are involved.

Hazardous waste in California is regulated primarily under the authority of the federal RCRA, and the California Health and Safety Code. Other California laws that affect hazardous waste are specific to handling, storage, transportation, disposal, treatment, reduction, and cleanup of hazardous materials wastes, and emergency planning.

Worker health and safety and public safety are key issues when dealing with hazardous materials that may affect human health and the environment. Proper disposal of hazardous material is vital if it is disturbed during project construction.

2.12.2 Affected Environment

This section is based on the *Initial Site Assessment* (ISA) (June 2009). The following were conducted as part of the ISA:

- **Environmental Database Review:** A records search of federal and State environmental databases for the project area (refer to Figure 1.2, presented previously in Section 1.3.1.1, for the limits of the project area) and properties up to approximately 660 feet (ft) (0.125 mile [mi]) from the project area was conducted on February 12, 2009. However, the search of the National Priority List (NPL) was for a 1 mi radius.
- **Agency Records Review:** The Regional Water Quality Control Board (RWQCB) and the Department of Toxic Substances Control (DTSC) were contacted with regard to obtaining and reviewing documents for properties located within and adjacent to the project area. Data contained on their websites were reviewed for any relevant information.
- **Historic Research:** Aerial photographs, topographic maps, oil well maps, and parcel maps were reviewed.
- **Site Reconnaissance:** On February 27, 2009, a site visit of the project area was conducted to assess its current land uses and to visually search for indications of surface and subsurface contamination.

The following hazardous materials are potentially of concern for the project area:

- **Polychlorinated Biphenyls (PCBs) and Mercury:** PCBs may be present in the pole-mounted transformers located along the northern sides of Rosewood Drive, Laurelwood Drive, and Lee Street, and pad-mounted transformers located adjacent to an abandoned restaurant (Wendy's) and a Denny's Restaurant. Other PCB sources (such as light ballasts) are suspected to be present within the commercial and residential structures. Suspected mercury sources within the structures in the project area include thermostats and florescent bulbs.
- **Aerially Deposited Lead (ADL):** Lead is generally encountered in unpaved areas (or formerly unpaved areas) adjoining older roads primarily as a result of deposition from historical vehicle emissions. Interstate 10 (I-10) has been in use since approximately 1958, resulting in the exposure of the adjacent unpaved surficial soils to ADL. An ADL survey (April 2009) was conducted in Department right-of-way for this project. According to the ADL survey, relatively elevated lead concentrations are present along I-10 in the project area. Approximately 67 percent of the tests that exceeded 50 milligrams per kilogram

(mg/kg) total lead were encountered at a depth of 0.5 ft, and approximately 82 percent of the tests that exceeded 50 mg/kg total lead were encountered between 0.5 ft and 1.0 ft. In addition, relatively elevated lead concentrations (higher than background levels) are suspected within near-surface soil (upper 2 ft) along Tippecanoe Avenue, Anderson Street, and Redlands Boulevard.

- **Lead-Based Paint (LBP):** It is possible for elevated lead concentrations to be present within the striping paint along I-10 and associated roads. In addition, it is possible for LBP to be present in buildings constructed before 1979 within the project area.
- **Asbestos-Containing Materials (ACM):** An asbestos survey was conducted for the two bridge widenings proposed for this project (at the I-10/Tippecanoe Avenue Undercrossing and at the I-10/San Timoteo Creek Bridge). The asbestos survey, conducted in March 2009, indicated that none of the materials sampled contained asbestos. However, asbestos has the potential to be present in buildings built before 1979 within the project area.
- **Chemical/Petroleum Hydrocarbon Materials:** Gasoline-impacted soil and groundwater are located within two properties within the project area: the Thrifty Oil Company property at 1945 South Tippecanoe Avenue and the former Union 76 service station at 24891 Redlands Boulevard. The gasoline at the Thrifty Oil Company property is currently being remediated. Impacted groundwater at this property extends north, south, and west of the station property, and is encountered at depths ranging between approximately 33 and 37 ft bgs. The gasoline at the Union 76 service station is also currently being remediated. Impacted groundwater at this property extends north and west of the station property, and is encountered at depths ranging between approximately 38 and 44 ft bgs. A third property (1930 Waterman Avenue) has gasoline-impacted soil and groundwater. However, the contamination is migrating away from the project site and not in the soil or groundwater underlying the proposed construction area.

2.12.3 Environmental Consequences

2.12.3.1 Temporary Impacts

Alternative 1 – Build Alternative

The Build Alternative would involve disturbance of existing soils and structures; therefore, hazardous soil contaminants (ADL, LBP, and gasoline) and structural materials (PCBs, mercury, LBP, and ACM) may be encountered during project construction. In addition, there is a potential that gasoline-impacted soil could be encountered during excavation activities near or at the Thrifty Oil Company property and the former Union 76 service station.

DTSC allows lead-containing soil with less than 1,411 mg/kg of total lead or less than 0.5 mg/L of extractable lead to be reused within Department right-of-way if it is placed at least 5 ft above the groundwater level and covered by 1 ft of clean soil. DTSC allows lead-containing soil with less than 3,397 mg/kg of total lead or 50 mg/L extractable lead to be reused within the Department right-of-way, provided it is placed a minimum of 5 ft above the maximum water table and is covered by pavement. In addition, soil with a pH less than 5.0 may only be used as fill under paved roads. Based on the ADL survey, lead-contaminated soil within the Department right-of-way within the project area would need to be placed under pavement and at least 5 ft above the highest groundwater elevation or disposed of at a Class I hazardous waste disposal site.

Typical hazardous materials used during construction (e.g., solvents, paints, fuels) would be handled in accordance with standard procedures. There are standard regulations and California Department of Transportation (Department) policies (avoidance and minimization measures) that must be followed with respect to the use, storage, handling, disposal, and transport of potentially hazardous materials during construction of the Build Alternative to protect human health and the environment.

Alternative 2 – No Build Alternative

The No Build Alternative would not involve ground or structure disturbance; therefore, no temporary impacts related to hazardous waste materials would occur.

2.12.3.2 Permanent Impacts

Alternative 1 – Build Alternative

Routine maintenance activities during operation of the proposed project would be required to follow applicable regulations with respect to the use, storage, handling, transport, and disposal of potentially hazardous materials. Therefore, the operation of the proposed project will not result in adverse impacts related to hazardous waste or materials.

Alternative 2 – No Build Alternative

The No Build Alternative would not change the existing physical environment; therefore, no permanent impacts would occur. As with the Build Alternative, routine maintenance activities would continue and would be required to follow applicable regulations with respect to handling and disposal of potentially hazardous materials.

2.12.4 Avoidance, Minimization, and/or Mitigation Measures

HAZ-1 During final design, an aerially deposited lead (ADL) study for soil shall be conducted within the planned construction areas within and immediately adjacent Tippecanoe Avenue, Anderson Street, and Redlands Boulevard.

HAZ-2 Prior to construction, construction contractors excavating, transporting, or stockpiling soil shall prepare a Lead Compliance Plan in accordance with the California Department of Transportation (Department) Code of Safety Practices, the California Code of Regulations, and California Division of Occupational Safety and Health (Cal-OSHA) standards. The Lead Compliance Plan shall address the presence of ADL in the soils within the project area.

HAZ-3 Prior to construction, the San Bernardino Associated Governments (SANBAG) shall provide the testing results of the ADL Content Testing Report (April 2009) to the construction contractors handling on-site soils during construction.

HAZ-4 During construction, lead-contaminated soils reused within Department right-of-way shall follow designated California Department of Toxic Substances Control (DTSC) requirements and be placed at least 5 feet (ft) above the groundwater level and covered by pavement. Lead-contaminated soil shall be buried and covered in a manner that shall prevent accidental or deliberate breach of the asphalt covering the soil. In addition, lead-contaminated soil shall not be buried within 10 ft of culverts or in locations subject to frequent worker exposure. Lead-contaminated soil removed from the project site shall be disposed of at a Class I hazardous waste disposal site.

HAZ-5 During construction, lead-contaminated soils excavated from the project area shall be stockpiled within the project area. If lead-contaminated soils are stockpiled overnight, the stockpiles shall be covered with either plastic sheeting or at least a 1 ft thick layer of clean soil. Soil stockpiles should be limited to areas of high ground to minimize contact with surface water runoff. If storm water contacts stockpiled soils, the Department shall ensure that runoff does not flow into storm drains, inlets, or waters of the United States.

HAZ-6 During final design, a lead study shall be conducted for soil adjacent to all residential and commercial structures (all painted structures) to be removed during construction by trained and/or licensed professionals in accordance with the California Department of Transportation's (Department) guidelines. It shall include the collection and analysis of soil immediately adjacent to the structures at depths of 0–6 inches (in), 6–12 in, 18–24 in, and 24–36 in. The field and analytical data obtained during this study would be used to provide a review of the sampling locations, summary of the analytical results, extent of lead-impacted soil (if identified) and recommendations for the handling, stockpiling, reuse, and/or off-site transportation and disposal of lead-impacted soil (as needed).

HAZ-7 During final design, the striping paint along Interstate 10 (I-10) and associated roads shall be sampled and tested for lead by trained and/or licensed professionals. Representative samples of striping paint shall be collected along both sides of I-10 and associated roads. The field and analytical data obtained during this study shall be used to provide a review of the sampling locations and descriptions, a summary of the analytical results, and recommendations for striping paint removal, containment, and off-site transportation and disposal, as appropriate.

HAZ-8 During final design, an asbestos survey shall be conducted at all the buildings and structures to be removed within the project area that were built before 1979. The asbestos survey shall be overseen by a California Certified Asbestos Consultant. The results of this survey shall provide a description of the asbestos-containing materials, their locations, and their estimated quantity, and recommendations for removal, containment, and off-site transportation and disposal.

HAZ-9 During final design, building structures built before 1979 within the project area shall be assessed for the possible presence of lead-based paint (LBP). This study will be conducted by trained and/or licensed professionals. The results of this study shall provide a description of the LBP locations, estimated quantity, and recommendations for removal, containment, and off-site transportation and disposal.

HAZ-10 During final design, building structures within the project area shall be assessed by a trained and licensed environmental professional for the possible presence of polychlorinated biphenyls (PCBs) and mercury within and adjacent to the buildings. The results of this study shall provide a description of the PCB and mercury source locations, the estimated quantity of the contaminants, and recommendations for removal, containment, and off-site transportation and disposal.

HAZ-11 A health, safety, and emergency contingency plan shall be established prior to excavation activities at the Thrifty Oil Company property (1945 South Tippecanoe Avenue) and the former Union 76 service station (24891 Redlands Boulevard), where gasoline-impacted soil may be encountered during excavation activities. This plan shall establish health and safety guidelines and requirements for personnel involved in the possible removal of gasoline-impacted soil. This plan, to be developed by an experienced environmental professional, shall provide safe handling procedures for any encountered gasoline-impacted soil at these locations. The plan shall include, but not be limited to, a description of the anticipated contaminant locations and depths, anticipated volumes to be generated during excavation activities, safe handling procedures, and appropriate soil disposal methods. This plan shall be approved by the Department prior to use.

HAZ-12 During construction, soil excavations conducted on site shall be monitored by the construction contractor for visible soil staining, odor, and the possible presence of unknown hazardous material sources, such as buried 55-gallon drums and underground tanks. If hazardous materials contamination or sources are suspected or identified during project construction activities, an environmental professional shall evaluate the course of action required. This course of action shall follow the Unknown Hazards Procedures described in Chapter 7 of the Department's Construction Manual (August 2006).

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2.13 Air Quality

2.13.1 Regulatory Setting

The Clean Air Act (CAA) as amended in 1990 is the federal law that governs air quality. Its counterpart in California is the California Clean Air Act (CCAA) of 1988. These laws set standards for the quantity of pollutants that can be in the air. At the federal level, these standards are called National Ambient Air Quality Standards (NAAQS). Standards have been established for six criteria pollutants that have been linked to potential health concerns. These criteria pollutants are carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM), lead (Pb), and sulfur dioxide (SO_2).

Under the 1990 CAA Amendments, the United States Department of Transportation cannot fund, authorize, or approve federal actions to support programs or projects that are not first found to conform to State Implementation Plan (SIP) for achieving the goals of the CAA requirements. Conformity with the CAA takes place on two levels—first, at the regional level and second, at the project level. A proposed project must conform at both levels to be approved.

Regional level conformity in California is concerned with how well the region is meeting the standards set for carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), and particulate matter (PM). California is in attainment for the other criteria pollutants. At the regional level, Regional Transportation Plans (RTP) are developed that include all the transportation projects planned for a region over a period of years, usually at least 20. Based on the projects included in the RTP, an air quality model is run to determine whether or not the implementation of those projects would conform to emission budgets or other tests showing that attainment requirements of the Clean Air Act are met. If the conformity analysis is successful, the regional planning organization, such as the Southern California Association of Governments (SCAG) for the County of San Bernardino and the appropriate federal agencies, such as the Federal Highway Administration (FHWA), make the determination that the RTP is in conformity with the State Implementation Plan for achieving the goals of the Clean Air Act. Otherwise, the projects in the RTP must be modified until conformity is attained. If the design and scope of the proposed transportation project are the same as described in the RTP, then that proposed project is deemed to meet regional conformity requirements for purposes of project-level analysis.

Conformity at the project-level also requires “hot spot” analysis if an area is “nonattainment” or “maintenance” for CO and/or Particulate Matter. A region is a “nonattainment” area if one or more monitoring stations in the region fail to attain the relevant standard. Areas that were previously designated as nonattainment areas but have recently met the standard are called “maintenance” areas. “Hot spot” analysis is essentially the same, for technical purposes, as CO or Particulate Matter analysis performed for National Environmental Policy Act (NEPA) purposes. Conformity does include some specific standards for projects that require a hot spot analysis. In general, projects must not cause the CO standard to be violated, and in “nonattainment” areas the project must not cause any increase in the number and severity of violations. If a known CO or Particulate Matter violation is located in the project vicinity, the project must include measures to reduce or eliminate the existing violation(s) as well.

2.13.2 Affected Environment

This section is based on the *Air Quality Technical Report* (January 2009).

The project area (refer to Figure 1.2, presented previously in Section 1.3.1.1, for the limits of the project area) is in the South Coast Air Basin (Basin), which includes Orange County and the nondesert parts of Los Angeles, Riverside, and San Bernardino Counties. Air quality regulation in the Basin is administered by the South Coast Air Quality Management District (SCAQMD).

The climate of the Basin is strongly influenced by the local terrain and geography. The Basin is a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean on the west and relatively high mountains on the north, south, and east. The climate is mild, tempered by cool sea breezes, and is dominated by the semipermanent high pressure of the eastern Pacific.

Across the 6,600-square-mile Basin, there is little variation in the annual average temperature of 62 degrees Fahrenheit (°F). However, the eastern part of the Basin (generally described as the Inland Empire) experiences greater variability in annual minimum and maximum temperatures, as this area is farther from the coast and the moderating effect on climate from the ocean is weaker. All parts of the Basin have recorded temperatures well above 100°F. January is usually the coldest month, while July and August are the hottest months.

The majority of the rainfall in the Basin falls from November through April. Annual rainfall values in the Basin range from approximately 9 inches (in) per year in Riverside to 14 in per year in downtown Los Angeles. Monthly and annual rainfall totals can vary considerably from year to year. Cloud cover, in the form of fog or low stratus, is often caused by persistent low inversions and the cool coastal ocean water. Downtown Los Angeles experiences sunshine approximately 73 percent of the time during daylight hours, while the inland areas experience a slightly higher amount of sunshine, and the coastal areas a slightly lower amount.

Although the Basin is characterized by a semiarid climate, the air near the surface can often have high relative humidity due to the presence of a shallow marine layer on most days. Except for infrequent periods of off-shore winds, the marine layer strongly influences the local climate. Periods of heavy fog are common, with “high fog” (low stratus clouds) a frequent and characteristic occurrence. The annual average relative humidity ranges from approximately 70 percent in the coastal areas to 57 percent in the inland parts of the Basin.

The Basin is characterized by light average wind speeds and poor ventilation. Wind speeds in the downtown Los Angeles area average 5.7 miles per hour (mph), with little seasonal variation. Coastal wind speeds typically average approximately 2 mph faster than downtown wind speeds, with inland area wind speeds slightly slower than in downtown Los Angeles. Summer wind speeds are typically higher than winter wind speeds. The recirculating sea breeze is the dominant wind pattern in the Basin, characterized by a daytime on-shore flow and a nighttime land breeze. This pattern is broken by the occasional winter storm, or the strong northeasterly flows from the mountains and deserts north of the basin known as Santa Ana winds.

Along the Southern California coast, surface air temperatures are relatively cool. Coupled with warm, dry, subsiding air from aloft, the potential for early morning inversions is high (i.e., approximately 87 percent of all days). The basinwide average occurrence of inversions at ground level (surface) is 11 days per month, and varies from 2 days per month in June to 22 days per month in December. Upper air inversions, with bases at less than 2,500 feet (ft) above mean sea level (amsl), occur approximately 22 days each month, while higher-based inversions (i.e., up to 3,500 ft amsl) occur approximately 191 days per year.

Representative climate data for the project area were derived from the Redlands, California meteorological station, located east of the project area, for 1927 through 2005. The representative climate data are summarized as follows:

- Mean annual maximum temperature = 78.6°F
- Highest mean maximum temperature = 100.5°F
- Mean temperature = 64.5°F
- Mean annual minimum temperature = 50.3°F
- Lowest mean minimum temperature = 33.2°F
- Mean Annual Relative Humidity = 52 percent (Norton Air Force Base data, Western Regional Climate Center [WRCC])
- Mean annual precipitation = 13.62 in/year
- Average wind speed = 3.3 mph

Air quality is determined primarily by the types and amounts of pollutants emitted into the atmosphere, the topography of the air basin, and the meteorological conditions. In the project area, inversion conditions and light winds can provide conditions for pollutants to accumulate in the air basin.

The Redlands meteorological station indicates that winds in that area are predominantly from the west through the west-northwest on an annual basis. Calm conditions occur approximately 16 percent of the time. Approximately 35 percent of the winds come from the west through northwest. In general, these winds are associated with a convective flow of cool marine air (i.e., off the Pacific Ocean) inland to the warm interior during the warm part of the day for a substantial part of the year. However, there is also a substantial incidence of southeasterly through easterly wind flow (approximately 20 percent). These southeasterly to easterly winds occur under conditions of relatively cold temperatures inland (i.e., during the cool periods of the year and the cooler parts of the day), when temperatures over the Pacific Ocean are warmer than those inland and cause an offshore convective flow.

2.13.3 Environmental Consequences

2.13.3.1 Regional Air Quality Conformity

Regional conformity is basically concerned with how a region is achieving and maintaining compliance with air quality standards. At the regional level, plans such as the RTP and Regional Transportation Improvement Program (RTIP) are developed to address all the planned transportation projects for a period of 20 years. These plans are periodically updated and require FHWA approval subsequent to each update.

SCAG is the regional planning organization with responsibility to produce and update the RTP and RTIP for the Southern California region. As part of the RTP and RTIP preparation, SCAG evaluates and analyzes the planned transportation projects with respect to impacts and current and future air quality. Subsequent to these analyses, SCAG makes a determination of conformity for all planned projects. If the proposed project, with respect to design and scope, is essentially the same as that listed in the RTP and RTIP, then the project is deemed to be in conformity at the regional level.

The proposed project is fully funded and is in the Southern California Association of Governments (SCAG) 2008 RTP, which was found to conform by SCAG on May 8, 2008, and the FHWA and the Federal Transit Administration (FTA) adopted the air quality conformity finding on June 5, 2008. The project is also included in the SCAG financially constrained 2008 Regional Transportation Improvement Program (RTIP) (RTIP Project ID: 44810, as amended). The SCAG 2008 RTIP was found to conform by FHWA and the FTA on November 17, 2008. The design concept and scope of the proposed project is consistent with the project description in the 2008 RTP, the 2008 RTIP, and the assumptions in the SCAG regional emissions analysis.

2.13.3.2 Project Level Conformity

The United States Environmental Protection Agency (EPA) has established NAAQS for NO_2, CO, O_3, SO_2, particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and airborne lead to protect public health and welfare. In general, if these standards are exceeded in a defined geographic area at a rate of four or more occurrences in any consecutive 3-year period, the area is considered a “nonattainment area” subject to regulatory control requirements that are more stringent than attainment area requirements.

Additionally, the California Air Resources Board (CARB) has adopted standards for CO, NO_2, SO_2, O_3, sulfates, PM_{10}, $PM_{2.5}$, and airborne lead at similar levels for the protection of public health and welfare (CARB 2006). CARB has primary jurisdiction in the area of mobile-source regulations, while local air districts such as the SCAQMD have primary responsibility for regulations and enforcement with respect to stationary sources. CARB also monitors local district programs for consistency and compliance with State regulations.

California ambient air quality standards (CAAQS) and the NAAQS are composed of two parts: a specific pollutant concentration and an averaging time over which the concentration is to be measured. Allowable concentrations are based on the results of studies of the effects of the pollutants on public health and welfare. The averaging times are based on whether the effects caused by a specific pollutant will occur over a short-term period (from 1 hour up to 1 day) or a long-term period (from 3 months up to 1 year). Several pollutants have more than one air quality standard and averaging time due to health and/or welfare effects that may occur over both the short and long term. Table 2.13.A presents the CAAQS and NAAQS for various pollutants. Some of the CAAQS are more stringent than the NAAQS with respect to pollutant concentrations and averaging times.

Typically, for transportation projects involving construction phases, the pollutants of most importance are CO, PM_{10}, and/or $PM_{2.5}$. The Basin attainment status for each of the criteria pollutants for the CAAQS and NAAQS is listed in Table 2.13.B. Recently, the Basin has been redesignated as a CO attainment maintenance area for the CAAQS and NAAQS. The Basin is classified as nonattainment/serious nonattainment for PM_{10} for the CAAQS and NAAQS, respectively. The Basin is classified as nonattainment for $PM_{2.5}$ for both the CAAQS and NAAQS. Because the Basin is in nonattainment, serious nonattainment, and/or attainment/maintenance for O_3 1-hour, O_3 8-hour, PM_{10}, $PM_{2.5}$, CO, and NO_2, the following analyses were conducted for the proposed project:

- CO hot-spot analysis
- PM_{10} and $PM_{2.5}$ hot-spot analysis
- Mobile Source Air Toxics (MSAT) emissions analysis

2.13.3.3 Temporary Impacts

Alternative 1 – Build Alternative

Emissions from construction activities typically include fugitive dust from grading and other surface disturbance activities (i.e., demolition, trenching, dirt hauling, movement of construction support vehicles across the project area, and exhaust emissions from construction equipment). During construction, disturbed and exposed soil areas, stockpiles, etc., on the project area (refer to Figure 1.2, presented previously in Section 1.3.1.1, for the project area) could potentially be subject to wind erosion as well as dry weather conditions.

Table 2.13.A Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[2,5]	Secondary[3,6]	Method[7]
Ozone (O_3)	1-Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	No federal standard	Same as Primary Standard	Ultraviolet Photometry
	8-Hour	0.07 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM_{10})	24-Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		–		
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	No Separate State Standard		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	15 µg/m^3		
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m^3)	Nondispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Nondispersive Infrared Photometry (NDIR)
	1-Hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
	8-Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		–		
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (56 µg/m^3)	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m^3)	Same as Primary Standard	Gas Phase Chemiluminescence
	1-Hour	0.18 ppm (339 µg/m^3)		–		
Lead[8]	30-day average	1.5 µg/m^3	Atomic Absorption	–	–	High-Volume Sampler and Atomic Absorption
	Calendar Quarter	–		1.5 µg/m^3	Same as Primary Standard	
	Rolling 3-Month Average[9]	–		0.15 µg/m^3		
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	–	Ultraviolet Fluorescence	0.030 ppm (80 µg/m^3)	–	Spectrophotometry (Pararosaniline Method)
	24-Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (365 µg/m^3)	–	
	3-Hour	–		–	0.5 ppm (1300 µg/m^3)	
	1-Hour	0.25 ppm (655 µg/m^3)		–	–	
Visibility-Reducing Particles	8-Hour	Extinction coefficient of 0.23 per kilometer - visibility of 10 miles or more (0.07–30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		**No Federal Standards**		
Sulfates	24-Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1-Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[8]	24-Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

Source: *Air Quality Technical Report* (January 2009)

See footnotes on next page.

Footnotes:

1 California standards for O_3; CO (except Lake Tahoe); sulfur dioxide (1- and 24-hour); NO_2; suspended PM, PM_{10}; and visibility-reducing particles are values not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2 National standards (other than O_3, PM, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth-highest 8-hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 mg/m^3 is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the EPA for further clarification and current federal policies.

3 Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4 Any equivalent procedure that can be shown to the satisfaction of CARB to give equivalent results at or near the level of the air quality standard may be used.

5 National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6 National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7 Reference method as described by the EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the EPA.

8 CARB has identified lead and vinyl chloride as “toxic air contaminants” with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

9 National lead standard, rolling 3-month average: final rule signed October 15, 2008.

Table 2.13.B Air Basin Air Quality Attainment Status

Pollutant	State Standards	Federal Standards
O_3 1-hour	Nonattainment	Revoked June 2005
O_3 8-hour	Not Established	Nonattainment-Severe 17
NO_2	Attainment	Unclassified-Attainment
CO	Attainment	Attainment-Maintenance
PM_{10}	Nonattainment	Serious Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
SO_2	Attainment/Unclassified	Attainment
Lead	Attainment/Unclassified	Attainment

Source: *Air Quality Technical Report* (January 2009).
CO = carbon monoxide
NO_2 = nitrogen dioxide
O_3 = ozone
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
SO_2 = sulfur dioxide

The *Air Quality Technical Report* provides analysis of construction-related emissions for the Build Alternative. Table 2.13.C summarizes these emissions. These data indicate that the localized significant threshold (LST) values for emissions from construction projects, as identified by the SCAQMD, are not exceeded by construction of the proposed project.

Table 2.13.C Construction Emission Summary (lbs/day)

Category	PM_{10}	NO_X	CO	VOC	SO_X
Fugitive Dust	76.40	–	–	–	–
Equipment Exhaust	3.600	70.52	28.11	5.87	13.42
Total	**80.00**	**70.52**	**28.11**	**5.87**	**13.42**
SCAQMD LST	150	100	550	75	150

Source: Air Quality Technical Report (January 2009).
CO = carbon monoxide
lbs/day = pounds per day
LST = localized significance threshold
NO_X = oxides of nitrogen
PM_{10} = particulate matter less than 10 microns in diameter
SCAQMD = South Coast Air Quality Management District
SO_X = oxides of sulfur
VOC = volatile organic compounds

SCAQMD and the California Department of Transportation (Department) standard measures, as specified in below Measures AQ-1 through AQ-3, would be adhered to during project construction to reduce fugitive dust and construction vehicle emissions.

Naturally Occurring Asbestos

Based upon a review of *A General Location Guide for Ultramafic Rocks in California–Areas More Likely to Contain Naturally Occurring Asbestos* (August 2000, Department of Conservation, Division of Mines and Geology), the project area is <u>not</u> identified as an area that exhibits ultramafic rock or is know to contain naturally occurring asbestos.

Alternative 2 – No Build Alternative

The No Build Alternative would not result in the construction of any of the proposed improvements to the Interstate 10 (I-10) Tippecanoe Avenue Interchange and therefore would not result in temporary impacts to air quality.

Climate change is analyzed in Chpater2 under “Climate Change (CEQA)”. Neither EPA nor FHWA has promulgated explicit guidance or methodology to conduct project-level greenhouse gas analysis. As stated on FHWA’s climate change website (http:www.fhwa.dot.gov/hep/climate/index.htm), climate change considerations should be integrated throughout the transportation decision-making process--from planning through project development and delivery. Addressing climate change mitigation and adaptation up front in the planning process will facilitate decision-making and improve efficiency at the program level, and will inform the analysis and stewardship needs of project level decision-making. Climate change considerations can easily be integrated into many planning factors, such as supporting economic vitality and global efficiency, increasing safety and mobility, enhancing the environment, promoting energy conservation, and improving the quality of life.

Because there have been more requirements set forth in California legislation and executive orders regarding climate change, the issue is addressed in the CEQA chapter of this environmental document and may be used to inform the NEPA decision. The four strategies set forth by FHWA to lessen climate change impacts do correlate with efforts that the State has undertaken and is undertaking to deal with transportation and climate change; the strategies included improved transportation system efficiency, cleaner fuels, cleaner vehicles, and reduction in the growth of vehicle hours travelled.

2.13.3.4 Permanent Impacts

Alternative 1 – Build Alternative

Carbon Monoxide

Prior to conducting CO impact analysis, investigation on the need for CO impact analysis should be performed pursuant to “Project Level Protocol” (Protocol). As stated in the Protocol, the determination of project requirements should be carried out according to Section 3 of the Protocol and as delineated in the Requirements of New Projects flowchart shown in Figure 1 of the Protocol. The following provides a discussion of each step for a project requirement analysis shown in Figure 1 of the Protocol.

Level 3.1.1: Is this project exempt from all emission analyses? (See Table 1)

No. This project is an interchange reconfiguration project, which is not included in Table 1.

Level 3.1.2: Is this project exempt from regional emission analyses? (See Table 2)

No. Although the project is an interchange reconfiguration project, it includes additional ramp lanes and auxiliary lanes. Therefore, it is not exempt from regional emissions analysis.

Level 3.1.3: Is the project locally defined as regionally significant?

Yes. As mentioned above, the proposed project includes the addition of ramp lanes and auxiliary lanes. Therefore, the project is potentially significant.

3.1.4: Is the project in a federal attainment area?

No. The proposed project is located within an attainment/maintenance area.

3.1.5: Are there a currently conforming RTP and TIP?

Yes.

3.1.6: Is the project included in the regional emissions analysis supporting the currently conforming RTP and TIP?

Yes. The project is included in the SCAG 2008 RTP and the 2008 RTIP (Project ID: 44810 Model No. S324, I-10/Tippecanoe reconfigure interchange and add eastbound off-ramp auxiliary lane from Waterman on-ramp to Tippecanoe off-ramp, widen bridge [noncapacity], and local road improvements/modifications).

3.1.7: Has the project design concept and/or scope changed significantly from that in the regional analysis?

No.

Level 3.1.9: Examine Local Impacts

Based on the flowchart analysis, this project requires Local Impact Analysis, and therefore will proceed to Section 4.

With respect to CO and the above flowchart analysis, the proposed project was evaluated pursuant to the "Transportation Project-Level Carbon Monoxide Protocol" (CO Protocol) for local CO impacts (hot spots). As stated in the CO Protocol, the determination of project-level CO impacts should be carried out according to Section 4 of the CO Protocol and as delineated in the Local Impact Analysis flow chart shown in Figure 3 of the CO Protocol. The following provides a discussion of each step for a local CO analysis, as shown in Figure 3 of the CO Protocol.

Level 1: Is the project in a CO nonattainment area?

No. The project site is located in an area that has demonstrated attainment with the federal CO standard.

Level 1 (cont.): Was the area redesignated as "attainment" after the 1990 Clean Air Act?

Yes. The SCAQMD has prepared and submitted a request of redesignation to attainment for the CO Maintenance Plan, which was approved by the EPA in 2008.

Level 1 (cont.): Has "continued attainment" been verified with the local Air District, if appropriate?

Section 4.1.3 of the CO Protocol states that projects in areas where proposed redesignation is so recent that the annual review or monitoring data has yet to occur should proceed to Section 4.7 (Level 7 in Figure 3 of the CO Protocol). The Basin was designated as an attainment/maintenance area by the EPA on June 11, 2007 (Proceed to Level 7).

Level 7: Does project worsen air quality?

No. The following analyses and findings show that the project does not worsen air quality.

Table 2.13.D identifies each of the intersections modeled in the CO Attainment Plan and their associated maximum a.m. and p.m. traffic volumes. These intersections represent the worst-case traffic/air quality conditions in the Basin.

For comparison, the traffic volumes at the intersections under study for the proposed project are given in Table 2.13.E for existing conditions, No Build conditions, and the proposed Build Alternative.

The localized CO impact (hot-spot) modeling in the CO attainment demonstration was conducted using the CAL3QHC air quality model. Additionally, results from the regional areawide CO modeling conducted for the attainment demonstration were combined with the hot-spot modeling results to identify the combined maximum 8-hour CO concentration at each intersection. The highest 1-hour CO concentrations

Table 2.13.D CO Attainment Plan Intersections (Traffic Counts)[1]

Intersection	Eastbound		Westbound		Southbound		Northbound		Total	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Wilshire Boulevard/ Veteran Avenue	4,951	2,069	1,830	3,317	721	1,400	560	933	**8,062**	**7,719**
Sunset Boulevard/ Highland Avenue	1,417	1,764	1,342	1,540	2,340	1,832	1,551	2,238	**6,650**	**7,374**
La Cienega Boulevard/ Century Boulevard	2,540	2,243	1,890	2,728	1,348	2,029	821	1,674	**6,599**	**8,674**
Long Beach Boulevard/ Imperial Highway	1,217	2,020	1,760	1,400	479	944	756	1,150	**4,212**	**5,514**

Source: *Air Quality Technical Report* (January 2009).
[1] Mainline counts only; turning movements not included.

Table 2.13.E Traffic Volumes for Intersections Evaluated for the Proposed Project

Intersection	Eastbound		Westbound		Southbound		Northbound		Total	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
2004 Existing										
Tippecanoe Avenue/Laurelwood Drive	493	805	130	180	572	1,066	1,235	1,436	**2,430**	**3,487**
Tippecanoe Avenue/Westbound Ramps	0	0	973	722	853	1,589	1,298	1,455	**3,124**	**3,766**
Tippecanoe Avenue/Eastbound Ramps	1,152	823	0	0	1,012	1,338	957	1,284	**3,121**	**3,445**
Tippecanoe Avenue/Redlands Boulevard	488	1,212	682	917	1,463	1,086	749	927	**3,382**	**4,142**
2035 No Build Alternative										
Tippecanoe Avenue/Laurelwood Drive	581	1,140	140	194	1,266	1,865	2,408	2,219	**4,395**	**5,418**
Tippecanoe Avenue/Westbound Ramps	0	0	1,458	1,156	1,579	2,643	2,589	2,186	**5,626**	**5,985**
Tippecanoe Avenue/Eastbound Ramps	2,790	2029	0	0	1,846	1,871	1,475	2,107	**6,111**	**6,007**
Tippecanoe Avenue/Redlands Boulevard	517	1,296	1,046	1,625	2,824	1,435	1,182	1,467	**5,569**	**6,823**
2035 Locally Preferred Alternative										
Tippecanoe Avenue/Laurelwood Drive	581	1,140	1,457	1,155	1,329	1,963	2,589	2,186	**5,956**	**6,444**
Tippecanoe Avenue/Westbound Ramps	0	0	0	0	2,448	2,999	2,589	2,186	**5,037**	**5,185**
Tippecanoe Avenue/Eastbound Ramps	2,790	2,029	0	0	1,846	1,871	1,475	2,107	**6,111**	**6,007**
Tippecanoe Avenue/Redlands Boulevard	517	1,296	1,046	1,625	2,824	2,435	1,182	1,467	**5,569**	**6,823**

Source: *Air Quality Technical Report* (January 2009).
[1] Mainline counts include turning movements.

calculated using the CAL3QHC model at each of the intersections evaluated are summarized in Table 2.13.F.

The results of the 8-hour CO modeling for each of the four intersections evaluated are shown in Table 2.13.G.

As shown in Tables 2.13.F and 2.13.G, the projected 1-hour and 8-hour CO concentrations are less than the NAAQS CO thresholds of 20 ppm for 1-hour average and 9.0 ppm for 8-hour average CO concentrations.

Table 2.13.F 2002 Intersection Maximum 1-Hour CO Modeling Concentrations

Location	Morning[1] (ppm)	Afternoon[2] (ppm)
Wilshire Boulevard/Veteran Avenue	4.6	3.5
Sunset Boulevard/Highland Avenue	4.0	4.5
La Cienega Boulevard/Century Boulevard	3.7	3.1
Long Beach Boulevard/Imperial Highway	3.0	3.1

Source: Air Quality Technical Report (January 2009).

1 Morning: 7:00–8:00 a.m. for La Cienega Boulevard/Century Boulevard;
8–9 a.m. for Wilshire Boulevard/Veteran Avenue;
7:00–8:00 a.m. for Long Beach Boulevard/Imperial Highway; and
8:00–9:00 a.m. for Sunset Boulevard/Highland Avenue.

2 Afternoon: 3:00–4:00 p.m. for Sunset Boulevard/Highland Avenue;
5:00–6:00 p.m. for Wilshire Boulevard/Veteran Avenue;
4:00–5:00 p.m. for Long Beach Boulevard/Imperial Highway; and
6:00–7:00 p.m. for La Cienega Boulevard/Century Boulevard.

ppm = parts per million

Table 2.13.G Projected 8-Hour Carbon Monoxide Concentrations (ppm) at Various Intersections Located in the Basin

Year	Maximum Areawide	Maximum Hot Spot	Time of Maximum Hot Spot	Time of Maximum Areawide	"Hot Spot" at Time of Maximum Areawide	Maximum Areawide and Hot Spot at Time of Maximum Areawide
Wilshire Boulevard/Veteran Avenue in Westwood						
1997	2.3	5.8	2:00 p.m.	11:00 a.m.	4.6	6.9
2002	1.6	3.4			2.9	4.5
2003	1.5	3.2			2.7	4.2
2004	1.4	3.0			2.6	4.0
2005	1.3	2.8			2.4	3.7
Sunset Boulevard/Highland Avenue in Hollywood						
1997	3.3	6.6	2:00 p.m.	3:00 a.m.	3.5	6.8
2002	2.1	3.8			2.0	4.1
2003	2.0	3.6			1.9	3.9
2004	1.9	3.4			1.8	3.7
2005	1.8	3.2			1.7	3.5
La Cienega Boulevard/Century Boulevard in Inglewood						
1997	8.0	4.5	12:00 p.m.	8:00 a.m.	3.0	11.0
2002	4.5	2.6			1.7	6.2
2003	4.2	2.5			1.6	5.8
2004	4.0	2.3			1.5	5.5
2005	3.8	2.2			1.4	5.2
Long Beach Boulevard/Imperial Highway in Lynwood						
1997	14.5	4.2	1:00 p.m.	6:00 a.m.	1.5	16.0
2002	9.2	2.3			0.8	10.0
2003	8.6	2.2			0.7	9.3
2004	8.1	2.0			0.7	8.8
2005	7.7	1.9			0.7	8.4

Source: *Air Quality Technical Report* (January 2009).

CO concentrations at the intersections under study would be lower than those reported for the maximums at the intersections analyzed in the CO attainment plan because all of the following conditions, listed in Section 4.3.2 of the CO Protocol, are satisfied:

- The receptor locations at the intersections under study for the proposed project are at the same distance or farther from the traveled roadway than the receptor locations used in the intersections in the attainment plan. The attainment plan evaluates the CO concentrations at a distance of 10 ft from the edge of the roadways. The CO Protocol does not permit the modeling of receptor locations closer than this distance.
- The assumed meteorology for the intersections under study is the same as the assumed meteorology for the intersections in the attainment plan. Worst-case meteorological conditions that resulted in the maximum concentrations for the attainment plan intersections are assumed to occur for those intersections under study for the proposed project.
- Traffic lane volumes for all approach and departure segments are lower for the intersections under study than those assumed for the intersections in the attainment plan (refer to Tables 2.13.D and 2.13.E).
- Percentages of vehicles operating in cold start mode are the same or lower for the intersections under study compared to those used for the intersections in the attainment plan.
- The percentages of heavy-duty gas trucks in the intersections under study and within the attainment plan are not known. However, based on the traffic study for the project, the proposed project would not cause an increase in traffic volumes at the intersections under study. Therefore, the percentage of heavy-duty trucks within the project area would remain the same. It is assumed that the traffic distributions at the intersections under study are similar to those analyzed in the attainment plan.
- Average delay and queue length for each approach are the same or less for the intersections under study compared to those found in the intersections in the attainment plan. The predicted level of service (LOS) for the intersections under study for the proposed project range from LOS C to D. The LOS for the intersections in the attainment plan are not listed; however, the traffic volumes and intersection geometries correspond to LOS F for the intersections in the attainment plan.

- Background CO concentrations in the area where the intersections under study are located are the same or lower than the background concentrations used for the intersections in the attainment plan since an intersection in the area with the highest monitored CO concentrations in the Basin was used in the attainment plan. Existing CO concentrations in the immediate project vicinity are not available.

The conditions modeled for the CO Attainment Plan did not result in any exceedances of the AAQS. The project traffic and ambient air quality conditions are better than those modeled in the attainment plan. Therefore, the proposed project is not expected to result in any CO concentrations exceeding the 1-hour or 8-hour NAAQS. A detailed CO hot-spot analysis was not required for the proposed project.

Particulate Matter (PM_{10} and $PM_{2.5}$)

The project is within a federal nonattainment area for PM_{10} and $PM_{2.5}$. Therefore, a hot-spot analysis is required for conformity purposes. However, the EPA does not require hot-spot analyses, qualitative or quantitative, for projects that are not listed in Section 93.123(b)(1) as an air quality concern. The proposed project does not qualify as a Project of Air Quality Concern (POAQC) because it would not construct or expand a highway that would have a substantial number or a substantial increase in diesel vehicles; it would not adversely affect intersections operating at LOS D, E, or F with a substantial number of diesel vehicles; it would not include the construction or expansion of a bus or rail terminal; and it would not affect a site identified as a site of possible $PM_{2.5}$ or PM_{10} violation.

The project-level PM hot-spot analysis was presented to SCAG's Transportation Conformity Working Group (TCWG) for discussion and review on November 28, 2006. Per Department Headquarters policy, all nonexempt projects need to go through review by the TCWG. This project was approved and concurred on by Interagency Consultation at the TCWG meeting as Not a Project of Air Quality Concern. The TCWG conformity finding is included as Appendix I. Therefore, the proposed project meets the CAA requirements and 40 CFR 93.116 without any explicit hot-spot analysis. The proposed project would not create a new, or worsen an existing, PM_{10} or $PM_{2.5}$ violation.

Mobile-Source Air Toxics

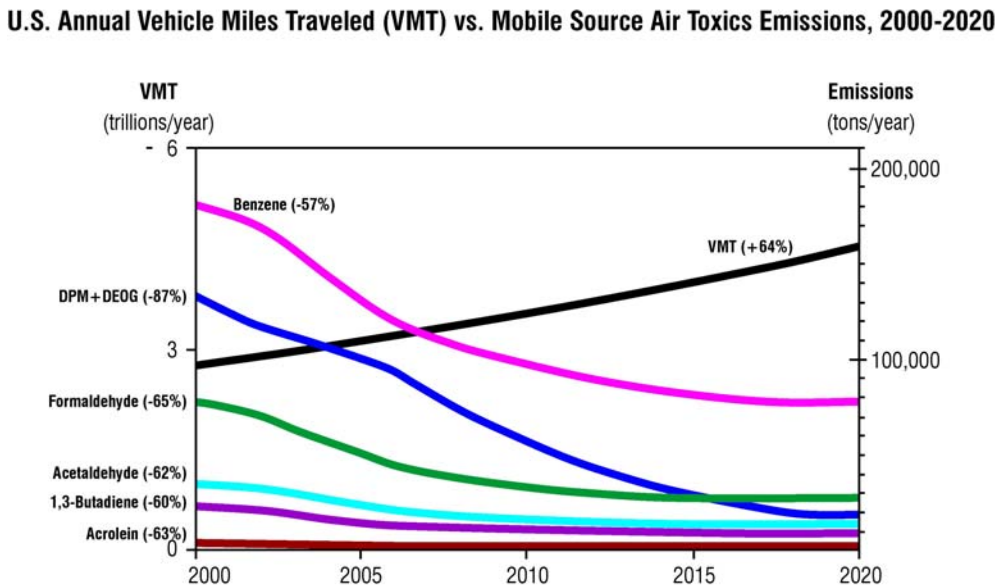
In addition to the criteria air pollutants for which there are NAAQS, the EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, nonroad mobile sources (e.g., airplanes), area sources (e.g., dry cleaners), and stationary sources (e.g., factories or refineries). MSATs are a subset of the 188 air toxics defined by the CAA. The MSATs are compounds emitted from highway vehicles and nonroad equipment. Some toxic compounds are present in fuel and are emitted into the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

The EPA is the lead Federal Agency for administering the CAA and has certain responsibilities regarding the health effects of MSATs. The EPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources (66 Federal Register 17229, March 29, 2001). This rule was issued under the authority in Section 202 of the CAA. In its rule, EPA examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline (RFG) program, its national low-emission vehicle (NLEV) standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Between 2000 and 2020, FHWA projects that even with a 64 percent increase in VMT, these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57–65 percent and will reduce on-highway diesel PM emissions by 87 percent, as shown in the graph on the next page.

As a result, EPA concluded that no further motor vehicle emissions standards or fuel standards were necessary to further control MSATs. The agency is preparing another rule under authority of CAA Section 202(l) that will address these issues and could make adjustments to the full 21 and the primary 6 MSATs.

Unavailable Information for Project-Specific MSAT Impact Analysis

This EA includes a basic analysis of the likely MSAT emission impacts of this project. However, available technical tools are not to predict the project-specific health impacts of the emission changes associated with the alternatives in this EA. Due to these limitations, the following discussion is included in accordance with CEQ regulations (40 CFR 1502.22(b)) regarding incomplete or unavailable information:



Notes: For on-road mobile sources. Emissions factors were generated using MOBILE6.2. MTBE proportion of market for oxygenates is held constant, at 50%. Gasoline RVP and oxygenate content are held constant. VMT: Highway Statistics 2000, Table VM-2 for 2000, analysis assumes annual growth rate of 2.5%. "DPM + DEOG" is based on MOBILE6.2-generated factors for elemental carbon, organic carbon and SO4 from diesel-powered vehicles, with the particle size cutoff set at 10.0 microns.

Information that is Unavailable or Incomplete

Evaluating the environmental and health impacts from MSATs on a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling to estimate ambient concentrations resulting from the estimated emissions, exposure modeling to estimate human exposure to the estimated concentrations, and then a final determination of health impacts based on the estimated exposure. Each of these steps is encumbered by technical shortcomings or uncertain science that prevent a more complete determination of the MSAT health impacts of the proposed project, as described below.

Emissions

The EPA tools to estimate MSAT emissions from motor vehicles are not sensitive to key variables determining emissions of MSATs in the context of highway projects. While MOBILE 6.2 and EMFAC2007 are used to predict emissions at a regional level, they have limited applicability at the project level. MOBILE 6.2 is a trip-based model with emission factors projected based on a typical trip of 12 km (7.5 mi) and on average speeds for this typical trip. This means that MOBILE 6.2 does not have the ability to predict emission factors for a specific vehicle operating condition at a specific location at a specific time. Because of this limitation, MOBILE 6.2 can only approximate the operating speeds and levels of congestion likely to be present on the largest-scale projects and cannot adequately capture emissions effects of smaller projects. For PM, the model results are not sensitive to average trip speed, although the other MSAT emission rates do change with changes in trip speed. Also, the emission rates used in MOBILE 6.2 for both PM and MSATs are based on a limited number of tests of mostly older-technology vehicles. Lastly, in its discussions of PM under the conformity rule, EPA has identified problems with MOBILE 6.2 as an obstacle to quantitative analysis. Similar limitations apply to EMFAC2007.

These deficiencies compromise the capability of MOBILE 6.2 to estimate MSAT emissions. MOBILE 6.2 is an adequate tool for projecting emission trends and performing relative analyses among alternatives for very large projects, but it is not sufficiently sensitive to capture the effects of travel changes due to smaller projects or to predict emissions near specific roadside locations.

Dispersion

The tools to predict how MSATs disperse are also limited. The current EPA regulatory models, CALINE4 (a Department model used in California only) and CAL3QHC, were developed and validated more than a decade ago for predicting episodic concentrations of CO to determine compliance with the NAAQS. The performance of dispersion models is more accurate for predicting maximum concentrations that can occur at some time at some location in a geographic area. This limitation makes it difficult to predict accurate exposure patterns at specific times at specific highway project locations across an urban area to assess potential health risk. The National Cooperative Highway Research Program (NCHRP) is conducting research on best practices in applying models and other technical methods in the analysis of MSATs. This work will also focus on identifying appropriate methods of documenting and communicating MSAT impacts in the NEPA process and to the general public. Along with these general limitations of dispersion models, FHWA is also faced with a lack of monitoring data in most areas for use in establishing project-specific MSAT background concentrations.

Exposure Levels and Health Effects

Even if emission levels and concentrations of MSATs could be accurately predicted, shortcomings in current techniques for exposure assessment and risk analysis limit the ability to reach meaningful conclusions about project-specific health impacts. Exposure assessments are difficult because it is difficult to accurately calculate annual concentrations of MSATs near roads and to determine the part of a year that people are actually exposed to those concentrations at a specific location. These difficulties are magnified for 70-year cancer assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over a 70-year period. There are also considerable uncertainties associated with the existing estimates of toxicity of the various MSATs because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population. Because of these shortcomings, any calculated difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with calculating the impacts. Consequently, the results of such assessments would not be useful to decision-makers who would need to weigh this information against other project impacts that are better suited for quantitative analysis.

Summary of Existing Credible Scientific Evidence Relevant to Evaluating the Impacts of MSATs

Research into the health impacts of MSATs is ongoing. For different emission types, there are studies that show that some either are statistically associated with adverse health outcomes through epidemiological studies (frequently based on emissions levels found in occupational settings) or that animals demonstrate adverse health outcomes when exposed to large doses.

Exposure to toxics has been a focus of a number of EPA efforts. Most notably, in 1996 the EPA conducted the National Air Toxics Assessment (NATA) to evaluate modeled estimates of human exposure applicable to the county level. While not intended for use as a measure of or benchmark for local exposure, the modeled estimates in the NATA database best illustrate the levels of various toxics when aggregated to a national or state level.

The EPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The EPA Integrated Risk Information System (IRIS) is a database of human health effects that may result from exposure to various substances found in the environment.[1] The following toxicity information for the six prioritized MSATs was taken from the IRIS database Weight of Evidence Characterization summaries. This information represents the EPA's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures.

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[1] http://www.epa.gov/iris.

- Benzene is characterized as a known human carcinogen.
- The potential carcinogenicity of acrolein cannot be determined because the existing data are inadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure.
- Formaldehyde is a probable human carcinogen, based on limited evidence in humans and sufficient evidence in animals.
- 1,3-butadiene is characterized as carcinogenic to humans by inhalation.
- Acetaldehyde is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure.
- Diesel exhaust (DE) is likely to be carcinogenic to humans by inhalation from environmental exposures. DE is the combination of diesel particulate matter and diesel exhaust organic gases.
- DE also represents chronic respiratory effects, possibly the primary noncancer hazard from MSATs. Prolonged exposures to DE may impair pulmonary function and could produce symptoms such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.

Other studies have addressed MSAT health impacts in proximity to roads. The Health Effects Institute, a nonprofit organization funded by the EPA, FHWA, and the industry, has undertaken a major series of studies to research near-road MSAT hot spots, the health implications of the entire mix of mobile source pollutants, and other topics. The final summary of the series is not expected for several years.

Some recent studies have reported that proximity to roads is related to adverse health outcomes, particularly respiratory problems.[1] Much of this research is not specific to MSATs, instead surveying the full spectrum of both criteria and other pollutants. FHWA cannot evaluate the validity of these studies, but more importantly, these studies do not provide information that would be useful to alleviate the uncertainties listed above and allow for a more comprehensive evaluation of the health impacts specific to a proposed project.

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[1] Multiple Air Toxic Exposure Study-II (SCAQMD, 2000); Highway Health Hazards (The Sierra Club, 2004, summarizing 24 studies on the relationship between health and air quality); and NEPA's Uncertainty in the Federal Legal Scheme Controlling Air Pollution from Motor Vehicles (Environmental Law Institute, 35 ELR 10273, 2005) with health studies cited therein.

Because of the uncertainties outlined above, a quantitative assessment of the effects of air toxic emissions impacts on human health cannot be made at the project level. While available tools do allow reasonable prediction of relative emission changes among alternatives for larger projects, the amount of MSAT emissions from the project alternatives and MSAT concentrations or exposures created by each project alternative cannot be predicted with sufficient accuracy to be useful in estimating health impacts. As noted above, the current emissions model is not capable of serving as a meaningful emission analysis tool for smaller projects. Therefore, the relevance of the unavailable or incomplete information is that it is not possible to make a determination of whether any of the alternatives for the proposed I-10/Tippecanoe Avenue Interchange project would have substantial adverse impacts on the human environment.

For the Build Alternative, the amount of MSATs emitted would be proportional to the vehicle miles traveled (VMT). The proposed project is an interchange improvement project. This type of project improves road operations by reducing traffic congestion and improving traffic operations. The proposed project would reduce the delay and either improve the LOS or maintain the LOS at the same level as without the project.

Therefore, under the Build Alternative, it is expected that there would be similar or lower MSAT emissions in the project area compared to the No Build Alternative due to the improvement in LOS. In addition, on a regional basis, the EPA's vehicle and fuel regulations, coupled with fleet turnover, would over time cause substantial reductions that, in almost all cases, would cause regionwide MSAT levels to be substantially lower than they are today.

Diesel Air Toxic Emissions

On August 27, 1998, CARB designated particulate emissions from diesel-fueled engines or diesel-powered machines (DPM) as a toxic air contaminant. The proposed project would involve diesel-powered transportation equipment.

Exposures to diesel exhaust are difficult to precisely quantify due to the complex nature and composition of the exhaust. At present, no single constituent of diesel exhaust serves as a unique surrogate for purposes of exposure assessment. As a result, many researchers, including CARB staff, have used particles in diesel exhaust to quantify exposures for "whole" diesel exhaust. Per CARB, the particle fraction of diesel exhaust is used as the basis for estimating the public's exposure to the toxic substances in the exhaust. This assumption most likely will tend to slightly underpredict the risk from "whole" diesel exhaust, but when considering the assumptions as to exposure periods delineated below versus the actual exposure periods, it is unlikely that risk from whole diesel exhaust based upon DPM will be underpredicted. Table 2.13.H identifies the substances listed by CARB as toxic air contaminants found in diesel exhaust.

Table 2.13.H Diesel Exhaust Constituents

Acetaldehyde	Hexane
Acrolein	Inorganic lead
Aniline	Manganese
Antimony	Mercury
Arsenic	Methanol
Benzene	MEK
Beryllium	Naphthalene
Biphenyl	Nickel
Bis(2-ethylhexyl)phthalate	4-Nitrobiphenyl
1,3-Butadiene	Phenol
Cadmium	Phosphorus
Chlorine	PAHs, POMs
Chlorobenzene	Propionaldehyde
Chromium	Selenium
Cobalt	Styrene
Cresol isomers	Toluene
Cyanide compounds	Xylenes
Dioxins and dibenzofurans	
Dibutylphthalate	
Ethyl benzene	
Formaldehyde	

Source: Air Quality Technical Report (January 2009).
MEK = methyl ethyl ketone
PAH = polycyclic aromatic hydrocarbon
POM = polyoxometalate

Based upon data presented in the preceding Mobile Source Air Toxics section, emissions of diesel particulates and diesel organic gases are expected to decrease through 2020 and beyond; therefore, exposures and health risks from such toxics will also decrease as a result of the following project benefits:

- Decrease in traffic congestion on the immediate collectors and arterials at the Tippecanoe Avenue interchange.
- Decrease in congestion on the I-10 mainline prior and subsequent to the Tippecanoe Avenue interchange area.
- Improved flow of the I-10/Tippecanoe Avenue interchange.

- Elimination or substantial reduction of operational deficiencies in the I-10/ Tippecanoe Avenue interchange area.
- Improved local street circulation to the north and south of the main interchange.

Alternative 2 – No Build Alternative

The No Build Alternative would not result in any improvements to the I-10/ Tippecanoe Avenue Interchange and therefore would not result in permanent impacts to air quality.

2.13.4 Avoidance, Minimization, and/or Mitigation Measures

The following SCAQMD and Department standard measures are required to avoid, minimize, and/or mitigate project impacts to air quality during construction:

AQ-1 To reduce fugitive dust emissions, the construction contractor shall adhere to the requirements of South Coast Air Quality Management District (SCAQMD) Rule 403 during construction. These Best Available Control Measures (BACMs) specified in SCAQMD's Rule 403 shall be incorporated into the project construction. BACMs shall include, but not be limited to, the following:

a) All construction site areas shall be watered at least twice daily.
b) All trucks hauling soils, sand, gravel, and other loose materials shall be covered or required to maintain at least 2 feet of freeboard space.
c) All paved access roads, parking areas, and staging areas at the construction site shall be swept at least twice daily.
d) A nontoxic soil stabilizer or hydroseed shall be applied to parts of the construction site that are inactive for 10 or more days.
e) Exposed dirt or sand stockpiles shall be enclosed, covered, or watered twice daily.
f) Vehicle speeds shall be limited to 15 miles per hour in active construction areas.
g) Construction equipment shall be scheduled to maximize use rates and minimize idling times.
h) California Air Resources Board certified gasoline and diesel fuels shall be used in the construction equipment.

AQ-2 The construction contractor shall adhere to the California Department of Transportation Standard Specifications Sections 10 and 18 for dust control and Section 39–3.06 for asphalt concrete plants during construction to reduce emissions as a result of construction equipment operations and construction activities, and to reduce fugitive dust.

AQ-3 During construction, the construction contractor will ensure that portable equipment meets either the SCAQMD or statewide registration requirements, and that mobile construction equipment meets all applicable State and federal exhaust emissions standards.

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2.14 Noise

2.14.1 Regulatory Setting

The National Environmental Policy Act (NEPA) of 1969 and the California Environmental Quality Act (CEQA) provide the broad basis for analyzing and abating highway traffic noise effects. The intent of these laws is to promote the general welfare and to foster a healthy environment. The requirements for noise analysis and consideration of noise abatement and/or mitigation, however, differ between NEPA and CEQA.

2.14.1.1 California Environmental Quality Act

CEQA requires a strictly baseline versus build analysis to assess whether a proposed project will have a noise impact. If a proposed project is determined to have a significant noise impact under CEQA, then CEQA dictates that mitigation measures must be incorporated into the project unless such measures are not feasible.

2.14.1.2 National Environmental Policy Act and 23 CFR 772

For highway transportation projects with FHWA (and the Department, as assigned) involvement, the federal-Aid Highway Act of 1970 and the associated implementing regulations (23 CFR 772) govern the analysis and abatement of traffic noise impacts. The regulations require that potential noise impacts in areas of frequent human use be identified during the planning and design of a highway project. The regulations contain noise abatement criteria (NAC) that are used to determine when a noise impact would occur. The NAC differ depending on the type of land use under analysis. For example, the NAC for residences (67 dBA) is lower than the NAC for commercial areas (72 dBA). The following table lists the noise abatement criteria for use in the NEPA-23 CFR 772 analysis.

Table 2.14.B lists the noise levels of common activities to enable readers to compare the actual and predicted highway noise-levels discussed in this section with common activities.

In accordance with the Department's *Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects, August 2006,* a noise impact occurs when the future noise level with the project results in a substantial increase in noise level (defined as a 12 dBA or more increase) or when the future noise level with the project approaches or exceeds the NAC. Approaching the NAC is defined as coming within 1 dBA of the NAC.

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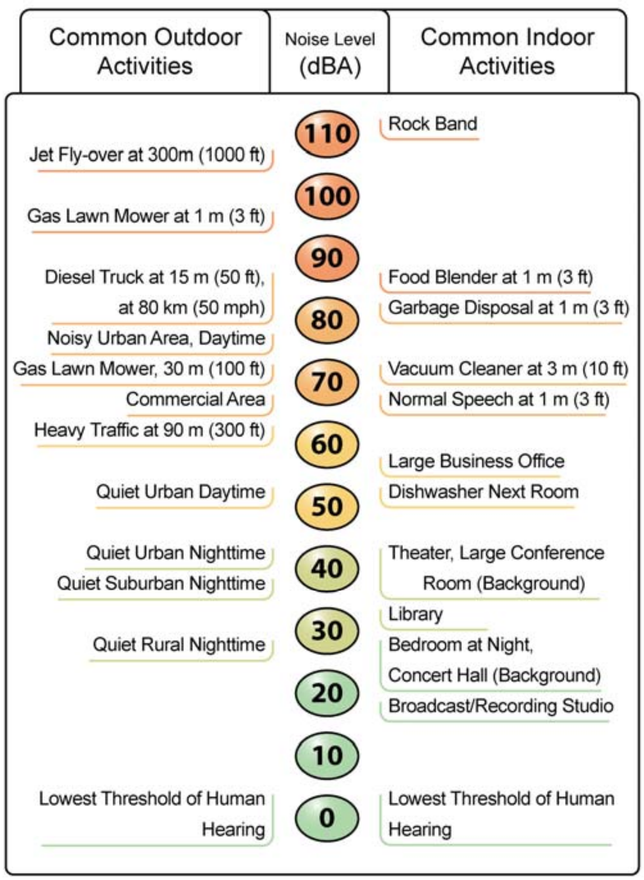
Table 2.14.A Activity Categories and Noise Abatement Criteria

Activity Category	NAC, Hourly A- Weighted Noise Level, dBA L_{eq}(h)	Description of Activities
A	57 Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	67 Exterior	Picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 Exterior	Developed lands, properties, or activities not included in Categories A or B above
D	–	Undeveloped lands.
E	52 Interior	Residence, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

Table 2.14.B Noise Levels of Common Activities



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If it is determined that the project will have noise impacts, then potential abatement measures must be considered. Noise abatement measures that are determined to be reasonable and feasible at the time of final design are incorporated into the project plans and specifications. This document discusses noise abatement measures that would likely be incorporated in the project.

The Department's *Traffic Noise Analysis Protocol* sets forth the criteria for determining when an abatement measure is reasonable and feasible. Feasibility of noise abatement is basically an engineering concern. A minimum 5 dBA reduction in the future noise level must be achieved for an abatement measure to be considered feasible. Other considerations include topography, access requirements, other noise sources and safety considerations. The reasonableness determination is basically a cost-benefit analysis. Factors used in determining whether a proposed noise abatement measure is reasonable include: residents acceptance, the absolute noise level, build versus existing noise, environmental impacts of abatement, public and local agencies input, newly constructed development versus development pre-dating 1978 and the cost per benefited residence.

2.14.2 Affected Environment

This section is based on the *Noise Study Report* (NSR) (May 2009) prepared for the project.

2.14.2.1 Surrounding Land Use and Sensitive Receivers

Land uses in the project vicinity (refer to Figure 1.2, presented previously in Section 1.3.1.1, for the limits of the project area) include single- and multifamily residences, a recreational vehicle (RV) park, hotels, an outdoor sitting area of a fast food establishment, commercial uses, industrial uses, and vacant land.

A total of 37 receiver locations, as shown in Figure 2.14.1, were selected to represent noise-sensitive land uses in the project vicinity. Receivers, as used in this section, are those locations at which noise impacts were evaluated. As shown in Table 2.14.C, the majority of the sensitive receiver locations consist of residential uses.

With exception of the fast food establishment, no receivers were modeled to represent commercial, light industrial, and vacant uses within the project area because there were no associated outdoor active use areas.

Table 2.14.C Existing Traffic Noise Levels, dBA L_{eq}

Rec No.	Location	Type of Land Use	No. of Units Represented	Noise Abatement Category	Modeled Existing Noise Level
R-1	Harriman Place	Hotel	NA[1]	E(52)	74 /50[2]
R-2	East Laurelwood Drive	Residential	2	B(67)	62
R-3	East Laurelwood Drive	Residential	3	B(67)	60
R-4	East Laurelwood Drive	Residential	2	B(67)	60
R-5	East Laurelwood Drive	Residential	2	B(67)	62
R-6	East Laurelwood Drive	Residential	2	B(67)	66[3]
R-7	East Laurelwood Drive	Residential	2	B(67)	56
R-8	East Laurelwood Drive	Residential	3	B(67)	56
R-9	East Laurelwood Drive	Residential	2	B(67)	57
R-10	East Laurelwood Drive	Residential	2	B(67)	57
R-11	East Laurelwood Drive	Residential	2	B(67)	58
R-12	East Laurelwood Drive	Residential	2	B(67)	59
R-13	East Lee Street	Residential	2	B(67)	58
R-14	East Lee Street	Residential	1	B(67)	57
R-15	East Lee Street	Residential	2	B(67)	60
R-16	East Lee Street	Residential	1	B(67)	58
R-17	East Lee Street	Residential	1	B(67)	62
R-18	East Sycamore Lane	Residential	2	B(67)	69
R-19	East Sycamore Lane	Residential	2	B(67)	69
R-20	East Sycamore Lane	Residential	2	B(67)	69
R-21	East Sycamore Lane	Residential	2	B(67)	70
R-22	East Sycamore Lane	Residential	2	B(67)	70
R-23	East Sycamore Lane	Residential	2	B(67)	70
R-24	East Sycamore Lane	Residential	1	B(67)	70
R-25	East Sycamore Lane	Residential	1	B(67)	71
R-26	East Sycamore Lane	Residential	1	B(67)	63
R-27	East Sycamore Lane	Residential	2	B(67)	61
R-28	East Sycamore Lane	Residential	3	B(67)	62
R-29	East Sycamore Lane	Residential	3	B(67)	62
R-30	East Sycamore Lane	Residential	2	B(67)	63
R-31	Redlands Boulevard	Residential	5	B(67)	61
R-32	Redlands Boulevard	Residential	1	B(67)	70
R-33	Anderson Street	Outdoor area	1	C(72)	70
R-34	Anderson Street	Residential	1	B(67)	65
R-35	Anderson Street	Residential	1	B(67)	64
R-36	Redlands Boulevard	RV park	14	B(67)	65
R-37	Redlands Boulevard	Residential	1	B(67)	63

Source: *Noise Study Report*, May 2009.
[1] There are no associated outdoor use areas at the hotel.
[2] Exterior/interior noise levels. The interior noise level was calculated assuming standard building construction in Southern California, which would provide 24 dBA or more in reduction from exterior to interior with windows and doors closed.
[3] Numbers in bold represent noise levels that approach or exceed the NAC.
dBA = A-weighted decibel
Leq = Equivalent Sound Level
NAC = Noise Abatement Category
RV = recreational vehicle

2.14.2.2 Existing Noise Levels

The primary source of noise in the project area is traffic on the Interstate 10 (I-10), the I-10 ramps, Tippecanoe Avenue, Anderson Street, and Redlands Boulevard. Ambient (15-minute) noise level measurements were conducted to document existing noise levels at 8 representative sensitive receiver locations in the project area. The noise monitoring locations are shown on Figure 2.14.1. The short-term noise level measurements were used to calibrate the noise model and to predict the noise levels at all 37 modeled sensitive receivers in the project area. The existing p.m. peak-hour traffic volumes were obtained from the *Traffic Report for the I-10/Tippecanoe Avenue Interchange* (March 2008). Table 2.14.C shows the existing traffic noise levels at the 37 modeled receiver locations. Figure 2.14.1 also shows the 37 modeled receiver locations. As shown in Table 2.14.C, of the 37 modeled receiver locations, 10 receivers currently approach or exceed the 67 dBA equivalent continuous sound level (L_{eq}) NAC for residential uses under the existing traffic noise condition. No receiver is approaching or exceeding the 72 dBA L_{eq} NAC under Activity Category C.

2.14.3 Environmental Consequences

2.14.3.1 Temporary Impacts

Alternative 1 – Build Alternative

Two types of short-term noise impacts would occur during project construction. The first type would be from construction crew commutes and the transport of construction equipment and materials to and from the project site. These activities would incrementally raise noise levels on access roads leading to the project site. The pieces of heavy equipment for grading and construction activities would be moved on site, would remain for the duration of each construction phase, and would not add to the daily traffic volume in the project vicinity. A high single-event noise exposure potential at a maximum level of 87 dBA maximum instantaneous noise level (L_{max}) from trucks passing at 50 feet (ft) would occur. However, the projected construction traffic would be minimal when compared to existing traffic volumes on I-10, Tippecanoe Avenue, Anderson Street, and Redlands Boulevard, and its associated short-term noise level change would not be perceptible. Therefore, project-related short-term construction worker commutes and equipment transport noise impacts would not be substantial.

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Figure 2.14.1 Receiver and Sound Barrier Locations
(Page 1 of 3)

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Figure 2.14.1 Receiver and Sound Barrier Locations
(Page 2 of 3)

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Figure 2.14.1 Receiver and Sound Barrier Locations
(Page 3 of 3)

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The second type of short-term noise impact is related to noise generated during excavation, grading, and roadway construction. Construction is performed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated and, therefore, the noise levels at the project area as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table 2.14.D lists typical construction equipment noise levels (L_{max}) recommended for noise impact assessments, based on a distance of 50 ft between a piece of equipment and a noise receiver.

Table 2.14.D Typical Construction Equipment Noise Levels

Type of Equipment	Range of Maximum Sound Levels (dBA at 50 ft)	Suggested Maximum Sound Levels for Analysis (dBA at 50 ft)
Pile Drivers	81 to 96	93
Rock Drills	83 to 99	96
Jackhammers	75 to 85	82
Pneumatic Tools	78 to 88	85
Pumps	74 to 84	80
Scrapers	83 to 91	87
Haul Trucks	83 to 94	88
Cranes	79 to 86	82
Portable Generators	71 to 87	80
Rollers	75 to 82	80
Dozers	77 to 90	85
Tractors	77 to 82	80
Front-End Loaders	77 to 90	86
Hydraulic Backhoe	81 to 90	86
Hydraulic Excavators	81 to 90	86
Graders	79 to 89	86
Air Compressors	76 to 89	86
Trucks	81 to 87	86

Source: Noise Study Report, May 2009.
dBA = A-weighted decibel
ft = feet
L_{max} = Maximum Instantaneous Noise Level
NAC = Noise Abatement Criteria

Typical noise levels at 50 ft from an active construction area range up to 91 dBA L_{max} during the noisiest construction phases. The site preparation phase, which includes grading and paving, tends to generate the highest noise levels because the noisiest construction equipment is earthmoving equipment. Earthmoving and compacting equipment includes excavating machinery such as backfillers, bulldozers, front loaders, compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full-power operation followed by 3 or 4 minutes at lower power settings.

Construction of the proposed project is expected to require the use of earthmovers, bulldozers, water trucks, and pickup trucks. Noise associated with the use of construction equipment is estimated between 79 and 89 dBA L_{max} at a distance of 50 ft from the active construction area for the grading phase. As seen in Table 2.14.D, the maximum noise level generated by each earthmover is assumed to be approximately 86 dBA L_{max} at 50 ft from the earthmover in operation. Each bulldozer would generate approximately 85 dBA L_{max} at 50 ft. The maximum noise level generated by water trucks and pickup trucks is approximately 86 dBA L_{max} at 50 ft from these vehicles. Each doubling of the sound source with equal strength increases the noise level by 3 dBA. Each piece of construction equipment operates as an individual point source. The worst-case composite noise level at the nearest residence during this phase of construction would be 91 dBA L_{max} at a distance of 50 ft from an active construction area.

In addition to standard construction equipment, the proposed project will require the use of pile drivers. As shown in Table 2.14.D, pile driving generates noise levels of approximately 93 dBA L_{max} at 50 ft. If the pile driving is conducted concurrently with the site preparation, the project construction could potentially generate noise levels of 95 dBA L_{max} at a distance of 50 ft.

The closest sensitive receivers are within 50 ft of the project construction areas. Therefore, these receiver locations may be subject to short-term noise levels of 95 dBA L_{max} or higher generated by construction activities on the project site. With Minimization Measures N-1 and N-2 provided later, the potential short-term noise impacts during project construction would not be adverse.

Alternative 2 – No Build Alternative

The No Build Alternative would not result in the construction of improvements to I-10 or Tippecanoe Avenue and therefore would not result in temporary noise impacts.

2.14.3.1 Permanent Impacts

Alternative 1 – Build Alternative

Long-Term Exterior Noise Impacts

Potential long-term noise associated with project operations would be solely from traffic noise. Traffic noise impacts occur when either of the following occurs: (1) the traffic noise level at a sensitive receiver is predicted to approach or exceed the NAC, or (2) the predicted traffic noise level at a sensitive receiver is 12 dBA or more over the corresponding modeled existing noise level at that sensitive receiver. When traffic noise impacts occur, noise abatement measures must be considered.

The predicted future worst-case noise levels at representative sensitive receiver locations within the project area were determined with existing walls and with no new modeled sound barriers (SBs), using the worst-case traffic volumes (prior to speed degradation) along I-10 and the I-10 westbound loop on-ramp/eastbound on-ramp. This traffic condition is assumed to be level of service (LOS) D/E, which corresponds to 1,950 vehicles per lane per hour (vplph) on the highway mainline and 1,200 vplph on highway on- and off-ramps. In addition, the I-10 westbound off-ramp/eastbound off-ramp, Tippecanoe Avenue, Anderson Street, and Redlands Boulevard were modeled using 2035 p.m. peak-hour traffic volumes obtained from the Traffic Report prepared by the San Bernardino Associated Governments (SANBAG) as worst-case-scenario traffic volumes; the projected volumes would not exceed 1,200 vplph.

Table 2.14.E shows the existing and future worst-case traffic noise level results. Under the future with project conditions, of the 37 modeled receivers, 16 receivers would approach or exceed the NAC under Activity Category B, which has an exterior NAC of 67 dBA L_{eq} for residential uses. Of the 37 modeled receivers, one receiver would approach or exceed the NAC under Activity Category C, which has an exterior NAC of 72 dBA L_{eq}. No receivers would approach or exceed the NAC under Category E, which has an interior NAC of 52 dBA L_{eq}. The following receiver locations would be exposed or would continue to be exposed to noise levels that approach or exceed the NAC:

- **Receivers R-2 through R-6:** These receivers represent existing single-family residences in the northeast quadrant of I-10 and Tippecanoe Avenue, along East Laurelwood Drive. An existing 6 ft high wall currently shields these receivers.
- **Receivers R-18 through R-25:** These receivers represent existing single-family residences in the northeast quadrant of I-10 and Tippecanoe Avenue, along East Sycamore Lane. An existing 4.5 ft high wall currently shields these receivers.
- **Receivers R-32 and R-33:** These receivers represent an existing single-family residence and an outdoor sitting area associated with a fast food restaurant in the southwest quadrant of I-10 and Tippecanoe Avenue, along Redlands Boulevard. Currently, there are no existing barriers shielding these receivers.

Table 2.14.E Projected Traffic Noise Levels, dBA L_{eq}

Rec No.	Location	Modeled Existing Noise Level[4]	Future No Build Alternative[4]	Future Build Alternative (Worst-Case)[4]	Change from Modeled Existing Level
R-1[1]	Harriman Place	74/50[2]	74/50	73/49	-1[3]
R-2	East Laurelwood Drive	62	62	**67**[4]	5
R-3	East Laurelwood Drive	60	61	**66**	6
R-4	East Laurelwood Drive	60	60	**66**	6
R-5	East Laurelwood Drive	62	62	**68**	6
R-6	East Laurelwood Drive	**66**	**66**	**69**	3
R-7	East Laurelwood Drive	56	57	60	4
R-8	East Laurelwood Drive	56	56	60	4
R-9	East Laurelwood Drive	57	57	60	3
R-10	East Laurelwood Drive	57	57	59	2
R-11	East Laurelwood Drive	58	58	60	2
R-12	East Laurelwood Drive	59	59	61	2
R-13	East Lee Street	58	59	62	4
R-14	East Lee Street	57	58	61	4
R-15	East Lee Street	60	61	62	2
R-16	East Lee Street	58	60	60	2
R-17	East Lee Street	62	64	64	2
R-18	East Sycamore Lane	**69**	**69**	**70**	1
R-19	East Sycamore Lane	**69**	**69**	**70**	1
R-20	East Sycamore Lane	**69**	**69**	**70**	1
R-21	East Sycamore Lane	**70**	**70**	**70**	0
R-22	East Sycamore Lane	**70**	**70**	**70**	0
R-23	East Sycamore Lane	**70**	**70**	**70**	0
R-24	East Sycamore Lane	**70**	**70**	**71**	1
R-25	East Sycamore Lane	**71**	**71**	**71**	0
R-26	East Sycamore Lane	63	64	65	2
R-27	East Sycamore Lane	61	62	62	1
R-28	East Sycamore Lane	62	62	62	0
R-29	East Sycamore Lane	62	62	62	0
R-30	East Sycamore Lane	63	63	63	0
R-31	Redlands Boulevard	61	61	61	0
R-32	Redlands Boulevard	**70**	**70**	**70**	0
R-33	Anderson Street	70	**72**	**73**	3
R-34	Anderson Street	65	**67**	**67**	2
R-35	Anderson Street	64	65	65	1
R-36	Redlands Boulevard	65	**67**	**67**	2
R-37	Redlands Boulevard	63	63	64	1

Source: *Noise Study Report*, May 2009.

1 This receiver was evaluated under Activity Category E (interior NAC of 52 dBA L_{eq}) because there are no associated outdoor use areas.

2 Exterior/interior noise levels. The interior noise level was calculated assuming standard building construction in Southern California, which would provide 24 dBA or more in reduction from exterior to interior with windows and doors closed.

3 Receiver R-1, under future Build conditions, would experience a decrease in traffic noise levels because the proposed project would change shielding effects at this receiver.

4 Numbers in bold represent noise levels that approach or exceed the NAC.

dBA = A-weighted decibels

L_{eq} = Equivalent Sound Level

NAC = Noise Abatement Criteria

- **Receivers R-34 and R-36:** These receivers represent existing single-family residences and an RV park in the southeast quadrant of I-10, along Redlands Boulevard and Anderson Street. Currently, there are no existing barriers shielding these receivers.

In the future (2035) build condition, Receivers R-2 through R-6 would experience at least a 3 dBA increase in noise levels, and noise levels would exceed the City of San Bernardino exterior noise standard of 65 dBA community noise equivalent level (CNEL). A 3 dBA change is the lowest level that is perceptible by the average human ear in an outdoor environment. Because these receivers would be exposed to noise levels above City standards in the future (2035) build condition and the change would be detectable, this increase is considered significant under CEQA. A sound barrier with a minimum height of 10 ft to shield these receivers would abate the adverse impact (refer to Appendix A, CEQA Checklist, for further discussion).

Long-Term Interior Noise Impacts

One location, the hotel (R-1) located northwest of I-10 and Tippecanoe Avenue, was modeled for potential long-term interior noise impacts associated with project operations. This hotel was evaluated under Activity Category E, which has an interior NAC of 52 dBA L_{eq}, because there are no associated outdoor active uses areas at the hotel. Based on the typical sound level reductions of buildings, standard building construction in Southern California would provide 24 dBA (the national average is 25 dBA) or more in noise reduction from exterior to interior with windows and doors closed, and the predicted future worst-case interior noise levels of 49 dBA L_{eq} would not approach or exceed the 52 dBA L_{eq} NAC under Activity Category E under Alternative 1 traffic conditions. Therefore, no interior noise abatement measures are required.

Alternative 2 – No Build Alternative

Potential long-term noise impacts under the No Build Alternative would be solely from traffic noise. Future No Build Alternative noise levels are shown in Table 2.14.E. Of the 37 receivers, 13 receivers would or would continue to approach or exceed the NAC under the No Build Alternative 2035 conditions.

2.14.4 Avoidance, Minimization, and/or Abatement Measures

2.14.4.1 Noise Abatement Consideration

Noise abatement measures, such as sound barriers, were considered to shield noise-sensitive receivers located along I-10, Tippecanoe Avenue, Anderson Street, and Redlands Boulevard, where sensitive receivers exist and would continue to be exposed to traffic noise levels approaching or exceeding the NAC. All properties requiring abatement consideration are within Category B (67 dBA L_{eq} NAC). The bold numbers in Table 2.14.E, provided earlier, show impacted receiver locations that approach or exceed the NAC under future worst-case with project traffic conditions. Sound barriers were analyzed for each of these sensitive receivers. At each location, 6 sound barrier heights were analyzed: 6, 8, 10, 12, 14, and 16 ft. If sound barriers would be located within 15 ft of the nearest travel lane, a 16 ft sound barrier height was not analyzed. In addition, as there is driveway and pedestrian access onto Redlands Boulevard and Anderson Street, it would not be feasible to abate traffic noise with sound barriers for Receivers R-34 and R-36.

The following barriers were analyzed to shield the sensitive receiver locations that would be exposed to traffic noise levels approaching or exceeding the NAC:

- **SB No. 1:** A 2,413 ft long barrier along the edge of shoulder in the northeast quadrant of I-10 and Tippecanoe Avenue was analyzed to shield Receivers R-2 through R-14 and R-18 through R-30.
- **SB No. 2:** A 708 ft long barrier along the residential property line in the northeast quadrant of I-10 and Tippecanoe Avenue was analyzed to shield Receivers R-2 through R-6, R-8 through R-12, and R-14.
- **SB No. 3:** A 709 ft long barrier along the residential property line in the northeast quadrant of I-10 and Tippecanoe Avenue was analyzed to shield Receivers R-18 through R-30.
- **SB No. 4:** A 1,203 ft long barrier along the edge of shoulder in the southwest quadrant of I-10 and Tippecanoe Avenue was analyzed to shield Receivers R-31, R-32, R-34, and R-35.
- **SB No. 5:** A 295 ft long barrier along the State right-of-way in the southwest quadrant of I-10 and Tippecanoe Avenue was analyzed to shield Receiver R-32.

The results of the sound barrier modeling are shown in Tables 2.14.F and 2.14.G. The analyzed sound barriers were shown previously in Figure 2.14.1.

Table 2.14.F Noise Levels Summary and Sound Barrier Modeling, dBA L_{eq} (Along Edge of Shoulder)

Sound Barrier No.	Rec No.	Future Build (Worst-Case)	With Barrier H = 6 ft		With Barrier H = 8 ft		With Barrier H = 10 ft		With Barrier H = 12 ft		With Barrier H = 14 ft		With Barrier H = 16 ft	
			L_{eq}	I.L.[1]	L_{eq}	I.L.	L_{eq}	I.L.	L_{eq}	I.L.	L_{eq}	I.L.	L_{eq}	I.L.
	R-1[2]	73	--	--	--	--	--	--	--	--	--	--	--	--
1	R-2	**67**[3]	63	4	62[4]	5	61	6	60	7	59	8	NP[5]	NP
	R-3	**66**	63	3	62	4	61	5	60	6	59	7	NP	NP
	R-4	**66**	63	3	62	4	61	5	60	6	60	6	NP	NP
	R-5	**68**	65	3	64	4	63	5	62	6	61	7	NP	NP
	R-6	**69**	**67**	2	**66**	3	65	4	63	6	62	7	NP	NP
	R-7	60	59	1	58	2	58	2	58	2	57	3	NP	NP
	R-8	60	58	2	58	2	57	3	57	3	57	3	NP	NP
	R-9	60	58	2	57	3	56	4	56	4	55	5	NP	NP
	R-10	59	57	2	57	2	56	3	56	3	55	4	NP	NP
	R-11	60	59	1	58	2	58	2	57	3	56	4	NP	NP
	R-12	61	60	1	59	2	59	2	58	3	57	4	NP	NP
	R-13	62	61	1	61	1	61	1	61	1	61	1	NP	NP
	R-14	61	60	1	59	2	59	2	59	2	59	2	NP	NP
	R-15	62	--[6]	--	--	--	--	--	--	--	--	--	--	--
	R-16	60	--	--	--	--	--	--	--	--	--	--	--	--
	R-17	64	--	--	--	--	--	--	--	--	--	--	--	--
1	R-18	**70**	**68**	2	**67**	3	**67**	3	**66**	4	65	5	NP	NP
	R-19	**70**	**68**	2	**67**	3	**67**	3	**66**	4	65	5	NP	NP
	R-20	**70**	**67**	3	**67**	3	**66**	4	**66**	4	65	5	NP	NP
	R-21	**70**	**68**	2	**67**	3	**67**	3	**66**	4	65	5	NP	NP
	R-22	**70**	**68**	2	**68**	2	**67**	3	**67**	3	**66**	4	NP	NP
	R-23	**70**	**69**	1	**68**	2	**67**	3	**67**	3	**66**	4	NP	NP
	R-24	**71**	**70**	1	**69**	2	**68**	3	**67**	4	**66**	5	NP	NP
	R-25	**71**	**69**	2	**69**	2	**68**	3	**68**	3	**67**	4	NP	NP
	R-26	65	63	2	63	2	62	3	62	3	61	4	NP	NP
	R-27	62	61	1	60	2	60	2	59	3	59	3	NP	NP
	R-28	62	61	1	60	2	60	2	60	2	59	3	NP	NP
	R-29	62	61	1	60	2	60	2	59	3	59	3	NP	NP
	R-30	63	62	1	61	2	61	2	60	3	60	3	NP	NP

Table 2.14.F Noise Levels Summary and Sound Barrier Modeling, dBA L_{eq} (Along Edge of Shoulder)

Sound Barrier No.	Rec No.	Future Build (Worst-Case)	With Barrier H = 6 ft		With Barrier H = 8 ft		With Barrier H = 10 ft		With Barrier H = 12 ft		With Barrier H = 14 ft		With Barrier H = 16 ft	
			L_{eq}	I.L.[1]	L_{eq}	I.L.	L_{eq}	I.L.	L_{eq}	I.L.	L_{eq}	I.L.	L_{eq}	I.L.
4	R-31	61	60	1	60	1	59	2	59	2	59	2	NP	NP
	R-32	**70**	**69**	1	**68**	2	**68**	2	**68**	2	**68**	2	NP	NP
	R-33	**73**	NF[7]	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
4	R-34	**67**	**67**	0	**67**	0	**67**	0	**66**	1	**66**	1	NP	NP
	R-35	65	65	0	64	1	64	1	64	1	64	1	NP	NP
	R-36	**67**	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
	R-37	64	--	--	--	--	--	--	--	--	--	--	--	--

Source: *Noise Study Report*, May 2009.
1 I.L.: Insertion Loss.
2 This receiver represents the south side of the hotel. There are no outdoor active use areas associated with the hotel.
3 Numbers in bold represent noise levels that approach or exceed the NAC.
4 Underlined noise levels have been attenuated by at least 5 dBA (i.e., feasible barrier height).
5 NP = Not Permitted. Sound barriers within 15 ft of the nearest travel lane are not permitted to exceed 14 ft in height.
6 No barrier was analyzed at this location because the modeled receiver would not approach or exceed the NAC.
7 NF = Not Feasible. As there is driveway and pedestrian access onto Redlands Boulevard and Anderson Street, it is not feasible to abate traffic noise with sound barriers.
dBA = A-weighted decibels
ft = feet
H = height
Leq = Equivalent Sound Level
NAC = Noise Abatement Criteria

Table 2.14.G Noise Levels Summary and Sound Barrier Modeling, dBA L_{eq} (State ROW/Property Line)

Sound Barrier No.	Rec No.	Future Build (Worst-Case)	With Barrier H = 6 ft		With Barrier H = 8 ft		With Barrier H = 10 ft		With Barrier H = 12 ft		With Barrier H = 14 ft		With Barrier H = 16 ft	
			L_{eq}	I.L.[1]	L_{eq}	I.L.	L_{eq}	I.L.	L_{eq}	I.L.	L_{eq}	I.L.	L_{eq}	I.L.
	R-1[2]	73	--	--	--	--	--	--	--	--	--	--	--	--
	R-2	**67**[3]	**66**	1	63	4	62[4]	5	61	6	60	7	60	7
	R-3	**66**	64	2	62	4	60	6	60	6	59	7	58	8
2	R-4	**66**	63	3	61	5	60	6	59	7	58	8	58	8
	R-5	**68**	65	3	63	5	62	6	61	7	60	8	60	8
	R-6	**69**	**67**	2	**66**	3	65	4	65	4	65	4	65	4
	R-7	60	60	0	60	0	60	0	60	0	60	0	59	1
	R-8	60	59	1	59	1	59	1	59	1	59	1	58	2
	R-9	60	59	1	59	1	59	1	58	2	58	2	58	2
2	R-10	59	58	1	58	1	58	1	57	2	57	2	57	2
	R-11	60	59	1	58	2	58	2	58	2	58	2	58	2
	R-12	61	59	2	59	2	59	2	58	3	58	3	58	3
	R-13	62	--[5]	--	--	--	--	--	--	--	--	--	--	--
2	R-14	61	60	1	60	1	60	1	60	1	60	1	60	1
	R-15	62	--	--	--	--	--	--	--	--	--	--	--	--
	R-16	60	--	--	--	--	--	--	--	--	--	--	--	--
	R-17	64	--	--	--	--	--	--	--	--	--	--	--	--
	R-18	**70**	**70**	0	**69**	1	**66**	4	65	5	65	5	65	5
	R-19	**70**	65	5	64	6	65	5	63	7	63	7	63	7
	R-20	**70**	64	6	61	9	60	10	59	11	58	12	58	12
	R-21	**70**	**66**	4	63	7	62	8	61	9	61	9	61	9
	R-22	**70**	65	5	63	7	61	9	61	9	60	10	60	10
	R-23	**70**	65	5	62	8	60	10	59	11	59	11	58	12
3	R-24	**71**	**66**	5	64	7	64	7	62	9	62	9	62	9
	R-25	**71**	**69**	2	65	6	63	8	61	10	60	11	59	12
	R-26	65	65	0	64	1	64	1	64	1	64	1	64	1
	R-27	62	62	0	61	1	61	1	60	2	60	2	60	2
	R-28	62	62	0	61	1	61	1	60	2	60	2	59	3
	R-29	62	61	1	61	1	61	1	60	2	60	2	59	3
	R-30	63	63	0	62	1	61	2	61	2	60	3	60	3
	R-31	61	--	--	--	--	--	--	--	--	--	--	--	--
5	R-32	**70**	**69**	1	**69**	1	**66**	4	65	5	65	5	65	5
	R-33	**73**	NF[6]	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
	R-34	**67**	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF

Table 2.14.G Noise Levels Summary and Sound Barrier Modeling, dBA L_{eq} (State ROW/Property Line)

Sound Barrier No.	Rec No.	Future Build (Worst-Case)	With Barrier H = 6 ft		With Barrier H = 8 ft		With Barrier H = 10 ft		With Barrier H = 12 ft		With Barrier H = 14 ft		With Barrier H = 16 ft	
			L_{eq}	I.L.[1]	L_{eq}	I.L.	L_{eq}	I.L.	L_{eq}	I.L.	L_{eq}	I.L.	L_{eq}	I.L.
	R-35	65	--	--	--	--	--	--	--	--	--	--	--	--
	R-36	**67**	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
	R-37	64	--	--	--	--	--	--	--	--	--	--	--	--

Source: *Noise Study Report*, May 2009.
[1] I.L.: Insertion Loss.
[2] This receiver represents the south side of the hotel. There are no outdoor active use areas associated with the hotel.
[3] Numbers in bold represent noise levels that approach or exceed the NAC.
[4] Underlined noise levels have been attenuated by at least 5 dBA (i.e., feasible barrier height).
[5] No barrier was analyzed at this location because the modeled receiver would not approach or exceed the NAC.
[6] NF = Not Feasible. As there is driveway and pedestrian access onto Redlands Boulevard and Anderson Street, it is not feasible to abate traffic noise with sound barriers.
dBA = A-weighted decibels
ft = feet
H = height
L_{eq} = Equivalent Sound Level
NAC = Noise Abatement Criteria
ROW = right-of-way

Sound Barrier Feasibility

A minimum noise reduction of 5 dBA must be achieved at an impacted receiver for the noise abatement measure to be considered feasible. The feasibility criterion is not necessarily a noise abatement design goal. Greater noise reductions are encouraged if they can be reasonably achieved. Feasibility may also be restricted by the following factors: (1) topography, (2) access requirement for driveways, (3) the presence of local cross streets, (4) underground utilities, (5) other noise sources in the area, and (6) safety considerations.

Of the five modeled sound barriers evaluated, four sound barriers were capable of reducing noise levels by 5 dBA or more, as required to be considered feasible. SB No. 4 was determined to be not feasible because this barrier would not reduce noise levels by 5 dBA or more. Table 2.14.H lists all the feasible sound barriers.

Sound Barrier Reasonableness

The overall reasonableness of noise abatement is determined by considering a multitude of factors, including, but not necessarily limited to, the following:

- Cost of the abatement
- Absolute noise levels
- Change in noise levels
- Noise abatement benefits
- Date of development along the highway
- Lifecycle of abatement measures
- Environmental impact of abatement construction
- Views (opinions) of impacted residents
- Input from the public and local agencies
- Social, economic, environmental, legal, and technological factors

A preliminary reasonableness determination of providing noise abatement for exteriors of residential areas in Activity Category B (which includes residential areas) begins with a $36,000 base allowance per benefited residence. The $36,000 base allowance is adjusted using the following four factors to determine the total reasonable allowance per residence:

- Absolute noise level
- Design-year increase over existing noise levels

Table 2.14.H Sound Barrier Feasibility and Reasonableness

Sound Barrier No.	Height (ft)	Approximate Length (ft)	Noise Attenuation Range (dBA)	Number of Benefited Residences[1]	Receiver Locations Shielded	Reasonable Allowance per Residence	Total Reasonable Allowance	Estimated Sound Barrier Construction Cost[2]	Reasonable?
1	8	2,413	5	2	R-2	$50,000	$100,000	$1,521,215	No
	10	2,413	5-6	9	R-2–R-5	$52,000	$468,000	$1,764,431	No
	12	2,413	6-7	11	R-2–R-6	$52,000	$572,000	$2,173,300	No
	14	2,413	5-8	22	R-2–R-6, R-9, R-18–R-21, R-24	$52,000	$1,144,000	$2,250,861	No
2	8	708	5	4	R-4–R-5	$50,000	$200,000	$260,017	No
	10	708	5-6	9	R-2–R-5	$52,000	$468,000	$309,187	Yes
	12	708	6-7	9	R-2–R-5	$52,000	$468,000	$363,467	Yes
	14	708	7-8	9	R-2–R-5	$52,000	$468,000	$417,747	Yes
	16	708	7-8	9	R-2–R-5	$52,000	$468,000	$481,467	No
3	6	709	5-6	9	R-19–R-20, R-22–R-24	$52,000	$468,000	$213,604	Yes
	8	709	6-9	12	R-19–R-25	$54,000	$648,000	$260,382	Yes
	10	709	5-10	12	R-19–R-25	$54,000	$648,000	$309,621	Yes
	12	709	5-11	14	R-18–R-25	$54,000	$756,000	$363,978	Yes
	14	709	5-12	14	R-18–R-25	$56,000	$784,000	$418,334	Yes
	16	709	5-12	14	R-18–R-25	$56,000	$784,000	$482,144	Yes
5	12	295	5	1	R-32	$50,000	$50,000	$152,378	No
	14	295	5	1	R-32	$50,000	$50,000	$174,994	No
	16	295	5	1	R-32	$50,000	$50,000	$201,544	No

Source: *Noise Study Report*, May 2009.
[1] Number of residences that are attenuated by 5 dBA or more by the modeled barrier.
[2] Sound barrier construction cost provided by RMC, Inc. (April 2009).
dBA = A-weighted decibels
ft = feet

- Achievable noise reduction
- New highway construction or pre-1978 residence

Of the feasible sound barriers shown in Table 2.14.H, SB Nos. 2 and 3 were found to be reasonable. Table 2.14.H also list their height, approximate length, noise attenuation range, number of benefited residences, reasonable allowance per residence, total reasonable allowance, and estimated sound barrier construction costs, and whether the sound barrier is reasonable. SB Nos. 1 and 5 were found to be not reasonable because the estimated sound barrier construction cost exceeded the total reasonable allowance.

Factors not relating to acoustics that must be considered during the construction of sound barriers include: safety, maintenance, security, geotechnical consideration, and utility relocations. Additional factors to consider include opinions of affected residents and input from the public and public agencies. Social, economic, legal, and technological factors also must be taken into consideration. The factors not relating to acoustics for SB Nos. 2 and 3 are addressed below:

- **Safety:** Neither sound barrier would affect sight distance for vehicular or pedestrian traffic. SB No. 2 would be located on the State right-of-way/private property line, and SB No. 3 would be located outside of State right-of-way, along private property lines, and would be outside of the Clear Recovery Zone, which is the area beyond the travel lane that needs to be kept clear of potential fixed-object hazards.
- **Maintenance:** For SB No. 2, no special maintenance considerations would be required. SB No. 3 would be located along the residential property line; therefore, 100 percent of the affected property owners must be in favor of the sound barrier in order for it to be constructed. In addition, the affected property owners must enter into contracts with the Department to accept aesthetic maintenance responsibility for their respective portion of the barrier upon completion. The Department would be responsible for structural integrity for the useful life of SB No. 3.
- **Security:** The sound barriers do not create any potential security risks.
- **Geotechnical Considerations:** Both sound barriers would be constructed at existing grade in native soil. Geotechnical investigations, including boreholes, would be required to determine the appropriate footings to support the proposed sound barriers.

- **Utility Relocations:** The proposed sound barriers would not require any utility relocations and would not conflict with any planned utilities. For SB No. 3, modifications to existing irrigation systems within private properties are anticipated.

Recommended Sound Barriers

Based on this study completed to date, the Department intends to incorporate noise abatement in the form of barriers along the residential property line of residences located on East Laurelwood Drive and East Sycamore Lane in the northeast quadrant of I-10 and Tippecanoe Avenue. The recommended sound barriers (SB Nos. 2 and 3) and benefited receivers are shown in Figure 2.14.2. Recommended SB Nos. 2 and 3 have respective lengths of 708 ft and 709 ft and heights of 14 ft and 8 ft, respectively. Calculations based on preliminary design data indicate that the barriers will reduce noise levels by 5 to 9 dBA for 21 residences at a cost of $678,129. If during final design conditions have substantially changed, noise abatement may not be necessary. The final decision of the noise abatement will be made upon completion of the project design and the public involvement processes.

The preliminary noise abatement decision presented in this report is based on preliminary project alignments and profiles, which may be subject to change. As such, the physical characteristics of noise abatement described herein also may be subject to change.

The following measures are required to minimize adverse construction noise impacts:

N-1 The control of noise from construction activities shall conform to the California Department of Transportation’s (Department) Standard Specifications, Section 14-8.02, “Noise Control,” and the Standard Special Provisions S5-310, “Noise Control.” The noise level from the Contractor’s operations, between the hours of 9:00 p.m. and 6:00 a.m., shall not exceed 86 A-weighted decibels (dBA) at a distance of 50 feet (ft). The Contractor shall use an alternative warning method instead of a sound signal unless required by safety laws. In addition, the Contractor shall equip all internal combustion engines with the manufacturer-recommended muffler and shall not operate any internal combustion engine on the job site without the appropriate muffler.

Figure 2.14.2 Recommended Sound Barriers and Benefited Receivers

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N-2 In accordance with the Municipal Codes of the Cities of Loma Linda and San Bernardino, construction activities shall be limited to between the hours of 7:00 a.m. and 8:00 p.m., Monday through Friday, excluding weekends and holidays.

The following abatement measure is required to minimize adverse operational noise impacts:

N-3 Prior to completion of final design, the sound barriers that are determined to be reasonable and feasible will be coordinated with the affected property owners. Sound Barriers No. 2 and 3 are required to abate an adverse noise impact.

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Biological Environment

2.15 Wetlands and Other Waters

2.15.1 Regulatory Setting

Wetlands and other waters are protected under a number of laws and regulations. At the federal level, the Clean Water Act (33 U.S.C. 1344) is the primary law regulating wetlands and waters. The Clean Water Act regulates the discharge of dredged or fill material into waters of the United States, including wetlands. Waters of the United States include navigable waters, interstate waters, territorial seas and other waters that may be used in interstate or foreign commerce. To classify wetlands for the purposes of the Clean Water Act, a three-parameter approach is used that includes the presence of hydrophytic (water-loving) vegetation, wetland hydrology, and hydric soils (soils subject to saturation/inundation). All three parameters must be present, under normal circumstances, for an area to be designated as a jurisdictional wetland under the Clean Water Act.

Section 404 of the Clean Water Act establishes a regulatory program that provides that no discharge of dredged or fill material can be permitted if a practicable alternative exists that is less damaging to the aquatic environment or if the nation's waters would be significantly degraded. The Section 404 permit program is run by the United States Army Corps of Engineers (ACOE) with oversight by the United States Environmental Protection Agency (EPA).

The Executive Order for the Protection of Wetlands (EO 11990) also regulates the activities of federal agencies with regard to wetlands. Essentially, this Executive Order states that a federal agency, such as the Federal Highway Administration (FHWA), cannot undertake or provide assistance for new construction located in wetlands unless the head of the agency finds: 1) that there is no practicable alternative to the construction and 2) the proposed project includes all practicable measures to minimize harm.

At the state level, wetlands and waters are regulated primarily by the California Department of Fish and Game (CDFG) and the Regional Water Quality Control Boards (RWQCBs). In certain circumstances, the California Coastal Commission (or Bay Conservation and Development Commission) may also be involved. Sections 1600-1607 of the Fish and Game Code require any agency that proposes a project that will substantially divert or obstruct the natural flow of or substantially change the bed or bank of a river, stream, or lake to notify CDFG before beginning construction. If CDFG determines that the project may substantially and adversely affect fish or wildlife resources, a Lake or Streambed Alteration Agreement will be required. CDFG jurisdictional limits are usually defined by the tops of the stream or lake banks, or the outer edge of riparian vegetation, whichever is wider. Wetlands under jurisdiction of the ACOE may or may not be included in the area covered by a Streambed Alteration Agreement obtained from the CDFG.

The Regional Water Quality Control Boards were established under the Porter-Cologne Water Quality Control Act to oversee water quality. The Regional Water Quality Control Board also issues water quality certifications in compliance with Section 401 of the Clean Water Act. Please see Section 2.9 Water Quality and Storm Water Runoff, for additional details.

2.15.2 Affected Environment

This section is based on the *Natural Environment Study (Minimal Impacts)* (NES[MI]) (June 2009) prepared for the project.

As discussed in more detail in Section 2.9, the project site is in the Upper Santa Ana River, Bunker Hill hydrologic subarea of the Santa Ana River watershed. The San Timoteo Creek Channel, a jurisdictional drainage, occurs within the Biological Study Area (BSA). There is a potentially jurisdictional roadside channel parallel to the south side of Interstate 10 (I-10) between San Timoteo Creek and the eastbound Tippecanoe Avenue off-ramp. It connects to San Timoteo Creek via a subsurface culvert. In addition, Gage Canal is enclosed in an underground pipe throughout the project area. Based on the results of the Jurisdictional Delineation (Appendix C of the NES[MI]) for the proposed project, the potentially jurisdictional areas in the BSA are shown in Figure 2.15.1, summarized in Table 2.15.A, and discussed in more detail below.

2.15.2.1 ACOE Jurisdictional Areas

San Timoteo Creek is a 60-foot (ft) wide concrete-lined channel near the western boundary of the project area, just south of I-10 and Redlands Boulevard. It crosses under I-10 and drains into the Santa Ana River less than 0.25 mile (mi) northwest of the project area, just west of the Waterman Avenue bridge. The Santa Ana River eventually conveys flows to the Pacific Ocean. The San Timoteo Creek Channel contains seasonal flows and urban runoff but does not contain any vegetation or sediment accumulation in the project area. It historically only conveyed flows

Figure 2.15.1 Potential Jurisdictional Areas

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Table 2.15.A Potential ACOE and CDFG Jurisdictional Areas

	Potential ACOE Waters		Potential CDFG Areas	
	Wetland	**Nonwetland**	**Wetland**	**Nonwetland**
Unnamed Channel	0 ac 0 lf	0.49 ac 3,447 lf	0 ac 0 lf	1.46 ac 3,447 lf
San Timoteo Creek Channel	0 ac 0 lf	4.00 ac 3,952 lf	0 ac 0 lf	4.00 ac 3,952 lf
Totals	**0 ac 0 lf**	**4.49 ac 7,399 lf**	**0 ac 0 lf**	**5.46 ac 7,399 lf**

Source: Natural Environment Study (Minimal Impacts) (June 2009).
ac = acres
ACOE = United States Army Corps of Engineers
CDFG = California Department of Fish and Game
lf = linear feet

intermittently, but due to agricultural and urban runoff flows it is now a relatively permanent water. It is subject to ACOE jurisdiction due to regular water flow and hydrologic connectivity with the Santa Ana River, a relatively permanent water.

The unnamed channel adjacent to the eastbound Tippecanoe Avenue off-ramp is a concrete-lined trapezoidal channel that is 6 ft wide at the bottom and 18 ft wide at the top. This drainage ditch is likely not subject to ACOE regulation. However, to expedite the permit approval process, this channel is considered potentially jurisdictional for this project in order to obtain a preliminary Jurisdictional Determination.

The San Timoteo Creek Channel and the unnamed channel are both concrete-lined, and therefore do not meet the ACOE wetland criteria. There are no areas in the BSA that satisfy all three criteria for ACOE jurisdictional wetlands (i.e., hydrophytic vegetation, hydric soils, and wetland hydrology); therefore, there are no potential ACOE jurisdictional wetlands in the BSA.

The Jurisdictional Delineation will be submitted to the ACOE to obtain a Preliminary Jurisdictional Determination as part of the permit process during the Plans, Specifications, and Estimates (PS&E) stage. Coordination with ACOE is specified in Measure WET-1 in Section 2.15.4 and Appendix E, Environmental Commitments Record.

2.15.2.2 CDFG Jurisdictional Areas

CDFG regulates wetland areas only to the extent that those wetlands are part of a river, stream, or lake as defined by the CDFG. CDFG jurisdiction typically extends beyond the streambed/banks to the limits of the riparian vegetation (if present) associated with streams, rivers, or lakes.

San Timoteo Creek does not contain any riparian vegetation or provide wildlife habitat that would be under the jurisdiction of the CDFG. The unnamed channel, although concrete-lined, supports a small amount of riparian vegetation, including mulefat and willows, at its intersection with Tippecanoe Avenue. This small patch of vegetation is established in accumulated sediment and is likely not substantial enough to provide any wildlife habitat. Additionally, any maintenance activities to clean this channel or a substantial storm event would likely result in removal of this vegetation. However, because San Timoteo Creek and the unnamed channel both convey flows into the Santa Ana River, which is less than 0.25 mi from the project site, CDFG may consider the drainages in the project area as jurisdictional due to the potential to support downstream wildlife habitat.

2.15.2.3 RWQCB Jurisdictional Areas

Because there is no public guidance on determining RWQCB jurisdictional areas pursuant to the CWA, jurisdiction was determined based on the federal definition of wetlands and other waters of the United States. Therefore, the RWQCB jurisdictional areas are assumed to be the same as those discussed above for the ACOE.

2.15.3 Environmental Consequences

2.15.3.1 Temporary Impacts

Alternative 1 – Build Alternative

Extension and seismic retrofitting of the I-10 bridge over San Timoteo Creek would result in temporary impacts to jurisdictional waters, as shown in Figure 2.15.2 and summarized in Table 2.15.B. The total temporary impacts to ACOE nonwetland waters of the United States and CDFG jurisdictional area would be 0.24 acres (ac). The total temporary impacts to potential RWQCB jurisdictional areas would be the same as those for the ACOE.

Extension of the I-10 bridge over San Timoteo Creek would result in up to 0.08 ac of temporary impacts to potential ACOE nonwetland waters of the United States and CDFG jurisdictional area within the concrete-lined San Timoteo Creek. The materials staging area would be located outside the channel, in a vacant lot adjacent to where the project work in the channel would occur.

Figure 2.15.2 Impacts to Potential Jurisdictional Areas
(Page 1 of 2)

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Figure 2.15.2 Impacts to Potential Jurisdictional Areas

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Table 2.15.B Temporary Impacts to Potential ACOE and CDFG Jurisdictional Areas

Drainage	Potential ACOE Jurisdictional Areas	Potential CDFG Jurisdictional Areas
Unnamed Channel	0 ac 0 lf	0 ac 0 lf
San Timoteo Creek Channel – Bridge Widening/Pier Extension	0.080 ac 75 lf	0.080 ac 75 lf
San Timoteo Creek Channel – Bridge Retrofit	0.16 ac 320 lf	0.16 ac 320 lf
Totals	**0.24 ac** **395 lf**	**0.24 ac** **395 lf**

Source: Natural Environment Study (Minimal Impacts) (June 2009).
ac = acres
ACOE = United States Army Corps of Engineers
CDFG = California Department of Fish and Game
lf = linear feet

Additional impacts to the San Timoteo Creek Channel would occur as a result of seismic retrofitting of the I-10 bridge. There are two alternatives for the bridge retrofit, and a final design has not been selected (refer to Chapter 1 for details of the retrofit options). Retrofit Option 1 would result in 0.16 ac of temporary impacts to potential ACOE nonwetland waters of the United States and CDFG jurisdictional area within the San Timoteo Creek Channel. Retrofit Option 2 would not result in any impacts to jurisdictional waters within the San Timoteo Creek Channel.

Construction vehicles would access the San Timoteo Creek Channel via an existing access ramp at Anderson Avenue, located approximately 0.5 mi east of the I-10 bridge. There is no vegetation in the channel in this section, and no grading would be required.

There is the potential for temporary indirect water quality impacts through sediment introduction and transport downstream. Refer to the discussion in Section 2.9 regarding this issue. Identification and implementation of erosion, sedimentation, and pollution prevention best management practices (BMPs) in the Storm Water Pollution Prevention Plan (SWPPP; refer to Section 2.9) for the project would avoid or minimize indirect impacts to jurisdictional waters during construction.

With implementation of the measures outlined below in Section 2.15.4, in addition to the water quality measures presented in Section 2.9, potential temporary impacts to wetlands and other waters would not be adverse.

Alternative 2 – No Build Alternative

The No Build Alternative would not involve construction activities associated with the Build Alternatives; therefore, no temporary impacts to potentially jurisdictional waters would occur.

2.15.3.2 Permanent Impacts

Alternative 1 – Build Alternative

Extension of the I-10 bridge over San Timoteo Creek and undergrounding of the unnamed channel would result in permanent impacts to jurisdictional waters, as shown in Figure 2.15.2 and summarized in Table 2.15.C. The total area of permanent impacts to potential ACOE nonwetland waters of the United States and CDFG jurisdictional area would be 0.47 ac and 1.42 ac, respectively. The total permanent impacts to potential RWQCB jurisdictional areas are the same as those for the ACOE.

Table 2.15.C Permanent Impacts to Potential ACOE and CDFG Jurisdictional Areas

Drainage	Potential ACOE Jurisdictional Areas	Potential CDFG Jurisdictional Areas
Unnamed Channel	0.47 ac 3,447 lf	1.424 ac 3,447 lf
San Timoteo Creek Channel – Bridge Widening/Pier Extension	0.001 ac 42 lf	0.001 ac 42 lf
San Timoteo Creek Channel – Bridge Retrofit	0 ac 0 lf	0 ac 0 lf
Totals	**0.47 ac** **3,489 lf**	**1.42 ac** **3,489 lf**

Source: Natural Environment Study (Minimal Impacts) (June 2009)
ac=acres
ACOE = United States Army Corps of Engineers
CDFG = California Department of Fish and Game
lf = linear feet

Extension of the I-10 bridge over San Timoteo Creek would result in up to 0.001 ac of permanent impacts to potential ACOE nonwetland waters of the United States and CDFG jurisdictional area. Undergrounding of the channel adjacent to the eastbound Tippecanoe Avenue off-ramp would result in approximately 0.47 ac of permanent impacts to ACOE nonwetland waters of the United States and 1.42 ac of permanent impacts to CDFG jurisdictional waters within the concrete-lined unnamed channel.

With implementation of Measures WET-1 through WET-3, which are provided below in Section 2.15.4, the potential permanent project impacts to wetlands and other waters would not be adverse.

Alternative 2 – No Build Alternative

The No Build Alternative would not result in permanent impacts to potentially jurisdictional waters.

2.15.4 Avoidance, Minimization, and/or Mitigation Measures

As presented previously in Measure WQ-1 in Section 2.9, erosion control, sedimentation control, and pollution prevention BMPs would be implemented during construction, as specified in the SWPPP. In addition, as specified in Measure WQ-2 in Section 2.9, construction within the drainages would be limited to outside the rainy season to minimize erosion and sediment deposition within the drainages. In addition, the following measures are required to avoid, minimize, and/or mitigate project impacts to waters of the United States:

WET-1 Prior to obtaining grading permits, the San Bernardino Associated Governments (SANBAG) shall submit a Pre-Construction Notification form to the United States Army Corps of Engineers to obtain coverage under a Nationwide Permit, pursuant to Section 404 of the federal Clean Water Act (CWA).

WET-2 Prior to obtaining grading permits, SANBAG shall obtain a certification of water quality or waiver from the Santa Ana Regional Water Quality Control Board (RWQCB) Region 8, pursuant to Section 401 of the federal CWA.

WET-3 Prior to obtaining grading permits, SANBAG shall obtain a letter of nonjurisdiction or a Section 1602 Streambed Alteration Agreement from the California Department of Fish and Game.

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2.16 Animal Species

2.16.1 Regulatory Setting

Many State and federal laws regulate impacts to wildlife. The United States Fish and Wildlife Service (USFWS), the National Oceanic and Atmospheric Administration (NOAA) Fisheries, and the California Department of Fish and Game (CDFG) are responsible for implementing these laws. This section discusses potential impacts and permit requirements associated with wildlife not listed or proposed for listing under the state or federal Endangered Species Acts (ESAs). All other special-status animal species are discussed here, including CDFG fully protected species and species of special concern, and USFWS or NOAA Fisheries candidate species.

Federal laws and regulations pertaining to wildlife include:

- National Environmental Policy Act
- Migratory Bird Treaty Act (MBTA)
- Fish and Wildlife Coordination Act

State laws and regulations pertaining to wildlife include:

- California Environmental Quality Act
- Sections 1600 – 1603 of the Fish and Game Code
- Section 4150 and 4152 of the Fish and Game Code

2.16.2 Affected Environment

This section is based on the *Natural Environment Study (Minimal Impacts)* (NES[MI]) (June 2009) prepared for the project.

Prior to on-site biological surveys, a literature review and records search were conducted to identify the existence or potential occurrence of sensitive or special-status biological resources (e.g., animal species) in or within the vicinity of the Biological Study Area (BSA). The BSA for the proposed project includes the entire proposed ground disturbance area associated with the interchange, including the grading limits and staging areas. The BSA is defined by the project limits and extends along Interstate 10 (I-10) from approximately 0.8 mile (mi) west of Tippecanoe Avenue to approximately 0.5 mi east of Tippecanoe Avenue, then north along Tippecanoe Avenue to East Coulston Street and south along Anderson Street to

Court Street. The results of the literature review indicated the potential occurrence of 27 special-interest animal species in the BSA.

A reconnaissance-level survey of the BSA was conducted on December 3, 2008, to generally characterize the biological resources on the site and to ascertain the presence or absence of special-status animals or the likelihood of their occurrence. The survey evaluated the BSA based on existing conditions, with particular focus on the native vegetation and sensitive species.

The BSA is characterized by developed/ornamental and ruderal vegetation. Most native vegetation has been removed or disturbed by urbanization in the area. The majority of the BSA is developed and dominated by ornamental plantings consisting of introduced plant species used for landscaping purposes. The unpaved parts of the BSA consist of predominantly nonnative ruderal vegetation. Ruderal vegetation occurs in several small, single-lot parcels throughout the BSA as well as in a large field at the east end of the BSA, north of I-10. Only a small part of this field is within the BSA.

Animal species observed or otherwise detected in the BSA during the site visit are listed in Table 2.16.A. No sensitive or special-interest animal species were observed or otherwise detected in the BSA during the site visit. There is no suitable habitat in the BSA for any of the sensitive or special-status animal species. Therefore, none of these species are expected to occur in the BSA. In addition, bats and burrowing owls are not expected to occur in the BSA due to lack of suitable roosting/burrowing habitat and foraging habitat.

The BSA does not appear to function as a wildlife movement corridor. The BSA is surrounded on all sides by development and there are no adjacent habitat areas. Additionally, San Timoteo Creek is a concrete-lined channel in the BSA and does not provide wildlife habitat.

2.16.3 Environmental Consequences

2.16.3.1 Temporary Impacts

Alternative 1 – Build Alternative

Construction of the Build Alternative would not impact any special-status species or wildlife movement corridors. However, vegetation clearing and grading associated with the Build Alternative would disturb nonnative trees and shrubs that may provide

Table 2.16.A Animal Species Observed

Scientific Name	Common Name
AVES	**BIRDS**
Accipitridae	**Kites, Hawks, and Eagles**
Buteo jamaicensis	Red-tailed hawk
Columbidae	**Pigeons and Doves**
Columba livia (nonnative species)	Rock pigeon
Zenaida macroura	Mourning dove
Tyrannidae	**Tyrant Flycatchers**
Sayornis nigricans	Black phoebe
Corvidae	**Crows and Ravens**
Corvus brachyrhynchos	American crow
Mimidae	**Mockingbirds and Thrashers**
Mimus polyglottos	Northern mockingbird
Sturnidae	**Starlings**
Sturnus vulgaris (nonnative species)	European starling
Fringillidae	**Finches**
Carpodacus mexicanus	House finch
Passeridae	**Old World Sparrows**
Passer domesticus (nonnative species)	House sparrow

Source: *Natural Environment Study (Minimal Impacts)* (June 2009).

nesting habitat for migratory birds. Compliance with the MBTA and the California Fish and Game Code would be required to avoid or minimize potential impacts to migratory birds during construction.

With implementation of Measure AN-1, provided below, potential temporary impacts during project construction to migratory birds would not be adverse.

Alternative 2 – No Build Alternative

Under the No Build Alternative, no construction would occur, and there would be no impacts to special-status animal species.

2.16.3.2 Permanent Impacts

Alternative 1 – Build Alternative

Implementation of the Build Alternatives would result in the loss of a minor number of nonnative trees and shrubs to accommodate widening of the freeway and realignment of the ramps. The BSA does not support any native habitats. Impacts to nonsensitive habitats are not considered substantial because of the small area of impact and the existing disturbed nature of the habitats.

Alternative 2 – No Build Alternative

Under the No Build Alternative, no improvements would occur; therefore, no permanent impacts to animal species would occur.

2.16.4 Avoidance, Minimization, and/or Mitigation Measures

The following measure is required to avoid, minimize, and/or mitigate project impacts to migratory birds:

AN-1 To comply with the Migratory Bird Treaty Act and the California Fish and Game Code, Section 3503, the construction contractor shall restrict vegetation clearing to outside the active breeding season (February 15–August 15) for birds. If vegetation clearing is scheduled during breeding season, the San Bernardino Associated Governments (SANBAG) shall ensure that a qualified biologist conducts clearance surveys for active bird nesting immediately prior to any clearing of vegetation. This is necessary to definitively ascertain whether any raptors or other migratory birds are actively nesting in the Biological Study Area (BSA). During the clearance surveys, the locations of any active bird nests shall be mapped by the biologist, and an appropriate buffer (e.g., a 500-foot buffer) where work will not take place shall be established and monitored. The buffer shall be delineated by roping or flagging the boundaries and shall remain in place until the nest is either abandoned or the young have fledged.

2.17 Invasive Species

2.17.1 Regulatory Setting

On February 3, 1999, President Clinton signed Executive Order 13112 requiring federal agencies to combat the introduction or spread of invasive species in the United States. The order defines invasive species as "…any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to human health." Federal Highway Administration (FHWA) guidance issued August 10, 1999 directs the use of the State's noxious weed list to define the invasive plants that must be considered as part of the NEPA analysis for a proposed project.

2.17.2 Affected Environment

Plant species observed in the BSA during the site visit are listed in Table 2.17.A. There are exotic plant species within the nonnative plant communities throughout the Biological Study Area (BSA), in areas that have been disturbed by human uses. Exotic species are typically more numerous adjacent to roads and developed areas and frequently border ornamental landscapes. In the past, the BSA likely supported grasslands, oak woodland, Venturan coastal sage scrub, and riparian habitats. Consequently, scattered plant species associated with these plant communities are often found in the BSA.

The California Invasive Plant Council (Cal-IPC) 2006 Invasive Plant Inventory and 2007 Invasive Plant Inventory Update are based on information submitted by members, land managers, botanists, and researchers throughout the State as well as published sources. The inventory highlights nonnative plants that are serious problems in wildlands (natural areas that support native ecosystems, including national, State, and local parks; ecological reserves; wildlife areas; National Forests; Bureau of Land Management lands; etc.). The inventory categorizes plants as High, Moderate, or Limited based on the species' negative ecological impact in California. Plants categorized as High have severe ecological impacts. Plants categorized as Moderate have substantial and apparent, but not severe, ecological impacts. Plants categorized as Limited are invasive, but their ecological impacts are minor on a statewide level. The invasive plant species identified within the BSA are primarily categorized as Moderate or Limited on the Cal-IPC Invasive Plant Inventory.

Table 2.17.A Plant Species Observed

Scientific Name	Common Name
Pinaceae	**Pine family**
Pinus sp.	Pines
Anacardiaceae	**Sumac family**
Malosma laurina	Laurel sumac
Schinus molle (nonnative species)[1]	Peruvian pepper tree
Apocynacecae	**Dogbane family**
Nerium oleander (nonnative species)	Oleander
Asteraceae	**Sunflower family**
Artemisia californica	California sagebrush
Baccharis salicifolia	Mulefat
Conyza canadensis	Canadian horseweed
Encelia farinose	Brittlebush
Brassicaceae	**Mustard family**
Hirschfeldia incana (nonnative species)	Shortpod mustard
Chenopodiaceae	**Saltbush family**
Salsola tragus (nonnative species)	Russian thistle
Euphorbiaceae	**Spurge family**
Ricinus communis (nonnative species)	Castor bean
Hydrophllaceae	**Waterleaf family**
Phacelia sp.	Phacelia
Myrtaceae	**Myrtle family**
Eucalyptus sp. (nonnative species)	Eucalyptus
Polygonaceae	**Buckwheat family**
Eriogonum fasciculatum	California buckwheat
Salicaceae	**Willow family**
Salix lasiolepis	Arroyo willow
Solanaceae	**Nightshade family**
Nicotiana glauca (nonnative species)	Tree tobacco
Tamaricaceae	**Tamarisk family**
Tamarix sp. (nonnative species)	Tamarisk
Arecaceae	**Palm family**
Phoenix sp. (nonnative species)	Date palm
Washingtonia filifera	California fan palm
Washingtonia robusta (nonnative species)	Mexican fan palm
Poaceae	**Grass family**
Bromus sp.	Brome
Cynodon dactylon (nonnative species)	Bermuda grass

Source: *Natural Environment Study (Minimal Impacts)* (June 2009).
[1] Plant species listed as nonnative species are also included on the California Invasive Plant Council (Cal-IPC) Invasive Plant Inventory.

2.17.3 Environmental Consequences

2.17.3.1 Temporary Impacts

Alternative 1 – Build Alternative

Impacts related to invasive species are considered permanent impacts because the introduction of invasive species into previously undisturbed areas would result in permanent impacts to the habitat. Therefore, impacts related to invasive species as a result of the proposed project are described below under permanent impacts.

Alternative 2 – No Build Alternative

Under the No Build Alternative, there would be no construction and no temporary project-related changes to the extent of invasive species that occur within the BSA.

2.17.3.2 Permanent Impacts

Alternative 1 – Build Alternative

The construction of the Build Alternative has the potential to spread invasive species by the entering and exiting of construction equipment contaminated by invasive species, the inclusion of invasive species in seed mixtures and mulch, disturbances to soil surfaces, and improper removal and disposal of invasive species that results in the seed being spread along the highway. With implementation of Measures IS-1, IS-2, and IS-3 provided below, potential project-related permanent impacts related to invasive species would not be adverse.

Alternative 2 – No Build Alternative

The No Build Alternative would not result in the construction of any improvements to I-10, and therefore would not result in any adverse permanent impacts related to invasive species.

2.17.4 Avoidance, Minimization, and/or Mitigation Measures

The following measures are required to avoid, minimize, or mitigate project impacts related to invasive species:

IS-1 The construction contractor shall be required to inspect and clean construction equipment to minimize the importation of nonnative plant material, and eradication strategies (i.e., weed abatement programs) shall be employed should an invasion occur.

IS-2 In compliance with Executive Order 13112, affected areas shall be revegetated with plant species native to the vicinity, and use of species listed on the California Invasive Plant Council’s Invasive Plant Inventory with a high or moderate rating shall be avoided.

IS-3 During construction, the contractor shall follow all pollution and litter laws and regulations.\

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2.18 Cumulative Impacts

2.18.1 Regulatory Setting

Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of this project. A cumulative effect assessment looks at the collective impacts posed by individual land use plans and projects. Cumulative impacts can result from individually minor, but collectively substantial, impacts taking place over a period of time.

Cumulative impacts to resources in the project area may result from residential, commercial, industrial, and highway development, as well as from agricultural development and the conversion to more intensive types of agricultural cultivation. These land use activities can degrade habitat and species diversity through consequences such as displacement and fragmentation of habitats and populations, alteration of hydrology, contamination, erosion, sedimentation, disruption of migration corridors, changes in water quality, and introduction or promotion of predators. They can also contribute to potential community impacts identified for the project, such as changes in community character, traffic patterns, housing availability, and employment.

Section 15130 of the CEQA Guidelines describes when a cumulative impact analysis is warranted and what elements are necessary for an adequate discussion of cumulative impacts. The definition of cumulative impacts, under CEQA is provided in Section 15355 of the CEQA Guidelines. A definition of cumulative impacts, under NEPA, is provided in 40 CFR, Section 1508.7 of the CEQ Regulations.

2.18.2 Affected Environment

The project site is in San Bernardino County, California, on Interstate 10 (I-10) at the Tippecanoe Avenue interchange. The project covers a distance of approximately 1.5 miles (mi) along I-10 in an urban area within the Cities of San Bernardino and Loma Linda. The I-10/Tippecanoe Avenue interchange provides local access to the part of the City of San Bernardino within the San Bernardino International Airport Influence Area and is the main access to the City of Loma Linda, including Loma Linda University Medical Center, Loma Linda University, and the Jerry Pettis Veterans Administration Hospital.

Census Tract 72 (Figure 2.3.1, presented previously in Section 2.3.1.2), in the City of San Bernardino, is dominated by commercial retail centers and industrial development. The Santa Ana River bisects the census tract. Older residential developments are concentrated in the southeast part of this census tract, but part of this area is designated for commercial and industrial redevelopment to be compatible with the adjacent San Bernardino International Airport and Trade Center uses. Census Tract 73.01, in the City of Loma Linda, is primarily residential and institutional and includes Loma Linda University Medical Center, Loma Linda University, and the Jerry Pettis Veterans Administration Hospital. These two census tracts are mostly centered on the I-10/Tippecanoe Avenue interchange, with their east and west borders near the adjacent I-10 interchanges.

2.18.3 Methodology

The cumulative impact analysis for the project was developed by following the eight-step process as set forth in the California Department of Transportation (Department) *Standard Environmental Reference* (SER) *Guidance for Preparers of Cumulative Impact Analysis* (2005). The eight-step process is as follows:

- Identify resources to be analyzed
- Define the study area for each resource
- Describe the current health and historical context for each resource
- Identify direct and indirect impacts of the proposed project
- Identify other reasonably foreseeable actions that affect each resource
- Assess potential cumulative impacts
- Report results
- Assess the need for mitigation

As specified in the Department/FHWA guidance, if the proposed project would not result in a direct or indirect impact to a resource, it would not contribute to a cumulative impact on that resource. This cumulative impact analysis includes resources that are substantially impacted by the project and resources that are currently in poor or declining health, or at risk even if the project's impacts to that resource would not be substantial.

The reasonably foreseeable actions used in this cumulative analysis were based on information provided by the Cities of San Bernardino and Loma Linda, which identified approved and pending developments in proximity to the project area.

Examples of reasonably foreseeable actions included: future development for which a General Plan or Specific Plan has been adopted that designates future land uses;

projects for which the applicable jurisdiction has received an application for site development; or infrastructure improvement projects approved or planned by the local jurisdictions or another public agency. The reasonably foreseeable actions in the vicinity of the project area are listed in Table 2.1.A and shown previously on Figure 2.1.3 in Section 2.1.3.2.

2.18.4 Resources Excluded from Cumulative Impacts Analysis

The proposed project includes the addition of an eastbound auxiliary lane on I-10 from Waterman Avenue to Tippecanoe Avenue; widening of I-10 bridges over San Timoteo Creek and Tippecanoe Avenue; widening of Anderson Street/Tippecanoe Avenue and Redlands Boulevard; construction of a roadway to connect East Coulston Street, East Lee Street, and East Laurelwood Drive; and elimination of the South Ferree Street connection to East Rosewood Drive. Based on the nature of the project, the nature of the project area, and the technical studies prepared for this Initial Study/ Environmental Assessment (IS/EA), the following resources would not be substantially impacted by the proposed project and are not at risk:

- **Land Use.** The interchange improvements, auxiliary lane, and local street improvements to accommodate the Build Alternative are consistent with local and regional goals to improve traffic operations and reduce congestion in the area. The conversion of the impacted residential and commercial properties to transportation uses is consistent with the Cities' General Plans and local agencies' redevelopment plans to increase job opportunities in the area due to the closure of the former Norton Air Force Base. Specifically, the Inland Valley Development Agency (IVDA) Redevelopment Plan, which is included in the City of San Bernardino General Plan, designates the northeast quadrant of the I-10/ Tippecanoe Avenue interchange for commercial and industrial redevelopment to allow appropriate land types in the vicinity of San Bernardino International Airport. The residential parcels in the northeast quadrant are designated CG-1 (Commercial General), which does not permit single-family residences except by Conditional Use Permits. Therefore, future planned redevelopment of this area would change the land use from residential to commercial or industrial.
- **Growth.** The Build Alternative would improve existing and future traffic operations, reduce congestion, and accommodate existing and future planned growth. The Build Alternative does not induce growth or remove obstacles to growth in the area.

- **Utilities and Emergency Services**. Utilities and emergency services would only be impacted during the construction period. The project would not result in permanent impacts to utilities or emergency services.
- **Traffic and Transportation/Pedestrian and Bicycle Facilities.** The Build Alternative would improve traffic operations and reduce congestion. Pedestrian access would be maintained and bicycle lanes would be provided consistent with the Cities' General Plans. Construction-related traffic impacts would be avoided or minimized through implementation of a comprehensive Transportation Management Plan (TMP).
- **Visual/Aesthetics.** The Build Alternative would not substantially change the existing views of and from the I-10/Tippecanoe Avenue interchange.
- **Cultural Resources.** Although the record search conducted for the project indicated numerous previously recorded cultural resources in the study area, none would be impacted by the project. Therefore, the Build Alternative would not impact known historic properties. While cultural resources in the study area outside the APE may be directly or indirectly impacted by other projects, the proposed project would not directly or indirectly impact those resources.
- **Hydrology and Floodplain.** The Build Alternative would make minor modifications to existing drainage and flood control channels. Temporary impacts would be avoided or minimized through implementation of Erosion Control Best Management Practices (BMPs). This alternative would not result in permanent impacts to drainages or floodplains.
- **Geology and Soils.** The Build Alternative would not result in substantial temporary impacts. Temporary impacts would be avoided or minimized through implementation of Soil Management BMPs. This alternative would not result in permanent impacts to soils.
- **Air Quality.** The Build Alternative would not result in a violation of existing air quality standards. Temporary impacts would be minimized through implementation of dust control and equipment handling measures.
- **Natural Communities.** The project area is urban and disturbed, and no natural communities would be temporarily or permanently impacted by the Build Alternative.
- **Wetlands and Other Waters.** The proposed project would not impact wetlands. Potential nonwetland jurisdictional areas that would be temporarily and/or permanently impacted by the Build Alternative (through covering or enclosure) are concrete-lined channels. No conversion of natural streambeds would occur.

- **Plant Species.** No sensitive plant species would be temporarily or permanently impacted by the Build Alternative.
- **Animal Species.** No sensitive animal species would be temporarily or permanently impacted by the Build Alternative.
- **Threatened or Endangered Species.** No threatened or endangered species would be temporarily or permanently impacted by the Build Alternative.
- **Invasive Species.** The Build Alternative would not substantially increase the potential for the spread of invasive species. Compliance with standard procedures would be sufficient to address this impact.

2.18.5 Resources Evaluated for Cumulative Impacts

The following resource areas have the potential to be adversely affected by the cumulative impacts of the proposed project in combination with the potential impacts of the reasonably foreseeable actions described above:

- Community impacts
- Water quality and storm water runoff
- Paleontology
- Hazardous waste/materials
- Noise

2.18.6 Environmental Consequences

The following discussion of potential cumulative impacts is presented by environmental resource area. No cumulative impact discussion is provided for the No Build Alternative because the No Build Alternative would not result in either temporary or permanent changes to the environment that could contribute to cumulative impacts.

2.18.6.1 Community Impacts

This section is based on the information from the *Community Impact Assessment* (April 2009), *Initial Site Assessment Report* (March 2009), *Archaeological Survey Report* (June 2009), and *Historical Resources Evaluation Report* (June 2009).

The cumulative resource study area (RSA) for community impacts comprises Census Tract 72 in the City of San Bernardino and Census Tract 73.01 in the City of Loma Linda. These census tracts could be reasonably affected by land acquisition, construction impacts, or displacements.

The RSA was primarily either in agricultural use (fields) or undeveloped and in a natural state in the 1930s and the 1940s. Roads in the area during this time included Tippecanoe Avenue, Anderson Street, Redlands Boulevard, Richardson Street, and Waterman Avenue. Residential and commercial structures were located along these roads. Transcontinental railway lines and a favorable climate fostered the area's prosperity as a citrus-growing region. This reputation and industry were dominant until the onset of World War II, when agricultural uses began to be displaced by the establishment of Kaiser Steel and the expansive military presence at what would become Norton Air Force Base, which operated from 1941 to 1994.

I-10 was constructed in the RSA in 1962. This spurred commercial development in the RSA in the 1960s and 1970s. Loma Linda University was established in 1961 from a college that first opened in 1909. By the 1940s, the Loma Linda community was transformed from an agricultural area into a developed suburb of San Bernardino.

Currently, Census Tract 72 is dominated by commercial-retail and industrial uses, with a few residential subdivisions. Older residential areas have been redeveloped with commercial-retail uses. Census Tract 73.01 is reflective of the City of Loma Linda itself, and is more stable and characterized by residential, educational, and hospital uses.

Alternative 1 – Build Alternative

Direct Impacts

Temporary road detours and access restrictions during construction would affect residents in the vicinity of the project census tract limits. However, those temporary impacts would be substantially minimized by implementation of a TMP, and substantial disruptions to the local neighborhoods in the project area during construction are not anticipated.

The proposed project would require the full acquisition of 25 residential parcels, 5 commercial parcels, and 8 vacant parcels. The Build Alternative would also require the partial acquisition of 4 residential parcels, 18 commercial parcels, and 8 vacant parcels. Because the proposed project would require the acquisition of residential and commercial properties, it would result in the displacement of residents and employees. The project would not divide the community because the acquisitions would occur on properties bordering the I-10 westbound off-ramp or Tippecanoe Avenue/Anderson Street. Local circulation would be improved. The proposed project would not independently impact the community because the area of permanent residential acquisitions is already planned for redevelopment by the Inland Valley Development Agency (IVDA), and these impacts were previously evaluated. As reported in the 2000 Census, the majority of the residents in the project area have lived in the neighborhood less than 5 years, indicating a neighborhood with frequent turnover and only moderate community cohesion. In addition, given the recent downward trends in the housing market, it is anticipated that adequate replacement housing and business properties would be available in the project area cities for residents and businesses displaced by the proposed project.

Because the overall proportions of minority and low-income persons in the project area census tracts are comparable to those within the Cities of San Bernardino and Loma Linda, the Build Alternative would not result in temporary construction or permanent impacts that are predominantly borne by a minority or low-income population, nor would the project-related impacts be appreciably more severe to these populations. Therefore, the Build Alternative would not have disproportionately high or adverse direct impacts to non-White, Hispanic, low-income, or transit-dependent residents within the reference populations, per Executive Order (EO) 12898 regarding environmental justice.

Indirect Impacts

Temporary indirect impacts to the community as a result of access restrictions and road detours during construction are not anticipated.

Because the proposed project would involve improvements to an existing interchange, and because the area is designated for redevelopment, permanent indirect impacts to the surrounding community associated with displacements are not anticipated.

Cumulative Impacts

The proposed project would provide better access to surrounding commercial-retail centers, the San Bernardino International Airport and Trade Center, Loma Linda University, and Loma Linda Medical Center. The City of Loma Linda has recently adopted a new General Plan that emphasizes maintenance of its residential, open space, and institutional areas. The City of San Bernardino has designated much of Census Tract 72 for commercial and industrial use in order to maintain uses that are compatible with the nearby airport to minimize noise and quality of life concerns for people residing in San Bernardino. The City of San Bernardino General Plan identifies the IVDA planned redevelopment areas that occur within the RSA.

Direct Impacts

The reasonably foreseeable projects listed in Table 2.1.A in Section 2.1.3.2 are infill projects on vacant properties or existing facilities (in the case of the transportation projects). Therefore, there would be no displacements associated with these projects. Like the proposed project, these projects are within the study area census tracts, whose low-income and minority population percentages are consistent with the percentages in the two cities as a whole. The community impacts associated with the IVDA redevelopment area have already been evaluated. Although the proposed project involves some residential and commercial displacements, it is consistent with approved plans that have focused on compatible surrounding land uses for economic/ employee and residential/resident benefits. For these reasons, cumulative direct community impacts would not be adverse.

Indirect Impacts

Because the proposed project is consistent with approved land use plans, indirect cumulative community impacts are not anticipated.

2.18.6.2 Water Quality and Storm Water Runoff

This section is based on the *Water Quality Assessment Report* (May 2009).

The RSA for water quality and storm water runoff is the Bunker Hill subwatershed of the Upper Santa Ana River Watershed, as the project area is tributary to this watershed. The Bunker Hill subwatershed is bounded by the San Bernardino Mountains to the north, east, and west, and by the Box Springs Mountains to the south. This watershed is primarily developed with urban uses. The Santa Ana River crosses the RSA approximately 2 mi north of the interchange. San Timoteo Creek (Reach 1A) crosses under I-10 and flows into the Santa Ana River (Reach 5) just west of the Waterman Avenue bridge. Reach 1A of San Timoteo Creek is defined as the segment of the creek from the Santa Ana River confluence to Barton Road in Loma Linda. Reach 5 of the Santa Ana River is defined as the segment of the river from the San Jacinto Fault in San Bernardino to the Seven Oaks Dam near Redlands.

The most serious regional issue in the Santa Ana River Watershed is degradation of water quality by nitrogen and total dissolved solids (TDS). Historically, the Santa Ana River and its major tributaries flowed year-round; however, diversion for irrigation has resulted in decreased flow and groundwater recharge. The primary water quality concerns in Reach 5 of the Santa Ana River and San Timoteo Creek are TDS and nitrate levels.

The Bunker Hill B Groundwater Management Zone consists of alluvial materials that underlie the San Bernardino Valley. The Bunker Hill B Groundwater Management Zone is bounded by consolidated rocks of the San Bernardino Mountains to the north, the Crafton Hills to the east, the San Jacinto Fault to the west, and the Bunker Hill A Groundwater Management Zone to the north.[1] The Bunker Hill B Groundwater Management Zone is recharged by rain, runoff from the surrounding mountains, and imported water. TDS levels in the Bunker Hill B Groundwater Management Zone range from 150 to 550 milligrams/liter (mg/L) and average 324 mg/L. Primary water quality concerns include TDS and nitrate levels in groundwater.

Alternative 1 – Build Alternative

Direct Impacts

Pollutants of concern during construction include sediments, trash, petroleum products, concrete waste (dry and wet), sanitary waste, and chemicals. Each of these pollutants on its own or in combination with other pollutants can have a detrimental effect on water quality. During project-related construction activities, excavated soil would be exposed, and there would be an increased potential for soil erosion compared to existing conditions. Chemicals, liquid products, petroleum products (such as paints, solvents, and fuels), and concrete-related waste may be spilled or leaked, and may have the potential to be transported off the project site in storm water runoff into receiving waters.

During construction of the new pier wall, chemicals, liquid products, petroleum products, and concrete-related waste spills would have a higher potential to impact water quality due to the vicinity of surface waters. In addition, undergrounding of the unnamed storm drain would have the potential to cause increased erosion and introduce sediment and sediment-related pollutants to the storm drain system because the existing concrete channel would be removed and replaced with a box culvert or the equivalent.

Under the General Construction Activity National Pollutant Discharge Elimination System (NPDES) Permit, the Build Alternative would be required to prepare a Storm Water Pollution Prevention Program (SWPPP) and implement construction BMPs detailed in the SWPPP during construction activities. Construction BMPs would be designed to minimize erosion and prevent spills.

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[1] California Department of Water Resources. 2004. *California's Groundwater, Bulletin 118 Update*.

The Build Alternative would alter the land use in the project area, replacing vacant, commercial, and residential uses with transportation uses that would change the concentrations of pollutants in storm water runoff. Runoff from the project area would be expected to contain higher concentrations of metals and oil and grease and lower levels of bacteria, viruses, nutrients, and pesticides compared to existing conditions.

Road runoff in the project area is currently not treated. As part of the Build Alternative, BMPs would be implemented to target constituents of concern in storm water runoff from the project area. The proposed project would not contribute to dry-weather runoff. Potential Treatment BMPs include biofiltration swales, media filters, and/or detention basins. The Treatment BMPs would target constituents of concern from transportation facilities and would provide a water quality benefit.

Indirect Impacts

Potential indirect water quality impacts include degradation of downstream waters or aquatic species. For example, aquatic habitats are sensitive to fluctuations in dissolved oxygen levels, turbidity, nutrients, and toxicity associated with urban runoff.

Because project Treatment BMPs would target constituents of concern from transportation facilities, and existing storm water runoff from the interchange is not currently treated, indirect impacts are not anticipated.

Cumulative Impacts

The existing trend of urbanization of the Bunker Hill subwatershed is projected to continue. The continued conversion of undeveloped land to transportation, commercial/industrial, or residential uses would result in hydromodification and increased loading of pollutants into surface waters and indirectly into groundwater. It would also introduce new sources of pollutants associated with the new land uses. Land use changes can result in increased pollutant loading.

To counteract the impacts associated with increased development, each project must undergo review by the Lead Agency for compliance with NPDES permits for construction activities, groundwater dewatering, and project operations, as well as compliance with local urban runoff ordinances. For projects within Department jurisdiction, such as the I-10 High-Occupancy Vehicle (HOV) lane project, this includes compliance with the Storm Water Management Plan (SWMP) and any local requirements of the Santa Ana Regional Water Quality Control Board (RWQCB). For the other reasonably foreseeable projects, this includes compliance with the San Bernardino County Water Quality Management Plan (WQMP), as specified in local ordinances. BMPs must be employed in site design to reduce sources of pollutants and to treat storm water runoff.

Direct Impacts

The purpose of the NPDES permit program is to protect and restore the beneficial uses of receiving waters. Compliance with the NPDES program, based on land use and pollutants of concern, is considered sufficient to minimize impacts to water quality. Because the Build Alternative involves improvements to an existing freeway facility and includes treatment measures that currently do not exist, the project would not contribute considerably to cumulative direct water quality impacts.

Indirect Impacts

Because the treatment of storm water would reduce impacts to downstream waters and aquatic species, indirect cumulative impacts are not anticipated.

2.18.6.3 Paleontology

The RSA for paleontology is the San Bernardino Basin, which is within the northwestern Peninsular Range Province of Southern California. It is roughly bounded on the northeast by the San Andreas Fault, on the southwest by the San Jacinto Fault, on the south by the Crafton Hills, and on the north by the mouth of Cajon Canyon. The San Bernardino Basin is an asymmetric basin that at depth contains the same metamorphic and granitic rock units that characterize the San Gabriel Mountains.

A series of alluvial fans ring most of the San Bernardino Basin. Major drainages in the basin include the southeast-flowing Lytle and Cajon Creeks, the southwest-flowing Waterman and City Creeks, the northwest-flowing San Timoteo Creek, and the west-flowing Santa Ana River and Mill Creek. These drainages converge with drainages from the Peninsular Ranges at the southwestern edge of the basin to form the trunk of the Santa Ana River.

Geologic mapping indicates that the RSA is located on deposits of late Holocene Alluvium and Holocene to late Pleistocene Alluvium primarily derived from the northwest-flowing San Timoteo Creek and the west-flowing Santa Ana River. These sediments represent a thin veneer overlying late to early Pleistocene alluvial deposits that crop out on the surface approximately 2.5 mi south of the project interchange.

The potential for near-surface late Pleistocene fossils from the northern Perris block, located immediately west of the project area at depths beginning as shallow as 3 feet (ft) below ground surface (bgs), has been noted, and this 3 ft depth of occurrence of Pleistocene fossils is consistent with that found elsewhere in the northern Peninsular Range Province near San Bernardino, Fontana, and Rancho Cucamonga, and in the Pomona Valley near Chino. The literature review indicated that several paleontological resource localities are known from this part of San Bernardino County.

Fossils of Rancholabrean-type animals such as elephants, horses, bison, camels, saber-tooth cats, deer, and sloths have been found in similar alluvial deposits from excavations for roads, land development, and quarries throughout California and the west. Therefore, the potential exists to encounter similar fossils during ground-disturbing activities whenever these sediments are encountered.

Alternative 1 – Build Alternative

Direct Impacts

The Build Alternative would require ground disturbance and modification to existing freeway and local street structures. These construction activities could result in impacts to paleontological resources. The potential impacts to paleontological resources would be permanent impacts. Analysis of temporary impacts is not applicable.

As discussed above, the project area has the potential for significant, unrenewable paleontological resources to be encountered at depths greater than 3 ft bgs. Potentially fossiliferous sediments may be encountered during excavation for the proposed project, which is currently estimated to be up to 7 ft bgs for normal excavation and deeper if cast-in-drilled-hole (CIDH) or driven piles are used for bridge supports. However, CIDH piles and driven piles are not conducive to the collection of paleontological resources, as the resources would usually not be visible and there would be no way to safely collect resources. Construction of some features of the Build Alternative would primarily be restricted to artificial fill or areas that cannot be physically monitored; however, it is very likely that sensitive sediments will be encountered during construction of the westbound off-ramp and on-ramp, the eastbound auxiliary lane, and retaining walls and sound walls; modifications to the San Timoteo Creek undercrossing; and local surface street improvements. Compliance with the Paleontological Mitigation Plan (PMP) is required.

Indirect Impacts

Impacts to paleontological resources are direct in nature; the physical impact to one resource does not indirectly affect another. Therefore, no indirect impacts would occur.

Cumulative Impacts

Direct Impacts

All the reasonably foreseeable projects with deep excavation into Pleistocene Alluvium have the potential to result in adverse direct impacts to paleontological resources. The Build Alternative is required to implement a PMP, which includes monitoring and recovery of paleontological resources that are found during project construction. A PMP will be required for every project with high-sensitivity sediments that is subject to Department oversight. For other projects, implementation of and adherence to a Paleontological Resources Mitigation Program would be required to minimize impacts to resources within high-sensitivity sediments. Because the Build Alternative includes this requirement, this project’s contribution to cumulative paleontological resources impacts would not be considerable.

Indirect Impacts

No indirect cumulative impacts are associated with paleontological resources.

2.18.6.4 Hazardous Waste/Materials

This section is based on the *Initial Site Assessment Report* (March 2009).

The RSA for hazardous waste/materials is the area up to one-eighth mile from the project area, as this is area that could be reasonably impacted by past or present use, storage, or generation of hazardous waste/materials. During the 20th century, the RSA transitioned from agricultural uses to the commercial-retail and residential uses that now surround the interchange. The RSA is characterized by commercial-retail development and a residential subdivision in the City of San Bernardino, and by commercial-retail strip malls and San Timoteo Creek in the City of Loma Linda. Hazardous waste/materials in the RSA are typical of human development and include asbestos, lead, underground fuel storage tanks, solvents, fertilizers, pesticides, polychlorinated biphenyls (PCBs), and vehicle pollutants.

Alternative 1 – Build Alternative

Direct Impacts

Construction of the Build Alternative would involve disturbance of existing soils and structures; therefore, hazardous soil contaminants (e.g., aerially deposited lead

[ADL], lead-based paint [LBP], and gasoline) and structural materials (e.g., PCBs, mercury, LBP, and asbestos-containing materials [ACM]) may be encountered during project construction. In addition, there is the potential for gasoline-impacted soil to be encountered during excavation activities near or at the Thrifty Oil Company property and the former Union 76 service station.

Typical hazardous materials used during construction (e.g., solvents, paints, fuels) would be handled in accordance with standard procedures during construction of the Build Alternative. There are standard regulations and Department policies (avoidance and minimization measures) that must be followed with respect to the use, storage, handling, disposal, and transport of potentially hazardous materials during construction of the Build Alternative to protect human health and the environment.

Routine maintenance activities during operation of the Build Alternative would be required to follow applicable regulations with respect to the use, storage, handling, transport, and disposal of potentially hazardous materials. Therefore, the operation of the Build Alternative will not result in direct adverse impacts related to hazardous waste or materials.

Indirect Impacts

There is the potential for illegal use or disposal of hazardous materials to prevent the designated use of a particular property. The proposed project does not involve the regular use or disposal of hazardous materials, and the Department will adhere to applicable regulations with respect to hazardous materials. Therefore, indirect impacts are not anticipated.

Cumulative Impacts

Direct Impacts

The reasonably foreseeable projects are consistent with the existing land uses in the area. Therefore, they can be expected to disturb or contribute hazardous waste/ materials similar to those disturbed or contributed by the proposed project.

Hazardous waste/materials are heavily regulated, and there are regulations to remediate historical hazardous waste as well as to prevent the release of hazardous waste/materials into the environment. Therefore, the reasonably foreseeable projects would not be anticipated to introduce substantial risks related to the use, storage, or disposal of hazardous waste/materials.

Because the Build Alternative does not rely on the substantial ongoing use of hazardous materials or the production of hazardous waste, its contribution to direct hazardous waste/materials impacts would not be cumulatively considerable.

Indirect Impacts

Because the Build Alternative does not rely on the substantial ongoing use of hazardous materials or the production of hazardous waste, its contribution to indirect hazardous waste/materials impacts would not be cumulatively considerable.

2.18.6.5 Noise

This section is based on the *Noise Study* (April 2009) and the *Noise Abatement Decision Report* (May 2009).

Because the proposed project is an interchange improvement project associated with traffic noise, the RSA for noise analysis includes the areas adjacent to the project area. Noise is localized and decreases rapidly with geographic distance.

During the 20th century, the RSA transitioned from agricultural uses to the commercial-retail and residential uses that now surround the interchange. The predominant noise source in the RSA is traffic noise from I-10 and local streets.

Alternative 1 – Build Alternative

Direct Impacts

Two types of short-term noise impacts would occur during project construction. The first would be from construction crew commutes and the transport of construction equipment and materials to and from the project site. These activities would incrementally raise noise levels on access roads leading to the project site. A high single-event noise exposure potential at a maximum level of 87 A-weighted decibels (dBA) maximum instantaneous noise level (L_{max}) from trucks passing at 50 ft would occur. However, the volume of the projected construction traffic would be minimal when compared to existing traffic volumes on I-10, Tippecanoe Avenue, Anderson Street, and Redlands Boulevard, and its associated short-term noise level change would not be perceptible. Therefore, project-related short-term construction worker commutes and equipment transport noise impacts would not be substantial.

The second type of short-term noise impact is related to noise generated during excavation, grading, and road construction. The worst-case composite noise level at the nearest residence during this phase of construction from equipment would be 91 dBA L_{max} at a distance of 50 ft from an active construction area. In addition to standard construction equipment, the Build Alternative will require the use of pile drivers. Pile driving generates noise levels of approximately 93 dBA L_{max} at 50 ft. If the pile driving is conducted concurrently with the site preparation, the project construction could potentially generate noise levels of 95 dBA L_{max} at a distance of 50 ft.

The closest sensitive receivers are within 50 ft of the project construction areas. Therefore, these receiver locations may be subject to short-term noise levels of 95 dBA L_{max} or higher generated by construction activities on the project site.

The predicted future worst-case long-term noise levels at the representative sensitive receiver locations in the project area were determined with existing walls and with no new modeled sound barriers (SBs), using the worst-case traffic volumes on I-10 and the I-10 westbound loop on-ramp/eastbound on-ramp.

Under the future with project conditions, 16 receivers would approach or exceed the Noise Abatement Criteria (NAC) under Activity Category B, which has an exterior NAC of 67 dBA equivalent continuous noise level (L_{eq}) for residential uses. In the future (2035) build condition, Receivers R-2 through R-6 would experience at least a 3 dBA increase in noise levels, and noise levels would exceed the City of San Bernardino exterior noise standard of 65 dBA community noise equivalent level (CNEL). A 3 dBA change is the lowest level that is perceptible by the average human ear in an outdoor environment. Because these receivers would be exposed to noise levels above City standards in the future (2035) build condition and the change would be detectable, this increase is considered significant under CEQA. A sound barrier with a minimum height of 10 ft to shield these receivers would abate the adverse impact (refer to Appendix A, CEQA Checklist, for further discussion).

Indirect Impacts

There is the potential for excessive noise to prevent the designated use of a particular property. Implementation of measures for direct noise impacts would prevent adverse indirect noise impacts.

Cumulative Impacts

The noise analysis is based on the traffic data provided in the *Traffic Report* (March 2008) for the project. The traffic analysis considered all future projects expected in the project vicinity through 2035. Therefore, the project impacts described above include the reasonably foreseeable projects through 2035 and/or the worst-case traffic conditions on I-10.

Direct Impacts

Like the proposed project, future transportation projects in the RSA would be required to analyze sound barriers to protect sensitive receivers to see whether they are reasonable and feasible under Department/FHWA protocol and/or local noise regulations, and whether they would be implemented as required. Measures to reduce interior noise levels, such as double-paned windows and air-conditioning units, would be required if these levels approach or exceed the applicable noise standard. The reasonably foreseeable projects would be required to comply with local ordinances with respect to noise abatement. Noise attenuation measures could include equipment enclosures, insulation, or muffling devices. Measures to reduce ground-borne vibration would also be required, if applicable.

Indirect Impacts

Implementation of measures for direct noise impacts would prevent adverse indirect cumulative noise impacts.

2.18.7 Avoidance, Minimization, and/or Mitigation Measures

No measures beyond those identified in Sections 2.1 through 2.13 are required to address the Build Alternative’s contribution to cumulative impacts. Those measures address both temporary and permanent impacts.

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2.19 Climate Change

2.19.1 Regulatory Setting

While climate change has been a concern since at least 1988, as evidenced by the establishment of the United Nations and World Meteorological Organization's Intergovernmental Panel on Climate Change (IPCC), the efforts devoted to greenhouse gas (GHG) emissions reduction and climate change research and policy have increased dramatically in recent years. These efforts are primarily concerned with the emissions of GHG related to human activity that include carbon dioxide (CO_2), methane, nitrous oxide, tetrafluoromethane, hexafluoroethane, sulfur hexafluoride, HFC-23 (fluoroform), HFC-134a (s, s, s, 2 –tetrafluoroethane), and HFC-152a (difluoroethane).

In 2002, with the passage of Assembly Bill 1493 (AB 1493), California launched an innovative and pro-active approach to dealing with GHG emissions and climate change at the state level. Assembly Bill 1493 requires the California Air Resources Board (CARB) to develop and implement regulations to reduce automobile and light truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the 2009-model year; however, in order to enact the standards California needed a waiver from the U.S. Environmental Protection Agency (EPA). The waiver was denied by EPA in December 2007. See California v. Environmental Protection Agency, 9th Cir. Jul. 25, 2008, No. 08-70011. However, on January 26, 2009, it was announced that EPA will reconsider their decision regarding the denial of California's waiver. On May 18, 2009, President Obama announced the enactment of a 35.5 mpg fuel economy standard for automobiles and light duty trucks which will take effect in 2012. On June 30, 2009 EPA granted California the waiver. California is expected to enforce its standards for 2009 to 2011 and then look to the federal government to implement equivalent standards for 2012 to 2016. The granting of the waiver will also allow California to implement even stronger standards in the future. The state is expected to start developing new standards for the post-2016 model years later this year.

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05. The goal of this Executive Order is to reduce California's GHG emissions to: 1) 2000 levels by 2010, 2) 1990 levels by the 2020 and 3) 80 percent below the 1990 levels by the year 2050. In 2006, this goal was further reinforced with the passage of Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006. AB 32 sets the same overall GHG emissions reduction goals while further mandating that CARB create a plan, which includes market mechanisms, and implement rules to achieve “real, quantifiable, cost-effective reductions of greenhouse gases.” Executive Order S-20-06 further directs state agencies to begin implementing AB 32, including the recommendations made by the state’s Climate Action Team.

With Executive Order S-01-07, Governor Schwarzenegger set forth the low carbon fuel standard for California. Under this executive order, the carbon intensity of California’s transportation fuels is to be reduced by at least 10 percent by 2020.

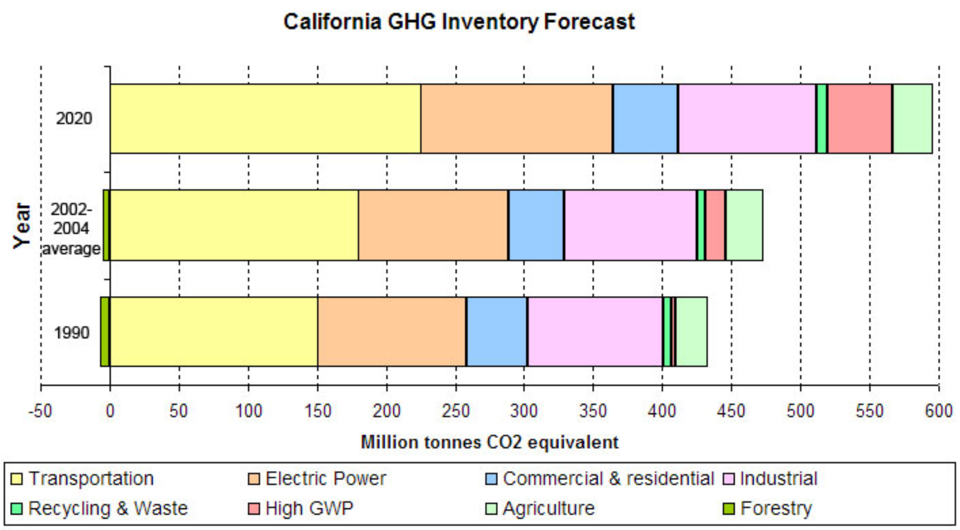
Climate change and GHG reduction is also a concern at the federal level; however, at this time, no legislation or regulations have been enacted specifically addressing GHG emissions reductions and climate change. California, in conjunction with several environmental organizations and several other states, sued to force the U.S. Environmental Protection Agency (EPA) to regulate GHG as a pollutant under the Clean Air Act (Massachusetts vs. Environmental Protection Agency et al., 549 U.S. 497 (2007). The court ruled that GHG does fit within the Clean Air Act’s definition of a pollutant, and that the EPA does have the authority to regulate GHG. Despite the Supreme Court ruling, there are no promulgated federal regulations to date limiting GHG emissions.

According to Recommendations by the Association of Environmental Professionals on How to Analyze GHG Emissions and Global Climate change in CEQA Documents (March 5, 2007), an individual project does not generate enough GHG emissions to significantly influence global climate change. Rather, global climate change is a cumulative impact. This means that a project may participate in a potential impact through its incremental contribution combined with the contributions of all other sources of GHG. In assessing cumulative impacts, it must be determined if a project’s incremental effect is “cumulatively considerable.” See CEQA Guidelines sections 15064(i)(1) and 15130. To make this determination the incremental impacts of the project must be compared with the effects of past, current, and probable future projects. To gather sufficient information on a global scale of all past, current, and future projects in order to make this determination is a difficult if not impossible task.

As part of its supporting documentation for the Draft Scoping Plan, CARB recently released an updated version of the GHG inventory for California (June 26, 2008).

Shown below is a graph from that update that shows the total GHG emissions for California for 1990, 2002-2004 average, and 2020 projected if no action is taken.

Figure 2.19.1 California Greenhouse Gas Inventory



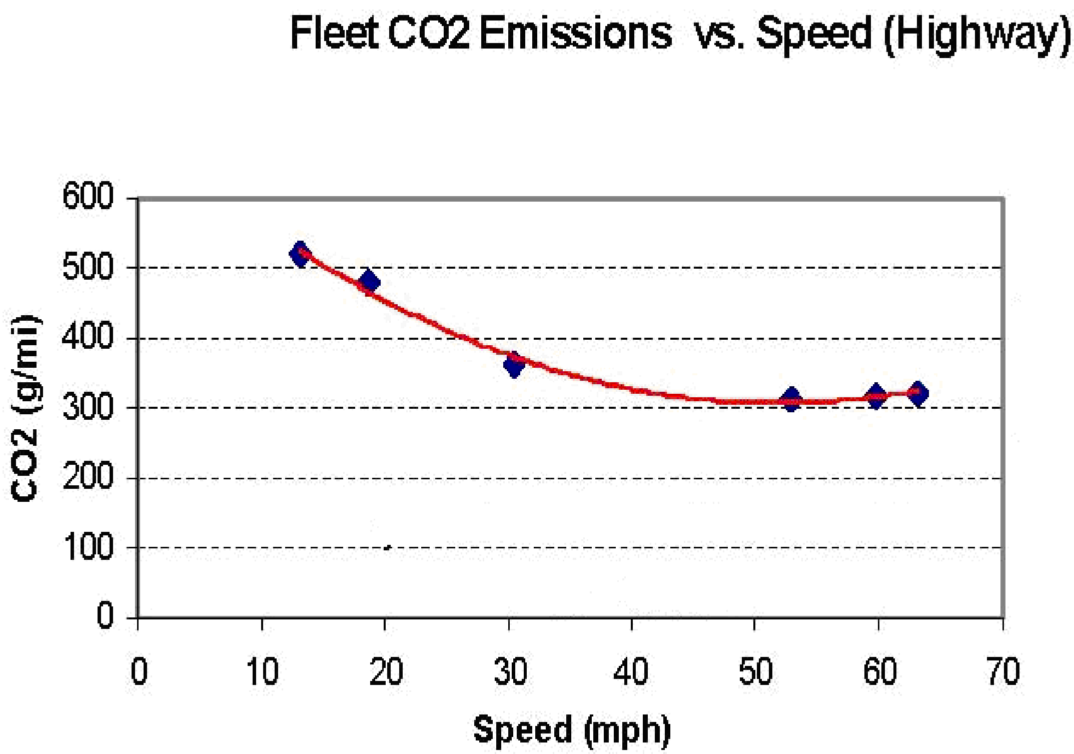
Taken from : http://www.arb.ca.gov/cc/inventory/data/forecast.htm.

Caltrans and its parent agency, the Business, Transportation, and Housing Agency, have taken an active role in addressing GHG emission reduction and climate change. Recognizing that 98 percent of California's GHG emissions are from the burning of fossil fuels and 40 percent of all human made GHG emissions are from transportation (see Climate Action Program at Caltrans (December 2006), Caltrans has created and is implementing the Climate Action Program at Caltrans that was published in December 2006. This document can be found at http://www.dot.ca.gov/docs/ ClimateReport.pdf.

2.19.2 Project Analysis

One of the main strategies in the Department's Climate Action Program to reduce GHG emissions is to make California's transportation system more efficient. The highest levels of carbon dioxide from mobile sources, such as automobiles, occur at stop-and-go speeds (0-25 miles per hour) and speeds over 55 mph; the most severe emissions occur from 0-25 miles per hour (see Figure 2.19.2 below). To the extent that a project relieves congestion by enhancing operations and improving travel times in high congestion travel corridors GHG emissions, particularly CO_2, may be reduced.

Figure 2.19.2 Fleet CO_2 Emissions vs. Speed (Highway)



The purpose of the proposed project is to alleviate existing and future traffic congestion at the interchange of Tippecanoe Avenue and Interstate 10 (I-10) during peak hours. The proposed project will not generate new vehicular traffic trips since it will not construct new homes or businesses. However, there is a possibility that some traffic currently utilizing other routes would be attracted to use the improved facility, thus resulting in slight increases in vehicle miles traveled (VMT). The impact of GHG emissions is a global rather than a local issue. Therefore, the impact of the Build Alternative on GHG emissions was calculated using traffic data for the San Bernardino region.

A focused traffic analysis (September 2009) estimated the impact that the proposed project would have on regional VMT and regional vehicle hours traveled (VHT). As shown in Table 2.19.A, the proposed project would not alter the regional VMT and would result in a decrease in regional VHT in 2015 and 2035.

The VMT and VHT data listed in Table 2.19.A, along with the EMFAC 2007 emission rates, were used to calculate the CO_2 emissions for the 2015 and 2035 regional conditions. The results of the modeling were used to calculate the CO_2 emissions listed in Table 2.19.B. The CO_2 emissions numbers listed in Table 2.19.B

Table 2.19.A Change in Regional VMT and VHT

Year	Regional VMT	Regional VHT
2015 Without Project[1]	208,871,150	13,276,562
2015 With Project	208,871,150	13,276,465
2035 Without Project[2]	258,930,448	16,458,502
2035 With Project	258,930,448	16,456,759

Source: LSA Associates, Inc., September 2009.
[1] VMT and VHT were calculated based on 2035 values using the SCAG annual growth rate of 1.08 percent.
[2] 2035 VMT and VHT values were obtained from the Loma Linda General Plan, which used the East Valley Traffic Model for all analyses.
SCAG = Southern California Association of Governments
VHT = vehicle hours traveled
VMT = vehicle miles traveled

Table 2.19.B Change in Regional CO_2 Emissions

Alternative	Daily CO_2 Emissions (lbs/day)	Increase from No Project (lbs/day)	Percent Increase from No Project
2015 Without Project	329,700,890	N/A	N/A
2015 With Project	329,699,498	-1,392	-0.0004
2035 Without Project	414,329,876	N/A	N/A
2035 With Project	414,304,507	-25,369	-0.006

Source: LSA Associates, Inc., September 2009.
CO_2 = carbon dioxide
lbs/day = pounds per day
N/A = not applicable

are only useful for a comparison between project alternatives. The numbers are not necessarily an accurate reflection of what the true CO_2 emissions will be because CO_2 emissions are dependent on other factors that are not part of the model, such as the fuel mix (EMFAC model emission rates are only for direct engine-out CO_2 emissions, not the full fuel cycle; fuel cycle emission rates can vary dramatically depending on the amount of additives like ethanol and the source of the fuel components), the rate of acceleration, and the aerodynamics and efficiency of the vehicles. As shown in Table 2.19.B, the proposed project would reduce CO_2 emissions within the region.

As discussed previously in Chapter 1 (Section 1.5.9), alternative travel modes were considered during the early planning studies. A separate Transportation Systems Management (TSM)/Transportation Demand Management (TDM) Alternative was not developed because there is substantial existing transit service (rail and bus) provided in this part of the City of Loma Linda, the City of San Bernardino, and the County, and because the proposed interchange improvements are needed to provide improved access to I-10.

GHG emissions for transportation projects can be divided into those produced during construction and those produced during operations. Construction GHG emissions include emissions produced as a result of material processing, emissions produced by onsite construction equipment, and emissions arising from traffic delays due to construction. These emissions will be produced at different levels throughout the construction phase; their frequency and occurrence can be reduced through innovations in plans and specifications and by implementing better traffic management during construction phases. In addition, with innovations such as longer pavement lives, improved traffic management plans, and changes in materials, the GHG emissions produced during construction can be mitigated to some degree by longer intervals between maintenance and rehabilitation events. As discussed below in Section 2.16.4, idling times would be restricted to ten minutes in each direction for passenger cars during lane closures and five minutes for construction vehicles. Restricting idling times reduces harmful emissions from passenger cars and diesel-powered construction vehicles.

2.19.3 CEQA Conclusion

Based on the above, it is the Department's determination that in the absence of further regulatory or scientific information related to green house gas emissions and CEQA significance, it is too speculative to make a determination regarding the project's direct impact and its contribution on the cumulative scale to climate change. However, as previously stated, the Department does anticipate a reduction in greenhouse gas emissions in the horizon year with the project when compared to the horizon year without the project. Nonetheless, the Department is taking further measures to help reduce energy consumption and greenhouse gas emissions.

2.19.4 AB 32 Compliance

Caltrans continues to be actively involved on the Governor's Climate Action Team as CARB works to implement the Governor's Executive Orders and help achieve the targets set forth in AB 32. Many of the strategies Caltrans is using to help meet the targets in AB 32 come from the California Strategic Growth Plan, which is updated each year. Governor Arnold Schwarzenegger's Strategic Growth Plan calls for a $238.6 billion infrastructure improvement program to fortify the state's transportation system, education, housing, and waterways, including $100.7 billion in transportation funding through 2016.[1] As shown on the figure below, the Strategic Growth Plan

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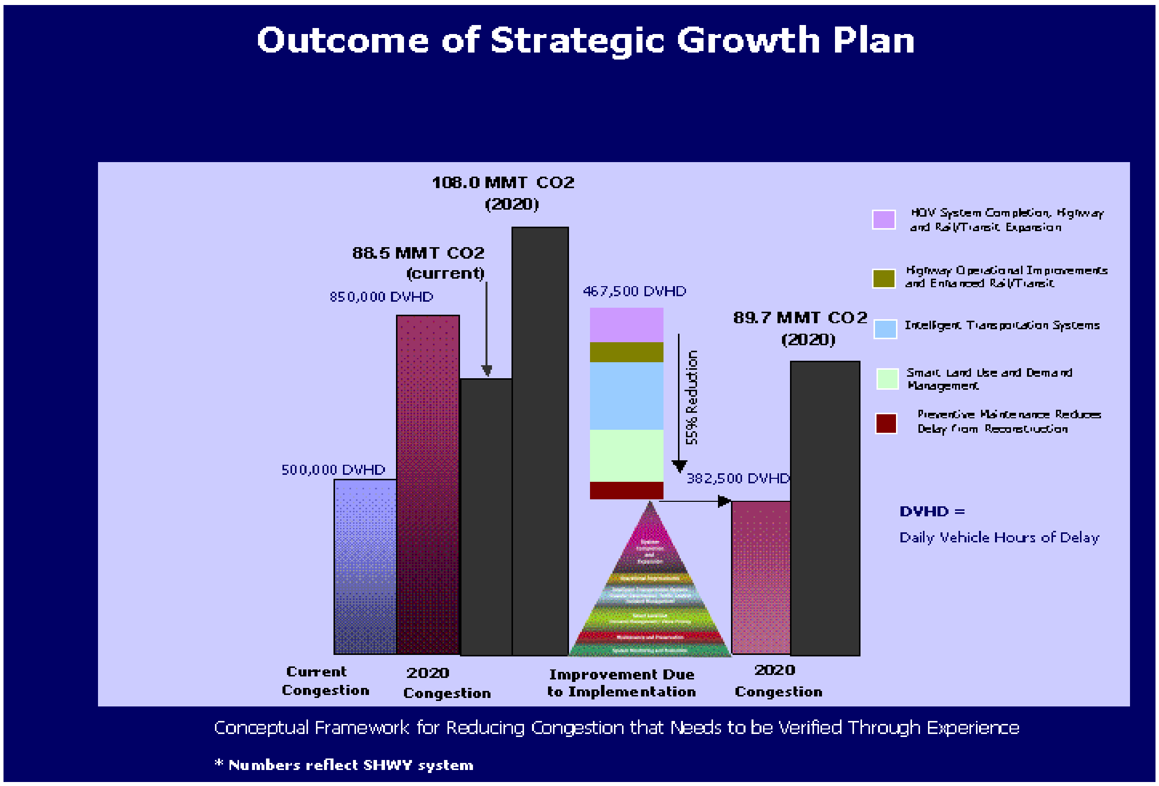
[1] Governor's Strategic Growth Plan, Fig. 1, (http://gov.ca.gov/pdf/gov/CSGP.pdf).

targets a significant decrease in traffic congestion below today's level and a corresponding reduction in GHG emissions. The Strategic Growth Plan proposes to do this while accommodating growth in population and the economy. A suite of investment options has been created that combined together yield the promised reduction in congestion. The Strategic Growth Plan relies on a complete systems approach of a variety of strategies: system monitoring and evaluation, maintenance and preservation, smart land use and demand management, and operational improvements.

Figure 2.19.3 Outcome of Strategic Growth Plan



As part of the Climate Action Program at Caltrans (December 2006, http://www.dot.ca.gov/docs/ClimateReport.pdf), Caltrans is supporting efforts to reduce VMT by planning and implementing smart land use strategies: job/housing proximity, developing transit-oriented communities, and high density housing along transit corridors. Caltrans is working closely with local jurisdictions on planning activities; however, Caltrans does not have local land use planning authority. Caltrans is also supporting efforts to improve the energy efficiency of the transportation sector by increasing vehicle fuel economy in new cars, light and heavy-duty trucks; Caltrans is doing this by supporting on-going research efforts at universities, by supporting legislative efforts to increase fuel economy, and by its participation on the Climate Action Team. It is important to note, however, that the control of the fuel economy standards is held by EPA and CARB. Lastly, the use of alternative fuels is also being considered; the Department is participating in funding for alternative fuel research at the University of California at Davis.

Table 2.19.C summarizes the Department and statewide efforts that Caltrans is implementing in order to reduce GHG emissions. For more detailed information about each strategy, please see Climate Action Program at Caltrans (December 2006); it is available at http://www.dot.ca.gov/docs/ClimateReport.pdf.

To the extent that it is applicable or feasible for the project and through coordination with the project development team, the following measures will also be included in the project to reduce the GHG emissions and potential climate change impacts from the project:

- The San Bernardino Associated Governments (SANBAG) provides ridesharing services and park-and-ride facilities to help manage the growth in demand for highway capacity.
- Landscaping reduces surface warming, and through photosynthesis, decreases CO2. Landscaping would be provided where necessary within the corridor to provide aesthetic treatment, replacement planting, or mitigation planting for the project. The landscape planting would help offset any potential CO2 emissions increase.
- The project would incorporate the use of energy efficient lighting, such as LED traffic signals, to the extent feasible. LED bulbs — or balls, in the stoplight vernacular — cost $60 to $70 apiece but last five to six years, compared to the one-year average lifespan of the incandescent bulbs previously used. The LED balls themselves consume 10 percent of the electricity of traditional lights, which will also help reduce the projects CO2 emissions.1
- According to Caltrans Standard Specification Provisions, idling time for lane closure during construction is restricted to ten minutes in each direction. In addition, the contractor must comply with Title 13, California Code of Regulations §2449(d)(3) was adopted by CARB on June 15, 2008. This regulation

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[1] Knoxville Business Journal, “LED Lights Pay for Themselves,” May 19, 2008 at http://www.knoxnews.com/news/2008/may/19/led-traffic-lights-pay-themselves/.

Table 2.19.C Climate Change Strategies

Strategy	Program	Partnership		Method/Process	Estimated CO_2 Savings (MMT)	
		Lead	Agency		2010	2020
Smart Land Use	Intergovernmental Review (IGR)	Caltrans	Local Governments	Review and seek to mitigate development proposals	Not Estimated	Not Estimated
	Planning Grants	Caltrans	Local and regional agencies & other stakeholders	Competitive selection process	Not Estimated	Not Estimated
	Regional Plans and Blueprint Planning	Regional Agencies	Caltrans	Regional plans and application process	0.975	7.8
Operational Improvements & Intelligent Trans. System (ITS) Deployment	Strategic Growth Plan	Caltrans	Regions	State ITS; Congestion Management Plan	.007	2.17
Mainstream Energy & GHG into Plans and Projects	Office of Policy Analysis & Research; Division of Environmental Analysis	Interdepartmental effort		Policy establishment, guidelines, technical assistance	Not Estimated	Not Estimated
Educational & Information Program	Office of Policy Analysis & Research	Interdepartmental, CalEPA, CARB, CEC		Analytical report, data collection, publication, workshops, outreach	Not Estimated	Not Estimated
Fleet Greening & Fuel Diversification	Division of Equipment	Department of General Services		Fleet Replacement B20 B100	0.0045	0.0065 0.45 .0225
Non-vehicular Conservation Measures	Energy Conservation Program	Green Action Team		Energy Conservation Opportunities	0.117	.34
Portland Cement	Office of Rigid Pavement	Cement and Construction Industries		2.5% limestone cement mix 25% fly ash cement mix > 50% fly ash/slag mix	1.2 .36	3.6
Goods Movement	Office of Goods Movement	Cal EPA, CARB, BT&H, MPOs		Goods Movement Action Plan	Not Estimated	Not Estimated
Total					**2.72**	**18.67**

restricts idling of construction vehicles to no longer than 5 consecutive minutes. Compliance with this regulation reduces harmful emissions from diesel-powered construction vehicles.

2.19.5 Adaptation Strategies

“Adaptation strategies” refer to how Caltrans and others can plan for the effects of climate change on the state’s transportation infrastructure and strengthen or protect the facilities from damage. Climate change is expected to produce increased variability in precipitation, rising temperatures, rising sea levels, storm surges and intensity, and the frequency and intensity of wildfires. These changes may affect the transportation infrastructure in various ways, such as damaging roadbeds by longer periods of intense heat; increasing storm damage from flooding and erosion; and inundation from rising sea levels. These effects will vary by location and may, in the most extreme cases, require that a facility be relocated or redesigned. There may also be economic and strategic ramifications as a result of these types of impacts to the transportation infrastructure.

Climate change adaption must also involve the natural environment as well. Efforts are underway on a statewide-level to develop strategies to cope with impacts to habitat and biodiversity through planning and conservation. The results of these efforts will help California agencies plan and implement mitigation strategies for programs and projects.

On November 14, 2008, Governor Schwarzenegger signed Executive Order S-13-08 which directed a number of state agencies to address California’s vulnerability to sea level rise caused by climate change.

The California Resources Agency (now the Natural Resources Agency, (Resources Agency)), through the interagency Climate Action Team, was directed to coordinate with local, regional, state and federal public and private entities to develop a state Climate Adaptation Strategy. The Climate Adaptation Strategy will summarize the best known science on climate change impacts to California, assess California's vulnerability to the identified impacts and then outline solutions that can be implemented within and across state agencies to promote resiliency.

As part of its development of the Climate Adaptation Strategy, Resources Agency was directed to request the National Academy of Science to prepare a Sea Level Rise Assessment Report by December 2010 to advise how California should plan for future sea level rise. The report is to include:

- relative sea level rise projections for California, taking into account coastal erosion rates, tidal impacts, El Niño and La Niña events, storm surge and land subsidence rates;
- the range of uncertainty in selected sea level rise projections;
- a synthesis of existing information on projected sea level rise impacts to state infrastructure (such as roads, public facilities and beaches), natural areas, and coastal and marine ecosystems;
- a discussion of future research needs regarding sea level rise for California.

Furthermore Executive Order S-13-08 directed the Business, Transportation, and Housing Agency to prepare a report to assess vulnerability of transportation systems to sea level affecting safety, maintenance and operational improvements of the system and economy of the state. The Department continues to work on assessing the transportation system vulnerability to climate change, including the effect of sea level rise.

Prior to the release of the final Sea Level Rise Assessment Report, all state agencies that are planning to construct projects in areas vulnerable to future sea level rise were directed to consider a range of sea level rise scenarios for the years 2050 and 2100 in order to assess project vulnerability and, to the extent feasible, reduce expected risks and increase resiliency to sea level rise. However, all projects that have filed a Notice of Preparation, and/or are programmed for construction funding the next five years (through 2013), or are routine maintenance projects as of the date of Executive Order S-13-08 may, but are not required to, consider these planning guidelines. Sea level rise estimates should also be used in conjunction with information regarding local uplift and subsidence, coastal erosion rates, predicted higher high water levels, storm surge and storm wave data. (Executive Order S-13-08 allows some exceptions to this planning requirement.)

Climate change adaptation for transportation infrastructure involves long-term planning and risk management to address vulnerabilities in the transportation system from increased precipitation and flooding; the increased frequency and intensity of storms and wildfires; rising temperatures; and rising sea levels. The Department is an active participant in the efforts being conducted as part of Governor's Schwarzenegger's Executive Order on Sea Level Rise and is mobilizing to be able to respond to the National Academy of Science report on Sea Level Rise Assessment which is due to be released by December 2010. Currently, the Department is working to assess which transportation facilities are at greatest risk from climate change effects. However, without statewide planning scenarios for relative sea level rise and other climate change impacts, the Department has not been able to determine what change, if any, may be made to its design standards for its transportation facilities. Once statewide planning scenarios become available, the Department will be able review its current design standards to determine what changes, if any, may be warranted in order to protect the transportation system from sea level rise.

The proposed project is programmed for construction funding within the next five years. Project Approval/Environmental Documentation (PA&ED) is anticipated to be complete in Spring 2010. Construction of the proposed improvements is scheduled to begin in April 2012 and end in August 2013. The I-10/Tippecanoe Avenue interchange improvements have been recognized as both locally and regionally important. Funds have been allocated through the 2009/2010 federal Demonstration (DEMO) and federal Projects of National and Regional Significance (PNRS) programs under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). SAFETEA-LU was signed into law by President George W. Bush on August 10, 2005, guaranteeing $244.1 billion for highways, highway safety, and public transportation. Matching funds have been allocated through Measure I, the sales tax measure approved by San Bernardino County voters in 1989 and reauthorized in 2004. As the proposed I-10/Tippecanoe Avenue Interchange project has been programmed for construction funding within the next 5 years, no further analysis is mandated.

Chapter 3 Comments and Coordination

Early and continuing coordination with the general public and appropriate public agencies involved in the Interstate 10 (I-10)/Tippecanoe Avenue Interchange Improvement project is an essential part of the environmental process to determine the scope of environmental documentation, the level of analysis necessary, potential impacts and mitigation measures, and related environmental requirements. The scoping process for the project focused on agency consultation and public participation accomplished through a variety of formal and informal methods, including: a public information meeting, monthly project development team (PDT) meetings, interagency coordination meetings, and consultation with interested parties. This chapter summarizes the results of the California Department of Transportation’s (Department) efforts to fully identify, address, and resolve project-related issues through early and continuing coordination in the scoping process.

3.1 Public Information Meeting

The Department and San Bernardino Associated Governments (SANBAG) held a public information meeting addressing the proposed project on June 17, 2008, at Victoria Elementary School, 1505 Richardson St., San Bernardino. Residents and business owners were invited to a presentation and overview of the project and were provided with comment cards. A total of 13 comment cards were collected. Much of the discussion focused on alternatives and issues of concern to carry forward in the technical studies and the environmental document. General observations and concerns expressed by the public pertaining to the I-10/Tippecanoe Avenue Interchange Improvement project included:

- Property/home acquisition
- Fair compensation
- The need/demand for the project
- Potential traffic impacts
- Access impacts
- Zoning changes
- Traffic on arterial roads

3.2 Interagency Coordination and Consultation

The formulation of project alternatives and mitigation has been carried out through a cooperative dialogue among representatives of the following organizations:

- Federal Highway Administration (FHWA)
- United States Fish and Wildlife Service (USFWS)
- Department District 8
- California Department of Fish and Game (CDFG)
- San Bernardino Associated Governments (SANBAG)
- City of Loma Linda
- City of San Bernardino
- Southern California Association of Governments
- U.S. Army Corps of Engineers (ACOE)

Table 3.1 summarizes the results of the Department's efforts to fully identify, address, and resolve project-related issues through early and continuing coordination.

3.3 Native American Consultation and Coordination

In August 2006, the Native American Heritage Commission (NAHC) was requested to review its Sacred Lands File for the project Area of Potential Effects (APE). In its August 2, 2006, correspondence, the NAHC stated that no Native American cultural resources or sacred sites are located within the project APE.

Native American consultation was initiated in 2006 with 9 Native American groups recommended by the Native American Heritage Commission (NAHC). Consultation was completed with the original 9 Native American groups as well as an additional 3 groups in 2009. Sixteen individuals representing the 12 Native American groups were contacted via certified mail and email on January 23, 2009. Letters were followed by telephone calls and emails during February and March 2009. This correspondence provided a description of the proposed project and a request for the identification of potential effects to any cultural resources, sacred lands, or other heritage sites within the proposed project area. Table 3.2 summarizes the responses received to this correspondence.

Table 3.1 Summary of Consultation and Coordination Activities

Timing	Activity
Starting November 2008	The current members of the Project Development Team (PDT) participate in monthly meetings to coordinate the preparation of the Project Report and Initial Study/Environmental Assessment for the proposed project.
August 2006	Consultation with the Native American Heritage Commission (NAHC) was initiated. A search of the Sacred Lands File and a list of individuals/organizations that may have knowledge of cultural resources in the project area were requested.
August 2006	The NAHC responded and sent a list of Native American contacts in the vicinity of the project for further consultation. The records search of the Sacred Lands File failed to indicate the presence of Native American cultural resources in the immediate project area.
Historical Groups Contacted in 2006	Local historical societies/historic preservation groups were sent requests for historical information for the project area. The following people were sent letters: Steve Shaw (President, City of San Bernardino Historical and Pioneer Society), Judith Hunt (President, Redlands Area Historical Society), Michele Nielsen (Curator, History/Archives, San Bernardino County Museum), Virginia Harshman (Vice President, San Bernardino Valley Genealogical Society), and Dick Schaeffer (Historian, Loma Linda University). Ms. Harshman responded in September 2006. No other responses were received.
September 1, 2006	Ms. Harshman (Vice President, San Bernardino Valley Genealogical Society) responded indicating the Society had no knowledge of historical or architectural resources in the project area.
November 28, 2006	The project-level particulate matter (PM) hot-spot analysis was presented to the Southern California Association of Governments (SCAG) Transportation Conformity Working Group (TCWG) for discussion and review on November 28, 2006. Per Department Headquarters policy, all nonexempt projects need to go through review by the TCWG. This project was approved and concurred on by Interagency Consultation at the TCWG meeting as Not a Project of Air Quality Concern. The TCWG conformity finding is included as Appendix I.
December 4, 2008	A letter was sent to the United States Fish and Wildlife Service (USFWS) requesting the list of proposed, threatened, or endangered species potentially occurring in the vicinity of the proposed project.
December 16, 2008	The USFWS sent a response letter and the Proposed, Threatened, or Endangered Species List for species potentially occurring in the vicinity of the proposed project. The list is provided in Appendix A of the *Natural Environment Study (Minimal Impacts)* (LSA Associates, Inc., June 2009).
December 18, 2008	Additional local historical societies/historic preservation groups were sent requests for historical information for the area where the project is located. Letters were sent to the City of Loma Linda Community Development Department, the Loma Linda Chamber of Commerce, the Loma Linda Historical Society, and the Redlands Historical Society. No responses have been received.
January 5, 2009	Consultation with the NAHC was continued. An expanded list of Native American individuals/organizations that may have knowledge of cultural resources in the project area was received.
January 23, 2009	Letters were sent to the expanded list of Native American individuals/organizations and requested information from the individuals/organizations that may have knowledge of cultural resources in the project area. Responses from those individuals and organizations are provided in Table 3.2.
May 5, 2009	An on-site meeting to discuss jurisdictional waters was held on May 5, 2009. The following personnel attended the meeting: Veronica Chan (ACOE), Scott Quinnell (Department District 8), Wendy Walters (LSA Associates, Inc. [LSA]), and Sarah Barrera (LSA). During the meeting, potential jurisdictional waters within the study area were visited to familiarize ACOE with the project scope. Proposed impacts to potential jurisdictional waters were discussed, but ACOE concurrence regarding the results of the jurisdictional delineation was not resolved.

Sources: *Natural Environment Study Report* (LSA Associates, Inc., May 2009) and *Historical Property Survey Report* (LSA Associates, Inc., August 2009).

Table 3.2 Summary of Native American Responses

Date	Contact	Response
January 28, 2009	Anthony Morales, Gabrieleno/Tongva San Gabriel Band of Mission Indians, Gabrielino Tongva	Mr. Morales stated that due to the presence of both the Santa Ana River and San Timoteo Wash in proximity to the project area, as well as the Mission Zanja, the area should be considered sensitive for cultural resources. Additionally, the nearby railroad tracks and Interstate 10 (I-10) may have been prehistoric travel or trade routes. This, combined with the proposed depth of excavation, which has the potential to expose buried cultural material, led him to recommend that the project be monitored by both an archaeologist and Native American when construction activities are in undisturbed native soil.
January 2, 2009	Joe Ontiveros, Soboba Band of Luiseño Indians	The letter from Mr. Ontiveros stated that the area is within the bounds of Tribal Traditional Use Areas and should be considered culturally sensitive because of the proximity of the Mission Zanja. The Tribe requests further consultation, updates on the project, copies of all archaeological documents, and participation in the survey as well as construction monitoring.
February 15, 2009	Samuel Dunlap, Gabrielino/Tongva	The letter from Mr. Dunlap and the Gabrielino/Tongva Nation recommends archaeological and Native American monitoring during project construction due to the possibility of buried archaeological deposits.
February 27, 2009	Goldie Walker, Serrano Band of Indians	Ms. Walker stated that while she does not know of any specific resources that would be affected by the project, it is not known what is underground. She asked to be notified immediately of any cultural resource discoveries.
March 5, 2009	Britt Wilson, Cahuilla Band of Indians	The Tribe stated that it had no knowledge of specific resources in the project area and requested that a plan for any discoveries be followed. The Tribe also requested notification if any cultural resources are encountered during construction.
March 18, 2009	Steven Estrada, Santa Rosa Band of Mission Indians	Mr. Estrada requested monitoring of all ground-disturbing activities by a Native American and notification of any cultural resource finds.

Source: *Historical Property Survey Report* (LSA Associates, Inc., August 2009).

In response to the requests for monitoring, letters were sent on June 2, 2009, indicating that due to the disturbed condition of the APE and the low sensitivity for prehistoric resources, the Department does not support these requests for monitoring. The Department made phone calls to Mr. Morales, Mr. Ontiveros, and Mr. Dunlap on July 8, 2009, and sent email correspondence to Mr. Estrada on July 9, 2009, to offer a final opportunity for feedback. In response, Mr. Morales contacted the Department by telephone on July 9, 2009. He reiterated his concerns about the project area being sensitive for cultural resources, and asked that work be halted in the event of a discovery and also that he be notified. He was assured that this is the Department's policy. No other concerns or requests were expressed by those contacted regarding the project.

3.4 Public Participation

The purpose of the public review period is to allow agencies, the public, and interested parties to review and comment on the IS/EA.

A Notice of Intent to Adopt a Mitigated Negative Declaration (MND) and Availability of Initial Study/Environmental Assessment (IS/EA), Notice of Public Hearing was published in the San Bernardino Sun, Press-Enterprise, and La Prensa newspapers. The published notice was also mailed to the distribution list (Chapter 5) as well as to all occupants/owners of all addresses within a 500-foot radius of the project limits. Printed copies and/or compact discs of the Draft IS/EA were mailed to responsible agencies and other agencies and were made available for public review at the following locations:

- San Bernardino Associated Governments (SANBAG), 1170 West 3rd Street, 2nd Floor, San Bernardino
- City Hall, 25541 Barton Road, Loma Linda
- Loma Linda Branch Library, 25581 Barton Road, Loma Linda
- Feldheym Central Library, 555 West 6th Street, San Bernardino
- City Hall, 300 North D Street, San Bernardino
- Highland Branch Library, 7863 Central Avenue, Highland

The Draft IS/EA was also made available on the SANBAG website at: www.sanbag.ca.gov/projects/interchange_tippecanoe.html.

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Chapter 4 List of Preparers

The following persons were principally responsible for preparation of this Initial Study/Environmental Assessment (IS/EA) or substantial background materials.

LSA Associates, Inc. (Project Environmental Analysis)

Mike Amling, Principal in Charge
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Sarah Barrera, Biologist, Natural Environment Study (Minimal Impacts) and Jurisdictional Delineation
Sandipan Bhattacharjee, AICP, EIT, Associate, Supplement to Traffic Operations Analysis
Jennette Bosseler, Editor
Meredith Canterbury, GIS Specialist, IS/EA Figures
Tung-chen Chung, Ph.D., INCE Board Certified, Principal, Air Quality Technical Report and Noise Study Report Technical Review
Kelly Czechowski, Environmental Planner, Community Impact Assessment and Draft Relocation Impact Report
Jane Dillon, Assistant Environmental Planner, IS/EA
Tom Flahive, GIS Specialist, Figures and GIS Information Documentation
Margaret Gooding, GIS/Graphics Specialist, Figures for Technical Reports and the IS/EA
Riordan Goodwin, Archaeologist, Archaeological Survey Report and Historic Property Survey Report
Pernilla Gremyr, Word Processor
Christine Huard-Spencer, Senior Environmental Planner, IS/EA Review
Lori Keller, Environmental Planner, Community Impact Assessment and Draft Relocation Impact Report
Teak Kim, Senior Acoustical Specialist, Noise Study Report and Noise Abatement Decision Report.
Keith Lay, Associate, Air Quality Specialist, Air Quality Technical Report and Air Quality Conformity Report
Jason Lui, Senior Noise Specialist, Noise Study Report and Noise Abatement Decision Report
Rob McCann, President, Quality Assurance Review (Environmental)
Agnieszka Napiatek, Environmental Planner, Community Impact Assessment

Brooks R. Smith, Paleontologist/Geologist, Paleontological Identification and Evaluation Report
Casey Tibbet, M.A., Principal Architectural Historian, Historical Resources Evaluation Report
Nicole West, Senior Environmental Specialist, IS/EA, Water Quality Assessment Report, and Summary of Floodplain Encroachment Report

RMC, Inc. (Engineering Lead and Project Management)

Jamal Salman, P.E., Project Manager and Engineer
Michael Han, P.E., Project Engineer
Joe Sawtelle, P.E., Senior Engineer

AECOM (Project Structural and Drainage Engineering)

Mario Montes, P.E., Project Manager
Bob Matthews, P.E., S.E., Structures Lead Engineer
Brian Smith, P.E., Drainage Lead Engineer
Hiep Bui, P.E., Quality Assurance/Quality Control Review (Engineering)

EMI, Inc. (Project Geotechnical Analysis)

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Bruce Lokkesmoe, Environmental Health and Safety
Ayumi Murai, Environmental Health and Safety

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Mike Goodhue, Transportation Engineer
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Christie Hammond, Office Chief, Environmental Cultural Studies Branch
Andrew Walters, Architectural Historian (PQS)
Scott Quinnell, Associate Environmental Planner, Natural Science (Biology)

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Andrea Nieto, Project Manager
Garry Cohoe, Director of Freeway Construction
Chad Costello, Project Manager
Khalil Saba, Project Manager
Paul Melocoton, Assistant Project Manager

City of Loma Linda

Jarb Thaipejr, Public Works Director/City Engineer

City of San Bernardino

Robert Eisenbeisz, P.E., City Engineer

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Chapter 5 Distribution List

This Initial Study/Environmental Assessment (IS/EA) will be distributed to the state, regional, and local agencies listed in this section as well as potentially-impacted parcel owners in the project area. In addition, all property owners and occupants within a 500-foot radius of the project limits will be provided the Notice of the Availability of the IS/EA.

Federal Agencies

Veronica Chan
United States Army Corps of Engineers
Regulatory Division
911 Wilshire Blvd.
Los Angeles, CA 90017

Sally Brown
United States Fish and Wildlife Service
Carlsbad Field Office
6010 Hidden Valley Road, Suite 101
Carlsbad, CA 92011

State Agencies

California Department of Conservation
Director
801 K. Street, 24th Floor
Sacramento, CA 95814

California Department of Water Resources
1416 9th Street
Sacramento, CA 95814

State of California
Dept. of Transportation, District 8
464 West 4th, 6th Floor
San Bernardino, CA 92401

California Air Resources Board
1001 I Street
Sacramento, CA 95812

State Water Resources Control Board
1001 I Street
Sacramento, CA 95814

California Transit Association
Director
1415 L Street, Suite 200
Sacramento, CA 95814

State Lands Commission
Executive Officer
100 Howe Ave., Ste. 100 South
Sacramento, CA 95825

State of California, Dept. of Fish & Game,
Region 6
3602 Inland Empire Boulevard, Suite C-220
Ontario, CA 91764

California Highway Patrol
Inland Division (801)
847 E. Brier Drive
San Bernardino, CA 92408-2820

Native American Heritage Commission
915 Capitol Mall, Rm. 364
Sacramento, CA 95814

State Clearinghouse
Executive Officer
Office of Planning and Research
1400 Tenth St.
Sacramento, CA 95814

Regional/County/ Local Agencies

Southern California Association of Governments
3600 Lime Street, Suite 216
Riverside, CA 92501

Water Quality Control Board
Santa Ana Region
3737 Main St. #500
Riverside, CA 92501

South Coast AQMD
IGR Coordinator
21865 E. Copley Drive
Diamond Bar, CA 91765

San Bernardino Associated Governments
1170 W. 3rd Street, 2nd Floor
San Bernardino, CA 92410

County of San Bernardino Department of Public Works-Flood Control District
825 East Third Street
San Bernardino, Ca 92415

San Bernardino County Fire Department
Pat A. Dennen, Fire Chief/Fire Warden
157 West Fifth Street, 2nd Floor
San Bernardino, CA 92415-0451

County of San Bernardino
Administrative Office
385 N. Arrowhead Avenue
San Bernardino, CA 92415-0120

San Bernardino County Sheriff's Department
Gary Penrod, Sheriff
655 East Third Street
San Bernardino, CA 92415-0061

City of Loma Linda Fire Department
Jeff Bender, Fire Chief
25541 Barton Road
Loma Linda, CA 92354

San Bernardino County
Department of Public Works
825 East Third Street, Room 145
San Bernardino, CA 92415-0835

San Bernardino County Library
Ed Kieczykowski, County Librarian
104 W. Fourth Street
San Bernardino, CA 92415-0035

City of San Bernardino Fire Department
Michael J. Conrad, Fire Chief
200 East 3rd Street
San Bernardino, CA 92410

City of Loma Linda Community Development Department
25541 Barton Road
Loma Linda, CA 92354

City of Loma Linda Public Works Department
T. Jarb Thaipejr, Director
25541 Barton Road
Loma Linda, CA 92354

City of San Bernardino Police Department
Michael A. Billdt, Chief of Police
710 North D Street
San Bernardino, CA 92402-1559

Loma Linda Branch Library
25581 Barton Road
Loma Linda, CA 92335

City of San Bernardino
Development Services Department
300 North D Street, 3rd Floor
San Bernardino, CA 92418

City of San Bernardino Library
Norman Feldheym Central Library
555 W. 6th Street
San Bernardino, CA 92410

Riverside County Flood Control and Water Conservation District
1995 Market Street
Riverside, CA 92501

City of Redlands
Community Development Department
35 Cajon Street
Redlands, CA 92373

City of Colton
Community Development Department
650 N La Cadena Drive
Colton, CA 92324

Federal Legislators

Hon. Dianne Feinstein, Senator
United States Senate
11111 Santa Monica Blvd., Suite 915
Los Angeles, CA 90025-3343

Hon. Barbara Boxer, Senator
United States Senate
201 North E Street, Suite 210
San Bernardino, CA 92401-1520

Hon. Jerry Lewis, Congress Member
United States House of Representatives, District 43
1150 Brookside Avenue, Suite J-5
Redlands, CA 92373

Hon. Joe Baca, Congress Member
United States House of Representatives, District 41
201 North E Street, Suite 102
San Bernardino, CA 92401-1507

State Legislators

Hon. Bob Dutton, Senator
California State Senate, District 31
8577 Haven Avenue, Suite 210
Rancho Cucamonga, CA 91730

Hon. Gloria Negrete McLeod, Senator
California State Senate, District 32
357 West 2nd Street, Suite 1
San Bernardino, CA 92401

Hon. Wilmer Amina Carter, Assembly Member
California State Assembly, District 62
335 N. Riverside Avenue
Rialto, CA 92376

Hon. Bill Emmerson, Assembly Member
California State Assembly, District 63
10681 Foothill Blvd., Suite 325
Rancho Cucamonga, CA 91730

Local Elected Officials

Hon. Stan Brauer, Mayor
City of Loma Linda
25541 Barton Road
Loma Linda, CA 92354

Hon. Patrick J. Morris, Mayor
City of San Bernardino
300 N. “D” Street
San Bernardino, CA 92418

Hon. Floyd Petersen
Council Member
City of Loma Linda
25541 Barton Road
Loma Linda, CA 92354

Hon. Ovidiu Popescu
Council Member
City of Loma Linda
25541 Barton Road
Loma Linda, CA 92354

Hon. Rhodes Rigsby
Mayor Pro Tem
City of Loma Linda
25541 Barton Road
Loma Linda, CA 92354

Hon. Robert Ziprick
Council Member
City of Loma Linda
25541 Barton Road
Loma Linda, CA 92354

Hon. Dennis J. Baxter
Council Member, 2nd Ward
City of San Bernardino
300 North "D" Street
San Bernardino, CA 92418

Hon. Chas A. Kelley
City of San Bernardino
300 North "D" Street
San Bernardino, CA 92402

Hon. Rikke Van Johnson
Council Member, 6th Ward
City of San Bernardino
300 North "D" Street
San Bernardino, CA 92418

Hon. Tobin Brinker
Council Member, 3rd Ward
City of San Bernardino
300 North "D" Street
San Bernardino, CA 92418

Hon. Wendy McCammack
Council Member, 7th Ward
City of San Bernardino
300 North "D" Street
San Bernardino, CA 92418

Hon. Neil Derry, Supervisor
San Bernardino County Board of Supervisors, District 3
385 N. Arrowhead Avenue, Fifth Floor
San Bernardino, CA 92415-0110

Hon. Esther R. Estrada
Council Member, 1st Ward
City of San Bernardino
300 North "D" Street
San Bernardino, CA 92418

Hon. Fred Shorett
Council Member, 4th Ward
City of San Bernardino
300 North "D" Street
San Bernardino, CA 92418

Hon. Josie Gonzales, Supervisor
San Bernardino County Board of Supervisors, District 5
385 North Arrowhead Avenue, Fifth Floor
San Bernardino, CA 92415-0110

Interested Groups, Organizations, and Individuals

Ti'At Society
Cindi Alvitre
6515 E. Seaside Walk, Suite C
Long Beach, CA 90803

Gabrielino Tongva Indians of California Tribal Council
Robert Dorame, Tribal Chair/Cultural Resources
5450 Slauson Avenue, Suite 151 PMB
Culver City, CA 90230

Gabrielino Band of Mission Indians of CA
Ms. Susan Frank
P.O. Box 3021
Beaumont, CA 92223

Cahuilla Band of Indians
Britt Wilson
P.O. Box 391760
Anza, CA 92539

Willie Pink
4830 Pechanga Road
Temecula, CA 92592

Anthony J. Andreas, Jr.
3022 W. Nicolet Street
Banning, CA 92220

Gabrielino/Tongva Council/Gabrielino Tongva Nation
Sam Dunlap, Tribal Secretary
761 Terminal Street, Building 1, 2nd Floor
Los Angeles, CA 90021

Ramona Band of Cahuilla Indians
John Gomez, Jr., Cultural Resources
P.O. Box 391670
Anza, CA 92539

Gabrieleño/Tongva Tribal Council
Anthony Morales, Chairperson
P.O. Box 693
San Gabriel, CA 91778

San Manuel Band of Mission Indians
James Ramos, Chairperson
26569 Community Center Drive
Highland, CA 92346

Morongo Band of Mission Indians
Michael Contreras, Cultural Heritage Prog. Manager
13000 Field Road
Cabazon, CA 92230

Santa Rosa Band of Mission Indians
David Largo, Cultural Resources Manager
325 N. Western Avenue
Hemet, CA 92543

Soboba Band of Luiseño Indians
Joe Ontiveros, Cultural Resources Director
P.O. Box 487
San Jacinto, CA 92581

Tongva Ancestral Territorial Tribal Nation
John Tommy Rosas, Tribal Administrator
Via email to: tattnlaw@gmail.com

Serrano Band of Indians
Goldie Walker
6588 Valeria Drive
Highland, CA 92346

Utilities, Services, and Businesses

Ms. Rebecca De Leon
Environmental Planning Team
Metropolitan Water District of Southern California
700 N. Alameda Street, US3-230
Los Angeles, CA 90012

Southern California Edison
Eastern Division
Ray Hicks, Division Manager
1351 Frances Street
Ontario, CA 91761

The Gas Company
Gertman Thomas
P.O. Box 3003
Redlands, CA 92373

Omnitrans East Valley
1700 W. Fifth St.
San Bernardino, CA 92411

Verizon California
1980 Orange Tree Lane, Suite 100
Redlands, CA 92374

Loma Linda University Medical Center
11234 Anderson St.
Loma Linda, CA 92354

The Gage Canal Company
7452 Dufferin Ave.
Riverside, CA 92504-4999

Sprint
KSOPHT0101-Z4300
6391 Sprint Parkway
Overland Park KS 66251-4300

Time-Warner Telecom
10475 Park Meadows Drive
Littleton, CO 80124

San Bernardino County Fire Department
Attn: Environmental Review
157 W. 5th St., 2nd Floor
San Bernardino, CA, 92415-0451

Los Angeles County Sheriff's Department
Attn: Environmental Review
4700 Ramona Blvd.
Monterey Park, CA 91754

San Bernardino Police Department
Attn: Environmental Review
710 North D St.
San Bernardino, CA 92401

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