

AIR QUALITY STUDY

I-15/I-215 DEVORE INTERCHANGE RECONSTRUCTION PROJECT

PM_{2.5} AND PM₁₀ HOT-SPOT ANALYSES

I-15 PM 14.0–16.4 and I-215 PM 16.0–17.8

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State of California
Department of Transportation, District 8
464 West 4th Street
San Bernardino, California 92401-1400

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INTRODUCTION

LSA Associates, Inc. (LSA) prepared this PM_{2.5}¹ and PM₁₀² hot-spot analysis for the Interstate 15 (I-15)/Interstate 215 (I-215) Devore Interchange Reconstruction Project (project) in response to the United States Environmental Protection Agency (EPA) releasing new PM_{2.5} and PM₁₀ hot-spot analysis requirements in its March 10, 2006, final transportation conformity rule (71 FR 12468) (Final Rule). The 2006 Final Rule supersedes the Federal Highway Administration's (FHWA) September 12, 2001, "Guidance for Qualitative Project-Level Hotspot Analysis in PM₁₀ Nonattainment and Maintenance Areas." This analysis was conducted following the procedures and methodology provided in the "Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas" (EPA/FHWA Guidance) (EPA 2006a).

This PM_{2.5} and PM₁₀ analysis addresses the construction of the proposed project, including the following components identified in the Regional Transportation Plan (RTP) and the Regional Transportation Improvement Program (RTIP): Project ID: SBD20061201; Description: I-15/I-215 Interchange Improvements-Devore Interchange south of Glen Helen Parkway to Kenwood and on I-215 from south of Devore Road Interchange to I-15 Interchange [I-215 PM 16.0-17.8]. Add one mixed flow lane in each direction to existing three mixed flow lanes from 3,000 feet (ft) south of Glen Helen Parkway to 3,000 ft north of I-215 Interchange including truck bypass lanes.

PROJECT LOCATION AND DESCRIPTION

The project is located at the north junction of I-15 and I-215, near the community of Devore in the County of San Bernardino, California. The interchange is referred to as the Devore interchange in this document. The project limits extend along I-15 from approximately 0.8 mile (mi) south of the Glen Helen Parkway undercrossing to 1.4 mi north of the Kenwood Avenue undercrossing, and along I-215 from 1.2 mi south of the Devore Road overcrossing to the I-15 junction. The proposed project would eliminate the existing lane reductions on I-15; reduce problems caused by weaving trucks; reduce operational deficiencies at the interchange, including nonstandard design features; and improve local circulation. The regional location of the project and project vicinity are shown in Figure 1.

The project site is a freeway-to-freeway interchange identified as the north junction of I-15/I-215 (Devore interchange). I-15 provides four travel lanes in each direction south of the I-15/Glen Helen Parkway interchange and north of I-215. The segment between Glen Helen Parkway and I-215 provides three travel lanes in each direction. I-215 provides two lanes in each direction south of I-15.

A portion of the San Bernardino National Forest is located southwest of the Devore Interchange. Glen Helen Regional Park is located southeast of the Devore interchange. The community of Devore is concentrated on the east side of I-215. The community is primarily residential; however, some commercial and light industrial uses occur in areas south of I-215/Devore Road. I-15 crosses over the Burlington Northern Santa Fe (BNSF) and Union Pacific Railroad lines, as well as Cajon Creek, just west of I-215.

¹ Particulate matter less than 2.5 microns in diameter.

² Particulate matter less than 10 microns in diameter.

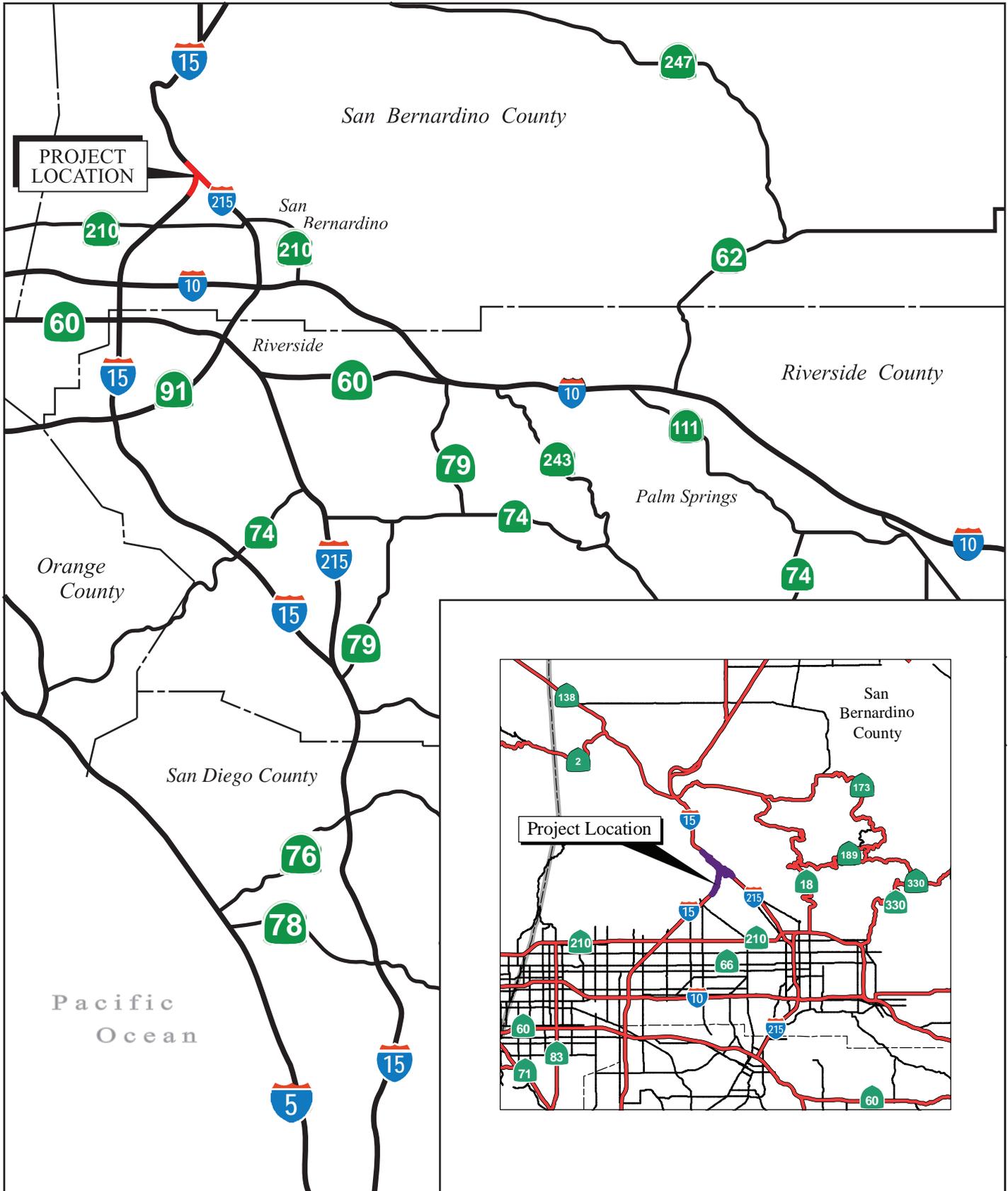


FIGURE 1



I-15/I-215 Interchange Improvements
Regional Location

Along with the No Build Alternative (Alternative 1), four project build alternatives have been developed. The build alternatives were developed to correct the identified project needs. The build alternatives are Alternative 2, Alternative 3, Alternative 3A, and Alternative 5.

Alternative 1: No Build Alternative

Under Alternative 1, no improvements would be made to the existing freeway or local streets.

Build Alternatives: Elements in Common

The four Build Alternatives have the following design elements in common:

I-15 South Leg. The four Build Alternatives are identical for the segment of I-15 south of the BNSF railroad crossing to south of the Glen Helen Parkway interchange. These elements include the following:

- Adding a northbound mainline lane between the Glen Helen Parkway off-ramp and the I-215 junction.
- Adding a northbound auxiliary lane between the Glen Helen Parkway on-ramp and the I-215 junction.
- Adding a southbound mainline lane between the I-215 junction and the Glen Helen Parkway on-ramp, where it will connect with the existing fourth southbound mainline lane.
- Adding a southbound auxiliary lane between the I-215 junction and the southbound Glen Helen Parkway on-ramp.
- Making minor adjustments to the Glen Helen Parkway on- and off-ramps to accommodate the new lanes, such as the northbound deceleration lane prior to the Glen Helen off-ramp and the southbound acceleration lane from the on-ramp.
- The additional lanes would be physically constructed in the existing wide median and the existing lanes shifted to the left. The existing bridges over Glen Helen Parkway would be widened by one lane in each direction in the median. The existing bridges over Glen Helen Road and the BNSF Railroad would be widened by two lanes in each direction in the median. No new right-of-way would be required south of the railroad. Immediately north of the railroad bridge, the widening would begin to shift to the outside to align with the next segments.

I-15/I-215 Branch Connectors. All of the Build Alternatives include the following modifications to I-15/I-215 branch connectors:

- The northbound I-215 to southbound I-15 branch connector would be retained approximately in its present location, but widened to two lanes for most of its length to allow for passing.
- The northbound I-15 to southbound I-215 branch connector would be relocated easterly.

Cajon Boulevard Reconnection. All of the Build Alternatives include the reconnection of Cajon Boulevard from Kenwood Drive to existing Devore Road in approximately the same alignment. The Cajon Boulevard component of the project would reopen two lanes of the abandoned roadway and bring the Kenwood Avenue/Cajon Boulevard intersection up to standards. The existing north leg of Cajon Boulevard ends south of Kenwood Avenue; the existing south leg ends 1,200 ft north of the Devore Road intersection. An abandoned segment of Cajon Boulevard southeast of Kenwood Avenue would be reactivated and realigned.

Two-lane Cajon Boulevard would transition onto a new alignment 3,000 ft east of Kenwood Avenue, bending to the south to parallel the existing I-15 to the I-15 southbound connector. As the roadway approaches Cajon Creek, it would make a sharp eastern turn to pass under the existing I-15 bridges just north of Cajon Creek. The roadway under the freeway would follow an existing dirt road and would require a retaining wall to protect the roadway from flooding.

Once crossing under the freeway, Cajon Boulevard would then follow a slow curve to the northeast, intersecting existing Cajon Boulevard just east of the existing Devore Road intersection. The existing Cajon Boulevard cul-de-sac east of Devore Road would remain, connected to either Devore Road or new Cajon Boulevard, depending on the alternative. To match existing conditions, Cajon Boulevard would widen out to four lanes as it approaches the Devore Road or Glen Helen Parkway intersections.

Local Roadway Changes. All of the Build Alternatives include the following modifications to local roadways:

- Nedlee Avenue and Dement Street would be realigned in all the alternatives to accommodate the widened freeway cross-section.
- Cul-de-sacs would be constructed where existing local streets would be shortened to accommodate the widened freeway.

Other Elements in Common. The following additional elements are common to the four build alternatives, although the specific design details vary. Each Build Alternative would do the following:

- Add truck bypass lanes through the interchange.
- Rebuild the I-215/Devore Road interchange, although the actual design varies with each alternative.
- Reconfigure the existing I-15/Kenwood Avenue interchange, although the actual design varies with each alternative.
- Construct an intersection with turning lanes at Cajon Boulevard and Kenwood Avenue.

Build Alternatives: Distinct Elements

Table A describes and compares the distinct elements of each alternative.

Table A: I-15/I-215 Alternatives Comparison

SEGMENT/LOCATION	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 3A	ALTERNATIVE 5
I-15 NORTHBOUND				
I-15 Northbound Mainline	I-15 widened to include three auto lanes and two truck bypass lanes between Cajon Creek and 2,100 ± ft north of Kenwood Avenue undercrossing where truck lanes merge with mainline. At the merge the northbound mainline will be five lanes wide with one auxiliary lane 2,600 ft long. The northbound truck bypass will merge with mainline 2,100 ft north of Kenwood Avenue overcrossing. Two auxiliary lanes added from the truck bypass merge to the existing five lanes over the next 3,000 ft.	I-15 widened to include three auto lanes and two truck bypass lanes between Cajon Creek and 2,100 ± ft north of Kenwood Avenue undercrossing where truck lanes merge with mainline. At the merge the northbound mainline will be five lanes wide with one auxiliary lane 2,600 ft long. The northbound truck bypass will merge with mainline 2,100 ft north of Kenwood Avenue overcrossing. Two auxiliary lanes added from the truck bypass merge to the existing five lanes over the next 3,000 ft.	I-15 widened to provide four through lanes from I-215 southbound exit to the I-15 truck bypass exit 1,800 ± ft north of I-215 northbound overcrossing. I-15 then provides three auto lanes between the truck bypass exit and merge with I-215 auto lanes. At the merge the northbound mainline will be 5 lanes wide with one auxiliary lane 2,600 ft long. The northbound truck bypass will merge with mainline 2,100 ft north of Kenwood Avenue overcrossing. Two auxiliary lanes added from the truck bypass merge to the existing five lanes over the next 3,000 ft.	I-15 widened to provide four through lanes from I-215 southbound exit to the I-15 truck bypass exit 1,800 ± ft north of I-215 northbound overcrossing. I-15 then provides three auto lanes between the truck bypass exit and merge with I-215 auto lanes. At the merge the northbound mainline will be 5 lanes wide with one auxiliary lane 2,600 ft long. The northbound truck bypass will merge with mainline 2,100 ft north of Kenwood Avenue overcrossing. Two auxiliary lanes added from the truck bypass merge to the existing five lanes over the next 3,000 ft.
Route Continuity	Northbound auto merge: I-15 mainline enters on the left; I-215 mainline enters on the right. Northbound route continuity provided	Northbound auto merge: I-15 mainline enters on the left; I-215 mainline enters on the right. Northbound route continuity provided	Northbound auto merge: I-215 mainline enters on the left; I-15 mainline enters on the right. Northbound route continuity not provided for autos.	Northbound auto merge: I-215 mainline enters on the left; I-15 mainline enters on the right. Northbound route continuity not provided for autos.
Truck Bypass	The two-lane I-15 truck bypass begins at Cajon Creek bridge; the truck bypass parallels northbound I-15 from Cajon Creek and re-merges with I-15 2100 ± ft north of the Kenwood Avenue undercrossing.	The two-lane I-15 truck bypass begins at Cajon Creek bridge; the truck bypass parallels northbound I-15 from Cajon Creek and re-merges with I-15 2,100 ± feet north of the Kenwood Avenue undercrossing.	I-215 truck bypass begins 1,200 ± ft north of I-215/Devore Road overcrossing; the truck bypass parallels northbound I-15 and remerges with I-15 2,100 ± ft north of the Kenwood Avenue undercrossing. Northbound I-15 trucks will diverge from auto lanes to join trucks from northbound I-215 3,000 ft south of Kenwood Avenue interchange.	I-215 truck bypass begins 1,200 ± ft north of I-215/Devore Road overcrossing; the truck bypass parallels northbound I-15 and remerges with I-15 2,100 ± ft north of the Kenwood Avenue undercrossing. Northbound I-15 trucks will diverge from auto lanes to join trucks from northbound I-215 3,000 ft south of Kenwood Avenue interchange.
Kenwood Avenue Ramps	Northbound ramps realigned with loop on-ramp and to accommodate longer merge with truck bypass.	Interchange ramps realigned to accommodate truck bypass maintaining a diamond configuration.	Interchange ramps realigned to accommodate truck bypass maintaining a diamond configuration.	Interchange ramps realigned to accommodate truck bypass maintaining a diamond configuration.
I-15 SOUTHBOUND				
I-15 Southbound Mainline	Up to three auxiliary lanes added starting approximately 1.2 miles north of the Kenwood Avenue undercrossing extending to I-215 diverge. I-15 truck bypass exit 300 ± ft south of Kenwood Avenue undercrossing. I-15 provides three auto lanes and two truck bypass lanes between 300 ft south of Kenwood Avenue undercrossing and Cajon Creek.	Up to three auxiliary lanes added starting approximately 1.4 miles north of Kenwood Avenue undercrossing extending to the I-215 truck bypass diverge 1,900 ft north of the Kenwood Avenue undercrossing. I-15 includes three auto lanes and two truck bypass lanes between above noted diverge and the merge of the truck lanes into I-15 2,600 ft south of Kenwood Avenue.	Up to three auxiliary lanes added starting approximately 1.4 miles north of Kenwood Avenue undercrossing extending to the I-215/truck bypass diverge 1,900 ft north of the Kenwood Avenue undercrossing. I-15 includes three auto lanes and two truck bypass lanes between above noted diverge and the merge of the truck lanes into I-15 2,600 ft south of Kenwood Avenue.	Auxiliary lanes added starting approximately 3300 ft north of Kenwood Avenue undercrossing extending to the I-215 truck bypass exit 100 ± ft north of the Kenwood Avenue undercrossing. I-15 includes four southbound through lanes throughout the project area plus three auxiliary lanes for I-215.
Route Continuity	I-15 continues on the left; I-215 exits on the right. Southbound route continuity provided	After the diverge of the I-215 traffic the I-15 mainline crosses under the I-215 connector and continues on the right using existing bridge over Cajon Creek. Southbound route continuity provided	After the diverge of the I-215 traffic the I-15 mainline crosses under the I-215 connector and continues on the right using existing bridge over Cajon Creek. Southbound route continuity provided	I-215 exits on the left; I-15 exits on the right. Southbound route continuity not provided.
Truck Bypass	The two-lane I-15 southbound truck bypass exits 300 ± ft south of Kenwood Avenue undercrossing; the truck bypass rejoins I-15 mainline at Cajon Creek Bridge.	The two-lane I-15 southbound truck bypass diverges from the south I-215 connector 500 ft north of Kenwood Avenue undercrossing; the truck bypass rejoins I-15 2,600 ± ft south of Kenwood Avenue	The two-lane I-15 southbound truck bypass diverges from the south I-215 connector 500 ft north of Kenwood Avenue undercrossing; the truck bypass rejoins I-15 2,600 ± ft south of Kenwood Avenue.	The two-lane southbound I-215 truck bypass begins 100 ± ft north of Kenwood Avenue. The truck bypass parallels I-15 until the I-215/I-15 diverge. The truck bypass then bridges over I-15 and rejoins I-215 3,000 ± ft south of the existing Devore Road overcrossing. Note: The Devore Road overcrossing is removed in this alternative.

SEGMENT/LOCATION	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 3A	ALTERNATIVE 5
Kenwood Avenue southbound interchange	Ramps retain diamond configuration, realigned to accommodate truck bypass. Southbound on-ramp provides access to I-15 only via truck bypass lanes. No direct freeway access from Kenwood Avenue to southbound I-215.	Ramps retain diamond configuration, realigned to accommodate truck bypass; Southbound on-ramp provides access to I-15 only. No direct freeway access from Kenwood Avenue to southbound I-215.	Ramps retain diamond configuration, realigned to accommodate truck bypass, Southbound on-ramp provides access to I-15 only. No direct freeway access from Kenwood Avenue to southbound I-215.	Ramps retain diamond configuration, realigned to accommodate truck bypass. Southbound on-ramp provides access to both I-15 and I-215; however, I-215 access requires weaving across four southbound I-15 lanes.
I-215 NORTHBOUND				
I-215 Northbound Mainline	Widened to three lanes from approximately 1.2 miles south of existing Devore Road interchange to merge with northbound I-15.	Widened to three lanes from 2,600 ± ft south of existing Devore Road interchange to the merge with I-15.	Widened to three lanes from 2,600 ± ft south of existing Devore Road interchange to the merge with I-15.	Widened to three lanes from approximately 1 mile south of existing Devore Road overcrossing to merge with northbound I-15.
I-215 SOUTHBOUND				
I-215 Southbound Mainline	Widened to three lanes from diverge from I-15 to 1 mile south of existing Devore Road overcrossing. From this point, the mainline will be realigned for another 1,000 ft south until it connects with the existing two-lane mainline.	Widened to three lanes from diverge from I-15 to 1.3 miles south of existing Devore Road overcrossing. From this point, the mainline will be realigned for another 1,000 ft south until it connects with the existing two-lane mainline. Note: The I-215 southbound exit from I-15 is combined with the I-15 truck bypass exit located 1,900 ± ft north of the Kenwood Avenue undercrossing. I-215 southbound splits from the I-15 southbound truck bypass 500 ± ft north of Kenwood Avenue, and then bridges over the I-15 auto mainline.	Widened to three lanes from diverge from I-15 to 4,800 ft south of existing Devore Road overcrossing. From this point, the mainline will be realigned for another 1,000 ft south until it connects with the existing two-lane mainline. Note: The I-215 southbound exit from I-15 is combined with the I-15 truck bypass exit located 1,900 ± ft north of the Kenwood Avenue undercrossing. I-215 southbound splits from the I-15 southbound truck bypass 500 ± ft north of Kenwood Avenue, then bridges over the I-15 auto mainline.	Widened to three lanes from diverge from I-15 to approximately 1 mile south of existing Devore Road overcrossing. From this point, the mainline will be realigned for another 1,000 ft south until it connects with the existing two-lane mainline.
I-215 DEVORE INTERCHANGE AND RAMPS				
Devore Road Overcrossing	Removed and replaced with Glen Helen Parkway Undercrossing located 1,400 ft south of existing Devore Road overcrossing (See Glen Helen Parkway discussion below). Devore Road rerouted to intersect with Glen Helen Parkway east of I-215	Removed and replaced with new bridge located immediately south of existing bridge. New bridge would accommodate two through lanes, potential turn lanes, shoulders usable as bicycle lanes, sidewalks and a potential future equestrian trail crossing.	Removed and replaced with new bridge located immediately south of existing bridge. New bridge would accommodate two through lanes, potential turn lanes, shoulders usable as bicycle lanes, sidewalks and a potential future equestrian trail crossing.	Removed and replaced with Glen Helen Parkway Undercrossing located 1,400 ft south of existing Devore Road overcrossing (See Glen Helen Parkway discussion below). Devore Road rerouted to intersect with Glen Helen Parkway east of I-215
Glen Helen Parkway/I-215 Undercrossing	Constructed 1,400 ± ft south of existing Devore Road overcrossing, and connecting to existing Cable Canyon Road.	Not constructed	Not constructed	Constructed 1,400 ± ft south of existing Devore Road overcrossing, and connecting to existing Cable Canyon Road.
Devore Road/Glen Helen Parkway northbound on/off ramps	Relocated 2,600 ± ft south of existing ramp termini and 1,100 ± ft south of new Glen Helen Parkway I-215 undercrossing.	Northbound off-ramp retained in approximately its current location; northbound on-ramp to I-15 northbound and southbound relocated opposite off-ramp.	Northbound off-ramp retained in approximately its current location; northbound on-ramp to I-15 northbound and southbound relocated opposite off-ramp.	Relocated 2,600 ± ft south of existing ramp termini and 1,100 ± ft south of new Glen Helen Parkway I-215 undercrossing.
Devore Road/Glen Helen Parkway southbound on/off ramps	Hook ramp connection to Cajon Boulevard relocated 2,900 ± ft south of current location and 1,400 ± ft south of proposed Glen Helen Parkway intersection with Cajon Boulevard..	Hook ramp connection to Cajon Boulevard relocated 2,900 ± ft south of current location and 2,100 ± ft south of the Devore Road intersection with Cajon Boulevard..	Hook ramp connection to Cajon Boulevard relocated 1,500 ft south of current location and 800 ft south of Devore Road intersection with Cajon Boulevard.	Hook ramp connection to Cajon Boulevard relocated 2,900 ± ft south of current location and 1,400 ± ft south of proposed Glen Helen Parkway intersection with Cajon Boulevard..

ft = ft
I-15 = Interstate 15
I-215 = Interstate 215
mi = miles

PM_{2.5} AND PM₁₀ HOT-SPOT METHODOLOGY

The new Final Rule establishes the transportation conformity criteria and procedures for determining which transportation projects must be analyzed for local air quality impacts in PM_{2.5} and PM₁₀ nonattainment and maintenance areas. The proposed project is in the South Coast Air Basin (Basin), which has been designated as a federal nonattainment area for PM_{2.5} and PM₁₀; therefore, a hot-spot analysis for the proposed project is required.

A hot-spot analysis is defined in the Code of Federal Regulations (CFR) (40 CFR 93.101) as an estimation of likely future localized pollutant concentrations and a comparison of those concentrations to the relevant air quality standards. A hot-spot analysis assesses the air quality impacts on a scale smaller than an entire nonattainment or maintenance area, such as for congested roadway intersections and highways or transit terminals. Such an analysis is a means of demonstrating that a transportation project meets the federal Clean Air Act (CAA) conformity requirements to support State and local air quality goals with respect to potential localized air quality impacts. When a hot-spot analysis is required, it is included within the project-level conformity determination that is made by FHWA or the Federal Transit Administration (FTA).

Section 176(c)(1)(B) of the CAA is the statutory criterion that must be met by all projects in nonattainment and maintenance areas that are subject to transportation conformity. Section 176(c)(1)(B) states that federally supported transportation projects must not “cause or contribute to any new violation of any standard in any area; increase the frequency or severity of any existing violation of any standard in any area; or delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.”

The EPA in its *Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas* (March 2006) has established the following two methods for completing PM_{2.5} and PM₁₀ hot-spot analyses:

- A. Comparison to another location with similar characteristics
- B. Air quality studies for the proposed project location

This analysis uses a combined approach to demonstrate that the proposed project would not result in a new or worsened PM_{2.5} or PM₁₀ violation. Method A was used to establish that the proposed project area will meet the national ambient air quality standards (NAAQS). Method B was used to demonstrate that implementation of the proposed project would not delay attainment of the NAAQS.

Ambient Air Quality Standards

PM_{2.5} nonattainment and maintenance areas are required to attain and maintain two NAAQS:

- **24-hour Standard:** 65 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). Based on 2004–2006 monitored data, the EPA tightened the PM_{2.5} 24-hour standard from 65 $\mu\text{g}/\text{m}^3$ to 35 $\mu\text{g}/\text{m}^3$, effective December 2006. New area designations will become effective in early 2010 (EPA 2006b). Therefore, the current standard for conformity purposes is 65 $\mu\text{g}/\text{m}^3$.
- **Annual Standard:** 15.0 $\mu\text{g}/\text{m}^3$

The current 24-hour standard is based on a 3-year average of the 98th percentile of 24-hour PM_{2.5} concentrations. The current annual standard is based on a 3-year average of annual mean PM_{2.5} concentrations. A PM_{2.5} hot-spot analysis must consider both standards unless it is determined for a given area in which meeting the controlling standard would ensure that CAA requirements are met for both standards. The interagency consultation process should be used to discuss how the qualitative PM_{2.5} hot-spot analysis meets statutory and regulatory requirements for both PM_{2.5} standards, depending on the factors that are evaluated for a given project.

PM₁₀ nonattainment and maintenance areas are required to attain the following standard:

- **24-hour Standard:** 150 µg/m³

The 24-hour PM₁₀ standard is attained when the average number of exceedances in the previous three calendar years is less than or equal to 1.0. An exceedance occurs when a 24-hour concentration of 155 µg/m³ or greater is measured at a site. The annual PM₁₀ standard of 50 µg/m³ is no longer used for determining the federal attainment status. The interagency consultation process should be used to discuss how the qualitative PM₁₀ hot-spot analysis meets statutory and regulatory requirements for the PM₁₀ standards, depending on the factors that are evaluated for a given project.

To meet statutory requirements, the 2006 Final Rule requires PM_{2.5} and PM₁₀ hot-spot analyses to be performed for a Project of Air Quality Concern (POAQC). The Final Rule states that projects not identified in 40 CFR 93.123(b)(1) as POAQCs have met statutory requirements without any further hot-spot analyses (40 CFR 93.116[a]).

PM_{2.5} AND PM₁₀ HOT-SPOT ANALYSIS

Projects of Air Quality Concern

The first step in the hot-spot analysis is to determine whether a project meets the standard for a POAQC. The EPA specified in 40 CFR 93.123(b)(1) of the 2006 Final Rule that POAQC are certain highway and transit projects that involve significant levels of diesel vehicle traffic, or any other project that is identified in the PM_{2.5} and PM₁₀ State Implementation Plan (SIP) as a localized air quality concern. The 2006 Final Rule defines the POAQC that require a PM_{2.5} and PM₁₀ hot-spot analysis in 40 CFR 93.123(b)(1) as:

- i. New or expanded highway projects that have a significant number of or significant increase in diesel vehicles;
- ii. Projects affecting intersections that are at level of service (LOS) D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;
- iii. New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;
- iv. Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; or

- v. Projects in or affecting locations, areas, or categories of sites that are identified in the PM_{2.5} and PM₁₀ applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

The project does qualify as a POAQC because it meets two of the following project types:

1. The *Traffic Operations Analysis* (Iteris, September 30, 2009) states that the proposed project would not increase the daily traffic volumes along I-15 or I-215. However, the proposed project is an expanded highway project that would have a significant number of diesel vehicles. In addition, the truck volumes would exceed the 8 percent threshold for POAQC along I-15 and I-215. The daily traffic volumes for I-15 and I-215 are listed in Table B.

Table B: Daily Traffic Volumes (ADT/Truck ADT/Truck Percentage)

Roadway Segment	Existing (2007)	2017	2040
I-15 South of I-215	112,800/15,600/13.8%	160,800/22,200/13.8%	271,000/37,400/13.8%
I-15 North of I-215	137,700/16,800/12.2%	210,800/25,700/12.2%	379,000/46,238/12.2%
I-215 South of I-15	59,800/5,500/9.2%	89,600/8,200/9.2%	158,400/14,600/9.2%

Source: Iteris, September 2009.

ADT = average daily traffic

I-15 = Interstate 15

I-215 = Interstate 215

2. The proposed project does not affect intersections that are at LOS D, E, or F with a significant number of diesel vehicles. The LOS conditions in the project vicinity with and without the proposed project are shown in Tables 31 through 35 and 54 through 58 of the *Traffic Operations Analysis* and included in Attachment B. As shown, the proposed project would not significantly change the LOS conditions at the intersections within the project area.
3. The proposed project does not include the construction of a new bus or rail terminal.
4. The proposed project does not expand an existing bus or rail terminal.
5. The proposed project is not in or affecting locations, areas, or categories of sites that are identified in the PM_{2.5} or PM₁₀ implementation plan as sites of possible violation.

Therefore, this project is considered to be a POAQC, and a qualitative project-level PM_{2.5} and PM₁₀ hot-spot analysis was conducted to assess whether the project would cause or contribute to any new localized PM_{2.5} or PM₁₀ violations, increase the frequency or severity of any existing violations, or delay timely attainment of the PM_{2.5} and PM₁₀ ambient air quality standards (AAQS).

Types of Emissions Considered

In accordance with the EPA/FHWA Guidance, this hot-spot analysis is based on directly emitted and re-entrained PM_{2.5} and PM₁₀ emissions. Tailpipe, brake wear, tire wear, and road dust PM_{2.5} and PM₁₀ emissions were considered in this hot-spot analysis.

Vehicles cause dust from paved and unpaved roads to be re-entrained, or resuspended, in the atmosphere. According to the 2006 Final Rule, road dust emissions are to be considered for PM₁₀ hot-spot analyses. For PM_{2.5}, road dust emissions are only to be considered in hot-spot analyses if the EPA or the State air agency has made a finding that such emissions are a significant contributor to the PM_{2.5} air quality problem (40 CFR 93.102(b)(3)). The EPA has published guidance on the use of AP-42 for re-entrained road dust for SIP development and conformity (August 2007); therefore, re-entrained PM_{2.5} is considered in this analysis.

Secondary particles formed through PM_{2.5} and PM₁₀ precursor emissions from a transportation project take several hours to form in the atmosphere, giving emissions time to disperse beyond the immediate project area of concern for localized analyses; therefore, they were not considered in this hot-spot analysis. Secondary emissions of PM_{2.5} and PM₁₀ are considered as part of the regional emission analysis prepared for the conforming RTP and Federal Transportation Improvement Program (FTIP).

According to the project schedule, no phase of construction would last more than 5 years, and construction-related emissions may be considered temporary; therefore, any construction-related PM_{2.5} and PM₁₀ emissions due to this project were not included in this hot-spot analysis. This project will comply with the applicable South Coast Air Quality Management District (SCAQMD) Fugitive Dust Rules for the control of fugitive dust during construction of this project. In addition, per Transportation Conformity Rule 93.117, the project will be required to comply with any applicable PM_{2.5} and PM₁₀ control measures in the SIP. Excavation, transportation, placement, and handling of excavated soils will result in no visible dust migration. A water truck or tank will be available within the project limits at all times to suppress and control the migration of fugitive dust from earthwork operations.

Analysis Method

According to the hot-spot methodology, estimates of future localized PM_{2.5} and PM₁₀ pollutant concentrations need to be determined. This analysis makes those estimates by extrapolating present PM_{2.5} and PM₁₀ pollutant concentrations from air quality data measured at monitoring stations in the vicinity of the proposed project. The data from these stations are combined with projections from the 2003 and 2007 Air Quality Management Plans (AQMP) prepared by the SCAQMD and examined for trends in order to predict future conditions in the project vicinity. Additionally, the impacts of the project and the likelihood of these impacts interacting with the ambient PM_{2.5} and PM₁₀ levels to cause hot spots are discussed.

Data Considered

The closest air quality monitoring station to the proposed project is the Fontana Air Quality Monitoring Station, located approximately 9 mi southwest of the project site at 14360 Arrow Boulevard. This station is approximately 2 mi from I-15. The project location relative to this monitoring station is shown in Figure 2.

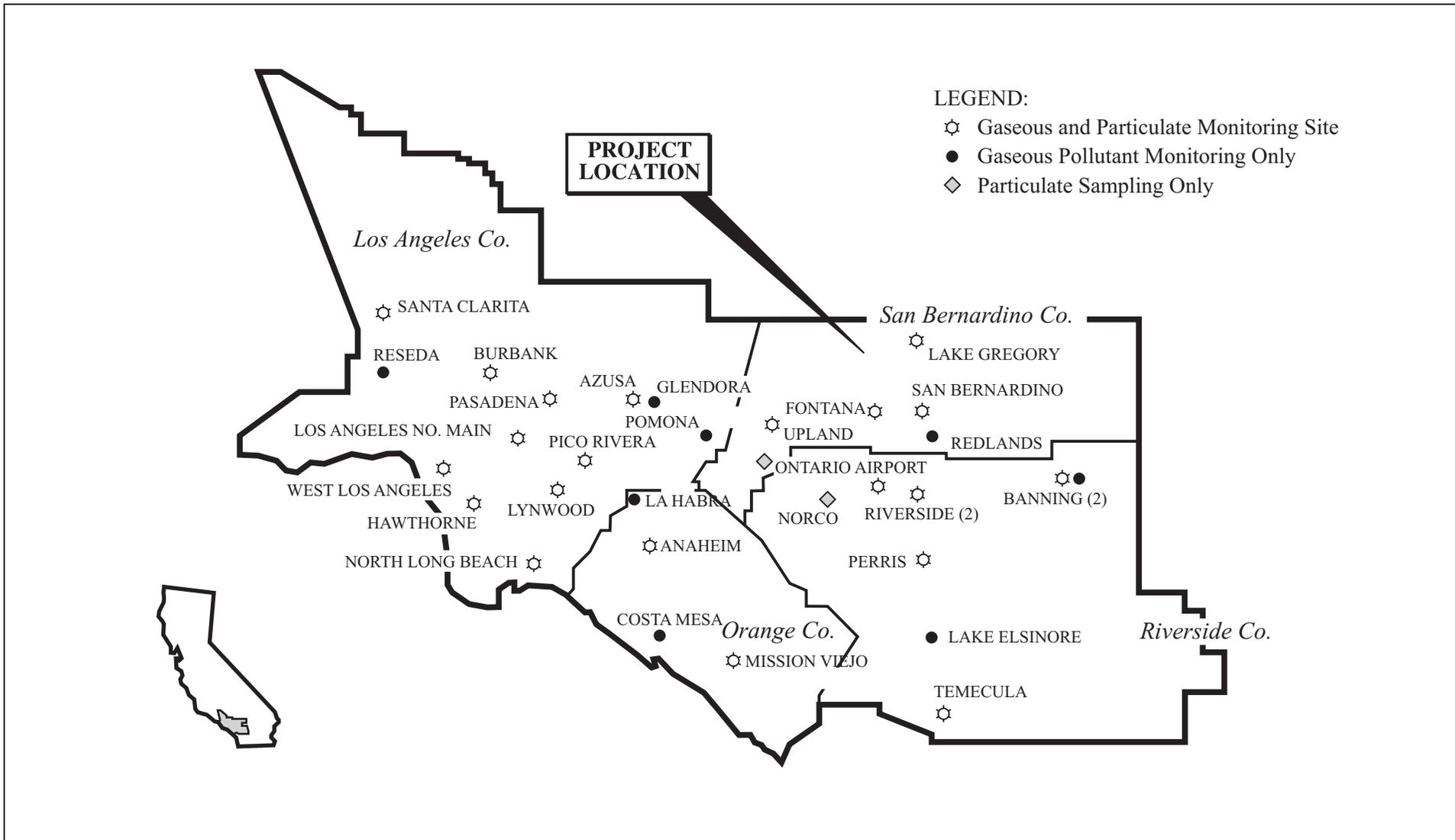


FIGURE 2

I-15/I-215 Devore Interchange Reconstruction Project

SCAQMD Air Monitoring Network
within the South Coast Air Basin

I-15PM 14.0-R16.4
I-215PM 16.0-17.8
EA# 08-0K7100



The existing truck volume along I-15 in the vicinity of the Fontana Station is 20,000 daily trips. This volume is higher than the 5,500 to 16,800 daily truck trips along I-215 and I-15, respectively, in the project area. The total vehicle trips along I-15 in the vicinity of this monitoring station is 196,000, greater than the 59,800 to 137,700 existing daily trips along I-215 and I-15, respectively, in the project area. Therefore, the air quality concentrations monitored at this station are representative of the existing conditions in the project area.

Trends in Baseline PM_{2.5} Concentrations. The monitored PM_{2.5} concentrations at the Fontana-Arrow Highway Station are shown in Table C. These data show that, within the past 5 years, the federal 24-hour PM_{2.5} AAQS (65 µg/m³) was not exceeded. The annual average PM_{2.5} AAQS (15 µg/m³) at this station was exceeded in each of the 5 years; however, the concentrations have been decreasing steadily over time.

Table C: Ambient PM_{2.5} Monitoring Data (µg/m³)

	2004	2005	2006	2007	2008
Fontana-Arrow Highway Air Quality Monitoring Station					
3-year average 98th percentile 24-Hour Value ¹	57.6	54.8	51.5	52.3	50.7
Exceeds federal 24-hour standard (65 µg/m ³)?	No	No	No	No	No
3-year annual average arithmetic mean	22.1	20.3	18.7	18.4	16.3
Exceeds federal annual average standard (15 µg/m ³)?	Yes	Yes	Yes	Yes	Yes

Source: EPA Web site: <http://www.epa.gov/air/data/monvals.html?st~CA~California>, October 2009.

¹ These values are higher than 98 percent of 24-hour values for the year.

µg/m³ = micrograms per cubic meter

PM_{2.5} = particulate matter less than 2.5 microns in diameter

Projected 24-hour Concentrations. The levels of PM_{2.5} in the project vicinity are below the current federal 24-hour standard. Table V-2-16 in the 2007 AQMP estimates that the 24-hour PM_{2.5} concentration at the Fontana station will be 46.7 µg/m³ in 2015. This concentration would not exceed the current federal 24-hour standard of 65 µg/m³.

Projected Annual Concentrations. While the current levels of PM_{2.5} in the project vicinity are above the federal annual standard, indications are that levels in the future will continue to decrease. As shown in Table V-2-15c in the 2007 AQMP with the California Air Resources Board's (ARB) emission reduction plan and the SCAQMD's emission reduction overlay, the annual PM_{2.5} concentration at the Fontana Station is projected to be 14.7 µg/m³ in 2014. This concentration would not exceed the federal annual standard of 15 µg/m³.

Trends in Baseline PM₁₀ Concentrations. The monitored PM₁₀ concentrations at the Fontana-Arrow Highway Station, shown in Table D, indicate that the federal 24-hour PM₁₀ AAQS (150 µg/m³) was exceeded twice in 2007.

Table D: Ambient PM₁₀ Monitoring Data (µg/m³)

	2004	2005	2006	2007	2008
Fontana Air Quality Monitoring Station					
First Highest	106	108	142	276	75
Second Highest	86	102	115	155	75
Third Highest	86	86	101	111	73
Fourth Highest	75	83	93	107	71
Number of days above national 24-hour standard (150 µg/m ³)	0	0	0	2	0

Source: ARB Web site: <http://www.arb.ca.gov/adam/welcome.html>, October 2009.

µg/m³ = micrograms per cubic meter

PM₁₀ = Particulate matter less than 10 microns in diameter

The 2007 AQMP reports that since the federal annual PM₁₀ standard has been revoked, the Basin is expected to be declared in attainment for the 24-hour federal PM₁₀ standard since 2000. Table V-3-1 in the 2007 AQMP lists the projected 24-hour PM₁₀ concentrations at various stations within the Basin. It is estimated that the 24-hour maximum concentration at the Fontana Station will be 97 µg/m³ by 2015, 65 percent of the federal standard.

Traffic Changes Due to the Proposed Project

The proposed project is a highway improvement project that will increase the capacity of I-15 and I-215. Based on the Traffic Study (Iteris, September 2009), the proposed project would not change peak-hour and daily traffic volumes on I-15 and I-215. The addition of the truck lanes and the elimination of the existing weaves are considered operational enhancements that do not add capacity to the freeway. The results of the simulation analysis for peak hours reflect the changes in VMT and VHT that will result from the decrease in congestion. Daily traffic volumes will not change because deferred trips are generally shifted to another time period within the same day. SCAG land use forecasts are based on regional demographic characteristics and are determined prior to the roadway network, so even if changes were made to the roadway network in the model, the land use forecasts as determined by SCAG are fixed. In addition, a travel demand model such as the SCAG model is not generally sensitive to point-oriented bottleneck improvements such as those proposed for the Devore interchange, and it would not be possible to accurately quantify a change in volume based on those improvements. Table B lists the existing (2007), opening year (2017), and build-out year (2040) traffic volumes along I-15 and I-215. These volumes apply to each of the project alternatives.

Table E lists the vehicle miles traveled (VMT), vehicle hours traveled (VHT), and average vehicle speed in the project area for the existing, no build, and build conditions. As shown, the project Build Alternatives would decrease the VHT without increasing the VMT within the project area.

Tables F through O list the freeway mainline LOS for each of the build alternatives in 2017 and 2040. As shown, all of the proposed build alternatives would improve the LOS along I-15 and I-215.

Table E: Daily Traffic Conditions

Alternative	Cars		Trucks		Vehicle Speed
	VMT	VHT	VMT	VHT	
Existing	371,768	6,340	37,040	632	58.6
2017 No Build Alternative	448,700	7,652	49,561	845	58.6
2017 Alternative 2	448,700	7,310	49,767	807	61.4
2017 Alternative 3	448,700	7,206	49,469	796	62.3
2017 Alternative 3A	448,700	7,177	49,489	793	62.5
2017 Alternative 5	448,700	7,020	49,520	775	63.9
2040 No Build Alternative	745,868	18,899	89,661	2,272	39.5
2040 Alternative 2	745,868	12,471	89,661	1,499	59.8
2040 Alternative 3	745,868	12,269	89,661	1,475	60.8
2040 Alternative 3A	745,868	12,471	89,661	1,499	59.8
2040 Alternative 5	745,868	12,079	89,661	1,452	61.8

Source: Iteris, September 2009.

VMT = vehicle miles traveled

VHT = vehicle hours traveled

Table F: Freeway Mainline LOS - 2017 No Build

Freeway Segment	AM			PM		
	Density	Speed	LOS	Density	Speed	LOS
I-15 Southbound						
North of Kenwood Avenue to Kenwood Avenue Off-Ramp	-	-	F	27.3	65	D
Kenwood Avenue Off-Ramp to Kenwood Avenue On-Ramp	-	-	F	25.5	65	C
Kenwood Avenue On-Ramp to I-215 SB Connector	25.4	61.8	C	17.1	65	B
I-215 SB Connector to I-215 NB Connector	39.4	46.1	E	21.2	63.3	C
I-215 NB Connector to Glen Helen Parkway Off-Ramp	64.2	31.3	F	25.5	59.7	C
Glen Helen Parkway Off-Ramp to Glen Helen Parkway On-Ramp	54.5	36.4	F	25.2	60	C
Glen Helen Parkway On-Ramp to Sierra Avenue Off-Ramp	23.7	64.8	C	17.8	65	B
I-15 Northbound						
Sierra Avenue On-Ramp to Glen Helen Parkway Off-Ramp	12.6	65	B	21.4	65	C
Glen Helen Parkway Off-Ramp to Glen Helen Parkway On-Ramp	16.3	65	B	28	63.1	D
Glen Helen Parkway On-Ramp to I-215 Off-Ramp	16.5	65	B	29.4	62.3	D
I-215 SB Connector to I-215 NB Connector	14	65	B	26.1	64	D
I-215 NB Connector to Kenwood Avenue Off-Ramp	15	65	B	30.6	62.7	D
Kenwood Avenue Off-Ramp to Kenwood Avenue On-Ramp	14.8	65	B	29.7	63.2	D
Kenwood Avenue On-Ramp to North of Kenwood Avenue	16.4	65	B	35.8	59.2	E
I-215 Southbound						
I-15 SB Connector from I-15 SB to CD Off-Ramp	18.4	65	C	10.2	65	A
CD Off-Ramp to CD On-Ramp	27.4	63.8	D	14.9	64.9	B
CD On-Ramp to Palm Avenue Off-Ramp	33.6	59.9	D	18	65	C
Palm Avenue Off-Ramp to Palm Avenue On-Ramp	26.3	64.4	D	16	65	B
Palm Avenue On-Ramp to University Avenue Off-Ramp	34.1	59.8	D	20.7	65	C
I-215 Northbound						
Palm Avenue On-Ramp to Devore Road Off-Ramp	14.6	65	B	35.7	64.2	E
Devore Road Off-Ramp to Devore Road On-Ramp	13.9	65	B	32.4	64.6	D
Devore Road On-Ramp to I-15 SB Connector	11.2	52.7	B	22.1	53.3	C

CD = collector-distributor

HOV = high-occupancy vehicle

I-15 = Interstate 15

I-215 = Interstate 215

LOS = level of service

NB = northbound

SB = southbound

Table G: Freeway Mainline LOS - 2017 Alternative 2

Freeway Segment	AM			PM		
	Density	Speed	LOS	Density	Speed	LOS
I-15 Southbound						
North of Kenwood Avenue to Kenwood Avenue Off-Ramp	21.2	59.9	C	13.8	61	B
Kenwood Avenue Off-Ramp to Truck Lane Connector	20.9	60.2	C	14	60.9	B
Truck Lane Connector to I-215 SB Connector	22.5	60.7	C	14.9	61.3	B
I-215 SB Connector to Truck Lane Merge	25.8	60.2	C	19.2	60.9	C
Car/Truck Lane Merge Ramp to I-215 NB Connector	17.7	60.3	B	13.1	60.7	B
I-215 NB Connector to Lane Deletion	16.3	60.6	B	12.4	61	B
Lane Deletion to Glen Helen Parkway Off-Ramp	19.7	60.1	C	14.9	60.7	B
Glen Helen Parkway Off-Ramp to Glen Helen Parkway On-Ramp	24.2	60	C	18.6	60.6	C
Glen Helen Parkway On-Ramp to Sierra Avenue Off-ramp	20.1	60	C	15.2	60.6	B
I-15 Northbound						
Sierra Avenue On-Ramp to Glen Helen Parkway Off-Ramp	12.5	62.5	B	21.5	61.8	C
Glen Helen Parkway Off-Ramp to Glen Helen Parkway On-Ramp	12.5	63	B	21.4	61.8	C
Glen Helen Parkway On-Ramp to I-215 SB Connector and Truck Lane	10.2	63	A	17.7	61.9	B
I-215 SB Connector and Truck Lane to I-215 NB Connector	12.8	63.7	B	22.4	62.8	C
I-215 NB Connector to Lane Deletion	10.4	62	A	20.4	60.7	C
Lane Deletion to Kenwood/Truck Lane Merge	12.5	62	B	24.3	60.8	C
Kenwood Avenue/ Truck Merge to North of Kenwood Avenue	9.7	60.9	A	20.1	58.9	C
I-215 Southbound						
I-15 SB to Devore Road CD System Connector Off	19.4	60.8	C	10.7	61.4	A
Devore Road CD System Connector Off to I-215 SB HOV Diverge	18.8	60.8	C	10.4	61.4	A
I-215 SB HOV diverge to Devore Road CD System Connector On	18.8	60.7	C	10.3	61.4	A
Devore Road CD System Connector On to Devore Road On-ramp	15.6	60.3	B	8.8	61.4	A
Devore Road On-Ramp to Palm Avenue On-ramp	22	60.6	C	12.5	61.6	B
I-215 Northbound						
Palm Avenue On-Ramp to Devore Road Off-Ramp	12.3	51.7	B	24.6	51.7	C
Devore Road Off-Ramp to HOV merge	9.6	62	A	19.1	62	C
HOV merge to I-15 SB Connector	7.3	61.6	A	14.5	61.5	B
I-15 SB Connector to Devore CD System Merge	6.9	61.7	A	16.4	61.9	B
Devore CD System to I-15 NB Mainline Merge	8.2	59.6	A	17.8	60.2	B

CD = collector-distributor
 HOV = high-occupancy vehicle
 I-15 = Interstate 15
 I-215 = Interstate 215
 LOS = level of service
 NB = northbound
 SB = southbound

Table H: Freeway Mainline LOS - 2017 Alternative 3

Freeway Segment	AM			PM		
	Density	Speed	LOS	Density	Speed	LOS
I-15 Southbound						
North of Kenwood Avenue to Kenwood Avenue Off-Ramp	22	58.4	C	14.3	59.2	B
Kenwood Avenue Off-Ramp to I-215 SB/I-15 Truck Lane Diverge	20.2	61.8	C	13.4	62.8	B
I-215 SB/I-15 Truck Lane Diverge to Kenwood Avenue On-Ramp	24.6	63	C	18.4	63.4	C
Kenwood Avenue On-Ramp to Truck Lane Merge	25.4	62.6	C	18.6	63.1	C
Truck Lane Merge to I-215 NB Connector	17.2	62.4	B	12.7	62.7	B
I-215 NB On-Ramp to Glen Helen Parkway Off-Ramp	19	62	C	14.4	62.4	B
Glen Helen Parkway Off-Ramp to Glen Helen Parkway On-Ramp	23.3	62	C	17.8	62.4	B
Glen Helen Parkway On-Ramp to Sierra Avenue Off-ramp	19.4	61.7	C	14.6	62.2	B
I-15 Northbound						
Sierra Avenue On-Ramp to Glen Helen Parkway Off-Ramp	10.4	63.2	A	18	62	B
Glen Helen Parkway Off-Ramp to Glen Helen Parkway On-Ramp	12.9	62.7	B	22	61.1	C
Glen Helen Parkway On-Ramp to I-215 SB Connector and Truck Lane	10.5	62.5	A	18.3	61	C
I-215 SB Connector and Truck Lane to I-215 NB Merge	13	63.7	B	22.8	63	C
I-215 NB Connector to Lane Deletion	10.2	62	A	20.2	61	C
Lane Deletion to Kenwood/Truck Lane Merge	12.1	62.2	B	24	61.2	C
Kenwood Avenue/ Truck Merge to North of Kenwood Avenue	9.8	61.2	A	20	59.7	C
I-215 Southbound						
After I-15NB/I-215 SB Diverge to Truck Lane Diverge	16.6	61.7	B	9.7	62.2	A
Truck lane to Devore Road CD System Connector Off	18.7	63	C	10.3	63.3	A
Devore Road CD System Connector Off to I-215 SB HOV	18.2	62.9	C	10.1	63.3	A
I-215 SB HOV to Devore Road CD System Connector On	18.1	62.8	C	10	63.2	A
Devore Road CD System Connector On to Devore Road On-ramp	15.2	63	B	8.7	63.3	A
Devore Road On-ramp to Lane Deletion	16.1	62.6	B	9.2	63.2	A
Lane Deletion to Palm Avenue On-ramp	21.5	62.4	C	12.3	63.2	B
I-215 Northbound						
Palm Avenue On-Ramp to Devore Road Off-Ramp	11.2	56.8	B	22.3	57	C
Devore Road Off-Ramp to HOV merge	9.9	61.3	A	19.9	61.5	C
HOV merge to I-15 SB Connector	7.4	61.2	A	14.9	61	B
I-15 SB Connector to I-15 NB merge	11.2	56.8	B	22.3	57	C

CD = collector-distributor
 HOV = high-occupancy vehicle
 I-15 = Interstate 15
 I-215 = Interstate 215
 LOS = level of service
 NB = northbound
 SB = southbound

Table I: Freeway Mainline LOS - 2017 Alternative 3A

Freeway Segment	AM			PM		
	Density	Speed	LOS	Density	Speed	LOS
I-15 Southbound						
North of Kenwood Avenue to Kenwood Avenue Off-Ramp	20.5	62.5	C	13.4	63	B
Kenwood Avenue Off-Ramp to I-215 SB/I-15 Truck Lane Diverge	20.1	61.9	C	13.4	62.9	B
I-215 SB/I-15 Truck Lane Diverge to Kenwood Avenue On-Ramp	24.9	63	C	18.4	63.4	C
Kenwood Avenue On-Ramp to Truck Lane Merge	25.6	62.7	C	18.6	63.2	C
Truck Lane Merge to I-215 NB Connector	21.5	62.2	C	15.8	62.6	B
I-215 NB On-Ramp to Glen Helen Parkway Off-Ramp	19	62.4	C	14.4	62.7	B
Glen Helen Parkway Off-Ramp to Glen Helen Parkway On-Ramp	23.5	62	C	17.9	62.4	B
Glen Helen Parkway On-Ramp to Lane Deletion	19.4	62	C	14.6	62.3	B
Lane Deletion to South of Lane Deletion	24.3	62	C	18.3	62.3	C
I-15 Northbound						
South of Glen Helen Parkway to Glen Helen Parkway Off-Ramp	10.4	63.2	A	17.9	62	B
Glen Helen Parkway Off-Ramp to Glen Helen Parkway On-Ramp	12.6	62.8	B	21.6	61.2	C
Glen Helen Parkway On-Ramp to I-215 SB Connector	10.3	62.5	A	18	60.9	C
I-215 S SB Connector to Truck Lane Connector	11	61.8	A	21.2	58.8	C
Truck Lane Connector to I-125 NB merge	12.7	63.7	B	19.4	62.7	C
I-215 NB Connector to Lane Deletion	9.3	63.7	A	17.2	63.2	B
Lane Deletion to Truck Lane Connector	11.1	63.9	B	20.5	63.3	C
Truck Lane Connector to Lane deletion	9.8	60.4	A	20.4	57.7	C
I-215 Southbound						
After I-15NB/I-215 SB Diverge to Truck Lane Diverge	16.3	61.7	B	9.6	62.2	A
Truck lane to Devore Road Off-Ramp Connector	18.4	63	C	10.3	63.3	A
Devore Road Off-Ramp Connector to I-15 NB Connector	18	62.5	C	10	63	A
I-15 NB Connector to HOV Diverge	15.2	62.1	B	8.6	63.1	A
HOV Diverge to Devore Road On-Ramp	19.9	62.9	C	11.4	63.3	B
Devore Road On-ramp to Palm Avenue Off-Ramp	21.1	62.7	C	12.2	63.2	B
I-215 Northbound						
Palm Avenue On-Ramp to Devore Road Off-Ramp	10.3	61.8	A	20.5	61.9	C
Devore Road Off-Ramp to HOV merge	9.8	61.8	A	19.8	61.7	C
HOV merge to I-15 SB Connector	7.5	60.8	A	15.2	60	B
I-15 SB connector to I-215 NB truck lane	7.3	59.8	A	17.4	59.3	B
I-215 NB truck lane to I-15 NB merge	5.8	64.2	A	15	63.7	B

CD = collector-distributor
 HOV = high-occupancy vehicle
 I-15 = Interstate 15
 I-215 = Interstate 215
 LOS = level of service
 NB = northbound
 SB = southbound

Table J: Freeway Mainline LOS - 2017 Alternative 5

Freeway Segment	AM			PM		
	Density	Speed	LOS	Density	Speed	LOS
I-15 Southbound						
North of Kenwood Avenue to Kenwood Avenue Off-Ramp	20	64.2	C	13.1	64.8	B
Kenwood Avenue Off-Ramp to Kenwood On-Ramp	19.7	64.2	C	13.2	64.8	B
Kenwood On-Ramp To I-215 Truck Lane	19	64.5	C	12.5	65.1	B
I-215 Truck Lane to I-15/I-215 SB Mainline diverge	19.9	63	C	12.8	64.5	B
I-215 SB Mainline to I-215 NB Connector	21.4	63.6	C	15.7	64.4	B
I-215 NB Connector to Glen Helen Parkway Off-Ramp	18.9	63.4	C	14.2	64.2	B
Glen Helen Parkway Off-Ramp to Glen Helen Parkway On-Ramp	23.4	63.1	C	17.7	64	B
Glen Helen Parkway On-Ramp to Lane Deletion	19.2	63.3	C	14.3	64	B
I-15 Northbound						
Lane Addition to Glen Helen Parkway Off-Ramp	10.3	64.4	A	17.9	62.5	B
Glen Helen Parkway Off-Ramp to Glen Helen Parkway On-Ramp	12.3	64.4	B	21.1	62.3	C
Glen Helen Parkway On-Ramp to I-215 SB Connector	10	64.6	A	17.5	62.8	B
I-215 SB Connector to Truck Lane Connector	10.8	64.1	A	20.5	61.4	C
Truck Lane Connector to I-15/I-125 NB merge	12.5	65.4	B	22	63.9	C
I-15/I-215 NB merge to Lane Deletion	9.1	65.5	A	18.5	64	C
Lane Deletion to Kenwood On-Ramp	10.8	65.9	A	21.9	64.6	C
Kenwood On-Ramp to North of Kenwood Avenue	9.6	62.2	A	19.8	60.2	C
I-215 Southbound						
I-15 SB/I-215 SB diverge to HOV diverge	16.9	65.2	B	8.8	66.1	A
HOV diverge to CD ramp connector	16.7	64.8	B	8.7	66	A
CD ramp Connector to Cajon Boulevard On-ramp	20.2	63.2	C	11.3	64.6	B
I-215 SB after Cajun Boulevard on-ramp	20.7	63.9	C	11.8	65.1	B
I-215 Northbound						
Palm Avenue On-Ramp to Devore Road Off-Ramp	11.5	55.2	B	22.9	55.3	C
Devore Road Off-Ramp to HOV merge	9.5	63.5	A	19.3	62.7	C
HOV merge to I-15 SB Connector	7.2	63	A	14.4	62.7	B
I-15 SB connector to I-215 NB truck lane	7.2	61	A	16.9	61.6	B
I-215 NB truck lane to I-15 NB merge	5.6	66.3	A	14.7	65.3	B

CD = collector-distributor
 HOV = high-occupancy vehicle
 I-15 = Interstate 15
 I-215 = Interstate 215
 LOS = level of service
 NB = northbound
 SB = southbound

Table K: Freeway Mainline LOS - 2040 No Build

Freeway Segment	AM			PM		
	Density	Speed	LOS	Density	Speed	LOS
I-15 Southbound						
North of Kenwood Avenue to Kenwood Avenue Off-Ramp	-	-	F	-	-	F
Kenwood Avenue Off-Ramp to Kenwood Avenue On-Ramp	-	-	F	-	-	F
Kenwood Avenue On-Ramp to I-215 SB Connector	-	-	F	-	-	F
I-215 SB Connector to I-215 NB Connector	-	-	F	41.9	54.5	E
I-215 NB Connector to Glen Helen Parkway Off-Ramp	-	-	F	-	-	F
Glen Helen Parkway Off-Ramp to Glen Helen Parkway On-Ramp	-	-	F	-	-	F
Glen Helen Parkway On-Ramp to Sierra Avenue Off-Ramp	95.7	27.6	F	44.5	50.1	E
I-15 Northbound						
Sierra Avenue On-Ramp to Glen Helen Parkway Off-Ramp	19.1	65	C	30.6	61.1	D
Glen Helen Parkway Off-Ramp to Glen Helen Parkway On-Ramp	24.9	64.4	C	54.5	43.4	F
Glen Helen Parkway On-Ramp to I-215 Off-Ramp	25.4	64.2	C	71.1	35.1	F
I-215 SB Connector to I-215 NB Connector	21.6	65	C	48.2	47.2	F
I-215 NB Connector to Kenwood Avenue Off-Ramp	25.2	64.8	C	-	-	F
Kenwood Avenue Off-Ramp to Kenwood Avenue On-Ramp	24.9	64.8	C	-	-	F
Kenwood Avenue On-Ramp to North of Kenwood Avenue	28.7	63.7	D	-	-	F
I-215 Southbound						
I-15 SB Connector from I-15 SB to CD Off-Ramp	30.4	62.4	D	21	65	C
CD Off-Ramp to CD On-Ramp	100.1	27.7	F	33.4	60.2	D
CD On-Ramp to Palm Avenue Off-Ramp	80.6	33.2	F	29.4	63	D
Palm Avenue Off-Ramp to Palm Avenue On-Ramp	46.3	50.8	F	27.1	64.2	D
Palm Avenue On-Ramp to University Avenue Off-Ramp	83.6	33.4	F	34.5	61.9	D
I-215 Northbound						
Palm Avenue On-Ramp to Devore Road Off-Ramp	21.9	63	C	29.6	57.8	D
Devore Road Off-Ramp to Devore Road On-Ramp	16.1	65	B	40.4	49.1	E
Devore Road On-Ramp to I-15 SB Connector	15.5	57.9	B	27.9	55.4	C

CD = collector-distributor
 HOV = high-occupancy vehicle
 I-15 = Interstate 15
 I-215 = Interstate 215
 LOS = level of service
 NB = northbound
 SB = southbound

Table L: Freeway Mainline LOS - 2040 Alternative 2

Freeway Segment	AM			PM		
	Density	Speed	LOS	Density	Speed	LOS
I-15 Southbound						
North of Kenwood Avenue to Kenwood Avenue Off-Ramp	33.7	54	D	23.3	59.7	C
Kenwood Avenue Off-Ramp to Truck Lane Connector	30.5	57.6	D	23.5	59.7	C
Truck Lane Connector to I-215 SB Connector	31.6	59.8	D	24.4	60.4	C
I-215 SB Connector to Truck Lane Merge	31.8	59.5	D	26.6	59.9	D
Car/Truck Lane Merge Ramp to I-215 NB Connector	22.4	59.7	C	19.2	59.9	C
I-215 NB Connector to Lane Deletion	20.5	60	C	17.9	60.2	B
Lane Deletion to Glen Helen Parkway Off-Ramp	24.9	58.9	C	21.7	59.3	C
Glen Helen Parkway Off-Ramp to Glen Helen Parkway On-Ramp	30.4	59	D	26.8	59.4	D
Glen Helen Parkway On-Ramp to Sierra Avenue Off-ramp	26	59.1	C	22	59.4	C
I-15 Northbound						
Sierra Avenue On-Ramp to Glen Helen Parkway Off-Ramp	19.1	61.8	C	29.4	60.8	D
Glen Helen Parkway Off-Ramp to Glen Helen Parkway On-Ramp	19.3	61.7	C	29.5	59.3	D
Glen Helen Parkway On-Ramp to I-215 SB Connector and Truck Lane	15.7	61.9	B	24.7	60.5	C
I-215 SB Connector and Truck Lane to I-215 NB Connector	17.5	63.2	B	29.1	61.8	D
I-215 NB Connector to Lane Deletion	17.3	60	B	33.6	53.2	D
Lane Deletion to Kenwood/Truck Lane Merge	20.5	60.4	C	38.7	55.1	E
Kenwood Avenue/ Truck Merge to North of Kenwood Avenue	16.7	58.5	B	33.4	53.4	D
I-215 Southbound						
I-15 SB to Devore Road CD System Connector Off	31.8	59.4	D	22.5	60.3	C
Devore Road CD System Connector Off to I-215 SB HOV Diverge	30.8	59.3	D	22	59.9	C
I-215 SB HOV diverge to Devore RD CD System Connector On	24.1	60.2	C	17.6	60.6	B
Devore Road CD System Connector On to Devore Road On-ramp	21	58.6	C	14.3	60.3	B
Devore Road On-Ramp to Palm Avenue On-ramp	29.8	59.4	D	20.2	60.5	C
I-215 Northbound						
Palm Avenue On-Ramp to Devore Road Off-Ramp	18	51.5	B	33.6	51	D
Devore Road Off-Ramp to HOV merge	14	61.2	B	26.4	59.7	D
HOV merge to I-15 SB Connector	12.8	61.2	B	24.7	59	C
I-15 SB Connector to Devore CD System Merge	13.9	61.5	B	29.3	58.7	D
Devore CD System to I-15 NB Mainline Merge	16.7	58.3	B	33.7	53.1	D

CD = collector-distributor
 HOV = high-occupancy vehicle
 I-15 = Interstate 15
 I-215 = Interstate 215
 LOS = level of service
 NB = northbound
 SB = southbound

Table M: Freeway Mainline LOS - 2040 Alternative 3

Freeway Segment	AM			PM		
	Density	Speed	LOS	Density	Speed	LOS
I-15 Southbound						
North of Kenwood Avenue to Kenwood Avenue Off-Ramp	34	54.4	D	24.5	57.5	C
Kenwood Avenue Off-Ramp to I-215 SB/I-15 Truck Lane Diverge	29.2	59.6	D	22.7	61.4	C
I-215 SB/I-15 Truck Lane Diverge to Kenwood Avenue On-Ramp	30.1	62.7	D	25.3	63	C
Kenwood Avenue On-Ramp to Truck Lane Merge	30.8	62.2	D	25.8	62.5	C
Truck Lane Merge to I-215 NB Connector	21.6	62	C	18.8	61.9	C
I-215 NB On-Ramp to Glen Helen Parkway Off-Ramp	23.9	61	C	21.1	61.3	C
Glen Helen Parkway Off-Ramp to Glen Helen Parkway On-Ramp	29.1	61.1	D	26	61.3	C
Glen Helen Parkway On-Ramp to Sierra Avenue Off-ramp	25.2	60.3	C	21.4	61.1	C
I-15 Northbound						
Sierra Avenue On-Ramp to Glen Helen Parkway Off-Ramp	16	62	B	25	59.8	C
Glen Helen Parkway Off-Ramp to Glen Helen Parkway On-Ramp	19.8	61.2	C	29.9	58.4	D
Glen Helen Parkway On-Ramp to I-215 SB Connector and Truck Lane	16.2	60.8	B	25.7	58.3	C
I-215 SB Connector and Truck Lane to I-215 NB Merge	17.7	63.3	B	28.7	62.8	D
I-215 NB Connector to Lane Deletion	16.2	60.8	B	32.6	54.4	D
Lane Deletion to Kenwood/Truck Lane Merge	19.2	61.2	C	37.5	56.3	E
Kenwood Avenue/ Truck Merge to North of Kenwood Avenue	16.6	59.2	B	32	55.9	D
I-215 Southbound						
After I-15NB/I-215 SB Diverge to Truck Lane Diverge	27.1	60.2	D	20.5	61.0	C
Truck lane to Devore Road CD System Connector Off	30.1	62.1	D	21.6	62.6	C
Devore Road CD System Connector Off to I-215 SB HOV	29.2	61.9	D	21.1	62.5	C
I-215 SB HOV to Devore Road CD System Connector On	23	62.4	C	16.9	62.7	B
Devore Road CD System Connector On to Devore Road On-ramp	19.9	62.8	C	13.9	63	B
Devore Road On-ramp to Lane Deletion	21.6	61.4	C	14.6	62.7	B
Lane Deletion to Palm Avenue On-ramp	28.9	61	D	19.5	62.5	C
I-215 Northbound						
Palm Avenue On-Ramp to Devore Road Off-Ramp	16.4	56.4	B	30.6	56	D
Devore Road Off-Ramp to HOV merge	14.3	60.7	B	27.6	59.4	D
HOV merge to I-15 SB Connector	12.9	61	B	25.5	58.3	C
I-15 SB Connector to I-15 NB merge	16.4	56.4	B	30.6	56	D

CD = collector-distributor
 HOV = high-occupancy vehicle
 I-15 = Interstate 15
 I-215 = Interstate 215
 LOS = level of service
 NB = northbound
 SB = southbound

Table N: Freeway Mainline LOS - 2040 Alternative 3A

Freeway Segment	AM			PM		
	Density	Speed	LOS	Density	Speed	LOS
I-15 Southbound						
North of Kenwood Avenue to Kenwood Avenue Off-Ramp	30.3	60.6	D	22.6	62.1	C
Kenwood Avenue Off-Ramp to I-215 SB/I-15 Truck Lane Diverge	29.2	59.8	D	22.7	61.6	C
I-215 SB/I-15 Truck Lane Diverge to Kenwood Avenue On-Ramp	30.6	62.7	D	25.4	63	C
Kenwood Avenue On-Ramp to Truck Lane Merge	31.4	62.3	D	25.7	62.8	C
Truck Lane Merge to I-215 NB Connector	27.5	61.3	D	23.5	61.3	C
I-215 NB On-Ramp to Glen Helen Parkway Off-Ramp	24	61.8	C	20.8	62	C
Glen Helen Parkway Off-Ramp to Glen Helen Parkway On-Ramp	29.5	61.1	D	25.8	61.4	C
Glen Helen Parkway On-Ramp to Lane Deletion	25.3	61.1	C	21.2	61.4	C
Lane Deletion to South of Lane Deletion						
I-15 Northbound						
South of Glen Helen Parkway to Glen Helen Parkway Off-Ramp	16	62	B	25	59.8	C
Glen Helen Parkway Off-Ramp to Glen Helen Parkway On-Ramp	19.5	61.2	C	30	58.5	D
Glen Helen Parkway On-Ramp to I-215 SB Connector	16	60.9	B	25.8	58.1	C
I-215 S SB Connector to Truck Lane Connector	17.2	58.8	B	30.5	54.6	D
Truck Lane Connector to I-215 NB merge	17.4	63.3	B	29	61.8	D
I-215 NB Connector to Lane Deletion	14.7	63.4	B	27.6	61.5	D
Lane Deletion to Truck Lane Connector	17.6	63.5	B	32.5	62.6	D
Truck Lane Connector to Lane deletion	17	57.5	B	31.7	55.9	D
I-215 Southbound						
After I-15NB/I-215 SB Diverge to Truck Lane Diverge	27	60.2	D	20.5	60.9	C
Truck lane to Devore Road Off-Ramp Connector	29.9	62.3	D	21.6	62.6	C
Devore Road Off-Ramp Connector to I-15 NB Connector	29.3	61.5	D	21.1	62.3	C
I-15 NB Connector to HOV Diverge	25	60.6	C	17.1	62	B
HOV Diverge to Devore Road On-Ramp	26.4	62.1	D	18.4	62.7	C
Devore Road On-ramp to Palm Avenue Off-Ramp	28.3	62	D	19.5	62.7	C
I-215 Northbound						
Palm Avenue On-Ramp to Devore Road Off-Ramp	15.1	61.1	B	28.6	59.9	D
Devore Road Off-Ramp to HOV merge	8.6	61.7	A	17	61.3	B
HOV merge to I-15 SB Connector	14.3	61.1	B	27.3	59.9	D
I-15 SB connector to I-215 NB truck lane	13.1	60.1	B	28.4	52.3	D
I-215 NB truck lane to I-15 NB merge	14.3	59.5	B	32.9	52.6	D
I-15 NB merge to I-15 NB merge	11.9	63.9	B	25.5	63	C

CD = collector-distributor
 HOV = high-occupancy vehicle
 I-15 = Interstate 15
 I-215 = Interstate 215
 LOS = level of service
 NB = northbound
 SB = southbound

Table O: Freeway Mainline LOS - 2040 Alternative 5

Freeway Segment	AM			PM		
	Density	Speed	LOS	Density	Speed	LOS
I-15 Southbound						
North of Kenwood Avenue to Kenwood Avenue Off-Ramp	29.5	62.3	D	22.1	63.4	C
Kenwood Avenue Off-Ramp to Kenwood On-Ramp	28.2	62.7	D	22.2	63.5	C
Kenwood On-Ramp To I-215 Truck Lane	27	63.3	D	21.3	63.9	C
I-215 Truck Lane to I-15/I-215 SB Mainline diverge	30	58.2	D	22.1	62.1	C
I-215 SB Mainline to I-215 NB Connector	27.5	61.9	D	23.3	62.6	C
I-215 NB Connector to Glen Helen Parkway Off-Ramp	24.1	62	C	20.9	62.6	C
Glen Helen Parkway Off-Ramp to Glen Helen Parkway On-Ramp	29.5	61.7	D	25.9	62.2	C
Glen Helen Parkway On-Ramp to Lane Deletion	24.9	62	C	21.1	62.6	C
I-15 Northbound						
Lane Addition to Glen Helen Parkway Off-Ramp	15.9	62.5	B	25.3	59.4	C
Glen Helen Parkway Off-Ramp to Glen Helen Parkway On-Ramp	19	62.5	C	29.3	59.3	D
Glen Helen Parkway On-Ramp to I-215 SB Connector	15.5	63	B	25	60.3	C
I-215 SB Connector to Truck Lane Connector	16.5	61.6	B	29.1	57.9	D
Truck Lane Connector to I-15/I-125 NB merge	17.1	64.7	B	29.2	61.9	D
I-15/I-215 NB merge to Lane Deletion	14.4	64.8	B	27.9	61.5	D
Lane Deletion to Kenwood On-Ramp	17.2	65.1	B	32.4	63.3	D
Kenwood On-Ramp to North of Kenwood Avenue	16.8	58.7	B	31.8	56.3	D
I-215 Southbound						
I-15 SB/I-215 SB diverge to HOV diverge	27.7	63.9	D	19.2	64.8	C
HOV diverge to CD ramp connector	22.9	59.9	C	15.6	62.8	B
CD ramp Connector to Cajon Boulevard On-ramp	27.4	60.5	D	18.5	63.1	C
I-215 SB after Cajun Boulevard on-ramp	27.7	62.9	D	18.9	64	C
I-215 Northbound						
Palm Avenue On-Ramp to Devore Road Off-Ramp	16.8	54.8	B	31.6	54.1	D
Devore Road Off-Ramp to HOV merge	13.9	62.2	B	27.8	58.6	D
HOV merge to I-15 SB Connector	12.6	62.3	B	25.3	58.5	C
I-15 SB connector to I-215 NB truck lane	14.2	60.8	B	31.3	56.3	D
I-215 NB truck lane to I-15 NB merge	11.7	65.6	B	25.6	63.5	C

CD = collector-distributor
 HOV = high-occupancy vehicle
 I-15 = Interstate 15
 I-215 = Interstate 215
 LOS = level of service
 NB = northbound
 SB = southbound

Vehicle Emission Changes Due to the Proposed Project

The traffic data listed in Table E, in conjunction with the EMFAC2007 emission model, was used to calculate the PM_{2.5} and PM₁₀ exhaust, tire wear, and brake wear emissions for each of the project alternatives. EMFAC2007 does not estimate road dust emissions; therefore, the emission rates listed in Section 13.2.1 of EPA's AP-42 were used to calculate the road dust PM_{2.5} and PM₁₀ emissions

under each alternative. The exhaust and dust emissions generated along the I-15 and I-215 corridors are listed in Tables P and Q for PM_{2.5} and PM₁₀, respectively. The results of the modeling are provided in Attachment A. As shown in Tables P and Q, implementation of the project alternatives would result in a net increase of the PM_{2.5} and PM₁₀ emissions in 2017 by 0.7 to 1.2 percent. In 2040 the project alternatives would decrease the PM_{2.5} emissions by 1.5 to 1.7 percent and would result in a slight increase (0.1 percent) or a slight decrease (0.3 percent) in the PM₁₀ emissions. However, by 2017 the project region is expected to be 28 percent below the 24-hour PM_{2.5} standard, 2 percent below the annual PM_{2.5} standard, and 35 percent below the annual PM₁₀ standard. Therefore, the 0.1 to 1.2 percent increase in PM emissions in the vicinity of the I-15/I-215 interchange would not delay the attainment of the PM_{2.5} or PM₁₀ air quality standards within the Basin.

Table P: Daily PM_{2.5} Emissions in Project Region (lbs/day)

Traffic Condition	Exhaust Emissions	Tire Wear	Brake Wear	Road Dust	Total	Change from No Build
Existing	22.6	2.4	4.5	167.1	196.6	-
2017 No Build Alternative	30.9	3.0	5.5	203.7	243.0	-
2017 Alternative 2	33.7	3.0	5.5	203.7	245.8	2.8 (1.2 %)
2017 Alternative 3	33.7	3.0	5.5	203.7	245.8	2.8 (1.2 %)
2017 Alternative 3A	33.7	3.0	5.5	203.7	245.8	2.8 (1.2 %)
2017 Alternative 5	33.7	3.0	5.5	203.7	245.8	2.8 (1.2 %)
2040 No Build Alternative	33.6	5.0	9.2	341.6	389.4	-
2040 Alternative 2	26.8	5.0	9.2	341.6	382.6	-6.8 (-1.7%)
2040 Alternative 3	27.7	5.0	9.2	341.6	383.5	-5.9 (-1.5%)
2040 Alternative 3A	26.8	5.0	9.2	341.6	382.6	-6.8 (-1.7%)
2040 Alternative 5	27.7	5.0	9.2	341.6	383.5	-5.9 (-1.5%)

Source: LSA Associates, Inc., October 2009.

PM_{2.5} = Particulate matter less than 2.5 microns in diameter

lbs/day = pounds per day

Table Q: Daily PM₁₀ Emissions in Project Region (lbs/day)

Traffic Condition	Exhaust Emissions	Tire Wear	Brake Wear	Road Dust	Total	Change from No Build
Existing	46.1	9.6	12.3	366.3	434.3	-
2017 No Build Alternative	33.5	11.9	15.1	446.4	506.9	-
2017 Alternative 2	36.8	11.9	15.1	446.4	510.2	3.3 (0.7%)
2017 Alternative 3	36.8	11.9	15.1	446.4	510.2	3.3 (0.7%)
2017 Alternative 3A	36.8	11.9	15.1	446.4	510.2	3.3 (0.7%)
2017 Alternative 5	36.8	11.9	15.1	446.4	510.2	3.3 (0.7%)
2040 No Build Alternative	41.1	20.1	25.4	748.6	835.3	-
2040 Alternative 2	38.5	20.1	25.4	748.6	832.7	-2.6 (-0.3%)
2040 Alternative 3	41.7	20.1	25.4	748.6	835.8	0.5 (0.1%)
2040 Alternative 3A	38.5	20.1	25.4	748.6	832.7	-2.6 (-0.3%)
2040 Alternative 5	41.7	20.1	25.4	748.6	835.8	0.5 (0.1%)

Source: LSA Associates, Inc., October 2009.

PM₁₀ = Particulate matter less than 10 microns in diameter

lbs/day = pounds per day

CONCLUSION

Transportation conformity is required under Section 176(c) of the federal CAA to ensure that federally supported highway and transit project activities are consistent with the purpose of the SIP. Conformity to the purpose of the SIP means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant AAQS. As required by the 2006 Final Rule, this qualitative PM_{2.5} and PM₁₀ hot-spot analysis demonstrates that this project meets the CAA conformity requirements to support State and local air quality goals with respect to potential localized air quality impacts.

It is not expected that changes to PM_{2.5} and PM₁₀ emissions levels associated with the proposed I-15/I-215 interchange Build Alternatives would result in new violations of the NAAQS for the following reasons:

- The traffic volumes in the vicinity of the Fontana air quality monitoring station are consistent with the existing traffic volumes along I-15 and I-215.
- The ambient PM₁₀ concentrations at the Fontana station exceeded the 24-hour federal standard twice within the past 5 years and are projected to be 65 percent of the NAAQS by 2015.
- Based on the local monitoring data and the 2007 AQMP, the 24-hour and annual average PM_{2.5} concentrations in the project area would be reduced to below the federal 24-hour and annual NAAQS by 2015.
- The 0.7 percent decrease to 1.2 percent increase in the PM_{2.5} emissions in the vicinity of the I-15/I-215 interchange would not result in a new exceedances of the NAAQS.
- The 0.3 percent decrease to 0.7 percent increase in PM₁₀ emissions in the vicinity of the I-15/I-215 interchange would not result in a new exceedances of the NAAQS.

For these reasons, future new or worsened PM_{2.5} and PM₁₀ violations of any standards are not anticipated; therefore, the proposed I-15/I-215 interchange meets the conformity hot-spot requirements in 40 CFR 93-116 and 93-123 for both PM_{2.5} and PM₁₀.

REFERENCES

Iteris. 2009. I-15/I-215 Interchange Improvement Project Traffic Operations Analysis. September.

United States Environmental Protection Agency. 2006. "Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas" (EPA 420-B-06-902, March 2006).

United States Environmental Protection Agency. 2006. Final Revisions to the National Ambient Air Quality Standards for Particulate Pollution (Particulate Matter). EPA Web site: www.epa.gov/oar/particulatepollution/naaqsrev2006.html, accessed on March 19, 2007.

ATTACHMENT A
PM_{2.5} AND PM₁₀ EMISSION CALCULATIONS

PM Emissions 2007 (pounds)

Emission	No Build	Alt 2	Alt 3	Alt 3A	Alt 5
PM2.5 Exhaust	22.616	0.000	0.000	0.000	0.000
PM2.5 Tire Wear	2.402	0.000	0.000	0.000	0.000
PM2.5 Brake Wear	4.506	0.000	0.000	0.000	0.000
PM2.5 Road Dust	167.121	0.000	0.000	0.000	0.000
PM10 Exhaust	46.066	0.000	0.000	0.000	0.000
PM10 Tire Wear	9.569	0.000	0.000	0.000	0.000
PM10 Brake Wear	12.329	0.000	0.000	0.000	0.000
PM10 Road Dust	366.292	0.000	0.000	0.000	0.000
Total PM2.5	196.645	0.000	0.000	0.000	0.000
Total PM10	434.255	0.000	0.000	0.000	0.000

PM Emissions 2017 (pounds)

Emission	No Build	Alt 2	Alt 3	Alt 3A	Alt 5
PM2.5 Exhaust	30.883	33.672	33.672	33.672	33.672
PM2.5 Tire Wear	2.964	2.964	2.964	2.964	2.964
PM2.5 Brake Wear	5.492	5.492	5.492	5.492	5.492
PM2.5 Road Dust	203.689	203.689	203.689	203.689	203.689
PM10 Exhaust	33.511	36.848	36.848	36.848	36.848
PM10 Tire Wear	11.855	11.855	11.855	11.855	11.855
PM10 Brake Wear	15.099	15.099	15.099	15.099	15.099
PM10 Road Dust	446.442	446.442	446.442	446.442	446.442
Total PM2.5	243.028	245.817	245.817	245.817	245.817
Total PM10	506.907	510.244	510.244	510.244	510.244

PM Emissions 2040 (pounds)

Emission	No Build	Alt 2	Alt 3	Alt 3A	Alt 5
PM2.5 Exhaust	33.632	26.807	27.706	26.807	27.706
PM2.5 Tire Wear	5.023	5.023	5.023	5.023	5.023
PM2.5 Brake Wear	9.210	9.210	9.210	9.210	9.210
PM2.5 Road Dust	341.564	341.564	341.564	341.564	341.564
PM10 Exhaust	41.148	38.542	41.668	38.542	41.668
PM10 Tire Wear	20.091	20.091	20.091	20.091	20.091
PM10 Brake Wear	25.428	25.428	25.428	25.428	25.428
PM10 Road Dust	748.634	748.634	748.634	748.634	748.634
Total PM2.5	389.429	382.604	383.503	382.604	383.503
Total PM10	835.301	832.695	835.822	832.695	835.822

ATTACHMENT B
INTERSECTION TRAFFIC DATA

Intersection Levels of Service

Alternative 1: No-Build

Year 2017 Alternative 1 a.m. and p.m. peak hour traffic volumes at the study intersections are illustrated in previously referenced **Figure 21** and **Figure 22**. The intersection geometrics for year 2017 Alternative 1 conditions are assumed to be the same as the existing geometrics and are illustrated in previously referenced **Figure 23**. A level of service analysis using the previously described methodologies was conducted to evaluate year 2017 Alternative 1 traffic conditions in the study area. The results of the intersection level of service analysis are summarized in **Table 31**. Detailed level of service calculation worksheets are included in **Appendix J**.

Table 31: Year 2017 Alternative 1 Intersection Levels of Service

	Intersection	Control Type	AM Peak Hour			PM Peak Hour		
			LOS	Delay	V/C	LOS	Delay	V/C
1	I-15 Southbound Ramps/Glen Helen Parkway	1WSC	B	12.4	-	B	11.1	-
2	I-15 Northbound Ramps/Glen Helen Parkway	1WSC	A	8.9	-	B	10.3	-
3	Kenwood Avenue/Cajon Boulevard	1WSC	B	10.9	-	B	12.0	-
4	Kenwood Avenue/I-15 Southbound Ramps	1WSC	B	11.8	-	B	11.5	-
5	Kenwood Avenue/I-15 Northbound Ramps	1WSC	B	10.4	-	C	15.6	-
6	I-215 Southbound Ramps/Cajon Boulevard	1WSC	A	9.9	-	B	11.8	-
7	Cajon Boulevard/Devore Road	AWSC	A	9.6	0.315	B	12.2	0.542
8	I-215 Northbound Ramps/ Devore Rd	2WSC	B	13.6	-	B	11.9	-
9	Palm Avenue/Kendall Drive/I-215 Southbound Ramps	AWSC	F	54.6	1.175	D	33.5	0.922
10	Palm Avenue/I-215 Northbound Ramps	1WSC	E	41.4	-	E	40.3	-
11	Cajon Boulevard/Kendall Drive	1WSC	A	9.7	-	B	10.6	-

1WSC: One-Way Stop Controlled Intersection 2WSC: Two-Way Stop Controlled Intersection
 AWSC: All Way Stop Controlled Intersection

LOS = Level of Service, Delay = Average Vehicle Delay (Seconds), V/C = Volume-to-Capacity Ratio.
 Per the CMP, V/C > 1 is considered LOS F regardless of delay.

An examination of the data in **Table 31** indicates that the following study intersections are projected to operate at unsatisfactory levels of service:

- Palm Avenue/Kendall Drive/I-215 Southbound Ramps (a.m. peak hour);
- Palm Avenue/I-215 Northbound Ramps (a.m. and p.m. peak hours).

The City of San Bernardino has plans to signalize the intersections of Palm Avenue/Kendall Drive/I-215 Southbound Ramps and Palm Avenue/I-215 Northbound Ramps. With the signalization, the southbound ramp intersection will operate at LOS C during the a.m. and p.m. peak hours. The northbound ramp intersection will operate at LOS B during both peak hours. Level of service calculation worksheets are included in **Appendix J**.

Alternative 2

Year 2017 Alternative 2 a.m. and p.m. peak hour traffic volumes at the study intersections are illustrated in **Figure 32**. Since this alternative entails bridge, ramp and roadway reconfiguration as described in the “Project Description” section, the intersection geometrics and stop control at some locations will change with the project. The reconfigured intersection geometrics for year 2017 Alternative 2 conditions are illustrated in **Figure 33**. Since the Palm Avenue interchange is outside the scope of the project, the intersection geometrics at this interchange are assumed to be the same as under existing conditions. A level of service analysis using the previously described methodologies was conducted to evaluate year 2017 Alternative 2 traffic conditions in the study area. The results of the intersection level of service analysis are summarized in **Table 32**. Detailed level of service calculation worksheets are included in **Appendix J**.

Table 32: Year 2017 Alternative 2 Intersection Levels of Service

	Intersection	Control Type	AM Peak Hour			PM Peak Hour		
			LOS	Delay	V/C	LOS	Delay	V/C
1	I-15 Southbound Ramps/Glen Helen Parkway	AWSC	A	9.4	0.334	A	8.7	0.195
2	I-15 Northbound Ramps/Glen Helen Parkway	1WSC	A	8.9	-	B	10.3	-
3	Kenwood Avenue/Cajon Boulevard	1WSC	A	9.7	-	B	10.4	-
4	Kenwood Avenue/I-15 Southbound Ramps	1WSC	B	10.3	-	B	10.7	-
5	Kenwood Avenue/I-15 Northbound Ramps	AWSC	A	8.1	0.238	A	9.2	0.299
6	I-215 Southbound Ramps/Cajon Boulevard	1WSC	B	11.3	-	B	10.4	-
7	Cajon Boulevard/Devore Road	AWSC	B	10.5	0.350	B	12.1	0.416
8	Frontage Rd/I-215 Northbound Ramps	1WSC	A	8.5	0.327	A	8.9	0.285
9	Palm Avenue/Kendall Drive/I-215 Southbound Ramps	AWSC	F	54.6	1.175	D	33.5	0.922
10	Palm Avenue/I-215 Northbound Ramps	1WSC	E	41.4	-	E	40.3	-
11	Cajon Boulevard/Kendall Drive	1WSC	A	9.7	-	B	10.6	-
12	Dement Rd/Glen Helen Pkwy	AWSC	A	9.8	0.356	B	10.7	0.455
13	Cajon Blvd / Old Cajon Blvd	AWSC	A	9.0	0.340	A	9.3	0.279

1WSC: One-Way Stop Controlled Intersection 2WSC: Two-Way Stop Controlled Intersection AWSC: All Way Stop Controlled Intersection
 LOS = Level of Service, Delay = Average Vehicle Delay (Seconds), V/C = Volume-to-Capacity Ratio.
 Per the CMP, V/C > 1 is considered LOS F regardless of delay.

An examination of the data in **Table 32** indicates that the following study intersections are projected to operate at unsatisfactory levels of service:

- Palm Avenue/Kendall Drive/I-215 Southbound Ramps (a.m. peak hour);
- Palm Avenue/I-215 Northbound Ramps (a.m. and p.m. peak hours).

The City of San Bernardino has plans to signalize the intersections of Palm Avenue/Kendall Drive/I-215 Southbound Ramps and Palm Avenue/I-215 Northbound Ramps. With the signalization, the southbound ramp intersection will operate at LOS C during the a.m. and p.m. peak hours.. The northbound ramp intersection will operate at LOS B during both peak hours. Level of service calculation worksheets are included in **Appendix J**.

An intersection queuing analysis was performed using Traffix 7.9 software for this build alternative, and the results of the analysis are included in **Appendix K**. None of the intersections have queues longer than one vehicle with the exception of the intersections of Palm Avenue/Kendall Drive/I-215 Southbound Ramps and Palm Avenue/I-215 Northbound Ramps. When the Palm Avenue intersections are signalized, signal phasing and timing will need to be evaluated to ensure that queues on the freeway off-ramps are minimized to the extent possible.

Alternative 3

Year 2017 Alternative 3 a.m. and p.m. peak hour traffic volumes at the study intersections are illustrated in **Figure 34**. Since this alternative entails bridge, ramp and roadway reconfiguration as described in the “Project Description” section, the intersection geometrics and stop control at some locations will change with the project. The reconfigured intersection geometrics for year 2017 Alternative 3 conditions are illustrated in **Figure 35**. Since the Palm Avenue interchange is outside the scope of the project, the intersection geometrics at this interchange are assumed to be the same as under existing conditions. A level of service analysis using the previously described methodologies was conducted to evaluate year 2017 Alternative 3 traffic conditions in the study area. The results of the intersection level of service analysis are summarized in **Table 33**. Detailed level of service calculation worksheets are included in **Appendix J**.

Table 33: Year 2017 Alternative 3 Intersection Levels of Service

	Intersection	Control Type	AM Peak Hour			PM Peak Hour		
			LOS	Delay	V/C	LOS	Delay	V/C
1	I-15 Southbound Ramps/Glen Helen Parkway	AWSC	A	9.4	0.334	A	8.7	0.195
2	I-15 Northbound Ramps/Glen Helen Parkway	1WSC	A	8.9	-	B	10.3	-
3	Kenwood Avenue/Cajon Boulevard	1WSC	A	9.8	-	B	10.8	-
4	Kenwood Avenue/I-15 Southbound Ramps	1WSC	B	10.5	-	B	11.2	-
5	Kenwood Avenue/I-15 Northbound Ramps	AWSC	A	8.3	0.247	A	9.7	0.337
6	I-215 Southbound Ramps/Cajon Boulevard	1WSC	B	11.4	-	B	10.4	-
7	Cajon Boulevard/Devore Road	AWSC	A	10.0	0.218	B	11.8	0.364
8	Devore Road/I-215 Northbound Ramps	1WSC	B	10.5	-	B	11.0	-
9	Palm Avenue/Kendall Drive/I-215 Southbound Ramps	AWSC	F	54.6	1.175	D	33.5	0.922
10	Palm Avenue/I-215 Northbound Ramps	1WSC	E	41.4	-	E	40.3	-
11	Cajon Boulevard/Kendall Drive	1WSC	A	9.7	-	B	10.6	-
12	Access Rd/Glen Helen Pkwy	1WSC	B	10.3	-	B	10.3	-

1WSC: One-Way Stop Controlled Intersection 2WSC: Two-Way Stop Controlled Intersection AWSC: All Way Stop Controlled Intersection
 LOS = Level of Service, Delay = Average Vehicle Delay (Seconds), V/C = Volume-to-Capacity Ratio.
 Per the CMP, V/C > 1 is considered LOS F regardless of delay.

An examination of the data in **Table 33** indicates that the following study intersections are projected to operate at unsatisfactory levels of service:

- Palm Avenue/Kendall Drive/I-215 Southbound Ramps (a.m. peak hour);
- Palm Avenue/I-215 Northbound Ramps (a.m. and p.m. peak hours).

The City of San Bernardino has plans to signalize the intersections of Palm Avenue/Kendall Drive/I-215 Southbound Ramps and Palm Avenue/I-215 Northbound Ramps. With the signalization, the southbound ramp intersection will operate at LOS C during the a.m. and p.m. peak hours.. The northbound ramp intersection will operate at LOS B during both peak hours. Level of service calculation worksheets are included in Appendix J.

An intersection queuing analysis was performed using Traffix 7.9 software for this build alternative, and the results of the analysis are included in **Appendix K**. None of the intersections have queues longer than one vehicle with the exception of the intersections of Palm Avenue/Kendall Drive/I-215 Southbound Ramps and Palm Avenue/I-215 Northbound Ramps. When the Palm Avenue intersections are signalized, signal phasing and timing will need to be evaluated to ensure that queues on the freeway off-ramps are minimized to the extent possible.

Alternative 3A

Year 2017 Alternative 3A a.m. and p.m. peak hour traffic volumes at the study intersections are illustrated in **Figure 36**. Since this alternative entails bridge, ramp and roadway reconfiguration as described in the “Project Description” section, the intersection geometrics and stop control at some locations will change with the project. The reconfigured intersection geometrics for year 2017 Alternative 3A conditions are illustrated in **Figure 37**. Since the Palm Avenue interchange is outside the scope of the project, the intersection geometrics at this interchange are assumed to be the same as under existing conditions. A level of service analysis using the previously described methodologies was conducted to evaluate year 2017 Alternative 3A traffic conditions in the study area. The results of the intersection level of service analysis are summarized in **Table 34**. Detailed level of service calculation worksheets are included in **Appendix J**.

Table 34: Year 2017 Alternative 3A Intersection Levels of Service

	Intersection	Control Type	AM Peak Hour			PM Peak Hour		
			LOS	Delay	V/C	LOS	Delay	V/C
1	I-15 Southbound Ramps/Glen Helen Parkway	AWSC	A	9.4	0.334	A	8.7	0.195
2	I-15 Northbound Ramps/Glen Helen Parkway	1WSC	A	8.9	-	B	10.3	-
3	Kenwood Avenue/Cajon Boulevard	1WSC	A	9.8	-	B	10.8	-
4	Kenwood Avenue/I-15 Southbound Ramps	1WSC	B	10.5	-	B	11.2	-
5	Kenwood Avenue/I-15 Northbound Ramps	AWSC	A	8.3	0.247	A	9.7	0.337
6	I-215 Southbound Ramps/Cajon Boulevard	AWSC	B	11.4	-	B	10.4	-
7	Cajon Boulevard/Devore Road	AWSC	A	10.0	0.218	B	11.8	0.364
8	Devore Road/I-215 Northbound Ramps	1WSC	B	10.5	-	B	11.0	-
9	Palm Avenue/Kendall Drive/I-215 Southbound Ramps	AWSC	F	54.6	1.175	D	33.5	0.922
10	Palm Avenue/I-215 Northbound Ramps	1WSC	E	41.4	-	E	40.3	-
11	Cajon Boulevard/Kendall Drive	1WSC	A	9.7	-	B	10.6	-
12	Devore Road and Access Road	1WSC	B	10.3	-	B	10.3	-

1WSC: One-Way Stop Controlled Intersection 2WSC: Two-Way Stop Controlled Intersection AWSC: All Way Stop Controlled Intersection
 LOS = Level of Service, Delay = Average Vehicle Delay (Seconds), V/C = Volume-to-Capacity Ratio.
 Per the CMP, V/C > 1 is considered LOS F regardless of delay.

An examination of the data in **Table 34** indicates that the following study intersections are projected to operate at unsatisfactory levels of service:

- Palm Avenue/Kendall Drive/I-215 Southbound Ramps (a.m. peak hour);
- Palm Avenue/I-215 Northbound Ramps (a.m. and p.m. peak hours).

The City of San Bernardino has plans to signalize the intersections of Palm Avenue/Kendall Drive/I-215 Southbound Ramps and Palm Avenue/I-215 Northbound Ramps. With the signalization, the southbound ramp intersection will operate at LOS C during the a.m. and p.m. peak hours.. The northbound ramp intersection will operate at LOS B during both peak hours. Level of service calculation worksheets are included in Appendix J.

An intersection queuing analysis was performed using Traffix 7.9 software for this build alternative, and the results of the analysis are included in **Appendix K**. None of the intersections have queues longer than one vehicle with the exception of the intersections of Palm Avenue/Kendall Drive/I-215 Southbound Ramps and Palm Avenue/I-215 Northbound Ramps. When the Palm Avenue intersections are signalized, signal phasing and timing will need to be evaluated to ensure that queues on the freeway off-ramps are minimized to the extent possible.

Alternative 5

Year 2017 Alternative 5 a.m. and p.m. peak hour traffic volumes at the study intersections are illustrated in **Figure 38**. Since this alternative entails bridge, ramp and roadway reconfiguration as described in the “Project Description” section, the intersection geometrics and stop control at some locations will change with the project. The reconfigured intersection geometrics for year 2017 Alternative 5 conditions are illustrated in **Figure 39**. Since the Palm Avenue interchange is outside the scope of the project, the intersection geometrics at this interchange are assumed to be the same as under existing conditions. A level of service analysis using the previously described methodologies was conducted to evaluate year 2017 Alternative 5 traffic conditions in the study area. The results of the intersection level of service analysis are summarized in **Table 35**. Detailed level of service calculation worksheets are included in **Appendix J**.

Table 35: Year 2017 Alternative 5 Intersection Levels of Service

	Intersection	Control Type	AM Peak Hour			PM Peak Hour		
			LOS	Delay	V/C	LOS	Delay	V/C
1	I-15 Southbound Ramps/Glen Helen Parkway	AWSC	A	9.4	0.334	A	8.7	0.195
2	I-15 Northbound Ramps/Glen Helen Parkway	1WSC	A	8.9	-	B	10.3	-
3	Kenwood Avenue/Cajon Boulevard	1WSC	B	10.4	-	B	10.8	-
4	Kenwood Avenue/I-15 Southbound Ramps	1WSC	B	10.8	-	B	11.4	-
5	Kenwood Avenue/I-15 Northbound Ramps	AWSC	A	8.3	0.247	A	9.7	0.337
6	I-215 Southbound Ramps/Cajon Boulevard	1WSC	B	10.3	-	B	10.3	-
7	Cajon Boulevard/Devore Road	AWSC	A	10.0	0.335	B	12.0	0.410
8	Frontage Rd/I-215 Northbound Ramps	1WSC	B	10.1	-	B	10.4	0.258
9	Palm Avenue/Kendall Drive/I-215 Southbound Ramps	AWSC	F	54.6	1.175	D	33.5	0.922
10	Palm Avenue/I-215 Northbound Ramps	1WSC	E	41.4	-	E	40.3	-
11	Cajon Boulevard/Kendall Drive	1WSC	A	9.7	-	B	10.6	-
12	Devore Rd/Glen Helen Pkwy	AWSC	A	9.6	0.346	B	10.2	0.442
13	Cajon Blvd / Old Cajon Blvd	AWSC	A	8.3	0.220	A	9.2	0.277

1WSC: One-Way Stop Controlled Intersection 2WSC: Two-Way Stop Controlled Intersection AWSC: All Way Stop Controlled Intersection
 LOS = Level of Service, Delay = Average Vehicle Delay (Seconds), V/C = Volume-to-Capacity Ratio.
 Per the CMP, V/C > 1 is considered LOS F regardless of delay.

An examination of the data in **Table 35** indicates that the following study intersections are projected to operate at unsatisfactory levels of service:

- Palm Avenue/Kendall Drive/I-215 Southbound Ramps (a.m. peak hour);
- Palm Avenue/I-215 Northbound Ramps (a.m. and p.m. peak hours).

The City of San Bernardino has plans to signalize the intersections of Palm Avenue/Kendall Drive/I-215 Southbound Ramps and Palm Avenue/I-215 Northbound Ramps. With the signalization, the southbound ramp intersection will operate at LOS C during the a.m. and p.m. peak hours.. The northbound ramp intersection will operate at LOS B during both peak hours. Level of service calculation worksheets are included in Appendix J.

An intersection queuing analysis was performed using Traffix 7.9 software for this build alternative, and the results of the analysis are included in **Appendix K**. None of the intersections have queues longer than one vehicle with the exception of the intersections of Palm Avenue/Kendall Drive/I-215 Southbound Ramps and Palm Avenue/I-215 Northbound Ramps. When the Palm Avenue intersections are signalized, signal phasing and timing will need to be evaluated to ensure that queues on the freeway off-ramps are minimized to the extent possible.

Intersection Levels of Service

Alternative 1: No-Build

Year 2040 Alternative 1 a.m. and p.m. peak hour traffic volumes at the study intersections are illustrated in previously referenced **Figure 16** and **Figure 17**. The intersection geometrics for year 2040 Alternative 1 conditions are assumed to be the same as existing geometrics and are illustrated in previously referenced **Figure 23**. A level of service analysis using the previously described methodologies was conducted to evaluate year 2040 Alternative 1 traffic conditions in the study area. The results of the intersection level of service analysis are summarized in **Table 54**. Detailed level of service calculation worksheets are included in **Appendix J**.

Table 54: Year 2040 Alternative 1 Intersection Levels of Service

	Intersection	Control Type	AM Peak Hour			PM Peak Hour		
			LOS	Delay	V/C	LOS	Delay	V/C
1	I-15 Southbound Ramps/Glen Helen Parkway	1WSC	F	63.7	-	C	18.7	-
2	I-15 Northbound Ramps/Glen Helen Parkway	1WSC	A	9.8	-	C	18.5	-
3	Kenwood Avenue/Cajon Boulevard	1WSC	C	18.3	-	F	227.4	-
4	Kenwood Avenue/I-15 Southbound Ramps	1WSC	F	65.5	-	B	14.7	-
5	Kenwood Avenue/I-15 Northbound Ramps	1WSC	C	15.9	-	F	881.2	-
6	I-215 Southbound Ramps/Cajon Boulevard	1WSC	B	13.2	-	F	214.0	-
7	Cajon Boulevard/Devore Road	AWSC	D	31.2	0.930	F	183.4	1.638
8	I-215 Northbound Ramps/ Devore Rd	2WSC	F	63.0	-	C	17.2	-
9	Palm Avenue/Kendall Drive/I-215 Southbound Ramps	AWSC	F	198.0	2.001	F	151.8	1.651
10	Palm Avenue/I-215 Northbound Ramps	1WSC	F	312.2	-	F	438.7	-
11	Cajon Boulevard/Kendall Drive	1WSC	B	11.4	-	C	15.3	-

1WSC: One-Way Stop Controlled Intersection 2WSC: Two-Way Stop Controlled Intersection AWSC: All Way Stop Controlled Intersection
 LOS = Level of Service, Delay = Average Vehicle Delay (Seconds), V/C = Volume-to-Capacity Ratio.
 Per the CMP, V/C > 1 is considered LOS F regardless of delay.

An examination of the data in **Table 54** indicates that the following study intersections are projected to operate at unsatisfactory levels of service:

- I-15 Southbound Ramps/Glen Helen Parkway (a.m. peak hour);
- Kenwood Avenue/Cajon Boulevard (p.m. peak hour);
- Kenwood Avenue/I-15 Southbound Ramps (a.m. peak hour);
- Kenwood Avenue/I-15 Northbound Ramps (p.m. peak hour);
- I-215 Southbound Ramps/Cajon Boulevard (p.m. peak hour);
- Cajon Boulevard/Devore Road (p.m. peak hour);
- I-215 Northbound Ramps/ (a.m. peak hour);
- Palm Avenue/Kendall Drive/I-215 Southbound Ramps (a.m. and p.m. peak hours);
- Palm Avenue/I-215 Northbound Ramps (a.m. and p.m. peak hours).

The City of San Bernardino has plans to signalize the intersections of Palm Avenue/Kendall Drive/I-215 Southbound Ramps and Palm Avenue/I-215 Northbound Ramps. With the signalization, the southbound ramp intersection will operate at LOS C during the a.m. and p.m. peak hours. The northbound ramp intersection will operate at LOS B during the a.m. peak hour and LOS C during the p.m. peak hour. Level of service calculation worksheets are included in **Appendix J**.

Alternative 2

Year 2040 Alternative 2 a.m. and p.m. peak hour traffic volumes at the study intersections are illustrated in **Figure 48**. Since this alternative entails bridge, ramp and roadway reconfiguration as described in the “Project Description” section, the intersection geometrics and stop control at some locations will change with the project. The reconfigured intersection geometrics for year 2040 Alternative 2 conditions are illustrated in **Figure 33**. Since the Palm Avenue interchange is outside the scope of the project, the intersection geometrics at this interchange are assumed to be the same as under existing conditions. A level of service analysis using the previously described methodologies was conducted to evaluate year 2040 Alternative 2 traffic conditions in the study area. The results of the intersection level of service analysis are summarized in **Table 55**. Detailed level of service calculation worksheets are included in **Appendix J**.

Table 55: Year 2040 Alternative 2 Intersection Levels of Service

	Intersection	Control Type	AM Peak Hour			PM Peak Hour		
			LOS	Delay	V/C	LOS	Delay	V/C
1	I-15 Southbound Ramps/Glen Helen Parkway	AWSC	D	28.8	0.932	B	13.6	0.579
2	I-15 Northbound Ramps/Glen Helen Parkway	1WSC	A	9.8	-	C	18.5	-
3	Kenwood Avenue/Cajon Boulevard	1WSC	B	13.4	-	C	22.4	-
4	Kenwood Avenue/I-15 Southbound Ramps	1WSC	C	22.2	-	B	12.8	-
5	Kenwood Avenue/I-15 Northbound Ramps	AWSC	C	16.1	0.736	C	19.5	0.796
6	I-215 Southbound Ramps/Cajon Boulevard	1WSC	C	17.7	-	C	16.5	
7	Cajon Boulevard/Devore Road	AWSC	C	17.3	0.586	D	32.1	0.857
8	Frontage Rd/I-215 Northbound Ramps	AWSC	B	14.9	0.741	B	10.4	0.394
9	Palm Avenue/Kendall Drive/I-215 Southbound Ramps	AWSC	F	198.0	2.001	F	151.8	1.651
10	Palm Avenue/I-215 Northbound Ramps	1WSC	F	312.2	-	F	438.7	-
11	Cajon Boulevard/Kendall Drive	1WSC	B	11.4	-	C	15.3	-
12	Dement Rd /Glen Helen Pkwy	AWSC	C	24.9	0.894	B	14.9	0.675
13	Cajon Blvd / Old Cajon Blvd	AWSC	B	11.6	0.554	D	25.9	0.863

1WSC: One-Way Stop Controlled Intersection 2WSC: Two-Way Stop Controlled Intersection AWSC: All Way Stop Controlled Intersection
 LOS = Level of Service, Delay = Average Vehicle Delay (Seconds), V/C = Volume-to-Capacity Ratio.
 Per the CMP, V/C > 1 is considered LOS F regardless of delay.

An examination of the data in **Table 55** indicates that the following study intersections are projected to operate at unsatisfactory levels of service:

- Palm Avenue/Kendall Drive/I-215 Southbound Ramps (a.m. and p.m. peak hours);
- Palm Avenue/I-215 Northbound Ramps (a.m. and p.m. peak hours).

The City of San Bernardino has plans to signalize the intersections of Palm Avenue/Kendall Drive/I-215 Southbound Ramps and Palm Avenue/I-215 Northbound Ramps. With the signalization, the southbound ramp intersection will operate at LOS C during the a.m. and p.m. peak hours. The northbound ramp intersection will operate at LOS B during the a.m. peak hour and LOS C during the p.m. peak hour.

An intersection queuing analysis was performed using Traffix 7.9 software for this build alternative, and the results of the analysis are included in **Appendix K**. None of the ramps have queues longer than five vehicles with the exception of the intersections of Palm Avenue/Kendall Drive/I-215 Southbound Ramps and Palm Avenue/I-215 Northbound Ramps. When the Palm Avenue intersections are signalized, signal phasing and timing will need to be evaluated to ensure that queues on the freeway off-ramps are minimized to the extent possible.

Alternative 3

Year 2040 Alternative 3 a.m. and p.m. peak hour traffic volumes at the study intersections are illustrated in **Figure 49**. Since this alternative entails bridge, ramp and roadway reconfiguration as described in the “Project Description” section, the intersection geometrics and stop control at some locations will change with the project. The reconfigured intersection geometrics for year 2040 Alternative 3 conditions are illustrated in **Figure 35**. Since the Palm Avenue interchange is outside the scope of the project, the intersection geometrics at this interchange are assumed to be the same as under existing conditions. A level of service analysis using the previously described methodologies was conducted to evaluate year 2040 Alternative 3 traffic conditions in the study area. The results of the intersection level of service analysis are summarized in **Table 56**. Detailed level of service calculation worksheets are included in **Appendix J**.

Table 56: Year 2040 Alternative 3 Intersection Levels of Service

	Intersection	Control Type	AM Peak Hour			PM Peak Hour		
			LOS	Delay	V/C	LOS	Delay	V/C
1	I-15 Southbound Ramps/Glen Helen Parkway	AWSC	D	28.8	0.932	B	13.6	0.579
2	I-15 Northbound Ramps/Glen Helen Parkway	1WSC	A	9.8	-	C	18.5	-
3	Kenwood Avenue/Cajon Boulevard	1WSC	B	13.4	-	D	28.7	-
4	Kenwood Avenue/I-15 Southbound Ramps	1WSC	C	22.2	-	B	14.3	-
5	Kenwood Avenue/I-15 Northbound Ramps	AWSC	C	17.1	0.763	D	25.6	0.798
6	I-215 Southbound Ramps/Cajon Boulevard	1WSC	C	17.8	-	C	16.4	-
7	Cajon Boulevard/Devore Road	AWSC	C	17.2	0.605	D	27.5	0.799
8	Devore Road/I-215 Northbound Ramps	1WSC	B	12.8	-	B	12.5	-
9	Palm Avenue/Kendall Drive/I-215 Southbound Ramps	AWSC	F	198.0	2.001	F	151.8	1.651
10	Palm Avenue/I-215 Northbound Ramps	1WSC	F	312.2	-	F	438.7	-
11	Cajon Boulevard/Kendall Drive	1WSC	B	11.4	-	C	15.3	-
12	Access Rd/Glen Helen Pkwy	1WSC	B	13.9	-	C	15.5	-

1WSC: One-Way Stop Controlled Intersection 2WSC: Two-Way Stop Controlled Intersection AWSC: All Way Stop Controlled Intersection
 LOS = Level of Service, Delay = Average Vehicle Delay (Seconds), V/C = Volume-to-Capacity Ratio.
 Per the CMP, V/C > 1 is considered LOS F regardless of delay.

An examination of the data in **Table 56** indicates that the following study intersections are projected to operate at unsatisfactory levels of service:

- Palm Avenue/Kendall Drive/I-215 Southbound Ramps (a.m. and p.m. peak hours);
- Palm Avenue/I-215 Northbound Ramps (a.m. and p.m. peak hours).

The City of San Bernardino has plans to signalize the intersections of Palm Avenue/Kendall Drive/I-215 Southbound Ramps and Palm Avenue/I-215 Northbound Ramps. With the signalization, the southbound ramp intersection will operate at LOS C during the a.m. and p.m. peak hours. The northbound ramp intersection will operate at LOS B during the a.m. peak hour and LOS C during the p.m. peak hour. Level of service calculation worksheets are included in **Appendix J**.

An intersection queuing analysis was performed using Traffix 7.9 software for this build alternative, and the results of the analysis are included in **Appendix K**. None of the ramps have queues longer than one vehicle with the exception of the intersections of Palm Avenue/Kendall Drive/I-215 Southbound Ramps and Palm Avenue/I-215 Northbound Ramps. When the Palm Avenue intersections are signalized, signal phasing and timing will need to be evaluated to ensure that queues on the freeway off-ramps are minimized to the extent possible.

Alternative 3A

Year 2040 Alternative 3A a.m. and p.m. peak hour traffic volumes at the study intersections are illustrated in **Figure 50**. Since this alternative entails bridge, ramp and roadway reconfiguration as described in the “Project Description” section, the intersection geometrics and stop control at some locations will change with the project. The reconfigured intersection geometrics for year 2040 Alternative 3A conditions are illustrated in **Figure 37**. Since the Palm Avenue interchange is outside the scope of the project, the intersection geometrics at this interchange are assumed to be the same as under existing conditions. A level of service analysis using the previously described methodologies was conducted to evaluate year 2040 Alternative 3A traffic conditions in the study area. The results of the intersection level of service analysis are summarized in **Table 57**. Detailed level of service calculation worksheets are included in **Appendix J**.

Table 57: Year 2040 Alternative 3A Intersection Levels of Service

	Intersection	Control Type	AM Peak Hour			PM Peak Hour		
			LOS	Delay	V/C	LOS	Delay	V/C
1	I-15 Southbound Ramps/Glen Helen Parkway	AWSC	D	28.8	0.932	B	13.6	0.579
2	I-15 Northbound Ramps/Glen Helen Parkway	1WSC	A	9.8	-	C	18.5	-
3	Kenwood Avenue/Cajon Boulevard	1WSC	B	13.4	-	D	28.7	-
4	Kenwood Avenue/I-15 Southbound Ramps	1WSC	C	22.2	-	B	14.3	-
5	Kenwood Avenue/I-15 Northbound Ramps	AWSC	C	17.1	0.763	D	25.6	0.798
6	I-215 Southbound Ramps/Cajon Boulevard	1WSC	C	17.8	-	C	16.4	-
7	Cajon Boulevard/Devore Road	AWSC	C	17.2	0.605	D	27.5	0.799
8	Devore Road/I-215 Northbound Ramps	1WSC	B	12.8	-	B	12.5	-
9	Palm Avenue/Kendall Drive/I-215 Southbound Ramps	AWSC	F	198.0	2.001	F	151.8	1.651
10	Palm Avenue/I-215 Northbound Ramps	1WSC	F	312.2	-	F	438.7	-
11	Cajon Boulevard/Kendall Drive	1WSC	B	11.4	-	C	15.3	-
12	Devore Road and Access Road	1WSC	B	13.9	-	C	15.4	-

1WSC: One-Way Stop Controlled Intersection 2WSC: Two-Way Stop Controlled Intersection AWSC: All Way Stop Controlled Intersection
 LOS = Level of Service, Delay = Average Vehicle Delay (Seconds), V/C = Volume-to-Capacity Ratio.
 Per the CMP, V/C > 1 is considered LOS F regardless of delay.

An examination of the data in **Table 57** indicates that the following study intersections are projected to operate at unsatisfactory levels of service:

- Palm Avenue/Kendall Drive/I-215 Southbound Ramps (a.m. and p.m. peak hours);
- Palm Avenue/I-215 Northbound Ramps (a.m. and p.m. peak hours).

The City of San Bernardino has plans to signalize the intersections of Palm Avenue/Kendall Drive/I-215 Southbound Ramps and Palm Avenue/I-215 Northbound Ramps. With the signalization, the southbound ramp intersection will operate at LOS C during the a.m. and p.m. peak hours. The northbound ramp intersection will operate at LOS B during the a.m. peak hour and LOS C during the p.m. peak hour. Level of service calculation worksheets are included in **Appendix J**.

An intersection queuing analysis was performed using Traffix 7.9 software for this build alternative, and the results of the analysis are included in **Appendix K**. None of the intersections have queues longer than one vehicle with the exception of the intersections of Palm Avenue/Kendall Drive/I-215 Southbound Ramps and Palm Avenue/I-215 Northbound Ramps. When the Palm Avenue intersections are signalized, signal phasing and timing will need to be evaluated to ensure that queues on the freeway off-ramps are minimized to the extent possible.

Alternative 5

Year 2040 Alternative 5 a.m. and p.m. peak hour traffic volumes at the study intersections are illustrated in **Figure 51**. Since this alternative entails bridge, ramp and roadway reconfiguration as described in the “Project Description” section, the intersection geometrics and stop control at some locations will change with the project. The reconfigured intersection geometrics for year 2040 Alternative 5 conditions are illustrated in **Figure 39**. Since the Palm Avenue interchange is outside the scope of the project, the intersection geometrics at this interchange are assumed to be the same as under existing conditions. A level of service analysis using the previously described methodologies was conducted to evaluate year 2040 Alternative 5 traffic conditions in the study area. The results of the intersection level of service analysis are summarized in **Table 58**. Detailed level of service calculation worksheets are included in **Appendix J**.

Table 58: Year 2040 Alternative 5 Intersection Levels of Service

	Intersection	Control Type	AM Peak Hour			PM Peak Hour		
			LOS	Delay	V/C	LOS	Delay	V/C
1	I-15 Southbound Ramps/Glen Helen Parkway	AWSC	D	28.8	0.932	B	13.6	0.579
2	I-15 Northbound Ramps/Glen Helen Parkway	1WSC	A	9.8	-	C	18.5	-
3	Kenwood Avenue/Cajon Boulevard	1WSC	C	16.0	-	D	30.2	-
4	Kenwood Avenue/I-15 Southbound Ramps	1WSC	D	27.6	-	B	14.5	-
5	Kenwood Avenue/I-15 Northbound Ramps	AWSC	C	17.1	0.763	D	25.6	0.798
6	I-215 Southbound Ramps/Cajon Boulevard	1WSC	B	13.8	-	C	15.7	-
7	Cajon Boulevard/Devore Road	AWSC	C	15.7	0.561	D	29.9	0.839
8	Frontage Rd/I-215 Northbound Ramps	1WSC	B	14.4	-	B	12.2	-
9	Palm Avenue/Kendall Drive/I-215 Southbound Ramps	AWSC	F	198.0	2.001	F	151.8	1.651
10	Palm Avenue/I-215 Northbound Ramps	1WSC	F	312.2	-	F	438.7	-
11	Cajon Boulevard/Kendall Drive	1WSC	B	11.4	-	C	15.3	-
12	Devore Road/Glen Helen Pkwy	AWSC	C	22.1	0.860	B	12.4	0.496
13	Cajon Blvd / Old Cajon Blvd	AWSC	B	10.0	0.396	D	25.0	0.853

1WSC: One-Way Stop Controlled Intersection 2WSC: Two-Way Stop Controlled Intersection AWSC: All Way Stop Controlled Intersection
 LOS = Level of Service, Delay = Average Vehicle Delay (Seconds), V/C = Volume-to-Capacity Ratio.
 Per the CMP, V/C > 1 is considered LOS F regardless of delay.

An examination of the data in **Table 58** indicates that the following study intersections are projected to operate at unsatisfactory levels of service:

- Palm Avenue/Kendall Drive/I-215 Southbound Ramps (a.m. and p.m. peak hours);
- Palm Avenue/I-215 Northbound Ramps (a.m. and p.m. peak hours).

The City of San Bernardino has plans to signalize the intersections of Palm Avenue/Kendall Drive/I-215 Southbound Ramps and Palm Avenue/I-215 Northbound Ramps. With the signalization, the southbound ramp intersection will operate at LOS C during the a.m. and p.m. peak hours. The northbound ramp intersection will operate at LOS B during the a.m. peak hour and LOS C during the p.m. peak hour. Level of service calculation worksheets are included in **Appendix J**.

An intersection queuing analysis was performed using Traffix 7.9 software for this build alternative, and the results of the analysis are included in **Appendix K**. None of the intersections have queues longer than one vehicle with the exception of the intersections of Palm Avenue/Kendall Drive/I-215 Southbound Ramps and Palm Avenue/I-215 Northbound Ramps. When the Palm Avenue intersections are signalized, signal phasing and timing will need to be evaluated to ensure that queues on the freeway off-ramps are minimized to the extent possible.