PM_{10} Hot-spot Project-Level Conformity Determination

for the

Schuyler Heim Bridge Replacement and SR-47 Expressway Project

This document provides the qualitative PM_{10} hot-spot analysis required to demonstrate project-level conformity for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project (proposed project). The PM_{10} hot-spot analysis was originally prepared before the release of the Transportation Conformity Rule amendments in March 2006 following the *Technical Report: Particulate Matter and Transportation Project Analysis Protocol* (UCD, Caltrans, FHWA; 2005). However, according to 40 CFR 93.104(d), conformity must be re-determined if there is a three year lapse since initiation of the environmental document for air quality purposes. Since final approval of the proposed project is expected beyond March 2009, the PM_{10} hot-spot analysis has been updated to follow the March 2006 guidelines. (Note: The $PM_{2.5}$ hot-spot analysis was re-approved for NEPA circulation by the Southern California Association of Governments Transportation Conformity Work Group (TCWG) at the March 2008 meeting.)

The proposed project would be considered as a project of air quality concern based on the criteria listed in the Final Conformity Rule (40 CFR 93.123 (b)(1)). Therefore, the following qualitative project-level hot-spot assessment was conducted to assess whether the project would cause or contribute to any new localized PM_{10} violations, or increase the frequency or severity of any existing violations, or delay timely attainment of the PM_{10} national ambient air quality standard (NAAQS). This project is identified as a Transportation Control Measure (TCM) project in the RTP and RTIP; its timely implementation is a crucial element in the reduction of air pollutant emissions from roadway transportation sources.

Regulatory Background

On March 10, 2006, EPA issued amendments to the Transportation Conformity Rule to address localized impacts of particulate matter: "*$PM_{2.5}$ and PM_{10} Hot-Spot Analyses in Project-level Transportation Conformity Determinations for the New $PM_{2.5}$ and Existing PM_{10} National Ambient Air Quality Standards*" (71 FR 12468). This amendment requires the assessment of localized air quality impacts in PM_{10} and $PM_{2.5}$ nonattainment and maintenance areas for federally funded or approved transportation projects of air quality concern. This assessment of localized impacts (i.e., "hot-spot analysis") examines potential air quality impacts on a scale smaller than an entire nonattainment or maintenance area. Such an analysis is a means of demonstrating that a transportation project meets Clean

Air Act (CAA) conformity requirements to support state and local air quality goals. Since the proposed project is located in a federal nonattainment area for PM_{10}, localized impacts must be assessed.

The EPA specified in 40 CFR 93.123(b)(1) of the Final Conformity Rule that projects of air quality concern are certain highway and transit projects that involve significant levels of diesel vehicle traffic, or any other project that is identified in the PM_{10} State Implementation Plan (SIP) as a localized air quality concern. According to 40 CFR 93.123(b)(2) and (4), a quantitative analysis for applicable projects is not required until EPA releases modeling guidance in the Federal Register. However, a qualitative hot-spot analysis is required for projects of air quality concern. This qualitative analysis of localized PM_{10} impacts was prepared because the proposed project has the potential to be a project of air quality concern.

This qualitative analysis was based on directly emitted emissions including tailpipe, break wear, and tire wear, because the direct emissions could potentially cause nearby hot-spots, or localized areas of elevated concentration. Re-entrained road dust was also included in the analysis. The emission inventories presented in the SCAQMD 2007 AQMP show that emissions from paved roads are the single largest contributor to the directly emitted PM_{10} emissions. Construction-related PM_{10} emissions were not included in this hot-spot analysis because these emissions would be considered temporary since construction would last less than 5 years (40 CFR 93.123(c)(5)).

Project Description

The Federal Highway Administration (FHWA) and California Department of Transportation (Caltrans) are proposing to replace the existing Commodore Schuyler F. Heim Bridge (Schuyler Heim Bridge) to meet current seismic criteria. Concurrently, the Alameda Corridor Transportation Authority (ACTA) proposes to construct an expressway along State Route (SR-) 47 or SR-103 to provide a high-capacity alternative route for traffic between Terminal Island and Interstate (I-) 405. In addition, a two-lane, elevated flyover structure to divert traffic bound for northbound SR-47 directly onto the new bridge from eastbound Ocean Boulevard is proposed. The Schuyler Heim Bridge is located within the City and Port of Long Beach, and Terminal Island is co-located within the Port of Long Beach and Port of Los Angeles. The project is scheduled to be open for traffic in 2011 and the flyover would be complete in 2015.

The proposed project is to improve traffic conditions between Terminal Island and major traffic arterials on the mainland to the north, primarily within the cities of Long Beach and Los Angeles. This project is identified as a Transportation Control Measure (TCM) project in the RTP and RTIP; its timely implementation is a crucial element in the reduction of air pollutant emissions from roadway transportation sources. Six alternatives have been proposed for analysis in an Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) to address the proposed project. There are four build alternatives, one transportation system management (TSM) alternative, and one no build alternative. According to the Transportation Conformity Rule (40 CFR 93.123(b)(1) (i)), this project would be classified as a new or expanded highway project that has a significant number of or significant increase in diesel vehicles. The project alternatives are described in the following sections.

Alternative 1: Bridge Replacement and Expressway

This alternative would replace the existing Schuyler Heim Bridge to meet current seismic criteria and provide an elevated through-lane (Ocean Boulevard/SR-47 flyover) from eastbound Ocean Boulevard onto northbound SR-47. This alternative also includes construction of a new SR-47 expressway to provide a high-capacity alternative route along the Alameda Corridor for traffic between Terminal Island and Alameda Street, south of Pacific Coast Highway. The Schuyler Heim Bridge is a major traffic route and connects Terminal Island within the Ports of Long Beach and Los Angeles to the mainland cities of Long Beach and Los Angeles. The bridge is located within the City of Los Angeles and through property owned by the Port of Long Beach.

With this alternative, a new fixed-span bridge would be constructed primarily within the existing bridge right-of-way (ROW) (Caltrans Highway Easement [HE(C)]), but toward the east to avoid impacts to the railroad on the Badger Avenue Bridge immediately to the west. The existing Schuyler Heim Bridge (a lift bridge) would be demolished. The replacement bridge would be slightly wider (13 meters [m] [43 feet (ft)]) than the existing bridge due to the addition of standard shoulders, which are not present on the existing bridge. The replacement bridge would include three 3.6-m (12-ft) lanes and 3-m (10-ft) shoulders in the northbound direction, and three 3.6-m (12-ft) lanes, one 3.6-m (12-ft) auxiliary lane, and 3-m (10-ft) shoulders in the southbound direction. Bridge construction would include a southbound off-ramp and northbound on-ramp at New Dock Street on Terminal Island, as well as a northbound off-ramp and southbound on-ramp at Henry Ford Avenue on the mainland side of the bridge. With this alternative, the new bridge would be supported by four piers in the channel, with a minimum vertical clearance of 14.3 m (47 ft) over the mean high water level (MHWL). This clearance would be maintained for the width of the navigable channel, which would be 54.9 m (180 ft).

The Ocean Boulevard/SR-47 flyover will be a two-lane, elevated structure to divert traffic bound for northbound SR-47 directly onto the new bridge from eastbound Ocean Boulevard. The purpose of the flyover is to enable this traffic to avoid the signalized Ocean Boulevard/ SR-47 intersection. Under Alternative 1, the flyover will begin on Terminal Island, about 1,200 m (3,900 ft) west of the Ocean Boulevard/SR-47 intersection, extend eastward along the south side of Ocean Boulevard, then turn north, cross over Ocean Boulevard and onto the new bridge. The west end of the flyover will be at grade, then rise to a maximum elevation of 21 m (69 ft) to cross over Ocean Boulevard, then descend to an elevation of 12.9 m (42.4 ft) to join the new bridge. The elevated portions of the flyover will be supported by eight single-column bents and two 2-column outrigger bents. Each column is approximately 2.4 m (8 ft) in diameter. The structure will consist of 11 spans, with lengths that range between 57 m (186 ft) and 73 m (240 ft). The flyover will have an overall length of 1,550 m (5,084 ft), ending at the northerly end point (gore point) of the northbound New Dock Street on-ramp onto the bridge. The left lane of the flyover will converge with the SR-47 through-lane to the left; the right lane of the flyover will continue as a northbound SR-47 through-lane and will have the option to continue to SR-47 or SR-103. The flyover will be located entirely within the City and Port of Long Beach.

The new SR-47 Expressway would begin on Terminal Island, at the intersection of SR-47 and Ocean Boulevard, extending north over New Dock Street and onto the Schuyler Heim Bridge replacement. A new northbound on-ramp would be constructed from New Dock

Street, and a new southbound off-ramp would be constructed to New Dock Street, as described above. The expressway would extend northward to Alameda Street, south of the intersection with Pacific Coast Highway, a distance of approximately 2.7 kilometers (km) (1.5 miles [mi]). The expressway would be a four-lane, limited access roadway. It would grade-separate five at-grade railroad crossings and three signalized intersections along its length. A segment of the expressway would be constructed as an elevated viaduct over Henry Ford Avenue and Alameda Street and return to grade at Alameda Street, just south of Pacific Coast Highway. Under this alternative, connectivity to SR-103 would be maintained. This alternative includes improvements to the Alameda Street/Wardlow Road connector and to Alameda Street north and south of the connector.

Alternative 1A: Haunch Bridge Design

Alternative 1A is a structural variation of Alternative 1. The main purpose of this alternative is to improve the aesthetics of the replacement bridge over the Cerritos Channel and span a greater horizontal distance across the channel between columns. This is accomplished by increasing the span lengths over the channel and arching the superstructure soffits (the bottom of the bridge structure). Under this alternative, the new bridge would be supported by two piers (four columns) in the Cerritos Channel, compared to four piers (eight columns) under Alternative 1; and the minimum vertical clearance between the piers would be of 14.3 m (47 feet). This clearance would be maintained for the width of the navigable channel, which would be 54.9 m (180 feet).

Other aspects of this alternative, including the flyover, would be the same as Alternative 1.

Alternative 2: SR-103 Extension to Alameda Street

With this alternative, the existing Schuyler Heim Bridge would be demolished and a new fixed-span bridge and flyover would be constructed, as described under Alternative 1. With this alternative, the right lane of the flyover would continue to SR-103 after crossing the new bridge. Additionally, modifications to the northbound and southbound approaches to the bridge would be constructed.

This alternative also would extend SR-103 to the northwest on a four-lane elevated viaduct to join Alameda Street between Sepulveda Boulevard and I-405. Improvements to SR-103 would begin approximately 3.2 km (2 mi) north of the Schuyler Heim Bridge and extend a distance of approximately 2.6 km (1.6 mi). The elevated viaduct would cross over the Union Pacific Railroad manual yard and San Pedro Branch, through the Southern California Edison (SCE) utility corridor, across the Los Angeles Harbor Department Warehouse 16/17 area, over Sepulveda Boulevard, then parallel the western boundary of the Intermodal Container Transfer Facility (ICTF) to the centerline of Alameda Street. The viaduct would slope to grade south of the Wardlow Road ramps to I-405. Improvements would be made to the existing SR-103 to accommodate the southerly end connection of the viaduct and to SR-47 to accommodate the northerly end connection of the viaduct. This alternative also includes widening the Alameda Street/Wardlow Road connector and improvements to Alameda Street north and south of the connector.

Alternative 3: Bridge Avoidance

This alternative would preserve the existing Schuyler Heim Bridge and construct a new fixed-span bridge on an alignment east of the existing bridge, and construct the flyover as described for Alternative 1. Under this alternative, the new bridge would have the same lane configuration as the replacement bridge for Alternative 1.

This alternative includes seismic retrofit of the existing Schuyler Heim Bridge, which would remain standing but unused. The retrofit would be for safety purposes, to avoid demolition of a historic resource, and ensure that the existing bridge would not collapse and result in safety hazards or damage to the new bridge or to the adjacent Badger Avenue Bridge. However, according to the U.S. Coast Guard, when a bridge is no longer used for its permitted purpose of providing land transportation, the bridge shall be removed from the waterway. Therefore, removal of the existing Schuyler Heim Bridge would be included as a condition of the federal permit for the replacement bridge.

With this alternative, a new SR-47 Expressway would be constructed north of the new fixed-span bridge, as described under Alternative 1, and connectivity with SR-103 would be maintained. Improvements to Alameda Street and the Wardlow Road connector would be the same as described under Alternative 1.

Alternative 4: Bridge Replacement Only

This alternative would replace the existing Schuyler Heim Bridge (lift bridge) with a fixed-span bridge largely along the existing bridge alignment, and the existing Schuyler Heim Bridge would be demolished, as would occur under Alternative 1.

With this alternative, no roadway improvements would occur. With this alternative, therefore, the SR-47 Expressway described in Alternative 1 would not be constructed; and the SR-103 extension to Alameda Street described in Alternative 2 would not be constructed. This alternative also does not include the flyover.

Alternative 5: Transportation System Management

This alternative is designed to identify low-cost, easily implementable improvements as an alternative to construction of more expensive improvements. For this project, the TSM alternative focuses on improvements to routes that parallel the proposed SR-47 Expressway, and that serve the same trips. These trips include trucking drayage trips to and from the ICTF, and trips destined to and from the Ports via Alameda Street, Henry Ford Avenue, and SR-47. The TSM alternative would include measures to improve capacity and traffic circulation at the Port of Long Beach and Port of Los Angeles through policy changes and use of the latest technologies. With this alternative, capital investment would be minimal compared to the previous alternatives addressed.

The TSM alternative for this project includes the following key elements:

- Intelligent Transportation Systems (ITS): These would be systems applications in and around the Port area, with special emphasis on truck movements. These include measures to improve traffic circulation through traffic control, incident management, traffic surveillance, and traffic information dissemination with the aid of ITS devices and systems.
- Lower-cost roadway and intersection improvements: Measures include restriping to provide additional turn lanes and acceleration lanes and traffic signalization improvements, primarily within existing ROWs.
- Minor roadway widening: There also could be peak-hour parking prohibitions to remove midblock bottlenecks along selected roadways.

This alternative would not result in the increased ability of the Schuyler Heim Bridge to withstand a major earthquake. In the event of a major earthquake that would render the Schuyler Heim Bridge unusable, there are only two other access routes to and from Terminal Island. In the event the Schuyler Heim Bridge would become unusable, a TSM alternative would not be effective in reducing roadway demand or in redirecting Terminal Island traffic to other routes.

This alternative would not result in physical improvement to or replacement of the Schuyler Heim Bridge. Therefore, this alternative: (1) would not provide a link from the mainland to Terminal Island that would ensure ground and vessel transportation immediately following a major earthquake, (2) would not provide for safety improvements for bridge traffic, (3) would not improve operational or design features of the bridge, and (4) would not minimize future maintenance and operational costs of the Schuyler Heim Bridge.

Alternative 6: No Build Alternative

Under this alternative, there would be changes to the existing Schuyler Heim Bridge or local roadway system. The existing Schuyler Heim Bridge would continue to be seismically inadequate and subject to damage or collapse under strong seismic conditions. Maintenance activities would continue and would include application of protective coatings; lift mechanism repairs; deck resurfacing; and other, similar, maintenance activities. The bridge is expected to continue to deteriorate over time as its structure is eroded further and as various magnitude earthquakes are experienced. At some point in the future, the bridge may need to be demolished and replaced solely to avoid safety hazards.

Hot-Spot Analysis Methodology

The qualitative hot-spot analysis was performed following the *Transportation Conformity Guidance for Qualitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* (EPA, March 2006) [PM Guide]. The proposed project is located in Los Angeles County, which is designated as nonattainment for the federal PM_{10} standard and is required to attain and maintain the NAAQS. The current PM_{10} 24-hour standard is 150 $\mu g/m^3$. Therefore, PM_{10} conformity for the proposed project is based on the 24-hour standard of 150 $\mu g/m^3$.

Based on the project types listed in the PM Guide, the proposed project would be categorized as a new or expanded highway project that would have a significant number of diesel vehicles, and would be affecting intersections that are at Level of Service (LOS) D, E, or F with a significant number of diesel vehicles. The proposed project would be considered a project of air quality concern based on the criteria listed in the Final Conformity Rule (40 CFR 93.123 (b)(1)). Therefore, a qualitative project-level hot-spot assessment was conducted to assess whether the project will cause or contribute to any new localized PM_{10} violations, or increase the frequency or severity of any existing violations, or delay timely attainment of the PM_{10} NAAQS.

This analysis was based on directly emitted emissions including tailpipe, break wear, and tire wear, because the direct emissions could potentially cause nearby hot-spots or localized areas of elevated concentration. Re-entrained road dust was also included in the analysis. The emission inventories presented in the SCAQMD 2007 AQMP show that emissions from paved roads are the single largest contributor to the directly emitted PM_{10} emissions. Construction-related PM_{10} emissions were not included in this hot-spot analysis because these emissions would be considered temporary since construction would last less than 5 years (40 CFR 93.123(c)(5)).

Existing Air Quality

The closest monitoring station to the project area is the North Long Beach Monitoring Station (approximately 5 miles northeast of Schuyler Heim Bridge) and provides ambient air quality data representative of local conditions. PM_{10} concentrations have remained stable at the North Long Beach monitoring station over the past six years as shown in Table 1. PM_{10} concentrations exceeded the federal 24-hour standard of 150 micrograms per square meter ($\mu g/m^3$) once in the past six years. This exceedance coincides with wildfires that occurred in October 2007 and is not likely representative of ambient air PM_{10} concentrations. PM_{10} concentrations at the Long Beach-East Pacific Coast Highway (PCH) monitoring station have not exceeded the federal 24-hour standard in the past six years.

The traffic data near the North Long Beach monitoring station and the Long Beach-East Pacific Coast Highway monitoring station were reviewed to evaluate the relationship between traffic conditions and monitoring data. The Long Beach-East Pacific Coast Highway station was selected for comparison since it is located closer to the project area than the North Long Beach station.

The annual average daily traffic (AADT) and truck percentages near the North Long Beach monitoring station were reviewed. The North Long Beach station is located approximately 0.5 mile north of I-405 and one mile east of the I-405/I-710 junction. For the year 2006, the AADT at the I-405/I-710 junction was 290,000 (Caltrans, 2008). In addition, the truck AADT (3, 4, and 5 axle trucks) was 8,606, or 3 percent of the total AADT (Caltrans, 2008). For comparison, the Long Beach-East Pacific Coast Highway monitoring station is located approximately 1 mile east of the Pacific Coast Highway (PCH)/I-710 junction. For the year 2006, the AADT at the PCH/I-710 junction was 48,000 (Caltrans, 2008). In addition, the truck AADT (3, 4, and 5 axle trucks) was 7,081, or 15 percent of the total AADT (Caltrans, 2008). The truck AADT located near both monitoring stations is similar while the total AADT is higher near the North Long Beach Station.

TABLE 1
PM_{10} Monitoring Data

Averaging Time	Standard (NAAQS)	PM_{10} Concentration ($\mu g/m^3$)					
		2002	2003	2004	2005	2006	2007
Highest 24-hour at the North Long Beach Station	150	74	63	72	66	78	232[a]
Exceedances of the 24-hour Standard		0	0	0	0	0	1
Highest 24-hour at the Long Beach – East PCH Station	150	NA	75	83	131	117	123
Exceedances of the 24-hour Standard		0	0	0	0	0	0

Source: ARB, 2009, www.arb.ca.gov/adam/welcome

[a] The first high value measured (232 $\mu g/m^3$) occurred on October 21, 2007 which coincides with three wildfires that occurred in October 2007. Therefore, it was assumed the first high value resulted from the wildfires and would not be representative of ambient concentrations. The second high value measured in 2007 was 75 $\mu g/m^3$.

[b] The Long Beach – East Pacific Coast Highway station became operational in the year 2003.

Traffic Condition Improvement by Proposed Project

The purpose of building the SR-47 Expressway or the SR-103 Extension, along with the Schuyler Heim Bridge replacement, is to reduce traffic congestion on local surface streets between Terminal Island and Pacific Coast Highway as well as on I-110 and I-710. The proposed project would also improve traffic conditions by eliminating at-grade railroad crossings and signalized intersections.

Currently, to connect from Terminal Island to Alameda Street, vehicles must travel 1.5 km (0.9 mi) north from Ocean Boulevard, then exit at the Henry Ford Avenue off-ramp and travel north through local streets, signalized intersections, and railroad crossings for about 2.0 km (1.2 mi) before joining Alameda Street just south of Pacific Coast Highway. Alameda Street continues north of Pacific Coast Highway for 4.0 km (2.5 mi) and connects to the I-405. About 5.5 km (3.4 mi) north of I-405, Alameda Street connects to the Artesia Freeway (SR-91).

The SR-47 Expressway (Alternatives 1 and 1A) would be built upon a network of local streets by constructing a high-capacity expressway connecting the Ocean Boulevard Interchange with Alameda Street at Pacific Coast Highway. When complete, the 2.7 km (1.7 mi) expressway would provide the missing link between the Ocean Boulevard interchange on Terminal Island and Alameda Street on the mainland. This link would allow traffic to continue north to connect to Pacific Coast Highway, I-405, and/or SR-91. The proposed expressway would also help maximize use of the recently completed six-lane Alameda Street. In addition, the Ocean Boulevard/SR-47 flyover will divert traffic bound for northbound SR-47 directly onto the new bridge from eastbound Ocean Boulevard.

The flyover would enable this traffic to avoid the signalized Ocean Boulevard/SR-47 intersection.

The SR-103 Extension (Alternative 2) is an alternative to the SR-47 Expressway, and would connect existing SR-103, beginning about 0.8 km (0.5 mi) north of Pacific Coast Highway, to Alameda Street at a point about 0.8 km (0.5 mi) south of the San Diego Freeway (I-405). The right lane of the flyover described above would continue to SR-103 after crossing the new bridge.

Alternative 3 is the bridge avoidance option, and would have the same traffic conditions as Alternative 1. Alternative 4 is the bridge replacement only option, which would not affect the traffic conditions, comparable to the No Build alternative. Alternative 5 was not evaluated in this report because no traffic analysis was done for this alternative.

As a result of the proposed project, the delays due to traffic congestion would be reduced and the average vehicle travel speed would slightly increase in the project area. Both of these effects would translate into decreased vehicle emissions. In 2030, the LOS at the intersections within the project area would be improved by implementing the build alternatives 1, 1A, 2, and 3. Table 2 compares the PM peak hour intersection conditions of the No Build alternative to the build alternatives. Among the 22 intersections analyzed, the LOS of Alternatives 1, 1A, and 3 would improve at six intersections compared to the No Build alternative. The LOS of Alternative 2 would improve at four of the intersections. Two intersections, 223rd Street/Alameda Street connector ramp at Alameda Street and the 223rd Street and I-405 southbound ramps, would have a worse LOS when compared to the No Build alternative.

TABLE 2
2030 PM Peak Intersection Conditions (PCE)

Intersections	Alternative 6 (No Build), Alternative 4	Alternatives 1, 1A, 3	Alternative 2
SR-47 & New Dock SB Off-Ramp1	B	B	B
SR-47 & New Dock NB On-Ramp1	E	C	C
SR-47 & Henry Ford Ramps	F	C	E
Henry Ford Ave & Anaheim St	F	F	F
Henry Ford Ave & Denni St	D	C	D
Alameda St & Anaheim St	F	F	F
Alameda St / PCH Connector Ramp n/o PCH	F	F	B
PCH / Alameda St Connector Ramp e/o Alameda St	F	F	E
Alameda St / Sepulveda Blvd Connector Ramp n/o Sepulveda	F	F	F
Sepulveda Blvd / Alameda St Connector Ramp e/o Alameda St	F	E	E
Alameda St / 223rd St Connector Ramp s/o 223rd St	F	F	F
223rd St / Alameda St Connector Ramp e/o Alameda St	E	F	F

TABLE 2
2030 PM Peak Intersection Conditions (PCE)

Intersections	Alternative 6 (No Build), Alternative 4	Alternatives 1, 1A, 3	Alternative 2
223rd St & I-405 SB Ramps	B	C	C
Alameda St & I-405 NB Ramps	C	C	C
Alameda St / Carson St Connector Ramp s/o Carson St	C	B	C
Carson St / Alameda St Connector Ramp e/o Alameda St	A	A	A
Alameda St / Del Amo Blvd Connector Ramp s/o Del Amo	D	C	C
Del Amo Blvd / Alameda St Connector Ramp e/o Alameda St	C	A	B
Alameda St & SR-91 EB Ramps	A	A	A
Alameda St & Artesia Blvd n/o Artesia Blvd	A	A	A

Data provided by Meyer, Mohaddes Associates, 2007

Table 3 presents the daily vehicle miles traveled (VMT) within the project area for the No Build and build alternatives. Alternative 1 would have less total VMT when compared to the No Build alternative. There would be approximately a 2 percent increase in VMT for Alternative 2 when compared to Alternative 1, due to the increase of capacity of the extended SR-103. The truck percentages of the build alternatives are similar to those of the No Build alternative within the same year. The percentage of port trucks is expected to increase between 2003 and 2030 while the percentage of other trucks is expected to decrease.

An increase of PM_{10} emissions would occur if the project significantly increased VMT in the project area, and at locations where there are more traffic delays. The traffic delays would occur at the intersections where vehicles are accumulating and idling. It is unlikely that PM_{10} hot-spots would be associated with the proposed project because local accumulation and delay of vehicles would be reduced by the project. Table 2 shows that LOS improves with the build alternatives when compared to the No Build alternative. Potential localized PM_{10} increases associated with this slight increase in VMT would be offset by the increase of vehicle speed in the project area, which is an indication of reduced congestion and idling of vehicles. Thus, the proposed project is not expected to result in increased localized concentrations of PM_{10} (see the following sections for more detailed emission calculations).

In conclusion, reviewing the existing and projected traffic conditions has shown that the proposed project would improve the operations of the intersections and increase the vehicle speed in the project area. It is unlikely that PM_{10} emissions associated with the proposed project would cause significant adverse impact to air quality.

TABLE 3
Daily Vehicle Miles Traveled and Percentages within the Project Area

Project Alternative	Cars		Port Trucks		Other Trucks		Total VMT
	Daily VMT	Percent of Total VMT	Daily VMT	Percent of Total VMT	Daily VMT	Percent of Total VMT	
2003 - Existing	3,762,790	86.6%	446,582	10.3%	133,242	3.1%	4,342,614
2011 - Alternative 6 (No Build), Alternative 4	3,683,868	85.2%	509,987	11.8%	128,848	3.0%	4,322,704
2011 - Alternative 1, 1A, 3	3,696,964	85.5%	496,472	11.5%	128,981	3.0%	4,322,417
2011 - Alternative 2	3,857,134	87.3%	454,902	10.3%	105,845	2.4%	4,417,883
2015 - Alternative 6 (No Build), Alternative 4	3,867,096	83.9%	609,988	13.2%	131,813	2.9%	4,608,899
2015 - Alternative 1, 1A, 3	3,881,725	84.3%	593,061	12.9%	132,236	2.9%	4,607,023
2015 - Alternative 2	3,913,907	84.1%	604,778	13.0%	133,812	2.9%	4,652,497
2030 - Alternative 6 (No Build), Alternative 4	4,384,500	81.1%	874,743	16.2%	144,870	2.7%	5,404,114
2030 - Alternative 1, 1A, 3	4,407,170	81.6%	845,124	15.7%	146,453	2.7%	5,398,748
2030 - Alternative 2	4,436,443	81.5%	858,343	15.8%	146,750	2.7%	5,441,537

Data provided by Meyer, Mohaddes Associates.

Direct Operational Emissions – Vehicle Operational Emissions

To further illustrate that the proposed project would not cause significant adverse impact to the ambient air quality, vehicle operation emissions of PM_{10} were estimated and compared with the No Build alternative. The emission analysis was performed for the entire project study area because the proposed improvements along the Schuyler Heim Bridge, SR-47, or SR-103 corridors would likely affect vehicle traffic patterns on other nearby roads, not just along the roadways with proposed improvements. As a result, traffic conditions and vehicle emissions would be affected by the project in a broader area. The project study area includes the area between Interstates 710, 110, 405, and Ocean Boulevard. Vehicle emissions are expected to be highest in the opening year of 2011 and reduce in future years with the addition of newer vehicles meeting lower emission standards.

Vehicle Exhaust Emissions

PM_{10} emissions from vehicles traveling in the project study area were calculated for the years 2003, 2011, 2015, and 2030. Daily VMT data for 2003, 2011, 2015, and 2030 were provided by Meyer, Mohaddes Associates (see Attachment 1, Table 1 for details). PM_{10} emissions were estimated for Alternatives 1, 1A, 2, 3, and the No Build alternative (Alternative 6). Emission factors for PM_{10} were obtained from EMFAC2007 (ARB, 2007). Emissions were calculated based on three major categories of vehicles: autos, heavy-duty trucks (regional), and port trucks. Emissions from autos were calculated using EMFAC2007 emission factors representing the Los Angeles County vehicle mix. To be conservative, PM_{10} emissions from regional and port trucks were calculated using the EMFAC2007 emission factors for heavy-duty diesel trucks. The emission factors selected from the EMFAC2007 results were based on the vehicle speeds shown in Table 4. Detailed emission calculations of vehicle exhaust emissions are shown in Attachment 1, Table 1.

TABLE 4
Average Speeds

Project Alternative	Average Speed
2003 - Existing	41
2011 - No Build	47
2011 - Alternative 1	48
2011 - Alternative 2	48
2015 - No Build	45
2015 - Alternative 1	46
2015 - Alternative 2	46
2030 - No Build	37
2030 - Alternative 1	39
2030 - Alternative 2	39

Data provided by Meyer, Mohaddes Associates.

As shown in Table 5, PM_{10} emissions from Alternatives 1, 1A, and 3 would be slightly lower than those from the No Build alternative. The emissions in Table 5 were conservatively estimated based on the average vehicle speed for the entire project area. The emission decrease for Alternatives 1, 1A, and 3 are due to a predicted decrease in VMT in the study area and an increase in vehicle speed for 2011, 2015, and 2030. Although there would be a slight increase in VMT for Alternative 2, due to increased capacity from the extension of SR-103, the PM_{10} emissions for Alternative 2 would be less than or similar to the No Build alternative. Emissions of Alternative 4 are predicted to be the same as those for the No Build alternative because the VMT and vehicle mix in the project area is predicted to be the same. Emissions associated with Alternative 5 were not discussed in this analysis because there is no traffic information available for Alternative 5.

TABLE 5
Daily Vehicle Emissions for the Project Study Area

Year	PM_{10} (lb/day)				
	No Build	Alternative 1, 1A	Alternative 2	Alternative 3	Alternative 4
2003	1,131	--	--	--	--
2011	876	871	836	871	876
2015	784	779	789	779	784
2030	629	625	631	625	629

Overall, PM_{10} emissions of the build alternatives would be the same or less than the No Build alternative. In addition, the exhaust emissions in 2030 would be much lower than those in 2011 (project opening year), attributed to the addition of newer vehicles with greater emission controls in future years. Based on the current ambient PM_{10} concentrations in the project area, the proposed project is not expected to have significant localized PM_{10} concentration increase when compared to the No Build alternative.

Re-entrained Road Dust

Re-entrained road dust was estimated based on VMT and Chapter 13.2.1 of *AP-42, Fifth Edition, Compilation of Air Pollutant Emission Factors* (EPA, 2006). The emission inventories presented in the SCAQMD 2007 AQMP show that emissions from paved roads are the single largest contributor to the directly emitted PM_{10}. Table 6 presents the paved road emissions for the years 2003, 2011, 2015, and 2030. Detailed emission calculations of vehicle exhaust emissions are shown in Attachment 1, Table 2. The PM_{10} emissions for the build alternatives would be the same or less than the No Build alternative for each year analyzed. Paved road emissions are expected to increase with time because the calculation of paved road emissions is based on VMT and vehicle weight. Since the VMT and the percentage of trucks are predicted to increase with time, the paved road emissions would also increase with time. This finding is consistent with the emission inventories reported in the SCAQMD 2007 AQMP, which also show paved road emissions increasing with time. Since paved road emissions are included in the 2007 AQMP, which is part of the California SIP, paved road emissions have been accounted for as part of the PM_{10} attainment plan.

Therefore, the proposed project is unlikely to cause new violations or increase the frequency or severity of any existing violations, or delay timely attainment of the PM_{10} NAAQS.

TABLE 6
Re-entrained Road Dust Emissions for the Project Study Area

Year	PM_{10} (lb/day)				
	No Build	Alternative 1, 1A	Alternative 2	Alternative 3	Alternative 4
2003	51,058	--	--	--	--
2011	56,031	54,887	49,540	54,887	56,031
2015	65,017	63,567	64,732	63,567	65,017
2030	89,802	87,213	88,425	87,213	89,802

Overall, PM_{10} emissions of the four build alternatives would be the same or less than the No Build alternative. In addition, the exhaust emissions in 2030 would be much lower than those in 2011 (project opening year), attributed to the addition of newer vehicles with greater emission controls in future years.

Conclusions

This project is identified as a Transportation Control Measure (TCM) project in the 2008 RTP and 2008 RTIP; its timely implementation is a crucial element in the reduction of air pollutant emissions from roadway transportation sources. Overall, PM_{10} emissions of the build alternatives would be the same or less than the No Build alternative. In addition, the exhaust emissions in 2030 would be much lower than those in 2011 (project opening year), attributed to the addition of newer vehicles with greater emission controls in future years. Based on the current ambient PM_{10} concentrations in the project area, the project is not expected to have a significant localized PM_{10} concentration increase when compared to the No Build alternative. The proposed project is unlikely to cause new violations or increase the frequency or severity of any existing violations, or delay timely attainment of the PM_{10} NAAQS. Therefore, the project meets the conformity hot-spot requirements in 40 CFR §93.116 and §93.123 for PM_{10}.

References

California Air Resources Board (ARB). 2009. *ADAM Air Quality Database*. http://www.arb.ca.gov/adam/welcome.html.

California Air Resources Board (ARB). 2007. *EMFAC 2007, Version 2.3.* California Department of Transportation (Caltrans). 2008. Traffic Data Branch, Traffic Volumes for the Year 2006. Website: http://traffic-counts.dot.ca.gov/. Accessed March 17, 2008.

South Coast Air Quality Management District (SCAQMD). 2007. *2007 Air Quality Management Plan*. http://www.aqmd.gov/aqmp/07aqmp/07AQMP.html.

University of California, Davis (UCD), Caltrans, Federal Highway Administration (FHWA). 2005. *Technical Report: Particulate Matter and Transportation Project Analysis Protocol*.

U.S. Environmental Protection Agency (EPA). 2006. *Transportation Conformity Guidance for Qualitative Hot-spot analyses in PM2.5 and PM10 Nonattainment and Maintenance Areas* EPA420-B-06-902. March.

U.S. Environmental Protection Agency (EPA). 2006. *AP-42, Fifth Edition, Compilation of Air Pollutant Emission Factors, Chapter 13.2*. November.