



Prepared for  
**Caltrans**  
**LA Metro**

Prepared by  
**Ramboll US Corporation**  
**Irvine and Los Angeles, California**

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# QUANTITATIVE PM<sub>2.5</sub> AND PM<sub>10</sub> HOT-SPOT ANALYSIS PROTOCOL **I-710 CORRIDOR PROJECT**

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## ACRONYMS AND ABBREVIATIONS

µg/m <sup>3</sup> :	micrograms per cubic meter
AERMET:	AMS/EPA Regulatory Model Meteorological Processor
AERMOD:	AMS/EPA Regulatory Model
AMS/EPA	American Meteorological Society/Environmental Protection Agency
AOI:	Area of Interest
AQ/HRA	Air Quality/Health Risk Assessment
AQMP:	Air Quality Management Plan
BNSF:	Burlington Northern Santa Fe Railway Company
CAA	Clean Air Act
CARB:	California Air Resources Board
CFR:	code of federal regulations
CSI:	Cambridge Systematics Incorporated
DA/SR	drive alone and shared ride vehicles
DPM	diesel particulate matter
EIR:	Environmental Impact Report
EIS:	Environmental Impact Statement
EMFAC	EMission FACtors model
FCAA:	Federal Clean Air Act
FRATIS:	freight advanced traveler information systems
FTIP:	Federal Transportation Improvement Program
GIS	geographic information system
GP:	general purpose
HDT:	heavy-duty trucks
HHDT	heavy heavy-duty trucks
I-105:	Interstate-105
I-405:	Interstate-405
I-5:	Interstate-5
I-710:	Interstate-710
ITS:	Intelligent Transportation Systems
KCQT:	University of Southern California/Downtown Los Angeles Monitoring Station

## ACRONYMS AND ABBREVIATIONS *(CONTINUED)*

KLGB:	Long Beach Airport Monitoring Station
LADWP:	Los Angeles Department of Water and Power
LAJ:	Los Angeles Junction
LHDT	light heavy-duty trucks
MHDT	medium heavy-duty trucks
NAAQS:	National Ambient Air Quality Standards
NOx:	oxides of nitrogen
NZE:	near zero emission
PCH:	Pacific Coast Highway
PM:	particulate matter
PM <sub>10</sub> :	particulate matter less than 10 microns in diameter
PM <sub>2.5</sub> :	particulate matter less than 2.5 microns in diameter
POLA:	Port of Los Angeles
POLB:	Port of Long Beach
RDEIR:	Recirculated Draft Environmental Impact Report
RTP:	Regional Transportation Plan
RTP/SCS:	Regional Transportation Plan/Sustainable Communities Strategy
SB:	southbound
SCAB:	South Coast Air Basin
SCAG:	Southern California Association of Governments
SCAQMD:	South Coast Air Quality Management District
SCE:	Southern California Edison
SDEIS:	Supplemental Draft Environmental Impact Statement
SIP:	state implementation plan
SR-60:	State Route 60
SR-91:	State Route-91
TCWG:	Transportation Conformity Working Group
TDM:	Transportation Demand Management
TSM:	Transportation Systems Management
UP:	Union Pacific

## ACRONYMS AND ABBREVIATIONS *(CONTINUED)*

USEPA:	United States Environmental Protection Agency
VMT:	vehicle miles traveled
WBAN:	Weather Bureau Army Navy
ZE:	zero emission

## 1. INTRODUCTION

Transportation conformity is required under Section 176(c) of the Federal Clean Air Act<sup>1</sup> (CAA) to ensure that federally supported highway and transit project activities are consistent with the purpose of the state implementation Plan (SIP). Conformity with an air quality SIP is defined as complying with a plan's purpose of maintaining the ambient air quality standards. The federal rules and regulations governing conformity are described in the Code of Federal Regulations (CFR), Chapter 40 Parts 51<sup>2</sup> and 93.<sup>3</sup> Transportation conformity with the CAA takes place on two levels: first at the regional level and second at the project level. The proposed project must conform at both levels to be federally approved. For the proposed Interstate-710 (I-710) Corridor Project, the Southern California Association of Government's (SCAG) 2012 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) and more recent 2016 RTP/SCS<sup>4</sup> are the relevant regional planning documents, both of which have been determined to be in conformity with the SIP for achieving the goals of the CAA.<sup>5, 6, 7</sup>

Transportation conformity review at the project-level is required given the proposed project is located within nonattainment and maintenance for particulate matter less than 2.5 microns in diameter (PM<sub>2.5</sub>) and particulate matter less than 10 microns in diameter (PM<sub>10</sub>), respectively. Specifically, under the 40 Code of Federal Regulations (CFR) 93.116 and 93.123, Ramboll will conduct the project-level conformity analyses, and, if necessary, a quantitative "hot-spot" analysis for PM<sub>2.5</sub> and PM<sub>10</sub> for the preferred project alternative.<sup>8</sup> As stated in 40 CFR 93.123(b)(1), PM hot-spot analyses are only required for projects of local air quality concern (POAQC), which is defined in the followings:

- (i) New highway projects that have a significant number of diesel vehicles, and expanded highway projects that have a significant increase in the number of diesel vehicles;

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<sup>1</sup> United States Senate. 2004. The Clean Air Act. As Amended Through P.L. 108-201, February 24. Available at: <https://www.congress.gov/108/plaws/publ201/PLAW-108publ201.pdf>. Accessed: January 2018.

<sup>2</sup> Code of Federal Regulations (CFR) Title 40 Chapter I Subchapter C Part 51 – Requirement for Preparation, Adoption, and Submittal of Implementation Plans. Available at: <http://www.ecfr.gov/>. Accessed: January 2018.

<sup>3</sup> CFR Title 40 Chapter I Subchapter C Part 51 – Determining Conformity of Federal Actions to State or Federal Implementation Plans. Available at: <http://www.ecfr.gov/>. Accessed: January 2018.

<sup>4</sup> Southern California Association of Governments (SCAG). 2016. The 2016-2014 Regional Transportation Plan/Sustainable Communities Strategy: A Plan for Mobility, Accessibility, Sustainability, and a High Quality of Life. Adopted April 2016. Available at: <http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS.pdf>. Accessed: January 2018.

<sup>5</sup> Mammano, Vincent. 2014. Conformity Determination for SCAG's 2015 FTIP, 2015 FTIP Amendment No. 15-01, and SCAG's 2012-2035 RTP/SCS through Amendment No. 2. United States Department of Transportation. Federal Highway Administration. Division Administrator. December 15. Available at: [http://ftip.scag.ca.gov/Documents/F2015\\_FTIPfedApproval.pdf](http://ftip.scag.ca.gov/Documents/F2015_FTIPfedApproval.pdf). Accessed: January 2018.

<sup>6</sup> Mammano, Vincent. 2016. Conformity Determination for SCAG 2016 RTP/SCS. United States Department of Transportation. Federal Highway Administration. Division Administrator. June 1. Available at: [http://scagrtpscs.net/Documents/2016/notices/FHMW-FTA\\_2016RTPSCSConformityDetermination\\_2016-0601.pdf](http://scagrtpscs.net/Documents/2016/notices/FHMW-FTA_2016RTPSCSConformityDetermination_2016-0601.pdf). Accessed: January 2018.

<sup>7</sup> As noted in the 2017 Recirculated Draft Environmental Impact Report/Recirculated Supplemental Impact Statement, the full scope of project is not currently in the FTIP and the Project Description in the RTP/SCS does not match either of the currently proposed build alternatives, both the RTP and RTIP will be amended to be consistent with the preferred alternative prior to the approval of the Final EIR/EIS.

<sup>8</sup> Code of Federal Regulations (CFR) Title 40 Chapter I Subchapter C Part 93 Subpart A §93.116 and §93.123. Available at: <http://www.ecfr.gov/>. Accessed: January 2018.

- (ii) Projects affecting intersections that are at Level of Service D, E, or F with a significant number of diesel vehicles, or those that will change to Level of Service 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; and
- (v) Projects in or affecting locations, areas, or categories of sites which are identified in the PM<sub>10</sub> or PM<sub>2.5</sub> applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

### The I-710 Corridor Project (Alternative 5C)

The I-710 Corridor Project, and in particular Alternative 5C, is an expanded highway project described in greater detail in Section 2.3.2. In addition to traditional expanded highway project features to improve safety and mobility, Alternative 5C includes novel air quality and public health program elements. A Zero Emission/Near-Zero Emission (ZE/NZE) truck program is included to provide monetary incentives for trucks travelling most frequently on the I-710 itself compared to other trucks (equivalent to 4,000 ZE/NZE trucks that must demonstrate travel on I-710). A ZE/NZE truck has 90% lower NO<sub>x</sub> emissions and 100% lower diesel particulate matter (DPM) emissions compared the cleanest current diesel trucks (Model Year 2010 or better). In addition to reducing NO<sub>x</sub> levels and cancer risk along the I-710 (maximum modeled cancer risk from the Recirculated Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement (RDEIR/SDEIS) in 2012 Baseline (1,421 in a million), 2035 No-Build (57 in million) and 2035 Alternative 5C (45 in a million), respectively), ***it is calculated that the ZE/NZE program will lower diesel heavy duty truck vehicle miles travelled (VMT) along the I-710 by 15% compared to the 2035 No-Build.***<sup>9</sup>

Ten intersections were identified to represent the worst-case operational conditions and/or most project-affected intersections in representative geographic locations throughout the AQ/HRA study area; five intersections (#177, #19, #63, #93, and #155) were the most congested and, because the project covers a large, diverse geographic area, an additional five were chosen as most project affected and congested in other geographic locations.<sup>10</sup> The ten intersections and related Level of Service (LOS) information for the No-Build and Alternative 5C are presented below (Table 5-2 of the June 2017 AQ/HRA Appendix G); ***LOS stays the same or improves at these intersections for Alternative 5C compared to the No Build.***

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<sup>9</sup> See June 2017 Air Quality/Health Risk Assessment (AQ/HRA) Report, Appendix C, Chapter 7 for technical details about how the effects of the ZE/NZE truck program were incorporated into the AQ/HRA analyses and this Protocol. As noted in this reference, the reduction in conventional heavy-heavy duty truck VMT along the I-710 is approximately 24%. Available at: <http://www.dot.ca.gov/d7/env-docs/docs/710corr-eir/Technical%20Studies/Air%20Quality%20Greenhouse%20Gas%20Health%20Risk%20Assessment%20June%202017.pdf>. Accessed: June 2018.

<sup>10</sup> Table 5-2 of June 2017 Air Quality/Health Risk Assessment (AQ/HRA) Report, Appendix G; see Section 5.2 for more technical details about the intersection selection.



**Table 1. Level of Service Data for Operational Worst-Case Intersections Analyzed in the CO Conformity Report**

ID	Main Street	Cross Street	Delay, LOS, and Total Afternoon Cumulative Peak-Hour Delay			
			No-Build (2035)		Alternative 5C (2035)	
			Delay (sec)/LOS	Total Delay (hr)	Delay (sec)/LOS	Total Delay (hr)
177	Washington Blvd	Soto St	196.6/F	325	192.3/F	320
19	Pacific Coast Hwy	Santa Fe Ave	151.4/F	210	179.7/F	263
63	Florence Ave	Alameda St (West	198.5/F	260	185.3/F	242
93	Ford Blvd	Whittier Blvd	212.2/F	150	241.8/F	171
155	Wilmington Ave	223rd St	157.8/F	242	151.3/F	232
1002	Pacific Coast Hwy	Harbor Ave	96.1/F	103	160.9/F	179
523	Long Beach Blvd	Victoria St	135.4/F	117	231.1/F	205
83	Indiana St	Olympic Blvd	214.0/F	177	105.7/F	92
57	Imperial Hwy	Paramount Blvd	95.5/F	148	96.3/F	149
503	I-405 SB	223rd St (On/Off)	332.3/F	235	26.4/C	20

*Alternative 5C mobility improvements also improve the LOS along the freeway,<sup>11</sup> as shown in Figure 1a through Figure 1c.*

<sup>11</sup> 2017. Caltrans, Metro. I-710 Corridor Project Recirculated Draft Environmental Impact Report/Subsequent Draft Environmental Impact Statement (RDEIR/SDEIS), Section 3.5. Available at: [http://www.dot.ca.gov/d7/env-docs/docs/RDEIR\\_SDEIS%20July%202017.pdf](http://www.dot.ca.gov/d7/env-docs/docs/RDEIR_SDEIS%20July%202017.pdf). Accessed: June 2018.

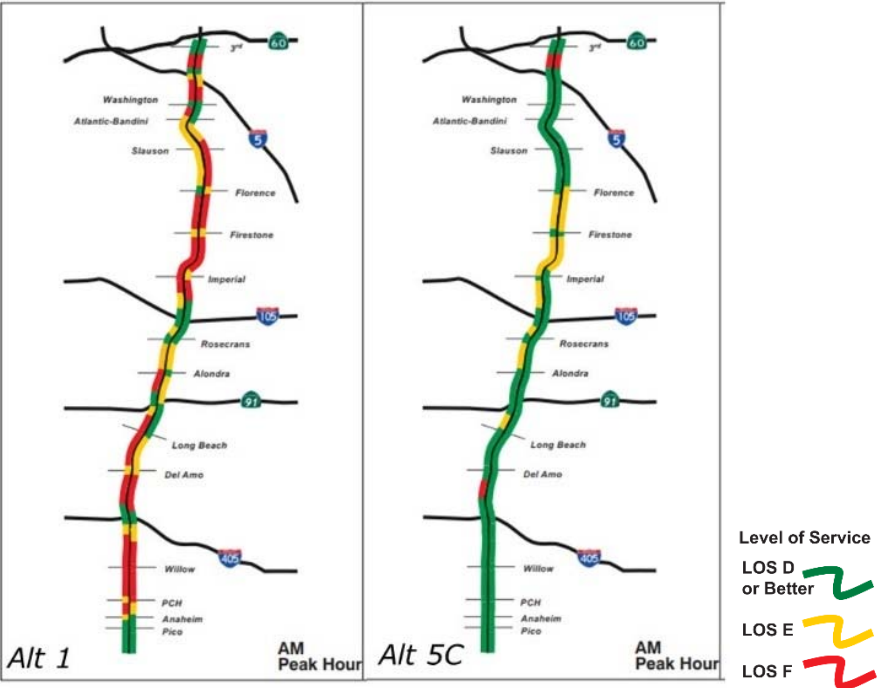


Figure 1a. AM Peak Hour Levels of Service  
 A full size figure can be found in the Figures Section

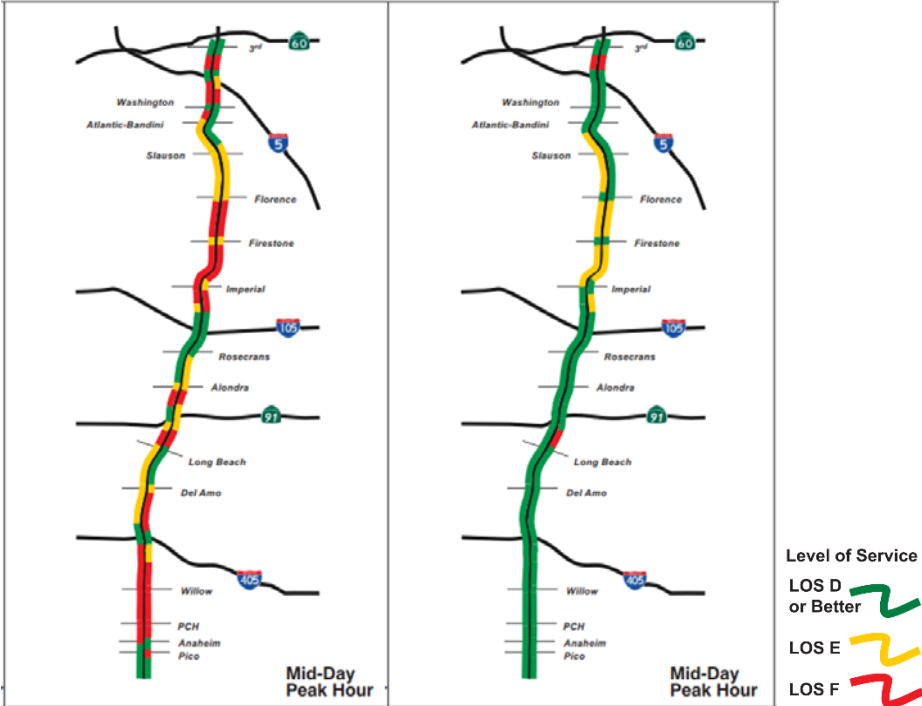
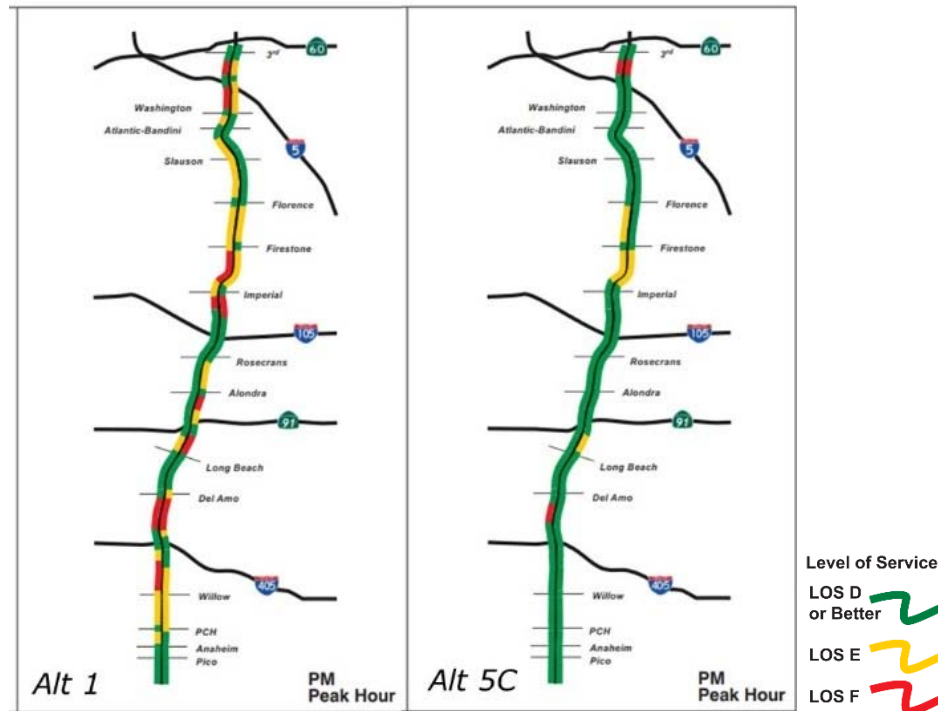


Figure 1b. Mid-Day Peak Hour Levels of Service  
 A full size figure can be found in the Figures Section



**Figure 1c. PM Peak Hour Levels of Service.**

**A full size figure can be found in the Figures Section**

According to the 2016 Air Quality Management Plan (AQMP), the Los Angeles area is in attainment of the PM<sub>10</sub> National Ambient Air Quality Standard (NAAQS) and 24-hour average and annual average PM<sub>2.5</sub> levels will be below their respective NAAQS levels by 2019 and 2025, respectively.<sup>12</sup> For example, the entire South Coast Air Basin (SCAB) will be below the 24-hour average PM<sub>2.5</sub> NAAQS of 35 µg/m<sup>3</sup> by 2019; Los Angeles is projected to be at 27.6 µg/m<sup>3</sup>. The entire SCAB will be below the annual average PM<sub>2.5</sub> NAAQS of 12 µg/m<sup>3</sup> by 2025; Los Angeles is projected to be at 10.8 µg/m<sup>3</sup>.

As seen above, Alternative 5C may not meet the definition of a POAQC. However, if it is determined to be a POAQC, this protocol describes the proposed technical methodology, model inputs, and assumptions that will be used in the I-710 Project quantitative PM<sub>2.5</sub> and PM<sub>10</sub> Hot-Spot Analysis in accordance with the applicable portions of the conformity regulations<sup>13, 14</sup> and the United States Environmental Protection Agency's 2015 guidance (2015 USEPA Guidance) for PM hot-spot analyses.<sup>15</sup>

<sup>12</sup> SCAQMD. 2017. 2016 AQMP, Chapter 5, Future Air Quality. Available at: <http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/chapter5.pdf?sfvrsn=4>. Accessed: June 2018.

<sup>13</sup> Code of Federal Regulations (CFR) Title 40 Chapter I Subchapter C Part 93 Subpart A §93.116 and §93.123. Available at: <http://www.ecfr.gov/>. Accessed: January 2018.

<sup>14</sup> CFR Title 40 Chapter I Subchapter C Part 93 Subpart A §93.123 - Procedures for determining localized CO, PM<sub>10</sub>, and PM<sub>2.5</sub> concentrations (hot-spot analysis). Available at: <http://www.ecfr.gov/>. Accessed: January 2018.

<sup>15</sup> USEPA. 2015. Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM<sub>2.5</sub> and PM<sub>10</sub> Nonattainment and Maintenance Areas (EPA-420-B-15-084). November. Office of Transportation and Air Quality. Available at: <https://www3.epa.gov/otaq/stateresources/transconf/documents/420b15084.pdf>. Accessed: January 2018.

## 2. PROJECT DESCRIPTION

I-710 (also known as the Long Beach Freeway) is a major north/south interstate freeway connecting the City of Long Beach to central Los Angeles. The I-710 Corridor Project study area includes the portion of Route 710 from Ocean Boulevard in Long Beach to State Route 60 (SR-60) in East Los Angeles, a distance of approximately 19 miles. At the crossing freeways, the study area extends up to one and a half miles east and west of I-710. It also traverses portions of the cities of Bell, Bell Gardens, Carson, Commerce, Compton, Cudahy, Downey, Huntington Park, Lakewood, Long Beach, Los Angeles, Lynwood, Maywood, Paramount, Signal Hill, South Gate, and Vernon.

Within the study area, the freeway serves as the principal transportation connection for goods movement between multiple facilities. These facilities include the Port of Los Angeles (POLA) and Port of Long Beach (POLB) shipping terminals, the four crossing freeways servicing destinations beyond the study area, local warehousing along I-710, and intermodal railyards located in the cities of Commerce and Vernon.

### 2.1 Project Air Quality Study Area

Figure 2 shows the general study area for the I-710 Corridor Project from Ocean Boulevard in Long Beach to State Route 60 (SR-60) in East Los Angeles, a distance of approximately 19 miles. However, each environmental analysis may have its own study area. In the Air Quality, Greenhouse Gas, and Health Risk Assessment Technical Study for the I-710 Corridor Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement (I-710 AQ/GHG/HRA Study),<sup>16</sup> incremental daily mass emission impacts were evaluated in the South Coast Air Basin (SCAB), Area of Interest (AOI) which is a sub-region of the SCAB that includes cities and communities along the I-710 freeway, and the I-710 freeway which may include a freight corridor and related ramps, depending on the project alternative (Figure 3).

According to 40 CFR 93.123(c)(2), hot-spot analyses must include the entire transportation project. However, due to the extent of the project area, this hot-spot analysis will focus on sub-areas where the air quality is substantially affected by the project and that result in the highest PM<sub>10</sub> and PM<sub>2.5</sub> concentrations. For the PM conformity analysis, traffic data, emissions data, and modeled PM<sub>10</sub> and PM<sub>2.5</sub> concentrations presented in the I-710 AQ/GHG/HRA Study will be evaluated as needed to assist in the decision on the hot-spot locations (i.e., which roadway links/areas). Per Section 3.3.2 in the 2015 USEPA Guidance, the conformity can be assumed to be met throughout the entire project area if conformity is demonstrated at such locations where highest PM concentrations are expected.

The Project-level hot-spot analyses for PM<sub>2.5</sub> and PM<sub>10</sub> will be conducted for the selected hot-spot locations of Alternative 5C, the locally preferred project alternative. Detailed project descriptions for the No Build Alternative (Alternative 1) and Alternative 5C are provided in the sections below.

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<sup>16</sup> Ramboll Environ. 2017. Air Quality, Greenhouse Gas, and Health Risk Assessment Technical Study for the I-710 Corridor Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement.



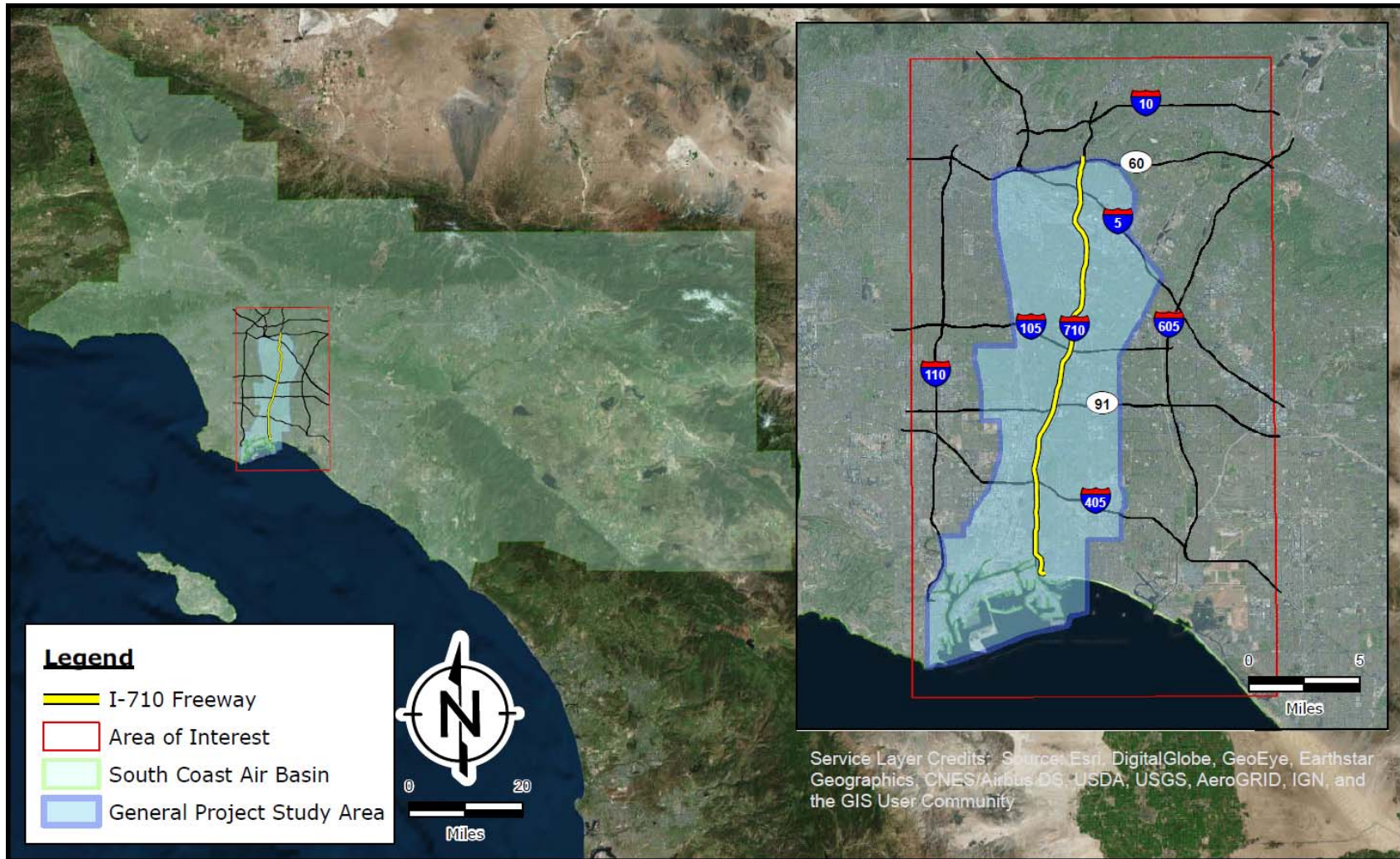


Figure 3. Project Study Areas for Air Quality Analyses  
A full size figure can be found in the Figures Section

## 2.2 Purpose and Need of the Project

I-710 is an essential component of the regional, statewide, and national transportation system and serves both passenger and goods movement vehicles. As a result of population growth, cargo container growth, increasing traffic volumes, and aging infrastructure, the I-710 Freeway experiences serious congestion and safety issues. Moreover, the number of Heavy-Duty Trucks (HDT) traveling along the I-710 corridor has also increased, resulting in high levels of air pollution, particularly diesel particulate matter (DPM) emissions, and other negative impacts to the communities near the I-710. As a result of this strain, I-710 is unable to accommodate current or future traffic demands. The purpose<sup>17</sup> of the proposed I-710 Corridor Project is to:

- Improve air quality and public health;
- Improve traffic safety;
- Address design deficiencies;
- Address projected traffic volumes; and
- Address projected growth in population, employment, and activities related to goods movement.

The need for the proposed I-710 Corridor Project is as follows:

- I-710 experiences high heavy-duty truck volumes, resulting in high concentrations of diesel particulate emissions within the I-710 Corridor.
- I-710 experiences accident rates, especially truck-related, that are well above the statewide average for freeways of this type.
- At many locations along I-710, the on- and off-ramps do not meet current design standards, and weaving sections within and between interchanges are of insufficient length.
- High volumes of both trucks and cars have led to severe traffic congestion throughout most of the day (6:00 a.m. to 7:00 p.m.) on I-710 as well as on the connecting freeways. This is projected to worsen over the next 25 years.
- Increases in population, employment, and goods movement between now and 2035 will lead to more traffic demand on I-710 and on the streets and roadways within the I-710 Corridor as a whole.

## 2.3 Project Alternatives

Project alternatives were developed by a multidisciplinary technical team to achieve the needs and purpose of the I-710 Corridor Project. Various committees involved in the I-710 Corridor Project community participation framework reviewed the alternatives. In May 2009, the Alternative Screening process for this Project recommended that three build alternatives (Alternative 5A, 6A, and 6B) be evaluated along with Alternative 1, the 2035 No Build.<sup>18</sup>

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<sup>17</sup> A full description of the Need and Purpose of the I-710 Corridor Project can be found in the Notice of Preparation ([http://www.metro.net/projects\\_studies/I710/images/710\\_NOP.pdf](http://www.metro.net/projects_studies/I710/images/710_NOP.pdf)) and the I-710 Major Corridor Study Final Report ([http://media.metro.net/projects\\_studies/710\\_final\\_report/default.htm](http://media.metro.net/projects_studies/710_final_report/default.htm)).

<sup>18</sup> URS Corporation. 2009. Technical Memorandum – Alternatives Screening Analysis (Final); Prepared for Los Angeles County Metropolitan Transportation Authority.

Subsequently in late 2010, the Funding Partners added a fourth build alternative (Alternative 6C). These five project alternatives were evaluated in the I-710 Draft Environmental Impact Report/ Environmental Impact Statement (EIR/EIS)<sup>19</sup> that was released in June 2012. Based on the feedback obtained from the communities and stakeholders, the project team redefined the Project build alternatives to two build alternatives (Alternative 5C and 7). These build alternatives were evaluated along with the future No Build Alternative (Alternative 1) in the Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement (RDEIR/SDEIS). On March 1, 2018 the Los Angeles Metropolitan Transportation Authority (LA Metro) Board adopted Alternative 5C as the locally preferred project alternative<sup>20</sup>. Hence, Alternative 5C will be evaluated in the quantitative PM hot-spot analyses. The following sub-sections provide a brief description of Alternative 1 and Alternative 5C.

### 2.3.1 Alternative 1– No Build Alternative

Alternative 1 is the future no-build condition, for which the build alternatives proposed for the I-710 Corridor Project will be compared. The No Build Alternative does not include any improvements within the I-710 Corridor Project Study Area other than those projects that are already funded and/or committed to be constructed by or before the planning horizon year of 2035. The projects included in this alternative are based on SCAG's 2012-2035 Regional Transportation Plan Sustainable Communities Strategy (2012 RTP/SCS) Future Baseline Scenario for the Year 2035<sup>21</sup> and 2011 Federal Transportation Improvement Program (FTIP) project list, including freeway, arterial, and transit improvements within the SCAG region. This alternative also includes current plans and projects related to goods movement to and from the Ports, such as maximum utilization of existing and planned railroad capacity as well as application of advanced technologies and programs to manage transportation systems and travel demand within the I-710 Corridor. Additionally, Alternative 1 assumes an expansion of transit service within the I-710 Corridor commensurate with future population and employment growth.

### 2.3.2 Alternative 5C

Alternative 5C proposes increasing the number of general purpose (GP) lanes on the freeway and reconfiguring the access points to/from I-710 and its crossing freeways. This alternative will:

- Shift the freeway centerline at several locations to minimize right-of-way impacts.
- Add up to one GP through lane in each direction between Anaheim Street and Olympic Boulevard to address capacity deficient segments on the freeway.
- Add two truck bypass lanes in each direction around the I-405 freeway-to-freeway interchange to address safety and operational deficiencies.
- Add a lane buffer in each direction between Pacific Coast Highway and Shoreline Drive to address safety and operational deficiencies.

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<sup>19</sup> Caltrans. 2012. I-710 Corridor Project: Draft EIR/EIS Report.

<sup>20</sup> Available at: <https://metro.legistar.com/View.ashx?M=A&ID=582362&GUID=281A07CD-E6CA-4A14-9DD6-ED7F71FB664E>. Accessed: April 2018.

<sup>21</sup> SCAG. 2012. 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy Print Version. Available at: <http://rtpscs.scag.ca.gov/Pages/2012-2035-RTP-SCS.aspx>. Accessed: January 2018.



- Modify freeway-to-freeway interchanges at I-405, SR-91, I-105, and I-5 to address safety, operational, and capacity deficiencies. Modification varies by location and may entail realignment of freeway connectors, adding and/or extending auxiliary lanes to connectors, and modification to the crossing freeways.
  - At the I-405 interchange, modification entails realignment and replacement of eight of the existing eight freeway-to-freeway connectors. Modifications also include the removal of the local interchange at Wardlow Road on I-710, the removal of the local interchange at Pacific Place on I-405, and modification of the local interchange on I-405 at Santa Fe Avenue.
  - At the SR-91 interchange, modification entails realignment and replacement of one of the existing eight freeway-to-freeway connectors and modification to ramp connection points on I-710. These modifications necessitate modification to the local interchange at Artesia Boulevard on I-710, the local interchange at Santa Fe Avenue on SR-91, the local interchange at Long Beach Boulevard on SR-91, and the local interchange at Atlantic Avenue on SR-91.
  - At the I-105 interchange, modifications entail relocating ramp connection points on I-710.
  - At the I-5 interchange, modifications include new collector-distributor roads that service local interchanges at Washington Boulevard and Bandini Boulevard and relocating ramp connection points on I-710.
- Modify local interchanges on I-710 to address safety, operational, and capacity deficiencies. Modification varies by location and may entail realignment of entrance and exit ramps, adding or extending auxiliary lanes to ramps, realignment of the local street crossings, and modification to adjacent intersecting local streets. Local interchange locations include:
  - Shoreline Drive,
  - Anaheim Street,
  - Pacific Coast Highway (PCH)/State Route 1,
  - Willow Street,
  - Del Amo Boulevard,
  - Long Beach Boulevard,
  - Alondra Boulevard,
  - Rosecrans Avenue,
  - MLK Jr. Boulevard,
  - Imperial Highway,
  - Firestone Boulevard,
  - Florence Avenue,
  - Atlantic Boulevard/Bandini Boulevard,

- Washington Boulevard, and
- Olympic Boulevard.
- Add or modify local crossings of I-710, as follows:
  - Add a local street crossing over I-710 at Southern Avenue in the City of South Gate to address capacity deficiencies.
  - Remove local one-way crossings over I-710 at Shoreline Drive (eastbound 9<sup>th</sup> Street to 6<sup>th</sup> Street and westbound 7<sup>th</sup> Street to 9<sup>th</sup> Street) to address safety and operational deficiencies.
  - On local street crossings, include pedestrian paths, which are comprised of sidewalks, curb ramps, and crosswalks.
  - On local street crossings, the cross section will have sufficient outside shoulder width to accommodate Class II bikeways.
  - Add five pedestrian/Class I bikeway crossings over I-710 and one pedestrian/Class I bikeway crossing under I-405.
- Replace, widen, add, and remove roadway or railway grade separation structures to accommodate lane additions, modified freeway realignments, and reconfigured interchanges. Some intersecting roadways and railroad crossings entail realignment of local streets and/or railroads. Railroad crossing locations where modifications are proposed include:
  - Union Pacific Railroad (UP Railroad) San Pedro Subdivision at I-405 in Long Beach,
  - UP Railroad San Pedro Subdivision at I-710 in Long Beach,
  - UP Railroad San Pedro Subdivision at I-710 in South Gate,
  - UP Railroad Patata Industrial Lead at I-710 in South Gate,
  - UP Railroad La Habra Subdivision at I-710 in Bell,
  - Los Angeles Junction (LAJ) Railway Laguna Line at I-710 in Bell,
  - LAJ Railway Laguna Line at I-710 in Vernon,
  - Burlington Northern and Santa Fe Railway Company (BNSF) Hobart Yard at I-710 in Commerce/Vernon, and,
  - UP Railroad East Yard at I-710 in Commerce.

- Replace, modify, enhance, add, and remove storm water conveyance and treatment systems, roadside equipment, maintenance, and access features, to accommodate freeway modifications.
- Replace, modify, and relocate critical infrastructure that crosses proposed freeway modifications. Critical infrastructure includes, but is not limited to, flood control facilities and major utilities. Prominent infrastructure crossings include the Los Angeles River, Compton Creek, Southern California Edison (SCE) transmission lines, and Los Angeles County Department of Water and Power (LADWP) transmission lines.
- Incorporate aesthetic enhancements that include thematic surface treatment of structures and paved surfaces, enhanced roadside landscaping, and irrigation consistent with a corridor-wide aesthetic master plan.

In addition to the freeway features described, the alternative includes added transit, new transportation system features and strategies, and programmatic elements, as follows:

- A program to address future congestion at selected local arterial intersections to reduce traffic delay and improve operations within the Study Area. The I-710 Corridor Congestion Relief Program will make funding available to local jurisdictions in order to improve deficient intersections under Alternative 1 (No Build) conditions. Eligible intersection projects consist of improvements such as signal phasing/timing adjustments, lane restriping, median modification, and/or spot widening to provide intersection turn lanes. Under this program, eligible projects must comply with Caltrans' "Complete Streets" guidelines and principles.
- Transportation Systems Management/Transportation Demand Management (TSM/TDM) elements including adaptive ramp metering, updated traffic signals, parking restrictions during peak periods, and improved arterial signage for access to I-710.
- Intelligent Transportation Systems (ITS) elements including updated fiber-optic communications to interconnect traffic signals along major arterial streets to improve traffic flow. Proposed I-710 ITS elements also incorporate selected components from the Los Angeles/Gateway Freight Technology Program specific to the I-710 Corridor. These include freeway smart corridor strategies that would deploy dedicated short-range communications roadside units alongside I-710 to manage and control traffic in real time based on prevailing conditions, applying operational strategies such as queue warning systems, variable speed limits/speed harmonization, and dynamic corridor ramp metering. Also included are Los Angeles/Gateway Freight Technology Program improvements that would expand in-vehicle freight advanced traveler information systems (FRATIS) to include intermodal trucks, managing truck movements among drayage operators and the marine terminals at the two Ports.
- Transit improvements, including increased revenue vehicle service hours for light rail service (Blue Line/Green Line), Metro Rapid routes, local bus service, and community bus service within the I-710 Corridor.
- New express bus/rapid service routes serving key activity centers and transit connections within the I-710 Corridor.
- A program that would provide air quality improvements in the I-710 Corridor. The I-710 Corridor Project Zero Emission/Near Zero Emission Truck Deployment Program would provide funding for facilities needed to support zero emission/near zero emission

(ZE/NZE) trucks, such as charging and/or refueling stations; as well as funding for ZE/NZE trucks through existing programs (e.g., Measures ONRD-03 and ONRD-04 in the 2012 Air Quality Management Plan) and/or through new programs such as the Gateway Cities Technology Deployment Program currently under development;

- A community health and benefit program that would take the form of a grant program structured to provide corridor communities the opportunity to implement projects or outreach activities that would improve air quality and public health related to I-710 travel and goods movement.
- Use of best available control technology construction equipment as defined by the California Air Resources Board during project construction.

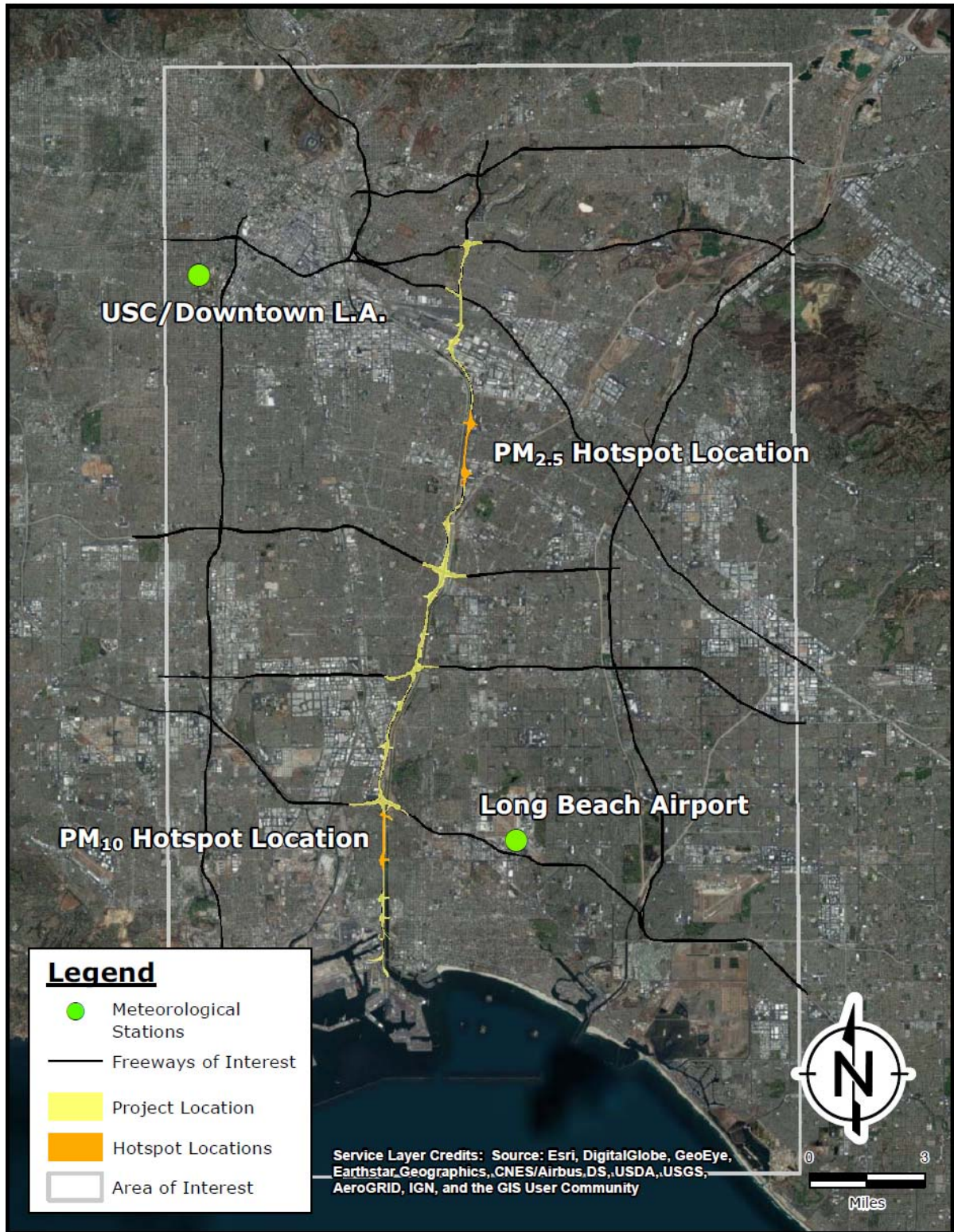
### 3. INTERAGENCY CONSULTATION

Table 2 summarizes the methodology and input assumptions included in the protocol that will require approval through interagency consultation.

<b>Table 2. Methodology and Assumptions for PM Hot-Spot Quantitative Analyses</b>	
<b>Input</b>	<b>Proposed Action</b>
Modeled Hot-Spot Location	<p>The modeled hot-spot location for Alternative 5C was chosen based on traffic data, emission estimates, and ambient air quality modeling results that are presented in the I-710 AQ/GHG/HRA Study. The following locations were chosen:</p> <ul style="list-style-type: none"> <li>• The section of I-710 freeway between Willow Street and Wardlow Road for PM<sub>10</sub> hot-spot analysis; and</li> <li>• The section of the I-710 freeway between Firestone Boulevard and north of Florence Avenue for PM<sub>2.5</sub> hot-spot analysis.</li> </ul> <p>Details on the hot-spot location selection are included in Appendix A.</p>
Analysis Year	The horizon year 2035 was determined to be the peak emissions year for the Alternative 5C (See Appendix B for details) and is therefore, chosen as the analysis year.
Ambient Air Quality Standards	<ol style="list-style-type: none"> <li>1) PM<sub>10</sub> 24-hour NAAQS: 150 µg/m<sup>3</sup></li> <li>2) PM<sub>2.5</sub> 24-hour NAAQS: 35 µg/m<sup>3</sup></li> <li>3) PM<sub>2.5</sub> Annual NAAQS: 12 µg/m<sup>3</sup></li> </ol>
Types of Emissions <sup>1</sup>	<ol style="list-style-type: none"> <li>1) Direct emissions from vehicles: PM<sub>10</sub> and PM<sub>2.5</sub> exhaust, tire wear, and brake wear</li> <li>2) Entrained road dust: PM<sub>10</sub> and PM<sub>2.5</sub></li> </ol>
Emission Model <sup>2</sup>	<ol style="list-style-type: none"> <li>1) EMFAC2014 for direct emissions</li> <li>2) 2014 California Air Resources Board (CARB) methodology <ol style="list-style-type: none"> <li>a. VMT-growth approach using USEPA's Compilation of Air Pollutant Emission Factors (AP-42) equation</li> <li>b. County-specific silt loading</li> <li>c. California-specific particle size multiplier for PM<sub>2.5</sub></li> <li>d. No precipitation adjustment for daily maximum emissions</li> </ol> </li> </ol>
Dispersion Model	The latest version of AERMOD (version 18081 at the time of this report).

<b>Table 2. Methodology and Assumptions for PM Hot-Spot Quantitative Analyses</b>	
<b>Input</b>	<b>Proposed Action</b>
Meteorological Data	<p>The following meteorological stations (Figure 4) were chosen based on their proximity to the selected hot-spot locations:</p> <ol style="list-style-type: none"> <li>1) Long Beach Airport (KLGB, WBAN ID: 23129) for PM<sub>10</sub> hot-spot analysis.</li> <li>2) University of Southern California/Downtown Los Angeles (KCQT, SCAQMD ID: 93134) for PM<sub>2.5</sub> hot-spot analysis.</li> </ol> <p>Five-year meteorological data sets (2012-2016) will be used for both KLGB and KCQT.</p>
Background Monitoring Station	<p>The following background monitoring stations were chosen based on their proximity of the station to the selected hot-spot locations:</p> <ol style="list-style-type: none"> <li>1) Compton for PM<sub>2.5</sub> monitoring data</li> <li>2) South Long Beach for PM<sub>10</sub> monitoring data</li> </ol>
Receptors	<ol style="list-style-type: none"> <li>1) 25-meter right-of-way following grid starting as near as the edge of the right-of-way and extending to 100 meters from the edge of the right-of-way on the modeled hot-spot location on the I-710 freeway</li> <li>2) 100-meter right-of-way following grid from a distance of 100-meters to 500-meters from the edge of the right-of-way on the modeled hot-spot location on the I-710 freeway</li> <li>3) Receptors will be placed as close to the source as possible, but not closer than 5 meters per the 2015 USEPA guidance<sup>4</sup>. Note, some model receptors may be in areas not accessible to the public. These receptors will be excluded from the analysis. Figure 5 and Figure 6 show the modeled sources and receptor setup for the identified PM<sub>10</sub> and PM<sub>2.5</sub> hot-spots, respectively.</li> <li>4) Discrete receptors will be placed at sensitive receptors located within 500 meters from the edge of the right-of-way on the modeled hot-spot location on the I-710 freeway.</li> </ol>

<b>Table 2. Methodology and Assumptions for PM Hot-Spot Quantitative Analyses</b>	
<b>Input</b>	<b>Proposed Action</b>
Other Input Parameters	Follows recommendations in the 2015 USEPA Guidance <sup>3</sup>
<p>Notes:</p> <p><sup>1</sup> The projected traffic data account for any potential increase in the regional level based on the RTP as a result of the proposed project. Entrained road PM<sub>2.5</sub> emissions are considered only if the USEPA or state agency has made a finding that such emissions are a significant contributor to the PM<sub>2.5</sub> air quality problem (40 CFR 93.102(b)(3) and 93.119(f)(8)). The SCAQMD has identified paved road dust as major source of direct PM<sub>2.5</sub> emissions in the 2016 AQMP. Available at: <a href="http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/appendix-vi.pdf?sfvrsn=4">http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/appendix-vi.pdf?sfvrsn=4</a>. Accessed: June 2018.</p> <p>PM<sub>10</sub> and PM<sub>2.5</sub> hot-spot analyses are not required to consider construction-related activities, which cause temporary increases in emissions (40 CFR 93.123(c)(5)). Although construction of the project as a whole is expected to take more than five years to complete, based on the construction staging analysis, construction would not occur at any single individual location for more than five years. Therefore, construction-related emissions may be considered temporary; and any construction-related PM<sub>2.5</sub> and PM<sub>10</sub> emissions due to this project were not included in this hot-spot analysis.</p> <p><sup>2</sup> EMFAC2014 is the approved model by USEPA for PM hot-spot analyses, which includes CARB's truck and bus rule and updated PM emission factors for heavy-duty trucks</p> <p><sup>3</sup> USEPA. 2015. Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM<sub>2.5</sub> and PM<sub>10</sub> Nonattainment and Maintenance Areas (EPA-420-B-15-084). November. Office of Transportation and Air Quality. Available at: <a href="https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100NMXM.pdf">https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100NMXM.pdf</a>. Accessed: January 2018.</p>	



**Figure 4. Meteorological Station Locations**  
A full size figure can be found in the Figures Section



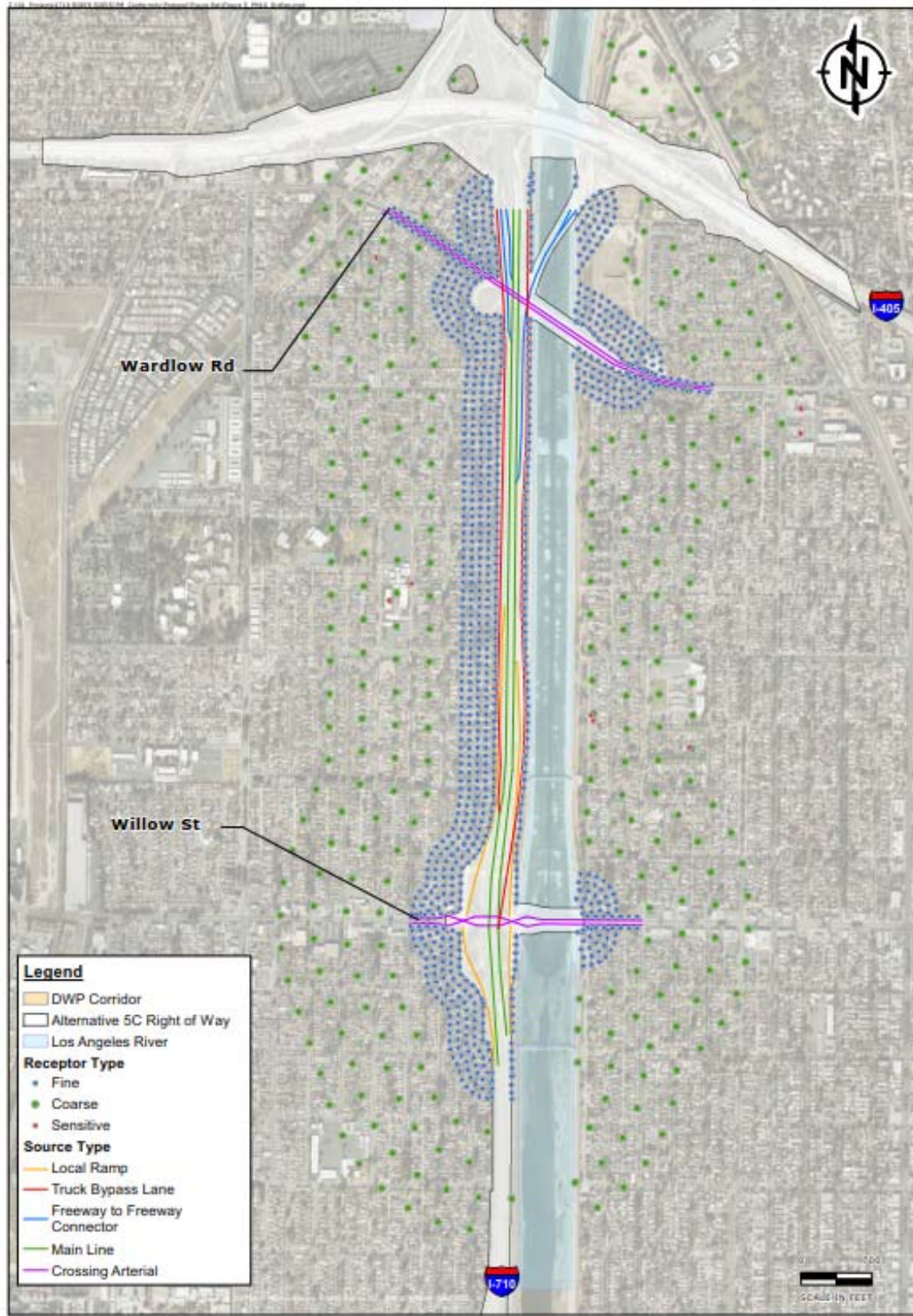
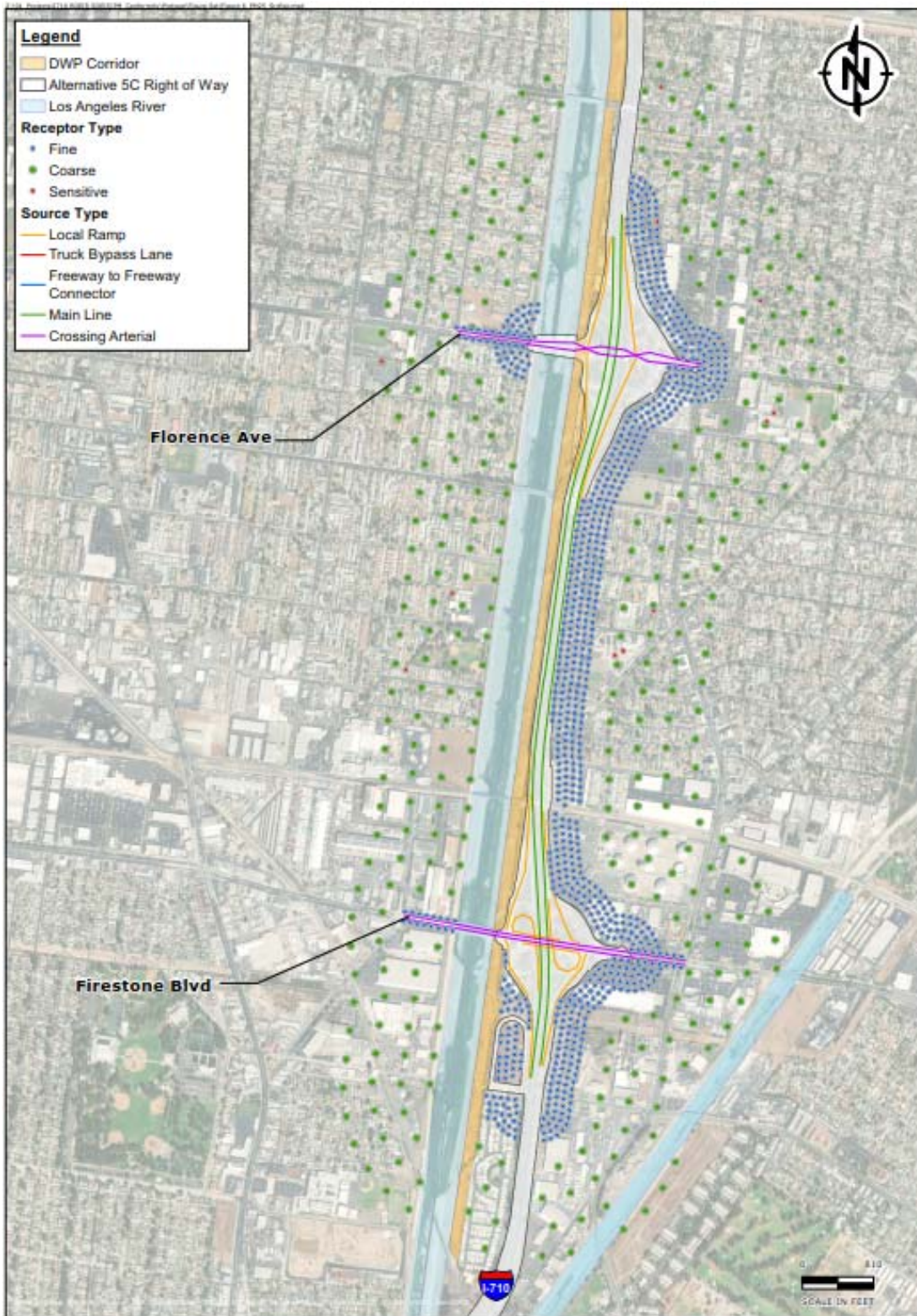


Figure 5. PM<sub>10</sub> Hot-Spot Modeling – Source-Receptor Setup  
A full size figure can be found in the Figures Section



**Figure 6. PM<sub>2.5</sub> Hot-spot Modeling – Source-Receptor Setup**  
A full size figure can be found in the Figures Section

## 4. HOT-SPOT ANALYSIS METHODOLOGY

Per requirements in 40 CFR 93.116, the primary goals of a project-level conformity determination<sup>22</sup> are to ensure that federally supported transportation projects in nonattainment and/or maintenance areas do not:

- Cause or contribute to new air quality violations, or
- Worsen existing violations, or
- Delay timely attainment of the National Ambient Air Quality Standards (NAAQS) or interim milestones

If required, a quantitative hot-spot analysis will be conducted for both PM<sub>2.5</sub> and PM<sub>10</sub> in accordance with USEPA's transportation conformity rules (40 CFR 51.390 and Part 93) and following the 2015 USEPA Guidance. A hot-spot analysis is an estimation of likely future localized pollutant concentrations and a comparison of those concentrations to the relevant NAAQS, as defined in the 40 CFR 93.101. A project-level hot-spot analysis evaluates the air quality impacts on a smaller scale (i.e., project area) than an entire nonattainment or maintenance area and subsequently determines if a transportation project meets CAA conformity requirements.

### 4.1 Hot-spot Selection

As stated in 40 CFR 93.123(c)(2), hot-spot analyses must include the entire transportation project. However, for large projects like the I-710 Corridor Project (a 19-mile-long section of freeway), Section 3.3.2 of the 2015 USEPA Guidance states that the PM hot-spot analysis can focus on a sub-area where the air quality is substantially affected by the project resulting in the highest modeled PM<sub>10</sub> and PM<sub>2.5</sub> concentrations. In addition to the recommendations in the 2015 USEPA Guidance, Ramboll reviewed the selection process used for the modeled locations used in the recent quantitative hot-spot analyses as examples.<sup>23</sup> As shown in Table 3, criteria such as traffic and truck traffic data, emission estimates, and results from a screening model run were used to choose the hot-spot location. For these analyses, Ramboll chose the hot-spot location for Alternative 5C based on a review of the traffic data, emission estimates, and modeled PM<sub>10</sub> and PM<sub>2.5</sub> concentrations in the vicinity of the I-710 freeway that are presented in the I-710 AQ/GHG/HRA Study. Details on how this was done are shown in Appendix A of this Protocol.

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<sup>22</sup> CFR Title 40 Chapter I Subchapter C Part 93 Subpart A §93.116 - Criteria and procedures: Localized CO, PM<sub>10</sub>, and PM<sub>2.5</sub> violations (hot-spots). Available at: <http://www.ecfr.gov/>. Accessed: January 2018.

<sup>23</sup> Submitted to the Transportation Conformity Working Group (TCWG). Available at <http://www.scag.ca.gov/programs/Pages/ProjectLevel.aspx>.

<b>Table 3. Criteria Used for Selection of Modeled Hot-Spot Locations for Other Freeway Projects</b>			
<b>Project<sup>1</sup></b>	<b>Project Study Area or Distance</b>	<b>Modeled Roadway Segment Length</b>	<b>Criteria for Selecting Hot-Spot Modeled Location</b>
SR 710 North <sup>1</sup>	100 sq miles	6 miles	Projected increase of total annual daily traffic (ADT) and diesel truck ADT between build and no build scenario
I-405 <sup>2</sup>	8.5 miles	1 mile	Highest emission segment
High Desert Corridor <sup>3</sup>	63 miles	2 - 3 miles	Area near the highest PM <sub>10</sub> concentration based on the first round model run with AERMOD's non-default FASTALL option
I-10 Corridor Project <sup>4</sup>	33 miles	7 miles	Top four emission segments
I-15 Corridor Improvement Project <sup>5</sup>	16 miles	1 mile	Highest total ADT and truck ADT Highest emission segment on per mile basis Highest number of nearby sources
Notes:			
<p><sup>1</sup> Quantitative PM<sub>2.5</sub> and PM<sub>10</sub> Hot-Spot Analysis Protocol. Available at: <a href="http://www.scag.ca.gov/programs/TCWG%20Document%20Library/4.2-1_18790/18790SR-710Protocol.pdf">http://www.scag.ca.gov/programs/TCWG%20Document%20Library/4.2-1_18790/18790SR-710Protocol.pdf</a>. Accessed: January 2018.</p> <p><sup>2</sup> Interagency Consultation for Interstate 405 South Improvements Project from Interstate 5 to Interstate 55, Irvine, California. Available at: <a href="http://www.scag.ca.gov/programs/TCWG%20Document%20Library/I-405%20South%20Improvements%20Project/I-405Project.pdf">http://www.scag.ca.gov/programs/TCWG%20Document%20Library/I-405%20South%20Improvements%20Project/I-405Project.pdf</a>. Accessed: January 2018.</p> <p><sup>3</sup> Updated Quantitative PM<sub>10</sub> Hot-Spot Analysis High Desert Corridor. Available at: <a href="http://www.scag.ca.gov/programs/TCWG%20Document%20Library/High%20Desert%20Corridor%20Project/High%20Desert%20Corridor%20Project.pdf">http://www.scag.ca.gov/programs/TCWG%20Document%20Library/High%20Desert%20Corridor%20Project/High%20Desert%20Corridor%20Project.pdf</a>. Accessed: January 2018.</p> <p><sup>4</sup> Quantitative PM<sub>2.5</sub> and PM<sub>10</sub> Hot-Spot Analysis, Interstate 10 Corridor Project. Available at: <a href="http://www.scag.ca.gov/programs/TCWG%20Document%20Library/Interstate%2010%20Corridor%20Project/Interstate%2010%20Corridor%20Project.pdf">http://www.scag.ca.gov/programs/TCWG%20Document%20Library/Interstate%2010%20Corridor%20Project/Interstate%2010%20Corridor%20Project.pdf</a>. Accessed: January 2018.</p> <p><sup>5</sup> Quantitative PM<sub>2.5</sub> and PM<sub>10</sub> Hot-Spot Analysis, Interstate 15 Corridor Improvement Project Tolled Express Lane. Available at: <a href="http://www.scag.ca.gov/programs/TCWG%20Document%20Library/RIV071267/RIV071267QuanAnalysis.pdf">http://www.scag.ca.gov/programs/TCWG%20Document%20Library/RIV071267/RIV071267QuanAnalysis.pdf</a>. Accessed: January 2018.</p>			

## 4.2 National Ambient Air Quality Standards (NAAQS)

Given that the Project is located within the SCAB, which is designated as a maintenance area for PM<sub>10</sub> and a non-attainment area PM<sub>2.5</sub>, a quantitative PM hot-spot analysis, if required, will be performed for the 24-hour PM<sub>10</sub> NAAQS and 24-hour and annual PM<sub>2.5</sub> NAAQS, following the requirements in the CAA and transportation conformity regulations.<sup>24,25</sup> Both primary and secondary NAAQS apply to PM hot-spot analyses.

### 4.2.1 PM<sub>2.5</sub> NAAQS

PM<sub>2.5</sub> nonattainment and maintenance areas are required to attain and maintain the following NAAQS<sup>26</sup>:

- 24-hour Standard: 35 micrograms per cubic meter (µg/m<sup>3</sup>)
- Annual Standard
  - Primary: 12 µg/m<sup>3</sup>
  - Secondary: 15 µg/m<sup>3</sup>

Both PM<sub>2.5</sub> 24-hour primary and secondary standards are 35 µg/m<sup>3</sup> based on a 3-year average of the 98<sup>th</sup> percentile of 24-hour PM<sub>2.5</sub> concentrations. PM<sub>2.5</sub> annual primary and secondary standards are 12 µg/m<sup>3</sup> and 15 µg/m<sup>3</sup>, respectively, based on a 3-year average of annual mean PM<sub>2.5</sub> concentrations.<sup>27</sup>

### 4.2.2 PM<sub>10</sub> NAAQS

PM<sub>10</sub> nonattainment and maintenance areas are required to attain and maintain the following NAAQS<sup>28</sup>:

- 24-hour Standard: 150 µg/m<sup>3</sup>

Both PM<sub>10</sub> 24-hour primary and secondary standards are 150 µg/m<sup>3</sup>. The 24-hour PM<sub>10</sub> NAAQS is attained when the average number of exceedances per year in the previous 3 calendar years is less than or equal to 1. For the 24-hour standard for PM<sub>10</sub>, concentrations are rounded to the nearest 10 before being compared to the standard of 150 µg/m<sup>3</sup>. Therefore, the number of exceedances are counted for any concentrations that are greater than or equal to 155 µg/m<sup>3</sup>.

## 4.3 Project-Level PM Emissions Overview

As required in the 2015 USEPA Guidance, Ramboll will use EMFAC2014, the latest USEPA-approved emissions model for use in California, to estimate the PM emissions for the quantitative PM hot-spot analysis. The PM emissions will be calculated using the

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<sup>24</sup> Code of Federal Regulations (CFR) Title 40 Chapter I Subchapter C Part 93 Subpart A §93.116 and §93.123. Available at: <http://www.ecfr.gov/>. Accessed: January 2018.

<sup>25</sup> United States Senate. 2004. The Clean Air Act. As Amended Through P.L. 108-201, February 24. Available at: <https://www.congress.gov/108/plaws/publ201/PLAW-108publ201.pdf>. Accessed: January 2018.

<sup>26</sup> USEPA. NAAQS Table. Available at: <https://www.epa.gov/criteria-air-pollutants/naqs-table>. Accessed: January 2018.

<sup>27</sup> In December 2012, USEPA promulgated a revised annual primary PM<sub>2.5</sub> NAAQS of 12.0 µg/m<sup>3</sup>. Designations for this NAAQS were effective on April 15, 2015. The one-year conformity grace period expired on April 15, 2016.

<sup>28</sup> Ibid.

emission factors from EMFAC2014, and the projected traffic data for the analysis year. As stated in Table 2, the peak emission year is the Project's horizon year 2035 (refer to Appendix B of the Protocol for details).

#### 4.3.1 Types of Emissions Considered

Ramboll will estimate the direct PM<sub>2.5</sub> and PM<sub>10</sub> emissions for the quantitative hot-spot analyses in accordance with the 2015 USEPA Guidance. Types of PM<sub>2.5</sub> and PM<sub>10</sub> emissions considered in the analysis include 1) vehicle exhaust, brake wear, and tire wear emissions, and 2) entrained road dust. PM<sub>2.5</sub> and PM<sub>10</sub> precursors are not considered in analysis because it takes time for precursors to form into secondary PM at the regional level (i.e., beyond the immediate area of concern for localized analysis). Secondary emissions of PM<sub>2.5</sub> and PM<sub>10</sub> are considered in the regional emissions analysis prepared for the conforming RTP and FTIP.

Although construction of the project as a whole is expected to take more than five years to complete, based on the construction staging analysis, construction would not occur at any single individual location for more than five years. Therefore, construction-related emissions may be considered temporary, and any construction related PM<sub>2.5</sub> and PM<sub>10</sub> emissions due to the Project will not be included in this hot-spot analysis. The Project will comply with the SCAQMD Fugitive Dust Rules for fugitive dust during construction of this project. In addition, per Transportation Conformity Rule 93.117, the Project will be required to comply with any PM<sub>2.5</sub> and PM<sub>10</sub> 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.

#### 4.3.2 Emission Factors

Emissions for diesel, gasoline, and natural gas vehicles will be calculated as described in Appendix C. PM<sub>10</sub> and PM<sub>2.5</sub> emissions from the freeway traffic at the selected hot-spot locations will be calculated by multiplying emission factors (g/mi) by traffic activity (vehicles miles travelled) for all vehicles. Emission factors for directly-emitted PM (i.e., exhaust and brake/tire wear) are derived from EMFAC2014, as described in Section 4.3.2.1 and Appendix C. Emission factors for entrained road dust are derived from CARB's 2014 "Entrained Road Travel, Paved Road Dust" methodology, as described in Section 4.3.2.2 and Appendix C.

##### 4.3.2.1 Exhaust, Tire Wear, and Brake Wear Emission Factors

PM<sub>10</sub> and PM<sub>2.5</sub> emission factors for on-road vehicles in the analysis year (2035) will be estimated using EMFAC2014, the latest USEPA-approved emissions model for use in California, as recommended in the 2015 USEPA Guidance.<sup>29, 30</sup> As discussed above, the following types of emission factors will be estimated for the direct PM<sub>10</sub> and PM<sub>2.5</sub> vehicular emissions in the PM hot-spot analyses:

<sup>29</sup> CARB. Mobile Source Emission Inventory – Categories - On-Road Motor Vehicles - EMFAC2014. Available at: <http://www.arb.ca.gov/msei/categories.htm>. Accessed: January 2018.

<sup>30</sup> See Section 3.3.6 of Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM<sub>2.5</sub> and PM<sub>10</sub> Nonattainment and Maintenance Areas. See also 40 CFR 93.111. EMFAC2014 is the most recent EPA-approved mobile source emission factor model for use in California; see 80 Federal Register 239 (December 14, 2015, pp. 77337 – 77340).

- Running Exhaust (grams per mile [g/mi]): On-road vehicles are typically fueled by gasoline, diesel, or natural gas. PM<sub>10</sub> and PM<sub>2.5</sub> emissions generated by the combustion of these fuels during the vehicle movement are released from the vehicle's tail pipe and referred to as running exhaust emissions.
- Tire Wear (g/mi) and Brake Wear (g/mi): On-road vehicles generate PM<sub>10</sub> and PM<sub>2.5</sub> emissions due to the operational wear of tires and brakes.

As described in greater detail in Appendix C, Ramboll will use CARB's EMFAC2014 model to generate the annual average emission factors for running exhaust, tire wear, and brake wear from on-road vehicles operating Los Angeles (LA) County. EMFAC (short for Emission FACtor) is a computer model developed by CARB and can be used for estimating emission rates for on-road mobile sources operating in California in calendar years 2000 to 2050. EMFAC2014 was released on December 30, 2014 and subsequently approved in December 2015 by USEPA for use in the conformity determinations. CARB recently released an updated version of the model called EMFAC2017 on December 22, 2017. This version has not yet been approved by USEPA for use in conformity analysis. Hence, Ramboll will use EMFAC2014.

Zero Emission/Near-Zero Emission (ZE/NZE) Trucks: Through the I-710 ZE/NZE Program, 2035 Alternative 5C will have a significant number of ZE/NZE trucks operating on the I-710 freeway. Exhaust emission factors for ZE/NZE-eligible trucks are the same as conventional heavy-duty trucks in EMFAC2014.<sup>31</sup> ZE truck exhaust emissions would be zero, but brake/tire wear emission factors are the same as any other truck in EMFAC2014. As shown in the AQ/HRA, exhaust emissions are less than 3% of total PM emissions in 2035. Thus, total PM emissions would not be significantly affected if a portion of the trucks had lower or zero exhaust emissions. The hot-spot conformity analysis will conservatively assume that PM<sub>10</sub> and PM<sub>2.5</sub> emission factors of ZE/NZE trucks are equal to that of a conventional heavy-duty truck.

#### 4.3.2.2 Entrained Road Dust Emission Factors

Entrained road dust results from the re-suspension of loose particulate material from the surface of the road as a result of vehicle movement. According to the 2006 Final Rule, road dust emissions are to be considered for PM<sub>10</sub> hot-spot analyses.<sup>32</sup> For PM<sub>2.5</sub>, road dust emissions are only to be considered in hot-spot analyses if the USEPA or the State air agency has made a finding that such emissions are a significant contributor to the PM<sub>2.5</sub> air quality problem (40 CFR 93.102(b)(3)). The USEPA has published a guidance on the use of AP-42 for entrained road dust for SIP development and conformity (August 2007). The SCAQMD has identified paved road dust as major source of direct PM<sub>2.5</sub> emissions in the 2016 AQMP.<sup>33</sup> Therefore, entrained PM<sub>2.5</sub> is considered in this analysis. PM<sub>10</sub> and PM<sub>2.5</sub> emissions from the entrained road dust caused by the Project traffic at

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<sup>31</sup> EMFAC2014 contains emission factors for T7 SWCV and UBUS categories. These emission factors are used in the PM emission analysis, but the ZE/NZE truck program does not affect these categories.

<sup>32</sup> USEPA. 2006. Transportation Conformity Rule That Addresses Requirements for Project-level Conformity Determinations in PM<sub>2.5</sub> and PM<sub>10</sub> Nonattainment and Maintenance Areas. March. Available at: <https://www.epa.gov/state-and-local-transportation/march-10-2006-transportation-conformity-rule-addresses-requirements>. Accessed: January 2018.

<sup>33</sup> 2016 AQMP. <http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/appendix-vi.pdf?sfvrsn=4>. Accessed: June 2018.

the selected hot-spot locations will be estimated using CARB’s methodology. Details on how entrained road dust emission factors will be calculated are included in Appendix C.

### 4.3.3 Traffic and VMT Data

Cambridge Systematics Incorporated (CSI), a member of the I-710 Project team, has run a more detailed version of the SCAG Regional Transportation Plan Travel Demand Model for the I-710 Study Area (hereafter referred to as the “I-710 Traffic Model”) to estimate the traffic activity data for No Build, and preferred build alternative in the analysis year (2035).

The I-710 Traffic Model represents freeways, ramps, and one-way streets as traffic links (sections of roadways) with one-directional traffic flows. All other roadways are represented as traffic links with bi-directional vehicle flow. The output of the I-710 Traffic Model provides several parameters including a unique identifier for each traffic link in the SCAG network (Link ID), description of each link (road name, route name, and road type), link lengths, and average vehicle speeds and traffic volumes for each traffic link during four different time periods (AM, mid-day, PM and night time).<sup>34</sup> For bi-directional traffic links, average vehicle speeds and traffic volumes are provided for each individual direction. The traffic volumes for each time period are sub-divided into several different vehicle classes: drive alone and shared ride vehicles (DA/SR), light heavy-duty trucks (LHDT), medium heavy-duty trucks (MHDT), heavy heavy-duty trucks (HHDT), and port trucks.

The I-710 Traffic Model results were further adjusted and/or calibrated using actual traffic counts at specific locations on the I-710 to provide more accurate traffic volumes (referred to as “post-processed traffic data” hereinafter) for the I-710 freeway and related ramps/freeway to freeway connectors.

Emissions used for the hot-spot analysis will be estimated using the traffic volumes from the post-processed traffic data, average vehicle speeds from the I-710 traffic model, and traffic link lengths obtained from the I-710 freeway’s geometric design provided by AECOM. See Appendix C for more details.

### 4.3.4 Project-Level PM<sub>10</sub> and PM<sub>2.5</sub> Emission Inventories

As described earlier, PM<sub>10</sub>, and PM<sub>2.5</sub> emission inventories for freeway/roadway traffic at the selected hot-spot locations will be developed. Operational emissions from freeway/roadway traffic will be estimated for the selected hot-spot locations using the emission factors for LA County and the post-processed traffic data. Equations 4, 5, and 6 (presented below) will be used to estimate emissions on each traffic link.

$$\text{Exhaust Emissions (lb/day)} = \frac{1}{453.59} \times \sum_i \sum_j \sum_t EF_{l,S,i,j} \times VMT_{l,i,j}$$

.....Equation 4

<sup>34</sup> Note that the I-710 traffic model is based on 2012 (latest) RTP model, but combines two time periods in the RTP model (evening 7 p.m. to 9 p.m. and night 9 p.m. to 6 a.m.) and calls it the night period (from 7 p.m. to 6 a.m.).



$$\text{Tire Wear and Brake Wear Emissions (lb/day)} = \frac{1}{453.59} \times \sum_i \sum_j \sum_l EF_l \times VMT_{l,i,j}$$

.....Equation 5

$$\text{Entrained Road Dust Emissions (lb/day)} = \frac{1}{453.59} \times \sum_i \sum_j E_{i,j} \times VMT_{i,j}$$

.....Equation 6

Where,

453.59	conversion factor from pounds to grams
j	Refers to a particular time period. Traffic data will be provided for four different time periods: AM (6 a.m. to 9 a.m.), midday (9 a.m. to 3 p.m.), PM (3 a.m. to 7 p.m.), and night time (7 p.m. to 6 a.m.). Refer to Section 3 for further details on traffic data.
l	Refers to a particular vehicle class. Vehicle classes used in this analysis include DA/SR, LHDT, MHDT, HHDT, and port trucks. Refer to Appendix C for further details.
S <sub>i,j</sub>	Represents the average vehicle speed on the i <sup>th</sup> traffic link during the j <sup>th</sup> time period.
EF <sub>l,S<sub>i,j</sub></sub>	Represents the running exhaust emission factor emission factor of the l <sup>th</sup> vehicle class at speed S <sub>i,j</sub> expressed in grams per miles.
EF <sub>l</sub>	Represents the tire wear/brake wear emission factor for the l <sup>th</sup> vehicle class in grams per miles. Note, tire wear/brake wear emission factors are not dependent on speed.
E <sub>i,j</sub>	Represents the entrained road dust emission factor for the i <sup>th</sup> traffic link during the j <sup>th</sup> time period (Equations 1 and 2).
VMT <sub>l,i,j</sub>	Represents total vehicle miles traveled (VMT) by the l <sup>th</sup> vehicle class traveling on the i <sup>th</sup> traffic link during the j <sup>th</sup> time period. This is calculated as a product of length of the i <sup>th</sup> traffic link and the traffic volume of the l <sup>th</sup> vehicle class traveling on the i <sup>th</sup> traffic link during the j <sup>th</sup> time period.
VMT <sub>i,j</sub>	Represents the total vehicle miles traveled on the i <sup>th</sup> traffic link during the j <sup>th</sup> time period. This is calculated as a sum of the vehicle miles traveled by all vehicle classes on the i <sup>th</sup> traffic link during the j <sup>th</sup> time period.

PM<sub>10</sub> and PM<sub>2.5</sub> emissions estimated using the post processed traffic data for the selected hot-spot location will be used in the air quality dispersion modeling to evaluate the ambient air quality impacts.

#### **4.4 Dispersion Modeling for PM Hot-Spot Analysis**

This section describes the air dispersion model, modeling data inputs (e.g., source parameters, elevations, and land use), receptor locations, and meteorological data that will be used for PM Hot-spot analysis.

##### **4.4.1 Air Dispersion Model**

As recommended by the 2015 USEPA Guidance, the American Meteorological Society/EPA Regulatory Model (AERMOD), the USEPA's recommended near-field dispersion model under Appendix W 40 CFR Part 51, will be used for PM hot-spot quantitative analysis for this Project. Ramboll will use the latest version 18081 of AMS/EPA Regulatory Model (AERMOD) for air dispersion modeling. The model will be run with flat terrain, with the exception of the truck bypass lanes. The truck bypass lanes will be modeled as elevated sources to better reflect the geometrics of the freeway and to avoid nearby ground-level receptors (see Figure 5). A brief description of the model's input parameters such as source location, source parameters, land-use type, terrain data, meteorological data, and receptor locations are discussed below.

##### **4.4.2 Source Location, Configuration, and Parameters**

Vehicle emissions from freeway mainlines, freeway interchanges, and principal arterials within the hot-spot areas will be modeled as line sources represented as a series of adjoining area or volume sources. Area or volume sources will be placed in the locations (e.g., freeway mainline, interchanges, Zero Emission/Near Zero Emission Freight Corridor) where emissions occur.

Ramboll will use geographic information system (GIS) tools to place sources along modeled traffic links and assign appropriate area or volume source parameters to each source. Modeled traffic links will include the freeway, ramps, and crossing arterials at the selected hot-spot locations for the preferred build alternative. If adjacent volume sources are used, the sources will be characterized so that receptors placed at the edge of the right of way or five meters from the edge of the roadway do not fall within the receptor exclusion zone (i.e., if the width of the roadway is greater than eight meters, additional volume sources will be defined for each traffic lane or subset of traffic lanes).

Engine exhaust, tire wear, brake wear, and entrained road dust emissions generated by vehicles on the modeled traffic links will be represented in AERMOD as a series of adjacent area or volume sources, which is an accepted practice for modeling mobile sources in a dispersion model.<sup>35</sup> Emission sources for this Project will be grouped into four source groups that represent these emissions: (1) non-truck exhaust, (2) truck exhaust, (3) tire and brake wear, and (4) entrained road dust. Emission estimates of these source groups from each traffic link will be estimated using post-processed traffic data based on the methodology described in Section 4.3.

A summary of the modeled source parameters for each type of emission is presented in Table 4.

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<sup>35</sup> USEPA. 2015. Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM<sub>2.5</sub> and PM<sub>10</sub> Nonattainment and Maintenance Areas. November. Office of Transportation and Air Quality.

<b>Table 4. Modeled Source Parameters</b>				
<b>Source Parameter Name</b>	<b>Source Parameter Value<sup>1</sup> (meters)</b>			
	<b>Non-Truck Exhaust</b>	<b>Truck Exhaust</b>	<b>Tire and Brake Wear</b>	<b>Entrained Road Dust</b>
Width	Road Width <sup>2</sup>	Road Width <sup>2</sup>	Road Width <sup>2</sup>	Road Width <sup>2</sup>
Initial Lateral Dispersion Coefficient (volume sources only)	Width ÷ 2.15	Width ÷ 2.15	Width ÷ 2.15	Width ÷ 2.15
Initial Vertical Dimension <sup>3, 4</sup>	2.6	6.8	2.6	2.6
Initial Vertical Dispersion Coefficient <sup>5</sup>	1.2	3.2	1.2	1.2
Release Height <sup>6</sup>	1.3	3.4	1.3	1.3
<b>Notes:</b> <sup>1</sup> Developed based on 2015 USEPA Guidance. <sup>2</sup> Road width is estimated as a product of the number of lanes and the width of a lane (12 feet for I-710 mainline and ramps, 11 feet for arterials). <sup>3</sup> The initial vertical dimension for non-truck and truck exhaust is assumed to be equal to 1.7 times the vehicle heights (1.53 meters for non-trucks and 4 meters for trucks). Vehicles heights are based on the 2015 USEPA Guidance. <sup>4</sup> The initial vertical dimension for tire wear, brake wear, and entrained road dust is assumed to be similar to non-truck exhaust. <sup>5</sup> The initial vertical dispersion coefficient is estimated as the initial vertical dimension divided by 2.15. <sup>6</sup> Release height is estimated as half of the initial vertical dimension.				

#### 4.4.3 Receptors

Ramboll will place the receptors in the following receptor networks at the selected hot-spot locations in order to capture the highest concentration and the impact of the project.

- 25-meter right-of-way following grid starting as near as the edge of the I-710 right-of-way and extending to 100 meters from the edge of the I-710 right-of-way.
- 100-meter right-of-way following grid from a distance of 100 meters to 500 meters from the edge of the I-710 right-of-way.
- Receptors will be placed as close to the source as possible, but not closer than 5 meters per the 2015 USEPA guidance. Note, some model receptors may be in areas not accessible to the public.
- Discrete receptors will be placed at sensitive receptors described in Appendix D of the June 2017 AQ/GHG/HRA Report located within 500 meters from the edge of the right-of-way in the modeled hot-spot locations on the I-710 freeway.

Results from model receptors falling in any right-of-way, on a limited access highway, or other areas, which are not generally accessible to the public, will be calculated but excluded from the conformity analysis.

#### 4.4.4 Meteorology and Climate

Hourly-resolution meteorological surface data, such as wind speed and direction, and upper air data must be provided as inputs to AERMOD for pollutant transport calculations. This information is generally acquired from existing meteorological stations near the project site that continuously monitor such data.

SCAQMD provides pre-processed AERMOD-ready meteorological data files processed with AERMET Version 16216r for all its monitoring stations.<sup>36</sup> Data from Long Beach Airport (KLGB), a Weather Bureau Army Navy (WBAN) meteorological station, and University of Southern California/Downtown Los Angeles station (KCQT), a SCAQMD meteorological station, will be used for the dispersion modeling. KLGB and KCQT are located in the vicinity of the selected PM<sub>10</sub> and PM<sub>2.5</sub> hot-spot locations, respectively, and are representative of the meteorology and climate at the selected hot-spot locations. The five-year meteorological data set for 2012 through 2016 will be used for both stations. The locations of the KLGB and KCQT stations is shown in Figure 4.

#### 4.5 Nearby Sources

As stated in Section 8.2 of the 2015 USEPA Guidance, nearby PM sources that are affected by the project and could contribute to PM concentration in the project area will need to be included in the analysis. The PM roadway emissions for the Preferred Alternative are based on the results of the I-710 Traffic Model, which reflects all projects in the 2012 SCAG RTP/SCS (except the I-710 Corridor Project), projected port-related growth, and additional near-dock rail projects.<sup>37</sup> Any stationary sources in the vicinity of the project not directly affected by the I-710 corridor project would be included in representative background concentrations and none of them depend upon the implementation of the project. Therefore, no additional projects are modeled in this analysis.

#### 4.6 Air Quality Trend Analysis

The latest approved and available full year of air quality data from the SCAQMD is 2016. Ramboll will use the South Long Beach monitoring station for PM<sub>10</sub> data and the Compton monitoring station for PM<sub>2.5</sub> data, see Figure 7.

Table 5 summarizes the past five years of the ambient monitoring data for PM<sub>2.5</sub> at the Compton station. The 24-hour PM<sub>2.5</sub> NAAQS was exceeded in 2014 and 2015. The annual average NAAQS was exceeded in 2013 and 2014. The data shows that PM<sub>2.5</sub> data was

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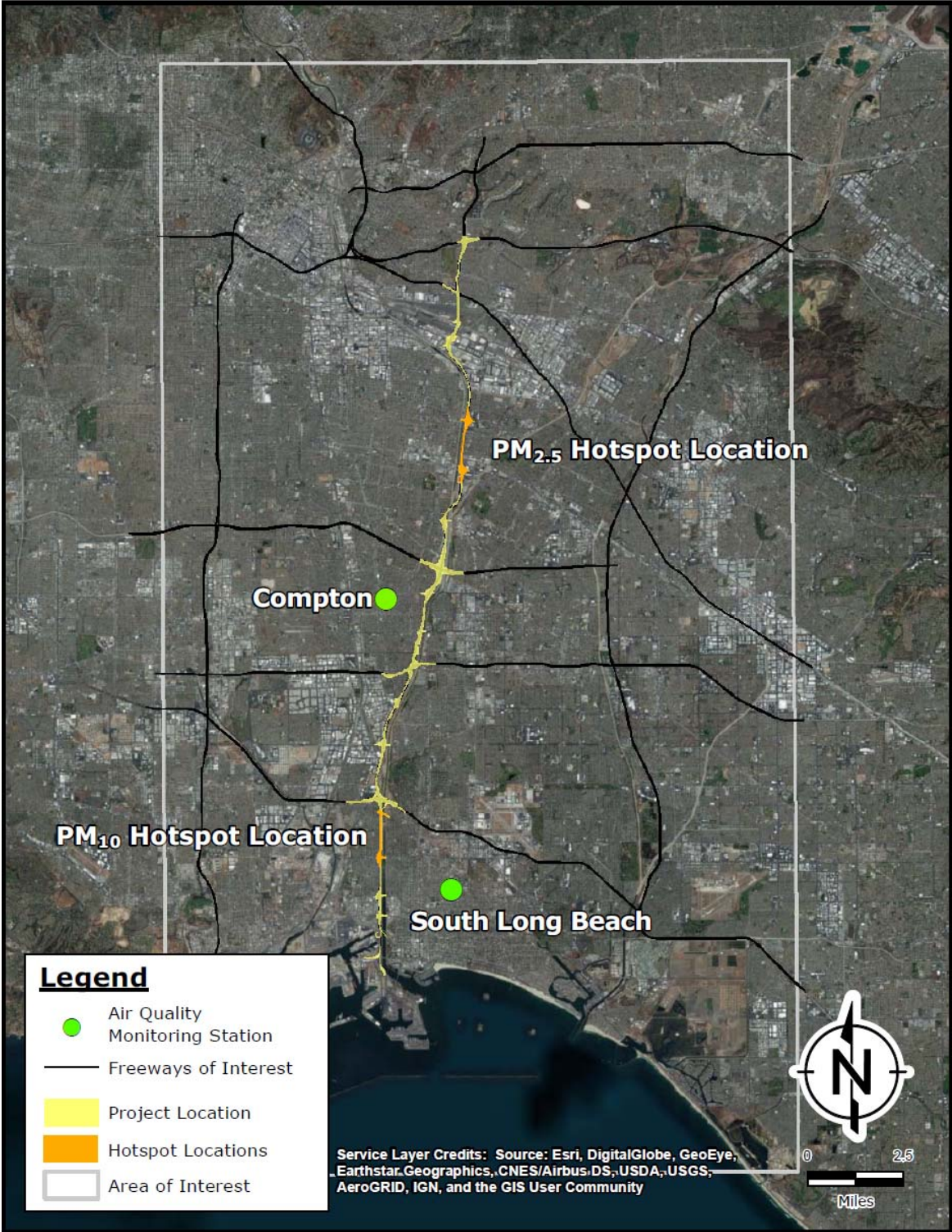
<sup>36</sup> These data files are available on the SCAQMD website at <https://www.aqmd.gov/home/air-quality/air-quality-data-studies/meteorological-data/aermod-table-1>. As seen on the webpage, five-year meteorological data (2012-2016) are available for both stations to be used (KCQT and LKGB).

<sup>37</sup> From the 2017 RDEIR/SDEIS, page 1-31: "In 2013, the assumptions related to goods movement within the SCAG region were further developed and updated to more closely align with the changed economic conditions, drawing on the Updated Cargo Forecast (2009), the 2012 RTP Travel Demand Forecast Model (2012), the San Pedro Bay Ports estimates of marine terminal capacity (2013), port cargo market shares (2013), and truck trip distribution (2013). The *Model Input Data and Key Assumptions Technical Memorandum for Goods Movement* (May 2013) was then reviewed and discussed by the I-710 Technical Advisory Committee and the Port growth assumptions were approved for use in traffic forecasting performed in support of this RDEIR/SDEIS. These assumptions include a 2035 total annual cargo container throughput at both ports of 41.4 million TEUs, and the construction and/or implementation of both the BNSF Railroad Southern California International Gateway (SCIG) near-dock intermodal yard and the expansion of the UP Railroad near-dock Intermodal Container Transfer Facility (ICTF)."

incomplete in 2014. This is the case for all stations in Los Angeles County. Since 2017 monitoring data is not yet available, 2013 monitoring data for PM<sub>2.5</sub> will be used instead of 2014 data.

Table 6 summarizes the PM<sub>10</sub> concentrations monitored at the South Long Beach station. The 24-hour PM<sub>10</sub> NAAQS was not exceeded in any year. The average of the first highest PM<sub>10</sub> concentration measured across the last five years (2012 to 2016) was 57 µg/m<sup>3</sup>, which is well below the 24-hour PM<sub>10</sub> NAAQS of 150 µg/m<sup>3</sup>.

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**Figure 7. Ambient Air Monitoring Stations**  
A full size figure can be found in the Figures Section

<b>Description of PM<sub>2.5</sub> Monitoring Data</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
3-year 24-hour average 98th percentile – PM <sub>2.5</sub>	30.3	24.3	35.8	37.2	26.3
Exceeds Federal 24-hour standard (35 µg/m <sup>3</sup> )?	No	No	Yes	Yes	No
3-year National annual average	11.69	12.05	16.64	11.91	11.03
Exceeds Federal annual average standard (12 µg/m <sup>3</sup> )?	No	Yes	Yes	No	No
Notes: <sup>1</sup> Data obtained from USEPA AirData Annual Summary Data. State Code 6, County Code 37, Monitoring Stations 1302 (Compton). Available at: <a href="https://aqs.epa.gov/aqsweb/airdata/download_files.html">https://aqs.epa.gov/aqsweb/airdata/download_files.html</a> . Accessed: January 2018. <sup>2</sup> Red text indicates that the regulatory data completeness criteria for valid summary data were not met for the monitor. Per USEPA guidance, <sup>3</sup> a valid data set requires ≥90% data completeness. Invalid data includes lost data due to calibrations or other quality assurance procedures. PM <sub>2.5</sub> data for 2014 is incomplete for all stations in Los Angeles County. <sup>3</sup> USEPA. 2000. Meteorological Monitoring Guidance for Regulatory Modeling Applications. EPA-454/R-99-005. February. Available at: <a href="https://www3.epa.gov/scram001/guidance/met/mmgrma.pdf">https://www3.epa.gov/scram001/guidance/met/mmgrma.pdf</a> . Accessed: January 2018.					

<b>Table 6. Ambient PM<sub>10</sub> Monitoring Data at the South Long Beach Station (µg/m<sup>3</sup>)</b>					
<b>Description of Ambient PM<sub>10</sub> Monitoring Data</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
First Highest (µg/m <sup>3</sup> )	54	54	59	62	56
Second Highest (µg/m <sup>3</sup> )	39	43	58	51	52
Third Highest (µg/m <sup>3</sup> )	39	43	43	50	51
Fourth Highest (µg/m <sup>3</sup> )	38	41	41	44	50
Number of days above National 24-hour standard (150 µg/m <sup>3</sup> )	0	0	0	0	0
Notes: <sup>1</sup> Data obtained from USEPA AirData Annual Summary Data. State Code 6, County Code 37, Monitoring Station 4004 (South Long Beach). Available at: <a href="https://aqs.epa.gov/aqsweb/airdata/download_files.html">https://aqs.epa.gov/aqsweb/airdata/download_files.html</a> . Accessed: January 2018.					



## 4.7 Background Concentrations

As required by 40 CFR 93.123(c)(1) and discussed in the 2015 USEPA Guidance, “estimated pollutant concentrations must be based on the total emissions burden which may result from the implementation of the project, summed together with future background concentrations....” For purposes of this analysis, Ramboll will use ambient PM<sub>10</sub> and PM<sub>2.5</sub> concentrations across the most recent three years of data available at the monitoring stations located in the vicinity of the modeled hot-spot locations.<sup>38</sup> Figure 6 shows the locations of the Compton and South Long Beach monitoring stations and Tables 5 and 6 present the PM<sub>10</sub> and PM<sub>2.5</sub> background concentrations recorded at these stations during the calendar years 2012 to 2016.

If needed, future year values from the 2016 AQMP may be used to calculate future background values. These 2016 AQMP projected values are based on photochemical modeling approved for State Implementation Plan (SIP) use. SCAQMD projects that, in Los Angeles, 24-hour average PM<sub>2.5</sub> will be 27.6 µg/m<sup>3</sup> by 2019 and annual average PM<sub>2.5</sub> will be 10.8 µg/m<sup>3</sup> by 2025.<sup>39</sup> As shown in the 2016 AQMP (Figures 5-13 and 5-15), PM<sub>2.5</sub> background concentrations at Los Angeles would be expected to be the same or higher than the background concentrations along the I-710 corridor;<sup>40</sup> thus, use of these future background concentrations would be conservative (i.e., the same or greater than expected future background concentrations anywhere along the I-710 project). Further, the background concentrations along the I-710 corridor would be projected to stay the same or decrease, based on the PM<sub>2.5</sub> emission trend in the 2016 AQMP (Figure III-2-18).<sup>41</sup> See also Appendix B of this Protocol for additional discussion of projected future concentrations in the project area.

### 4.7.1 PM<sub>2.5</sub>

Based on the methodology described in Section K.4.2 of the 2015 USEPA Guidance, average 98<sup>th</sup> percentile 24-hour background concentrations of the most recent three years of monitoring data at the Compton monitoring station will be calculated. Since monitoring data for 2014 is incomplete, this analysis will use monitoring data from 2013, 2015, and 2016.

For annual PM<sub>2.5</sub> background concentration, in accordance with Section K.3.2 of the 2015 USEPA Guidance, the average quarterly PM<sub>2.5</sub> concentrations will be first calculated to obtain the annual average and then a 3-year average will be calculated.

Table 7 summarizes the current background design values for 24-hour and annual PM<sub>2.5</sub>.

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<sup>38</sup> PM<sub>2.5</sub> monitoring data is incomplete for all monitoring stations in Los Angeles County for 2014. Therefore, 2013 data will be used in lieu of 2014.

<sup>39</sup> SCAQMD. 2017. 2016 AQMP, Chapter 5, Future Air Quality. Available at: <http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/chapter5.pdf?sfvrsn=4>. Accessed: June 2018.

<sup>40</sup> *ibid.*

<sup>41</sup> SCAQMD. 2017. 2016 AQMP, Appendix III, Chapter 2. Figure III-2-18. Available at: <http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/appendix-iii.pdf?sfvrsn=6>. Accessed: June 2018.

<b>PM<sub>2.5</sub></b>	<b>2013</b>	<b>2015</b>	<b>2016</b>	<b>Average</b>
<b>24-hour Average</b> (3-year 24-hour average 98th Percentile <sup>1</sup> )	24.3	37.2	26.3	<b>29.3</b>
<b>Annual Average</b> (3-year Weighted Arithmetic Mean <sup>2</sup> )	11.97	11.78	11.08	<b>11.61</b>
Notes:				
<sup>1</sup> Data obtained from USEPA Air Quality Design Value Reports. Site ID 060371302 (Compton). Available at: <a href="https://www.epa.gov/air-trends/air-quality-design-values">https://www.epa.gov/air-trends/air-quality-design-values</a> . Accessed: June 2018.				
<sup>2</sup> Data obtained from USEPA AirData Annual Summary Data. State Code 6, County Code 37, Monitoring Stations 1302 (Compton). Available at: <a href="https://aqs.epa.gov/aqsweb/airdata/download_files.html">https://aqs.epa.gov/aqsweb/airdata/download_files.html</a> . Accessed: January 2018.				

As noted above, future year PM<sub>2.5</sub> design value concentrations are projected to be lower in future years. The nearest station with future projections is the downtown Los Angeles stations:

- 24-hour average PM<sub>2.5</sub> future design value: 27.6 µg/m<sup>3</sup>
- Annual average PM<sub>2.5</sub> future design value: 10.8 µg/m<sup>3</sup>

#### **4.7.2 PM<sub>10</sub>**

In accordance with Section K.5.2 of the 2015 USEPA Guidance, the highest 24-hour PM<sub>10</sub> concentration in the most recent three years of South Long Beach monitoring data will be chosen. The 24-hour PM<sub>10</sub> background design value for the most recent three years (2014-2016) is 62 µg/m<sup>3</sup>.

#### **4.8 Calculation of Design Values and Conformity Determination**

To determine project-level PM conformity, design values for the preferred build alternative will be calculated and compared to the NAAQS or a comparison of the design values of the preferred build alternative and the no-build alternative will be performed. As stated in 40 CFR 93.116(a), the preferred build alternative should not cause or contribute to any new violations of the NAAQS, increase the frequency or severity of existing violations, or delay timely attainment as compared to the no-build scenario.

As suggested in the 2015 USEPA Guidance, the following steps will be used to determine the conformity by calculating design values.

- 1) If the design values for the preferred build alternative are less than or equal to the NAAQS, the project meets the conformity requirements and no further analysis is needed.

- 2) If the design values for the preferred build alternative are greater than the NAAQS, the no build alternative will be modeled at receptors where the build alternative is over the NAAQS and the design values for the preferred build alternative and the no build alternative will be compared. The conformity requirements are met if the design values for the preferred build alternative are less than or equal to those for no build alternative.
- 3) If the design values for preferred build alternative are greater than the design values for the no build alternative, further mitigation and control measures will be considered and additional modeling will be conducted to ensure the new design values for preferred build alternative are less than the no build alternative.

#### **4.8.1 24-Hour PM<sub>2.5</sub>**

The 24-hour PM<sub>2.5</sub> design value is defined as the average of three consecutive year's 98<sup>th</sup> percentile 24-hour concentrations per 40 CFR Part 50.13. According to Section 9.3.3 in the 2015 USEPA Guidance, design value is calculated as sum of the highest five-year average modeled 98<sup>th</sup> percentile 24-hour PM<sub>2.5</sub> concentration and the three-year average of 98<sup>th</sup> percentile 24-hour ambient monitoring data. If the calculated design value is less than or equal to the 24-hour PM<sub>2.5</sub> NAAQS of 35 µg/m<sup>3</sup> for the preferred build alternative, conformity is met; otherwise, a build no-build analysis will be conducted. If the design value for the preferred build alternative is greater than the no build alternative, a second-tier approach will be used. In the second-tier approach, quarterly background concentrations will be calculated and added into AERMOD to calculate 98<sup>th</sup> percentile concentrations.

#### **4.8.2 Annual PM<sub>2.5</sub>**

The annual PM<sub>2.5</sub> design value is defined as the average of three consecutive year's annual averages (average of quarterly average) per 40 CFR Part 50.13. According to Section 9.3.2 in the 2015 USEPA Guidance, design value is calculated as the sum of the highest modeled annual-average PM<sub>2.5</sub> concentration and the annual average monitoring data. If the calculated design value is less than or equal to the annual PM<sub>2.5</sub> NAAQS of 12 µg/m<sup>3</sup> for the build scenario, conformity is met; otherwise, a build/no-build analysis will be conducted. Conformity is met when the design value for the preferred build alternative is less than or equal to the annual PM<sub>2.5</sub> NAAQS of 12 µg/m<sup>3</sup> or when the design value of the preferred build alternative is less than the no build alternative.

#### **4.8.3 24-Hour PM<sub>10</sub>**

The 24-hour PM<sub>10</sub> NAAQS is met when the 24-hour PM<sub>10</sub> concentration exceedance (greater than 150 µg/m<sup>3</sup>) is no more than once per year on average over a 3-year period. According to Section 9.3.4 in the 2015 USEPA Guidance, the 24-hr PM<sub>10</sub> design value is calculated as the highest sixth-highest concentration combined with the appropriate background concentration from the most recent three years of air quality monitoring data.<sup>42</sup> Conformity is met when the calculated design value is less than or equal to the 24-hour PM<sub>10</sub> NAAQS of 150 µg /m<sup>3</sup>. If the design value is greater than the NAAQS a build non-build analysis will be performed. Conformity is met is the design value for the preferred build alternative is less than the no build alternative.

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<sup>42</sup> Depending on the number of observations from the selected ambient monitor station, different rank of the monitor value will be used for design value calculation.

## 5. REFERENCES

- Caltrans. 2012. I-710 Corridor Project: Draft EIR/EIS Report.
- California Air Resources Board (CARB). 2011. EMFAC2011 Vehicle Category Descriptions. Available at: <http://www.arb.ca.gov/msei/vehicle-categories.xlsx>. Accessed: January 2018.
- California Air Resources Board (CARB). 2014. Miscellaneous Process Methodology 7.9 – Entrained Road Travel, Paved Road Dust. Available at: [http://www.arb.ca.gov/ei/areasrc/fullpdf/full7-9\\_2014.pdf](http://www.arb.ca.gov/ei/areasrc/fullpdf/full7-9_2014.pdf). Accessed: May 2015.
- California Air Resources Board (CARB). Mobile Source Emission Inventory – Categories - On-Road Motor Vehicles - EMFAC2014. Available at: <http://www.arb.ca.gov/msei/categories.htm>. Accessed: January 2018.
- Code of Federal Regulations (CFR) Title 40 Chapter I Subchapter C Part 51 – Determining Conformity of Federal Actions to State or Federal Implementation Plans. Available at: <http://www.ecfr.gov/>. Accessed: January 2018.
- Code of Federal Regulations (CFR) Title 40 Chapter I Subchapter C Part 93 Subpart A §93.102(b)(3). Available at: <http://www.ecfr.gov/>. Accessed: August 2016.
- Code of Federal Regulations (CFR) Title 40 Chapter I Subchapter C Part 93 Subpart A §93.116 - Criteria and procedures: Localized CO, PM<sub>10</sub>, and PM<sub>2.5</sub> violations (hot-spots). Available at: <http://www.ecfr.gov/>. Accessed: January 2018.
- Code of Federal Regulations (CFR) Title 40 Chapter I Subchapter C Part 93 Subpart A §93.117 – Criteria and Procedures: Compliance with PM<sub>10</sub>, and PM<sub>2.5</sub> Control Measures. Available at: <http://www.ecfr.gov/>. Accessed: August 2016.
- Code of Federal Regulations (CFR) Title 40 Chapter I Subchapter C Part 93 Subpart A §93.119(f)(8). Available at: <http://www.ecfr.gov/>. Accessed: August 2016.
- Code of Federal Regulations (CFR) Title 40 Chapter I Subchapter C Part 93 Subpart A §93.123 - Procedures for determining localized CO, PM<sub>10</sub>, and PM<sub>2.5</sub> concentrations (hot-spot analysis). Available at: <http://www.ecfr.gov/>. Accessed: January 2018.
- Mammano, Vincent. 2014. Conformity Determination for SCAG’s 2015 FTIP, 2015 FTIP Amendment No. 15-01, and SCAG’s 2012-2035 RTP/SCS through Amendment No. 2. United States Department of Transportation. Federal Highway Administration. Division Administrator. December 15. Available at: [http://ftip.scag.ca.gov/Documents/F2015\\_FTIPfedApproval.pdf](http://ftip.scag.ca.gov/Documents/F2015_FTIPfedApproval.pdf). Accessed: January 2018.
- Mammano, Vincent. 2016. Conformity Determination for SCAG 2016 RTP/SCS. United States Department of Transportation. Federal Highway Administration. Division Administrator. June 1. Available at: [http://scagrtpscsc.net/Documents/2016/notices/FHMW-FTA\\_2016RTPSCSCConformityDetermination\\_2016-0601.pdf](http://scagrtpscsc.net/Documents/2016/notices/FHMW-FTA_2016RTPSCSCConformityDetermination_2016-0601.pdf). Accessed: January 2018.
- Ramboll Environ. 2017. Air Quality, Greenhouse Gas, and Health Risk Assessment Technical Study for the I-710 Corridor Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement.

- South Coast Air Quality Management District (SCAQMD). 2013. Final 2012 AQMP. February. Available at: [http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2012-air-quality-management-plan/final-2012-aqmp-\(february-2013\)/main-document-final-2012.pdf](http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2012-air-quality-management-plan/final-2012-aqmp-(february-2013)/main-document-final-2012.pdf). Accessed: January 2018.
- South Coast Air Quality Management District (SCAQMD). 2017. Final 2016 AQMP. March 3. Available at: <http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/final2016aqmp.pdf>. Accessed: January 2018.
- Southern California Association of Governments (SCAG). 2012. 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy Print Version. Available at: <http://rtpscs.scag.ca.gov/Pages/2012-2035-RTP-SCS.aspx>. Accessed: January 2018.
- Southern California Association of Governments (SCAG). 2016. The 2016-2044 Regional Transportation Plan/Sustainable Communities Strategy: A Plan for Mobility, Accessibility, Sustainability, and a High Quality of Life. Adopted April 2016. Available at: <http://scagrtpscsc.net/Documents/2016/final/f2016RTPSCS.pdf>. Accessed: January 2018.
- URS Corporation. 2009. Technical Memorandum – Alternatives Screening Analysis (Final). Prepared for Los Angeles County Metropolitan Transportation Authority.
- United States Environmental Protection Agency (USEPA). 2006. Transportation Conformity Rule That Addresses Requirements for Project-level Conformity Determinations in PM<sub>2.5</sub> and PM<sub>10</sub> Nonattainment and Maintenance Areas. March. Available at: <https://www.epa.gov/state-and-local-transportation/march-10-2006-transportation-conformity-rule-addresses-requirements>. Accessed: January 2018.
- United States Environmental Protection Agency (USEPA). 2011. AP-42 Compilation of Air Pollutant Emission Factors, Chapter 13.2.1 Miscellaneous Sources - Fugitive Dust Sources - Paved Roads. Available at: <http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s0201.pdf>. Accessed: January 2018.
- United States Environmental Protection Agency (USEPA). 2015. Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM<sub>2.5</sub> and PM<sub>10</sub> Nonattainment and Maintenance Areas (EPA-420-B-15-084). November. Office of Transportation and Air Quality. Available at: <https://www3.epa.gov/otaq/stateresources/transconf/documents/420b15084.pdf>. Accessed: January 2018.
- USEPA. 2017. Vehicle Weight Classification. Available at: <https://www.epa.gov/emission-standards-reference-guide/vehicle-weight-classifications-emission-standards-reference-guide>. Accessed: January 2018.
- United States Environmental Protection Agency (USEPA). NAAQS Table. Available at: <https://www.epa.gov/criteria-air-pollutants/naaqs-table>. Accessed: January 2018.
- United States Senate. 2004. The Clean Air Act. As Amended Through P.L. 108-201, February 24. Available at: <https://www.congress.gov/108/plaws/publ201/PLAW-108publ201.pdf>. Accessed: January 2018.