Response to Comments on the I-10 Project Modeling Protocol

Overall Modeling Approach

In the SCAG Transportation Conformity Working Group meeting of July 22nd, the group discussed potential options to modeling the entire project in one or two AERMOD modeling runs. One option discussed would be to split up the project by identifying potential high emission and concentrations areas first. Section 3.3.2 of EPA's quantitative PM hot-spot guidance states: "For large projects, it may be necessary to analyze multiple locations that are expected to have the highest air quality concentrations and, consequently, the most likely new or worsened PM NAAQS violations. If conformity is demonstrated at such locations, then it can be assumed that conformity is met in the entire project area." With this large transportation project, this approach would allow us to apply different met data and background data values for different parts of the project. Note that once we have more information from you on which segments you'll be modeling, we'll like to review your choices for representative meteorological data and ambient data stations for each segment.

Response: Due to the large size of the project and based on EPA's recommendation, an analysis was performed to identify areas expected to have the highest air quality concentrations, i.e. highest localized emissions or areas with the highest truck activity.

The analysis generated daily emissions rates for all the traffic links identified by the traffic study for the Alternatives 1, 2, and 3 and analysis years 2012, 2025, and 2035. The four segments, beginning in the east, that are expected to have the highest air quality concentrations include:

- Segment 1: Union Pacific West Colton Railyard, the area between Cedar and Riverside Avenues (1.48 miles);
- Segment 2: The area between Cherry and Sierra Avenues (3.67 miles);
- Segment 3: The area between Milliken and Haven Avenues (1.37 miles); and
- Segment 4: The area between Central Ave (0.66 mile) on- and off-ramps.

Selection of the four segments was performed according to the emission profiles that were developed based on the traffic data and emission factors obtained from EMFAC2011-PL. If conformity is demonstrated at these four segments, then it can be assumed that the conformity is met along the entire length of the project.

The surface and profile meteorological data will be obtained from the Fontana- Arrow Highway Meteorological Station for Segments 1 and 2 and from the Upland Meteorological Station for Segments 3 and 4.

The background concentration data will be obtained from the Fontana- Arrow Highway air monitoring station for Segments 1, 3 and 4 and from Ontario-Fire Station air monitoring station for Segment 2.

Nearby Sources

Also discussed at the interagency consultation workgroup meeting was the need to include nearby intersections and emission source. If the modeling is split into smaller areas, the consultant should also consider to include nearby sources, if impacted by the project and not already accounted for in the background concentrations. A South Coast staff person at the meeting mentioned a rail yard and warehouses which are nearby sections of the I-10 project as well as warehouse areas with high diesel truck traffic. Please consider inclusion of these emissions sources as appropriate. See Section 8.2 of EPA's quantitative PM hot-spot guidance for further background on when such sources should be included in modeling.

Response: According to the Section 8.2 of the PM Hotspot Guidance, nearby sources need to be included in the modeling only if those sources would be affected by the project. The three categories of nearby sources considered in the current analysis are as follows:

Arterials: The traffic study has identified twelve affected arterials with the highest truck counts or total traffic volumes along the alignment and near the railyard at Colton. Therefore, these arterials were included in the emissions analysis, and will be included in the AEROMD dispersion modeling where appropriate (see **Figure 6B** through **6D)**: Mountain, Vineyard, Archibald, Haven, Milliken, Etiwanda, Cherry Sierra, Cedar, Riverside, Mountain View, and Mount Vernon Avenues.

Railyard Emissions: The Union Pacific Colton Railyard covers an area about one mile in length and 1/3 mile in width at the widest part. Although different emissions between the build and no-build alternatives are not expected, the Union Pacific Colton railyard will be added as a nearby source to the modeling due to being a significant contributor to the background concentrations.

Warehouses: Nearby warehouses overlapping with a 1,000-meter buffer around the centerline of each of the four selected modeling segments will be included in this analysis. Locations of the warehouses were obtained from the County of San Bernardino land use map. Truck trip generation rates associated the warehouses were calculated according to the methodology outlined in a study conducted by City of Fontana in 2003. (Truck Trip Generation Study, City of Fontana, County of San Bernardino , State of California, August 2003).

Section 4.2.2 is updated accordingly with detailed.

Analysis Approach and Analysis Years: The document states that 2025 (open year) and 2045 (Design year) will be examined and the year with the highest emissions will be modeled. Section 2.8 of EPA's quantitative PM hot-spot guidance states: "Areas should analyze the year(s) *within the transportation plan or regional emissions analysis*… during which peak emissions from the project are expected; and a new NAAQS violation or worsening of an existing violation would most likely occur due to the cumulative impacts of the project and background concentration in the project area." The current SCAG transportation plan only covers the years 2012-2035, and as noted in the protocol EMFAC only estimates emissions out to 2035. 2045 is ten years past the years within the plan and past EMFAC2011's capabilities to

model future years. While potential modeling of the later design year (2045) is allowed, the conformity rule requires that the project show conformity within the timeframe of the area's Regional Transportation Plan to be consistent with section 93.116(a)[1] of the conformity rule. As a result, we request that a 2035 analysis year be added to the PM hot-spot analysis.

> **Response:** 2035 analysis year is added to the PM hotspot analysis. Our understanding of this comment is that the project-level analysis should assess either 2025 or 2035 depending on which year has higher emissions. The 2045 emissions will be estimated for the EIR/EIS but will not be used in the conformity analysis.

Traffic Data - The current draft of the Modeling Protocol contain only relative changes in traffic, no specific information on traffic data (including traffic volumes and numbers of trucks per link) for the build and no build alternatives. The protocol also indicates that no nearby intersections will be modeled. As mentioned previously, instead of modeling the entire project, we'd recommend breaking up the project and model the sections where the highest emissions and concentrations are expected, including nearby ramps and intersections. Once this is determined, please include the data for the mainline and any nearby intersections that will be included in the modeling. In addition, the protocol indicates that detailed traffic data will be available for different periods within the day and references an Appendix A that wasn't included in the protocol. Please include this information in any future revisions to the modeling protocol.

> **Response:** As recommended, the project length was split up and four modeling segments were identified as the areas with the highest daily emissions. Individual model runs will include any ramps, intersections, arterials, warehouses, railyard sources within the vicinity of the segment (**Figure 6B** through **6E**).
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> The missing information was added to the current revision:
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> - **Appendix A:** Detailed traffic study data for all alternatives and analysis years
> - **Appendix B-1:** Detailed Emission Calculations for all alternatives and analysis years
> - Summary of PM_{10} an $PM_{2.5}$ Emissions by alternative and analysis year
> - Emission Rates by Traffic Links
> - Output emission factors from the EMFAC-PL
> - **Appendix B-2:** Localized, one-mile Average Emissions, and Emissions Density Profiles representing snapshots of emissions along the alignment for all the alternatives and analysis years due to the project

Emission Modeling: The protocol indicates that "This project does not meet the following criteria needed to complete the detailed EMFAC2011-PL approach, and the analysis will utilize the USEPA-approved simplified approach." To clarify, the detailed approach described in the hot-spot guidance used EMFAC2011, use of EMFAC-PL is the simplified approach. In addition, the modeling protocol indicates that re-entrained road dust emissions will be calculated using the

[1]Section 93.116 (a) reads: "This criterion is satisfied for all other FHWA/FTA projects in CO, PM_{10} and $PM_{2.5}$ nonattainment and maintenance areas if it is demonstrated that during the time frame of the transportation plan no new local violations will be created and the severity or number of existing violations will not be increased as a result of the project, and the project has been included in a regional emissions analysis that meets applicable §§93.118 and/or 93.119 requirements."

AP-42 calculation formulas for paved roads (Fifth Edition, Volume I, Chapter 13.2.1, revised January 2011). Can you confirm that total vehicle miles traveled for each year will be used to estimates fugitive dust, not centerline miles?

> **Response:** The text is modified to reflect the correct term which is use of EMFAC2011-PL as the simplified approach.
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> The total vehicle miles for each year will be used to estimate fugitive dust and not the centerline miles.

AERMOD Emission Sources and modeling parameters: The description of the dispersion modeling indicates volume sources will be used (p.10 and p 14). EPA's guidance discusses using either volume or area sources and either are appropriate. Experience, though, suggests that area sources are easier to use and result in less run time, we would recommend using them, if modeling has not yet been done. We are aware that Caltrans has already contacted Lakes about submitting a demonstration package for use of Lakes MPI Version of AERMOD and is proposing to also using the FASTALL option. If the Lakes MPI version of AERMOD is going to be used and with our recommendation of breaking the project up and only modeling areas where the peak concentration is expected, the FASTALL option should not be used, since the MPI version is already getting a significant speed bonus.

> **Response:** We agree that area sources are easier to use and require less run time. As suggested by EPA, area sources will be used instead of volume sources. We plan on using Lakes MPI without using FASTALL option.

Modeling Domain / Receptors: As mentioned above, for large projects like this 31-mile long project, instead of modeling the entire project, we recommend focusing on analyzing multiple smaller locations that are expected to have the highest air quality concentrations and, consequently, the most likely new or worsened PM NAAQS violations. If modeling can show that conformity is demonstrated at such locations, then it can be assumed that conformity is met in the entire project area. The approach of using 50-m receptors, then including 10-m receptors only where the coarse grid exceeds the design value could miss areas of peak concentration. One receptor grid around each portion of the project modeled should be sufficient to balance run time and location of the peak concentration.

> **Response:** Since we are focusing the analysis on four smaller locations instead of the entire length of the project, modeling will include a fine grid and a coarse grid at the same time to eliminate the possibility of missing areas of exceedance.
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> We plan on a 10×10 meter grid to a distance of 100 meters from the freeway right-of-way (ROW) and a 50×50 meter coarse grid to a distance of 500 meters from the freeway ROW.
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> Section 4.2.3 (Receptors) is modified accordingly.

The protocol indicated that the receptor spacing "will vary slightly along the alignment as receptors will be excluded based on limitations to public access or where a member of the public

would normally be present only for a very short period of time." However, there are limits to which receptors can be excluded from modeling. Areas where there is limited, but not restricted public access should not be excluded. If any receptors are going to be restricted from inclusion in the receptor grid, those receptors should explicitly discussed in the modeling protocol and depicted in figures around each area to be modeled.

Response: We will make sure not to exclude any receptors that fall on the limited but not access-restricted access areas. If there are any areas, a list/map containing areas of exclusion will be included in the report.

Section 4.2.3 (Receptors) is modified as follows: "The spacing will vary slightly along the alignment as receptors will be excluded in areas of restricted access to the public. Areas where there is limited, but not restricted public access, will not be excluded. A list/map containing areas of exclusion will be included in the report."

Meteorological Data

With a project as large as this one, there are a number of meteorological sites around the facility. In order to evaluate whether the correct meteorological are chosen, we would first need to know how the modeling was going to be split up and focused around differ portions of the project. It is very likely that different meteorological sites could be appropriate for different portions of the project. Note that if airport data is available, but not chosen for the modeling, we would like to rationale on why that data was not used.

Response: Meteorological data are reevaluated based on the location of the selected modeling segments. In the current revision of the modeling protocol, **Section 4.2.1** (Modeling Domains) is updated to describe the methodology used to identify areas with the highest predicted PM emissions. **Section 4.3** (Meteorological Data) is modified to respond to EPA's comment regarding appropriateness of relation between selected meteorological stations and modeling segments.

Meteorological data from the Upland meteorological station will be used for modeling of the Segments 3 and 4 and data from the Fontana-Arrow Highway meteorological station will be used for modeling of Segments 1 and 2.

Airport meteorological data is not used, and the rationale as to why the airport data will not be used is presented in Section 4.3 (Meteorological Data) and here as follows:

> "Segment 3 on the west side is adjacent to Ontario International Airport. Due to frequent landing and take-off activities of airplanes in the airport and the excess generated heat, and also due to dissimilar airport surface characteristics, the vertical wind and temperature profiles will not be comparable with those of the Segment 3. In addition, AQMD frequently prepares and publishes AERMOD-ready meteorological data for a network of 27 monitoring stations across the South Coast Air Basin, of which 5 are located within close vicinity of the proposed project site and have approximate spacing of 6 miles. The closest

meteorological station in Upland is 3.6 miles away and has similar land use and surface characteristics. Therefore, meteorological data from the Upland monitoring station will be used for the analysis of Segment 3."

Background Monitor

Again, with a project as large as this one, there are a number of meteorological sites around the facility and we have recommended that the modeling for the facility be limited to the areas where the maximum concentrations are predicted. In order to evaluate whether the correct air quality stations are chosen, we would first need to know how the modeling was going to be split up and focused around differ portions of the project. The Fontana-Arrow Highway air monitoring station may be the best site to accurately characterize PM background concentrations along the alignment, but it is also possible that other background air quality sites could be appropriate for different portions of the project. Once the modeling domains are determined, the following considerations should be factored into the determination of representative air quality data sites:

- Include a table with the monitors under comparison at each site and inclusion of monitor type, sampling frequency, in addition to the data completeness and Design Value for each monitor under evaluation.
- Once a monitor has been chose, the document should include a rational as to why the other monitors were not chosen.
- Include maps that show all of the air quality monitors located around the project.

Response: As mentioned earlier, in the current revision of the modeling protocol, **Section 4.2.1** (Modeling Domains) is updated to describe the methodology used to identify areas (modeling segments) with the highest predicted PM emissions. **Section 4.4** (Background Concentrations) is modified to respond to EPA's comment regarding appropriateness of relation between select monitoring stations and modeling segments.

In response to this comment**, Table 5**. **Particulate Matter Sampling Sites in The Vicinity of The Proposed Project** was added to the protocol. This table includes Air Sampler ID, Sampling Frequency, Sampling Method, and Monitor Type for all the monitoring sites close to the project site. Data Availability is included in **Table 6.**

Figure 7A is modified to show the monitoring stations and modeling segments in relation to each other.

Design Value Calculations: EPA is re-evaluated the PM_{10} design concentration methodology in Section 9.3.4 of its November 2013 "Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas" and is considering further flexibility in what air quality monitoring data is used for design value calculations for PM hot-spot analyses, and it is important to be more consistent with how monitoring data is handled for calculating NAAQS design values for designations and other air quality planning purposes. The options depend upon the monitor's sampling frequency and the number of samples collected per year. Furthermore, there are also considerations, for both PM_{10} and $PM_{2.5}$ regarding

collection of continuous or filter based data, both of which are listed in the AQS data included in the protocol. We are currently discussing the options for PM_{10} and $PM_{2.5}$. Once we have additional data on the monitors considered for background data, we can discuss our recommendations for use of the two data sets.

Response: The sampling frequency was one of the criteria that was taken into account while selecting the most appropriate air monitoring station for each of the modeling segments. As the first step, all PM sampling sites in the vicinity of the project site were identified using the EPA AirData website. Then, relevant information such as measurement scale of the PM samplers, Sampling Period and Frequency, Sampling Collection and Analysis Methods, and Monitor Type were obtained from the EPA website for all of the monitoring locations, and were then organized in **Table 5**. In the assessment, we gave a high-frequency sampler more weight compared to a low-frequency sampler. We also took the Measurement Scale into account and gave more weight to a filter-based sampler (filter-based) over a non-gravimetric sampler. Also, sampling duration of 24 hours was preferred over sampling duration of one hour.

Table 6 was modified to include background concentrations and design values for all the discussed air monitoring stations.