I-710 Construction Phasing and Staging Emissions
Technical and Advisory Roundtables

September 14 & 15, 2011

This AQAP study is not part of the I-710 Corridor Project studies, but upon completion, it will be submitted to Caltrans for review and consideration for use in preparing the I-710 Corridor Project EIR/EIS.
Objectives

Estimate emissions for a reasonable foreseeable concept of construction staging and phasing of the I-710 corridor improvements (2018 – 2034)
Key Assumptions

- Criteria and MSAT air pollutants
- Alternative 6 – 4 freight corridor and 10 general purpose lanes were evaluated.
- Daily and monthly emissions at location of activity
- GHG (on-site and tailpipe only – not life cycle)
- Construction fleet changes every year
- Freight corridor is constructed first
Key Assumptions cont.

• Freight corridor built first – funding available as one project
  • Start north and south segment at same time
• Average of 20 working days per month
• Construction phases are sequential within segment
• Construction schedule follows late finish
• LACMTA “Green” Construction Policy not included in analysis
• No onsite concrete or asphalt batch plants
Approach

1. Use construction data from GCCOG Construction Staging/Phasing concept report for each segment
   a. Area disturbed, project length and/or area, project duration, soil hauling, acres disturbed per day,
   b. duration of each stage and phase within segment
2. Input construction data into the enhanced Roadway Construction Emissions Model
3. Output daily emissions on a month by month basis for each of seven construction phases
4. Develop monthly emissions for each segment
5. Sum daily and monthly emissions across all segments over entire project time frame (2018-2034)
6. Also report peak daily emissions for each segment (2018-2034)
Methodology: Overview

• Based on GCCOGs concept report (April 2011) for information on:
  • Location (segment) and duration (phases) of construction activity
  • Type of construction activity (%roadways, %bridge)
• Enhanced version of Roadway Construction Emissions Model (originally developed for Sacramento AQMD)
  • OFFROAD emission factors extended to 2035
  • Now includes mobile source air toxic and all GHG’s
  • For EMFAC, uses South Coast air basin fleet
Methodology: Overview

- On-road Activity (e.g., watering trucks)
  - CARB EMFAC2007 model – South Coast Air Basin
- Off-road Activity
  - Current CARB OFFROAD2007 - statewide fleet
  - Update with new CARB model (August 2011)
    - Equipment population post recession and growth
    - Updated average load factors by equipment type
- MSAT speciated from VOC and PM via CARB speciation database
Methodology: Modifications to Inputs

Activity Data provided by GCCOG

- Data Organization
  - Segment → Subsegment → Multiple stages and Multiple phases
  - Model timeline and location provided on a stage/phase level

- Bridge and Roadway Data
  - Data combined both bridge and roadway construction data on Sub-Segment level
• Four outputs are given in mass per day.
  – By type of construction activity
    • Grubbing/land clearing
    • Grading/excavation
    • Drainage/utilities/sub-grade
    • Paving
  – Since inputs are by sub-segment, outputs from model apply to the entire sub-segment.
    – Daily emissions applied to the stage-phases within each sub-segment.
### Allocation of emission factors by construction phase

<table>
<thead>
<tr>
<th>Year</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>January (Jan)</td>
</tr>
<tr>
<td>Stage 1 Phase 1</td>
<td></td>
</tr>
<tr>
<td>Construction Phase</td>
<td>GLC</td>
</tr>
<tr>
<td>ROG (lbs/month)</td>
<td>8.5</td>
</tr>
<tr>
<td>NOX (lbs/month)</td>
<td>2.5</td>
</tr>
<tr>
<td>Stage 2 Phase 1</td>
<td></td>
</tr>
<tr>
<td>Construction Phase</td>
<td>GEX</td>
</tr>
<tr>
<td>ROG (lbs/month)</td>
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</tr>
<tr>
<td>NOX (lbs/month)</td>
<td>2.5</td>
</tr>
<tr>
<td>TOTAL</td>
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</tr>
<tr>
<td>ROG (lbs/month)</td>
<td>22</td>
</tr>
<tr>
<td>NOX (lbs/month)</td>
<td>5.5</td>
</tr>
</tbody>
</table>

GLC = Grubbing/Land Clearing  
GEX = Grading/Excavation  
DUS = Drainage/Utilities/Sub-Grade  
Pav = Paving
Methodology: Roadway Construction Emission Model Output (continued)

- Apply either bridge or roadway daily emission factors to individual stage-phases.
- Allocation of daily emission factors to construction schedule
- Daily emissions are multiplied by 20 for monthly emissions
Preliminary Findings

Peak NO\textsubscript{x} Emissions (lbs/day)

Peak NO\textsubscript{x} Daily Emissions for Any One Segment
Peak PM$_{10}$ Emissions (lbs/day)

Most PM$_{10}$ generated from construction fugitive dust
Peak PM$_{2.5}$ Daily Emissions for Any One Segment

Most PM$_{2.5}$ generated from construction fugitive dust
Preliminary Findings cont.

• As shown in previous slides, PM$_{2.5}$ and PM$_{10}$ from diesel emissions (associated with construction equipment exhaust) do not exceed the AQMD thresholds of significance.

• Exceedances are generated primarily by fugitive dust from construction activities.
<table>
<thead>
<tr>
<th>Segment</th>
<th>Total Months of Construction (per Segment)</th>
<th>Total Months the Emissions Threshold is Exceeded</th>
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<tbody>
<tr>
<td></td>
<td>CO</td>
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<tr>
<td>7</td>
<td>60</td>
<td>none</td>
</tr>
</tbody>
</table>

Note: Bold values indicate exceedances are due primarily from fugitive dust
Conclusions

\textbf{NO}_x, \textbf{PM}_{10} \text{ and PM}_{2.5}

- Only segments 3-7 show exceedance of significance threshold, but only 10-20% of the construction period

- Analysis is developed for each segment and changes at the local scale (geometry, interchanges) will not impact the emission findings

\textbf{Robust analysis is useful for air quality modeling}

- Detailed info for specific times and locations
Next Steps

• Updating now with revised CARB OFFROAD model information

• Update to equipment population and load factors

• Health risk of the toxics addressed in HRA
Recommendations

Emission reductions for PM$_{10}$ and PM$_{2.5}$ fugitive dust
- Smaller disturbance areas
- More frequent water (> 50% efficiency)
- Possible use of surfactants

Emission reductions for NO$_x$
- Detailed info for specific times and locations
- Newer equipment (lower emitting) 2019-2020 for segment 4 & 6
- Modify construction duration to manage emissions