SR 710 North Study
Presentation to the Modeling Task Force – September 25, 2013
Modeling Analysis – Loren Bloomberg and Steve Weller, CH2M HILL

Agenda

1. Project Overview (Loren Bloomberg)
2. Methodology (Loren Bloomberg)
3. Validation (Steve Weller)
4. Application/Results (Steve Weller)
5. Next Steps and Discussion (Loren Bloomberg)
Purpose and Need Statement

- The purpose of the proposed action is to effectively and efficiently accommodate regional and local north-south travel demands in the study area of the western San Gabriel Valley and east/northeast Los Angeles, including the following considerations:
  - Improve the efficiency of the existing regional freeway and transit networks;
  - Reduce congestion on local arterials adversely affected due to accommodating regional traffic volumes;
  - Minimize environmental impacts related to mobile sources

Study Area Map
Alternatives Being Studied

1. No Build
2. Transportation System Management (TSM)/Transportation Demand Management (TDM)
3. Bus Rapid Transit (BRT) with TSM/TDM and bus feeder service
4. Light Rail Transit (LRT) with TSM/TDM and bus feeder service
5. Freeway Tunnel

TSM/TDM Alternative

- Local Street and Intersection Improvements
  - 27 intersection improvements
  - 7 local street improvements
  - Modify Fair Oaks and SR 110 Interchange
  - Extend St. John from Del Mar to California
  - Valley to Mission connector

- Transit Refinement
  - Expanded peak period bus service

- Active Transportation
  - Pedestrian and bike facility enhancements to support access to transit facilities
  - Coordinating with local agencies

- ITS Improvements
  - San Gabriel Valley Signal Forum Measures
    - Signal synchronization
    - Signal optimization
    - Transit signal priority
BRT Alternative

- Improve speed and reliability, comfort and convenience for the BRT trunk/spine alignment (provide rail-like service)
- Improve access and connectivity to the regional transit system
- Reduce potential effects to on-street parking
- Improve quality of BRT stations

LRT Alternative

- Grade-separation (tunnel and elevated)
- Seven stations
- Grade-separated maintenance yard over Valley Boulevard
- LRT Main line, new bus feeder service and enhanced connecting bus service, active transportation, ITS, local street and intersection improvements in the TSM/TDM Alternative
Freeway Tunnel

- A – Freeway with TSM/TDM* (dual bore tunnel)
- B – Freeway with TSM/TDM and tolls* (single and dual bore tunnel)
- C – Freeway with TSM/TDM and Express Bus through the tunnel* (single and dual bore tunnel)

*With and without trucks studied for each

Stakeholder Engagement

Transportation Modeling and Analysis

Stakeholders (TAC, SOAC, Public)

Environmental Studies and Documentation

Preliminary Engineering and Technical Reports
Methodology

➢ Two phases of work:
  ➢ Alternatives Analysis (AA) – 2012
  ➢ Environmental Documentation – 2013 to 2014
Methodology – Two Phases

- SCAG/Metro Model
- 2008/2012 RTP
- Multimodal Analysis

Generalized Modeling Process

- Engage stakeholders and share information
- Model validation
- Model application (runs)
- Screening and AA Report

AA Phase

- Technical analysis and EIR/EIS
- Model validation
- Model application (runs)

ED Phase
Model Outputs/Connections

Validation Approach

- SCAG 2012 RTP versus SCAG version 6.1
- FHWA Travel Model Validation and Reasonability Checking Manual and Caltrans Travel Forecasting Guidelines
- Bluetooth data to support travel time comparisons
- Technical guidance from Metro, Caltrans, and SCAG in bi-weekly meetings
- Transparency in modeling process and methodology

[Image of a table showing model outputs and connections]
Validation General Findings

- High peak auto volumes overall
- High freeway volumes versus arterials
- Transit trip table differences compared to survey data
- Travel times good compared blue tooth data
- Lower forecasts for 2012 models compared to 2008 models

Validation Strategy

- Clean up highway and transit networks
- Adjust TOD factors
- Alter freeway capacities
- Toll coding updates
- Adjust transit trip tables
Highway Validation Status: Global Count Metrics

**Count/ Model Volume Difference**

<table>
<thead>
<tr>
<th></th>
<th>AM Period</th>
<th>PM Period</th>
<th>ADT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caltrans and FHWA Guidance:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freeways +/- 7%</td>
<td>3%</td>
<td>5%</td>
<td>14%</td>
</tr>
<tr>
<td>Major Arterials +/- 10%</td>
<td>14%</td>
<td>-14%</td>
<td>14%</td>
</tr>
<tr>
<td>Minor Arterials +/- 15%</td>
<td>9%</td>
<td>-26%</td>
<td>4%</td>
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</table>

**Root Mean Square Error**

<table>
<thead>
<tr>
<th></th>
<th>AM Period</th>
<th>PM Period</th>
<th>ADT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caltrans Recommended Guidance: &lt; 40</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>%RMSE =</td>
<td>39</td>
<td>34</td>
<td>42</td>
</tr>
</tbody>
</table>

**Coefficient of Determination (R²)**

<table>
<thead>
<tr>
<th></th>
<th>FHWA Guidance &gt; 0.88</th>
<th>AM Period</th>
<th>PM Period</th>
<th>ADT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient of Determination (R²)</td>
<td>0.94</td>
<td>0.95</td>
<td>0.96</td>
<td></td>
</tr>
</tbody>
</table>

**% of Links within Caltrans Standard Deviations**

<table>
<thead>
<tr>
<th></th>
<th>Caltrans Guidance &gt;= 75%</th>
<th>AM Period</th>
<th>PM Period</th>
<th>ADT</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of Links within Caltrans Standard Deviations</td>
<td>74%</td>
<td>81%</td>
<td>57%</td>
<td></td>
</tr>
</tbody>
</table>
## Validation Cutlines

![Map ofValidation Cutlines](map.png)

**Legend**
- SR 710 EIR/EIS Study Area
- SR 710 EIR/EIS Cutlines
- SCAG Screenlines

## Highway Validation Status: Cutline Metrics

<table>
<thead>
<tr>
<th>Screenline Name</th>
<th>#</th>
<th>Direction</th>
<th>AM Peak Period</th>
<th>PM Peak Period</th>
<th>Daily</th>
<th>Exceeds</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>East of SR 2 and I-5</td>
<td>101</td>
<td>EB/WB</td>
<td>1.11 (Exceeds)</td>
<td>1.08 (Exceeds)</td>
<td>1.20</td>
<td>(0.08 high)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>West of SR-710</td>
<td>102</td>
<td>EB/WB</td>
<td>1.13 (Exceeds)</td>
<td>1.00 (Exceeds)</td>
<td>1.17</td>
<td>(0.04 high)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>East of SR-710</td>
<td>103</td>
<td>EB/WB</td>
<td>1.15 (Exceeds)</td>
<td>1.07 (Exceeds)</td>
<td>1.21</td>
<td>(0.09 high)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>East of Rosemead</td>
<td>104</td>
<td>EB/WB</td>
<td>1.16 (Exceeds)</td>
<td>0.93 (Exceeds)</td>
<td>1.09</td>
<td>(Exceeds)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>West of I-605</td>
<td>105</td>
<td>EB/WB</td>
<td>1.04 (Exceeds)</td>
<td>0.94 (Exceeds)</td>
<td>1.06</td>
<td>(Exceeds)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South of SR 134 and I-210</td>
<td>106</td>
<td>NB/SB</td>
<td>1.05 (Exceeds)</td>
<td>0.77 (0.1 Low)</td>
<td>1.07</td>
<td>(Exceeds)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South of Huntington Drive</td>
<td>107</td>
<td>NB/SB</td>
<td>1.18 (Exceeds)</td>
<td>0.97 (Exceeds)</td>
<td>1.24</td>
<td>(0.04 high)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North of I-10</td>
<td>108</td>
<td>NB/SB</td>
<td>1.21 (Exceeds)</td>
<td>1.02 (Exceeds)</td>
<td>1.22</td>
<td>(0.08 high)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North of SR 60</td>
<td>109</td>
<td>NB/SB</td>
<td>1.15 (Exceeds)</td>
<td>1.04 (Exceeds)</td>
<td>1.23</td>
<td>(0.09 high)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Exceeds** signifies that the model volume to count relationship exceeds the ratio stated in the guidance.

**Low** signifies that the model volume to count relationship is below the ratio stated in the guidance.

**High** signifies that the model volume to count relationship is above the ratio stated in the guidance.
Bluetooth Sensor Location Sites

Highway Validation Status: AM Travel Time

Observed versus Model Travel Times (SOV): AM Period
Transit Validation

- Completed refinement of transit parameters –
  - **Mode Priority** – implemented mode priority in non-local bus paths
  - **Bus speed functions** – separate speed curves for study area.
    Reduced bus speeds in study area to match observed run times.
  - **Transfer penalties** – increased transfer penalty from 3.2 min to 4.7 min. Fixed an inconsistency in transfer penalty handling between path building and mode choice.

- Study area and regional transit results improved compared to SCAG 6.1 model
- The model is generally replicating observed transit boardings by mode and route groups

<table>
<thead>
<tr>
<th></th>
<th>2012 Observed</th>
<th>2012 Modeled</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Peak</td>
<td>Off-peak</td>
<td>Total</td>
</tr>
<tr>
<td>Commuter Rail</td>
<td>-</td>
<td>-</td>
<td>13,000</td>
</tr>
<tr>
<td>Urban Rail</td>
<td>193,900</td>
<td>169,500</td>
<td>363,400</td>
</tr>
<tr>
<td>Orange BRT</td>
<td>14,700</td>
<td>12,600</td>
<td>27,200</td>
</tr>
<tr>
<td>MTA Bus**</td>
<td>80,200</td>
<td>77,800</td>
<td>158,000</td>
</tr>
<tr>
<td>Foothill Local**</td>
<td>21,200</td>
<td>12,300</td>
<td>33,500</td>
</tr>
<tr>
<td>Total</td>
<td>310,000</td>
<td>272,200</td>
<td>582,200</td>
</tr>
</tbody>
</table>

*Peak / off-peak splits from 2008 on-board survey
**2008 observed data
Model Application / Results

- Run times
- Model enhancements

2035 No-Build vs. Existing PM Peak Volume (AA Model)
2035 No-Build vs. Existing PM Peak Period Volume (ED Model)

Traffic Analysis Impact Area Daily Traffic Volume
Daily VMT in the Region

Daily VHT in the Region
Cut-Through Trips

- AA phase: select link on multiple suspected cut-through routes
- EIR/EIS phase: separated trip table into assignment classes of cut-through or at least one end in the study area (in progress)

Cut-through Trips in AA Phase

*Percentage of arterial trips which have origins and destinations outside of the study area. Local arterial cut-through travel is determined using 4 representative arterials in the study area: Huntington Road East of Fremont, Monterey Road south of SR 110, Fremont Road South of Huntington Drive, Rosemead Drive south of Huntington Drive.
Where are the vehicles coming from for the Freeway Tunnel Alternative?

<table>
<thead>
<tr>
<th>Segment</th>
<th>ADT</th>
<th>Percentage of Total</th>
<th>AM Peak Period (SB)</th>
<th>Percentage of Total</th>
<th>PM Peak Period (NB)</th>
<th>Percentage of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR 710 Tunnel (8 lanes, no toll)</td>
<td>173,800</td>
<td>100%</td>
<td>16,300</td>
<td>100%</td>
<td>23,900</td>
<td>100%</td>
</tr>
<tr>
<td>SR 2</td>
<td>36,500</td>
<td>21%</td>
<td>3,100</td>
<td>19%</td>
<td>5,300</td>
<td>22%</td>
</tr>
<tr>
<td>I-5</td>
<td>24,600</td>
<td>14%</td>
<td>1,500</td>
<td>9%</td>
<td>3,500</td>
<td>15%</td>
</tr>
<tr>
<td>I-605</td>
<td>8,900</td>
<td>5%</td>
<td>700</td>
<td>4%</td>
<td>1,600</td>
<td>7%</td>
</tr>
<tr>
<td>SR 110</td>
<td>15,700</td>
<td>9%</td>
<td>1,800</td>
<td>11%</td>
<td>1,900</td>
<td>8%</td>
</tr>
<tr>
<td>I-405</td>
<td>1000</td>
<td>1%</td>
<td>90</td>
<td>1%</td>
<td>70</td>
<td>0%</td>
</tr>
<tr>
<td>US 101</td>
<td>400</td>
<td>0%</td>
<td>10</td>
<td>0%</td>
<td>100</td>
<td>0%</td>
</tr>
<tr>
<td>All Freeways</td>
<td>87,100</td>
<td>50%</td>
<td>7,200</td>
<td>44%</td>
<td>12,470</td>
<td>52%</td>
</tr>
<tr>
<td>Fremont/Fair Oaks Avenue</td>
<td>25,900</td>
<td>15%</td>
<td>1,800</td>
<td>11%</td>
<td>3,200</td>
<td>13%</td>
</tr>
<tr>
<td>Huntington Drive</td>
<td>8,700</td>
<td>5%</td>
<td>710</td>
<td>4%</td>
<td>1,400</td>
<td>6%</td>
</tr>
<tr>
<td>San Gabriel Boulevard</td>
<td>8,300</td>
<td>5%</td>
<td>730</td>
<td>4%</td>
<td>1,000</td>
<td>4%</td>
</tr>
<tr>
<td>Rosemead Boulevard</td>
<td>8,100</td>
<td>5%</td>
<td>640</td>
<td>4%</td>
<td>1,200</td>
<td>5%</td>
</tr>
<tr>
<td>Los Robles Ave</td>
<td>6,400</td>
<td>4%</td>
<td>540</td>
<td>3%</td>
<td>990</td>
<td>4%</td>
</tr>
<tr>
<td>Eagle Rock Boulevard</td>
<td>2,000</td>
<td>1%</td>
<td>240</td>
<td>1%</td>
<td>220</td>
<td>1%</td>
</tr>
<tr>
<td>Other Arterials and Local Streets</td>
<td>27,400</td>
<td>16%</td>
<td>4,500</td>
<td>28%</td>
<td>3,400</td>
<td>14%</td>
</tr>
<tr>
<td>All Surface Streets</td>
<td>86,800</td>
<td>50%</td>
<td>9,160</td>
<td>56%</td>
<td>11,410</td>
<td>48%</td>
</tr>
</tbody>
</table>

Distribution of Tunnel Trips - Daily Traffic

Daily – Dual Bore w/o Tolls
Next Steps

- Complete 2035 Model Runs (Input to Environmental Analysis)
- Conduct Traffic Analysis (LOS) for Freeway and Surface Streets
- Transit, Parking, Bike/Ped Assessments
- Documentation

Open Discussion