I-105 Corridor Sustainability Study (CSS)

Metro Streets and Freeways Subcommittee
March 21, 2019

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Cambridge Systematics, Inc.
I-105 CSS Project History & Background

Funded by Caltrans Sustainable Transportation Planning Grant

Purpose:
» Examine multi-modal I-105 corridor
» Beyond traditional freeway operations planning
» Integrate emerging CTC and Caltrans Corridor guidelines
» Include key corridor stakeholders
NEW Multi-Modal Corridor Plan Guidelines

- **Caltrans Corridor Planning Guidebook**
  - To replace Transportation Concept Report (TCR) guidelines
  - Public draft released in December, 2018
  - Final draft April 2019

- **CTC Comprehensive Multi-Modal Corridor Plan Guidelines**
  - California Transportation Commission guidelines for eligibility of *plans and projects* under Congested corridors program (SB1)
  - Final guidelines approved December 5, 2018
  - Agencies beginning to create plans now (CMCP)
Project Objectives

Not simply Level of Service for Autos!

» Reduce delay per capita;
» Reduce vehicle miles traveled (VMT) per capita;
» Improve connectivity between modes;
» Increase mode share for transit, walking, and bicycling;
» Improve system conditions (preservation);
» Improve system efficiency (operations);
» Reduce serious and fatal collisions; and
» Support Senate Bill 375 and greenhouse gas reduction.
Process

Develop Evaluation Framework

Assess Existing + Future Conditions

Evaluate Projects

Final I-105 Plan

Stakeholder Input
**Significant Stakeholder Outreach Effort**

- **Project Develop Team**
  - SCAG, Caltrans, Metro

- **Technical Advisory Committee**
  - Cities/county
  - Transit providers
  - Interest groups

- **Stakeholder Interviews**
  - Transit providers,
  - Active transportation groups
  - Cities

- **Infographics**

- **Project Website**

- **Online Public Survey**
Leveraged Available Resources & Tools

- SCAG Model
- SCAG Land Use and SED
- Existing Corridor Microsimulation Model
- Metro Mobility Project Matrices
- Metro Arterial Performance Measurement Tool
- Safety Data (TASAS, SWITRS)
- “Big” Transportation Data – INRIX, AirSage, etc.
- Environmental Study Data
Task 1 - Study Area Definition

Purpose: Define Extent of Study Area

Methodology:
» SCAG’s regional travel demand model applied
» “Select link” analyses identify travel patterns
» Origins and destinations of trips in the area
Recommended Project Study Area

- 3 Miles around all sides of I-105 Freeway
Select Link Model Run Results
Freeway Mainline Segments

I-105 WB at Crenshaw Blvd

I-105 EB at S. Central Ave

Trip Origins & Destinations
Select Link Model Run Results
On-Ramp Segments

I-105 On-ramp at S. Croesus Ave.

I-105 On-ramp at Crenshaw Blvd.
Develop Evaluation Framework

Local/Regional/State Performance Measures

- SCAG RTP/SCS
- LA Metro Measure M Framework
- LA Metro Countywide Sustainability Planning Policy
- Caltrans Smart Mobility Framework
- Gateway Cities Strategic Transportation Plan
- South Bay Mobility Matrix
- Sustainable South Bay

Tie to Metro Planning Goals for Measure M

- Mobility & Connectivity
- Accessibility & Equity
- Safety
- State of Good Repair
- Sustainability
**Evaluation Framework**

<table>
<thead>
<tr>
<th>Goals</th>
<th>Objectives</th>
<th>Performance Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mobility</strong></td>
<td>• Improve multimodal system efficiency</td>
<td>• Transit ridership/mode share</td>
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<td></td>
<td>• Improve transit ridership</td>
<td>• High-occupant vehicle (HOV) mode share</td>
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<td></td>
<td>• Reduce congestion</td>
<td>• Total person throughput</td>
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<td>• Travel time by mode</td>
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<td></td>
<td></td>
<td>• Vehicle/person hours of delay (VHD/PHD)</td>
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<td></td>
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<td>• Truck VHD</td>
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<tr>
<td><strong>Accessibility &amp; Equity</strong></td>
<td>• Improve system connectivity and access to non-SOV modes</td>
<td>• Households within 1/2-mile of high quality transit access</td>
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<td></td>
<td>• Increase service to social equity focus (SEF) populations</td>
<td>• Jobs within 1/2-mile of high quality transit access</td>
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<td>• Promote geographic equity throughout the corridor</td>
<td>• Bicycle facility density within 1/2-mile of high quality transit access</td>
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<td>• Healthcare, schools and activity centers accessible by low-stress bicycle/pedestrian facilities</td>
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<td></td>
<td></td>
<td>• Travel time by mode for social equity focus (SEF) populations</td>
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<tr>
<td></td>
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<td>• SEF households with access to high quality transit</td>
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<td></td>
<td></td>
<td>• Geographic equity</td>
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</tbody>
</table>
### Evaluation Framework

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<tr>
<th>Goals</th>
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<th>Performance Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>• Reduce safety collisions and hazards</td>
<td>• Serious injury crash rates (by mode)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fatal collision rate (by mode)</td>
</tr>
<tr>
<td>State of Good Repair</td>
<td>• Improve &amp; preserve system conditions</td>
<td>• Pavement in good, fair, and poor condition</td>
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<td></td>
<td></td>
<td>• NHS bridges in good, fair, and poor condition</td>
</tr>
<tr>
<td>Sustainability</td>
<td>• Improve air quality and public health</td>
<td>• Greenhouse gas (GHG) emissions</td>
</tr>
<tr>
<td></td>
<td>• Reduce emissions</td>
<td>• Air quality criteria pollutant emissions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Bicycle and walk mode share</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Non-single occupant vehicle (SOV) mode share</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Parks, recreation &amp; open space accessible by low-stress bike/ped facilities, complete streets, and/or high quality transit</td>
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<td></td>
<td></td>
<td>• Vehicle miles traveled (VMT)</td>
</tr>
</tbody>
</table>
COMPREHENSIVE BASELINE CONDITIONS ASSESSMENT
• Pockets of high-density residential, most heavily concentrated in South LA, Hawthorne, South Gate, and Inglewood

Source: SCAG 2016
The western and eastern ends of corridor have the greatest density of employment. Employment mix is similar to County profile.

Source: SCAG 2016
Median Household Income

- Over 50% of Census Tracts have median income below $50K
- 21% below federal poverty level

Source: ACS 2015
% Households with Income Below Poverty Level
CalEnviroScreen and Communities of Concern

LEGEND

CalEnviroScreen

Most Vulnerable

Least Vulnerable

Communities of Concern

City Boundaries

Metrolink

Metro Blue Line

Metro Green Line

Freeways

Arterial Highways

Major Arterials

0 1.25 2.5 5 Miles
Freeway Conditions/Bottlenecks

AM Westbound

AM Eastbound

- AM peak – eastbound operates very well, westbound slow speeds and congestion.
Arterial Vehicle Miles Traveled

- Also looked at delay and level of service on arterial system

Source: Metro, 2016
**Pavement Conditions**

**Arterials + Frwy**
- Good: 56.8%
- Acceptable: 29.1%
- Poor: 14.1%

**Freeway Only**
- Good: 69.1%
- Acceptable: 22.0%
- Poor: 9.0%

Source: HPMS, 2015

Based on International Roughness Index Data
I-105 Collisions vs. Other Area Freeways

Accidents per Million VMT

Source: Caltrans PeMS and TASAS

- I-105 collision rates near other freeways, but slightly higher, than LA County average
Locations of Bicycle and Pedestrian Collisions

Concentration of bike collisions in middle portion of study area - LA

Source: SWITRS, 2012-2016

Legend:
- Injury Collision Density
- Injuries by Severity:
  - Fatal
  - Severe
  - Other visible injury & Minor Injury

- City Boundaries
- Freeways
- Arterial Highways
- Major Arterials

Scale: 0, 1.25, 2.5, 5 Miles
Locations of Truck Collisions

Source: SWITRS, 2012-2016
Metro Bus Ridership by Line

Source: Metro, 2017
Metro Rail Ridership by Station

Source: Metro 2017
Bike commute mode share close to county average (0.9%)
FUTURE BASELINE CONDITIONS
I-105 Study Area Population **Growth**, 2040

- Growth anticipated to be significantly lower than the county average
• Employment increase close to county average with concentrations in Inglewood and near LAX
Freeway volumes will only increase about 5% but congestion will increase.
Highway Volume-to-Capacity Ratios, 2012 and 2040

PM Volume-to-capacity ratios

Observation
Very few differences between base and future year. Differences are pointed with small black arrows.

KEY
- 0.6 and below (1)
- 0.6 to 0.8 (1)
- 0.8 to 1.0 (8)
- 1.0 to 1.2 (26)
- 1.2 and above (1)

Not to scale

Please note: these are raw model results from SCAG 2016 RTP model

Date prepared: 2/27/2018
Arterial Volume Growth to 2040

**Arterial Volume Growth** (between Year 2012 and Year 2040)

Daily

Source: Cambridge Systematics, SCAG 2016 RTP model based
Date prepared: 5/03/2018

Legend:
- **Water Area**
- **I-105 Corridor Growth Sets**
  - Up to 10% growth
  - 10-30% growth
  - Greater than 30% growth
  - No Growth

Please note:
Growth is shown with colors.
PROJECT ASSESSMENT &
SCENARIO IDENTIFICATION
### Task 6: Develop and Evaluate Improvement Scenarios

#### Current Project List

<table>
<thead>
<tr>
<th>Project Type</th>
<th># of Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Transportation Projects</td>
<td>124</td>
</tr>
<tr>
<td>Arterial Projects</td>
<td>295</td>
</tr>
<tr>
<td>Goods Movement Projects</td>
<td>11</td>
</tr>
<tr>
<td>Highway Projects</td>
<td>86</td>
</tr>
<tr>
<td>Transit Projects</td>
<td>38</td>
</tr>
</tbody>
</table>
Project Evaluation Process

**Categorization**
- Projects assigned to types, subtypes and implementation timeframes

**Evaluation**
- **Qualitative**
  - Project subtypes evaluated based on their ability to meet each performance objective
- **Quantitative**
  - Projects evaluated based on ability to address specific deficiencies

**Organization**
- Based on composite score across objectives, each project type organized into top, middle, and bottom tiers
### Steps 1 and 2: Projects Organized by Subtype and Implementation Period

<table>
<thead>
<tr>
<th>Type</th>
<th>Subtype</th>
<th>Near/ Mid/ Long</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Active Transportation</strong></td>
<td></td>
<td></td>
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<tr>
<td>Bikeshare</td>
<td></td>
<td></td>
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<tr>
<td>Bikeway—Class 2</td>
<td></td>
<td></td>
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<tr>
<td>Bikeway—Class 3 or Unspecified</td>
<td></td>
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<tr>
<td>Education and Promotion</td>
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<tr>
<td>Beautification/ Open Space</td>
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<tr>
<td>Pedestrian Improvements</td>
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<tr>
<td>1st/ Last Mile</td>
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<td></td>
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<tr>
<td>Bikeway—Class 1 or 4</td>
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<td></td>
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<tr>
<td>Bike/ ped Bridges</td>
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<tr>
<td>Complete Streets</td>
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<tr>
<td>New Sidewalk/ Trail</td>
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<tr>
<td><strong>Arterial</strong></td>
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<tr>
<td>Capacity Enhancement (arterial)</td>
<td></td>
<td>Near</td>
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<tr>
<td>Intersection Improvement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State of Good Repair</td>
<td></td>
<td></td>
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<tr>
<td>ITS / Operational Improvements (arterial)</td>
<td></td>
<td>Mid</td>
</tr>
<tr>
<td>Arterial Corridor Improvement</td>
<td></td>
<td>Mid</td>
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<tr>
<td>Bridge and Grade Separation</td>
<td></td>
<td>Long</td>
</tr>
<tr>
<td><strong>Goods Movement</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goods Movement, Logistics &amp; Technology</td>
<td></td>
<td>Mid</td>
</tr>
<tr>
<td>Grade Separation and Crossing Projects</td>
<td></td>
<td>Long</td>
</tr>
<tr>
<td><strong>Highway</strong></td>
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<td></td>
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<tr>
<td>ITS / Operational Improvements (highway)</td>
<td></td>
<td>Near</td>
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<tr>
<td>Auxiliary Lane</td>
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<td>Mid</td>
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<td>HOV/HOT/ Express Lanes</td>
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<tr>
<td>Integrated Corridor Management</td>
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<td>Interchange Enhancement</td>
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<td>Ramp Improvements</td>
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<tr>
<td>Soundwalls</td>
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<tr>
<td>Major Capacity Enhancement (highway)</td>
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<td>Long</td>
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<tr>
<td><strong>Transit</strong></td>
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<tr>
<td>Bus Replacement/ Transit Maintenance/ Transit Operations</td>
<td></td>
<td>Near</td>
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<tr>
<td>New Bus</td>
<td></td>
<td>Mid</td>
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<tr>
<td>Metrolink Commuter Rail Program Enhancements</td>
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<tr>
<td>New BRT</td>
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<tr>
<td>Transit Centers/ Park and Ride/ Bus stations/ Bus stops</td>
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<td>Long</td>
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<tr>
<td>New Rail</td>
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<td>Long</td>
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</tbody>
</table>
### Step 3: Active Transportation Project Type (Low, Medium, High)

<table>
<thead>
<tr>
<th>Type</th>
<th>Subtype</th>
<th>Mobility &amp; Connectivity</th>
<th>SOGR</th>
<th>Accessibility &amp; Equity</th>
<th>Safety</th>
<th>Sustainability</th>
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<tr>
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<td>Bikeway—Class 3</td>
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</tbody>
</table>

This table outlines the project types and their corresponding rankings under different criteria.
## GIS Locational Analysis; Projects Receive Detailed Score

<table>
<thead>
<tr>
<th>Type</th>
<th>Extra Scoring</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Active Transportation</strong></td>
<td>Within a half mile of a BRT or rail station</td>
</tr>
<tr>
<td></td>
<td>Intersects a CalEnviroScreen disadvantaged Census tract</td>
</tr>
<tr>
<td></td>
<td>Intersects a quarter-mile buffer around schools, intersects a half-mile buffer around hospitals and medical centers, intersects a commercial center</td>
</tr>
<tr>
<td><strong>Arterial</strong></td>
<td>Project on east/ west corridor</td>
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<tr>
<td></td>
<td><strong>Vehicle hours of delay &gt; 1,000</strong></td>
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<tr>
<td></td>
<td>VMT over 150,000 miles</td>
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<tr>
<td><strong>Transit</strong></td>
<td><strong>Employment Density &gt;15 jobs per acre, intersects a commercial center</strong></td>
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<tr>
<td></td>
<td>Intersects a CalEnviroScreen disadvantaged Census tract</td>
</tr>
<tr>
<td></td>
<td>Population density &gt; 20,000 people per square mile</td>
</tr>
</tbody>
</table>
Final Evaluation: Summary of Results

- **Near Tier**
  - Low Tier: 73
  - Medium Tier: 161
  - High Tier: 51

- **Mid Tier**
  - Low Tier: 36
  - Medium Tier: 48
  - High Tier: 34

- **Long Tier**
  - Low Tier: 10
  - Medium Tier: 7
  - High Tier: 5
Active Transportation Projects (eastern)
Highway Projects (western)
Arterial Projects (eastern)
Transit Projects (eastern)
Areas of Success

🛠 Clear Goals and Purpose
  » Study Area agreed upon up front
  » Objectives and performance measures developed early
  » Objectives and performance measures tied to regional goals

🛠 Leverage available resources
  » Utilize existing datasets to minimize cost and time
  » Use existing planning studies to identify deficiencies and project ideas
Areas of Success

- Engage stakeholders early and often
  - TAC valuable for identifying deficiencies & project ideas;
  - One-on-one interviews very valuable;

- Quantitative and qualitative evaluation techniques
  - Projects can meet objectives based on;
    - the type of improvement;
    - GIS / locational data valuable to assess specific deficiencies
Key Challenges

» Community Engagement
  » Public interest difficult at “plan” level;
  » People mostly care about what affects them NOW;

» Project Identification
  » Study Area can be too large for some modes and too small for others;

» Benefits Evaluation
  » How to determine if project provides mobility benefits in Study Area?
  » What level of evaluation can you accomplish?
Key Challenges

» **Project Evaluation**
  » Limited data to evaluate some projects,
  » Qualitative analysis can be limiting unless tied to specific corridor deficiencies

» **Project Prioritization**
  » Balancing competing multi-modal goals
    – (e.g. truck throughput and bicyclist safety)
  » How to develop project scenarios;
    – Time frame (short, medium, long)
    – Effectiveness (high, medium, low)
    – Ranking (1 to X)?
Questions/comments?

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