Building the California TAMP Workshop

California Transportation Asset Management Plan (TAMP)

September 21, 2017
Welcome and Introductions
TAMP Development Roadmap

Phase 1 – Setting the Approach and Baseline
- Kick-Off Meeting
- Document Review
- Establish Analysis Scope
- Asset Inventory and Condition

Phase 2 – Setting the Strategic Direction
- Asset Performance Forecasts
- Vision and Direction Workshop
- Risk Management Workshop
- Financial Plan and Investment Strategies Workshop
- Target-Setting Workshop

Phase 3 – Producing the TAMP
- Draft TAMP Components
- TAMP Building Workshop
- Draft TAMP
Agenda

8:00 Welcome & Introductions

8:10 TAMP Project History and Major Accomplishments

8:15 Asset Inventory & Conditions, Targets, Performance Scenarios

8:25 Lifecycle Planning

8:45 Financial Plan and Investment Strategies

9:15 Risk Management

9:45 Break

10:00 TAM Improvement Initiatives Exercise

10:45 Group Reports & Discussion

11:15 Composing the TAMP Story Exercise

11:55 Summary of Workshop Results and Next Steps

12:00 Workshop Conclusion
Workshop Objectives

- Present the building blocks that have been developed with input from stakeholders for the TAMP
- Obtain input from stakeholders on open issues
- Build the story for communicating the TAMP
TAMP Project History and Major Accomplishments
TAMP Requirements

FHWA TAMP Requirements (initiated by Moving Ahead for Progress in the 21st Century (MAP-21))

- All states must prepare a TAMP by April 30, 2018
- Needs to incorporate a 10-year time-frame
- Must include NHS pavements and bridges at a minimum
- May include additional asset classes
- Must use pavement and bridge measures specified separately

California law Senate Bill 486 (SB486) requires Caltrans to develop a “robust” asset management plan consistent with federal requirements
Project History and Accomplishments

- Project Kickoff Meeting - June 22-23, 2016
- TAMP Goals and Objectives Workshop – December 15, 2016
- Risk Management Workshop – April 19, 2017
- Financial Plan & Investment Strategies Workshop – June 14, 2017
- Draft TAMP Chapters – July / August / September 2017
Asset Inventory & Conditions, Targets, Performance Scenarios
Assets in the TAMP

- Pavements
- Bridges
- Drainage
- Transportation Management Systems (TMS)

Additional assets to be added in future plans.
## Assets in the TAMP: Scope

The California TAMP includes:

- Pavement: all NHS and SHS regardless of owner
- Bridges: all NHS and all SHS regardless of owner
- Drainage systems: SHS only
- Transportation Management Systems: SHS only
- Supplementary Assets: SHS only

Subsequent versions of the TAMP are expected to cover additional asset classes.

<table>
<thead>
<tr>
<th>System</th>
<th>Asset Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHS</td>
<td>NHS</td>
</tr>
<tr>
<td>Non-SHS</td>
<td>NHS</td>
</tr>
<tr>
<td>SHS</td>
<td>NHS</td>
</tr>
<tr>
<td>SHS</td>
<td>Non-NHS</td>
</tr>
</tbody>
</table>
Asset Inventory and Conditions

California’s transportation system is comprised of a wide variety of asset types, including pavements, bridges, transportation management systems (TMS), culverts, signs, signals, and others. California’s TAMP addresses pavement and bridge assets on the State Highway System (SHS) and/or the National Highway System (NHS), as well as TMS and culvert assets on the SHS. This chapter presents summary information on asset inventory and conditions for these assets.

Overview
Asset inventory and condition data are the foundation for managing transportation assets. Inventory and condition data are valuable for communicating the extent of the California’s assets and the state of those assets. These data are also the building block for other asset management processes. Accurate inventory and condition data are needed for supporting management processes, such as life-cycle planning, projecting funding needs, and monitoring performance. The road system consists of a wide variety of physical assets, as depicted in Figure 1. The significant assets on the system (in terms of their cost and extent) are roads and bridges. However, many other supporting systems are needed to support mobility and improve safety on those roads and bridges. This plan includes pavement and bridges on the SHS and NHS, as well as SHS TMS and culverts.

Part I: Today – Asset Inventory and Conditions DRAFT

Asset Performance Targets

Federal requirements now emphasize use of performance management for transportation, shifting the decision-making framework towards investment-driven, proactive, goal-oriented investment choices. FHWA defines transportation performance management “as a strategic approach that uses system information to make investment and policy decisions to achieve national performance goals.”

Overview
The cornerstone of FHWA’s Highway Performance Management System is the transition to a performance management system and outcome-based program. States now measure condition and set performance targets for their transportation assets. These targets should be aligned with state goals and as well as national goals. Following the targets will help state’s make investment decisions to achieve individual targets while making progress toward national goals.

California uses asset performance targets to drive investment decisions as part of the asset management and asset management best practice. California law requires the development of state highway system needs assessment that uses performance targets to estimate transportation needs. Performance measures and targets are used to track progress and guide state agencies towards short, medium, and long-term goals.

Part II: Tomorrow – Asset Performance Targets DRAFT

Performance Scenarios

California’s asset management focus involves managing transportation assets throughout their lifecycle. This requires looking to the future and projecting asset performance. California’s state and local transportation agencies use expected funding to predict future conditions, compare against targets, define funding gaps, and inform resource allocation decisions.

Overview
This chapter presents performance scenarios for bridge, pavement, drainage, and TMS asset performance over a 10-year period. A primary objective of the federal requirement to develop a TAMP is to analyze and monitor performance and provide a basis for developing strategies to improve or preserve the condition of transportation assets. This chapter presents performance scenarios to assess the adequacy of the TAMP and adopt asset management processes to improve or preserve the condition of transportation assets. Progress towards this objective is measured against national, state, and local goals.

Part III: Tomorrow – Performance Scenarios DRAFT
Asset Inventory & Condition
• Current asset inventories
  - Organized by the filters required by federal and state requirement
• Condition of the assets

Asset Performance Targets
• Projected condition targets
  - 2 and 4 year forecasts for pavements and bridges (not included in initial TAMP)
  - 10 year targets for all four assets
• Performance gap assessments

Performance Scenarios
• Projected 10 year performance scenarios for each of the four assets with different funding assumptions
  - Baseline = current spending levels
  - Target = project funding levels, including SB1
### NHS Inventory & Conditions

#### SHS

<table>
<thead>
<tr>
<th>System</th>
<th>Lane Miles</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate</td>
<td>14,159</td>
<td>44.9%</td>
<td>52.1%</td>
<td>3.1%</td>
</tr>
<tr>
<td>Non-Interstate NHS</td>
<td>22,490</td>
<td>43.5%</td>
<td>54.0%</td>
<td>2.5%</td>
</tr>
<tr>
<td>All NHS</td>
<td>36,649</td>
<td>44.0%</td>
<td>53.2%</td>
<td>2.7%</td>
</tr>
</tbody>
</table>

#### Non-SHS

<table>
<thead>
<tr>
<th>System</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Interstate NHS</td>
<td>4.6%</td>
<td>82.9%</td>
<td>12.5%</td>
</tr>
</tbody>
</table>

#### Total

<table>
<thead>
<tr>
<th>System</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate</td>
<td>44.9%</td>
<td>52.1%</td>
<td>3.1%</td>
</tr>
<tr>
<td>Non-Interstate NHS</td>
<td>25.5%</td>
<td>67.4%</td>
<td>7.1%</td>
</tr>
<tr>
<td>All NHS</td>
<td>30.4%</td>
<td>63.5%</td>
<td>6.1%</td>
</tr>
</tbody>
</table>

*Source: 2017 HPMS*
# NHS Projections, Targets & Gaps

<table>
<thead>
<tr>
<th>System</th>
<th>Measure</th>
<th>% Good</th>
<th>% Fair</th>
<th>% Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interstate</strong></td>
<td>Current Performance</td>
<td>44.9%</td>
<td>52.1%</td>
<td>3.1%</td>
</tr>
<tr>
<td></td>
<td>10-Year Projection</td>
<td>60.0%</td>
<td>39.0%</td>
<td>1.0%</td>
</tr>
<tr>
<td></td>
<td>10-Year Desired State of Repair</td>
<td>60.0%</td>
<td>39.0%</td>
<td>1.0%</td>
</tr>
<tr>
<td></td>
<td>Current Gap</td>
<td>15.1%</td>
<td>n/a</td>
<td>2.1%</td>
</tr>
<tr>
<td></td>
<td>Projected Gap</td>
<td>0.0%</td>
<td>n/a</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>Non-Interstate NHS</strong></td>
<td>Current Performance</td>
<td>25.5%</td>
<td>67.4%</td>
<td>7.1%</td>
</tr>
<tr>
<td></td>
<td>10-Year Projection</td>
<td>52.1%</td>
<td>44.9%</td>
<td>3.0%</td>
</tr>
<tr>
<td></td>
<td>10-Year Desired State of Repair</td>
<td>56.4%</td>
<td>41.9%</td>
<td>1.7%</td>
</tr>
<tr>
<td></td>
<td>Current Gap</td>
<td>30.9%</td>
<td>n/a</td>
<td>5.4%</td>
</tr>
<tr>
<td></td>
<td>Projected Gap</td>
<td>4.4%</td>
<td>n/a</td>
<td>1.3%</td>
</tr>
</tbody>
</table>
# NHS Inventory & Conditions

## SHS

<table>
<thead>
<tr>
<th>System</th>
<th>Count</th>
<th>Deck Area (ft²)</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHS</td>
<td>9,196</td>
<td>210,774,774</td>
<td>69.4%</td>
<td>26.9%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Non-NHS</td>
<td>3,217</td>
<td>41,791,595</td>
<td>61.1%</td>
<td>36.1%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Total</td>
<td>12,413</td>
<td>252,566,369</td>
<td>68.0%</td>
<td>28.4%</td>
<td>3.5%</td>
</tr>
</tbody>
</table>

## Non-SHS

<table>
<thead>
<tr>
<th>System</th>
<th>Count</th>
<th>Deck Area (ft²)</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHS</td>
<td>1,629</td>
<td>23,511,109</td>
<td>40.8%</td>
<td>44.4%</td>
<td>14.8%</td>
</tr>
<tr>
<td>Non-NHS</td>
<td>10,826</td>
<td>49,792,425</td>
<td>51.3%</td>
<td>38.7%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Total</td>
<td>12,455</td>
<td>73,303,534</td>
<td>47.9%</td>
<td>40.6%</td>
<td>11.5%</td>
</tr>
</tbody>
</table>

## Total

<table>
<thead>
<tr>
<th>System</th>
<th>Count</th>
<th>Deck Area (ft²)</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHS</td>
<td>10,825</td>
<td>234,285,883</td>
<td>66.5%</td>
<td>28.7%</td>
<td>4.8%</td>
</tr>
<tr>
<td>Non-NHS</td>
<td>14,043</td>
<td>91,584,021</td>
<td>55.8%</td>
<td>37.5%</td>
<td>6.7%</td>
</tr>
<tr>
<td>Total</td>
<td>24,868</td>
<td>325,869,903</td>
<td>63.5%</td>
<td>31.2%</td>
<td>5.3%</td>
</tr>
</tbody>
</table>

Source: 2017 NBI submittal
## NHS Projections, Targets, and Gaps

<table>
<thead>
<tr>
<th>System</th>
<th>Measure</th>
<th>% Good</th>
<th>% Fair</th>
<th>% Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHS</td>
<td>Current Performance</td>
<td>66.5%</td>
<td>28.7%</td>
<td>4.8%</td>
</tr>
<tr>
<td></td>
<td>10-Year Projection</td>
<td>80.3%</td>
<td>17.3%</td>
<td>2.3%</td>
</tr>
<tr>
<td></td>
<td>10-Year Desired State of Repair</td>
<td>83.5%</td>
<td>15.0%</td>
<td>1.5%</td>
</tr>
<tr>
<td></td>
<td>Current Gap</td>
<td>17.0%</td>
<td>n/a</td>
<td>3.3%</td>
</tr>
<tr>
<td></td>
<td>Projected Gap</td>
<td>3.2%</td>
<td>n/a</td>
<td>0.8%</td>
</tr>
</tbody>
</table>
Asset Summary

- Culverts and pipes on the SHS with a span of less than 20 feet

<table>
<thead>
<tr>
<th>System</th>
<th>Measure</th>
<th>% Good</th>
<th>% Fair</th>
<th>% Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHS</td>
<td>Current Performance</td>
<td>65.0%</td>
<td>23.5%</td>
<td>11.5%</td>
</tr>
<tr>
<td></td>
<td>10-Year Projection</td>
<td>80.0%</td>
<td>10.0%</td>
<td>10.0%</td>
</tr>
<tr>
<td></td>
<td>10-Year Desired State of Repair</td>
<td>80.0%</td>
<td>10.0%</td>
<td>10.0%</td>
</tr>
<tr>
<td></td>
<td>Current Gap</td>
<td>15.0%</td>
<td>n/a</td>
<td>1.5%</td>
</tr>
<tr>
<td></td>
<td>Projected Gap</td>
<td>0.0%</td>
<td>n/a</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Source: Caltrans
Asset Summary

- Includes 18,837 Intelligent Transportation System (ITS) components and other traffic control devices on the SHS

<table>
<thead>
<tr>
<th>System</th>
<th>Inventory</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>18,837</td>
<td>58.8%</td>
<td>n/a</td>
<td>41.2%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System</th>
<th>Measure</th>
<th>% Good</th>
<th>% Fair</th>
<th>% Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHS</td>
<td>Current Performance</td>
<td>58.8%</td>
<td>n/a</td>
<td>41.2%</td>
</tr>
<tr>
<td></td>
<td>10-Year Projection</td>
<td>90.0%</td>
<td>n/a</td>
<td>10.0%</td>
</tr>
<tr>
<td></td>
<td>10-Year Desired State of Repair</td>
<td>90.0%</td>
<td>n/a</td>
<td>10.0%</td>
</tr>
<tr>
<td></td>
<td>Current Gap</td>
<td>31.2%</td>
<td>n/a</td>
<td>31.2%</td>
</tr>
<tr>
<td></td>
<td>Projected Gap</td>
<td>0.0%</td>
<td>n/a</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Source: Caltrans
## Supplementary Assets

### Asset Summaries

<table>
<thead>
<tr>
<th>Supplementary Assets</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Highway System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drainage Pump Plants</td>
<td>290</td>
<td>24.1%</td>
<td>29.3%</td>
</tr>
<tr>
<td>Highway Lighting</td>
<td>89,829</td>
<td>40.2%</td>
<td>13.9%</td>
</tr>
<tr>
<td>Office Buildings</td>
<td>2,778,299</td>
<td>41.9%</td>
<td>31.6%</td>
</tr>
<tr>
<td>Overhead Signs</td>
<td>16,470</td>
<td>74.5%</td>
<td>21.8%</td>
</tr>
<tr>
<td>Roadside Rest Facilities</td>
<td>86</td>
<td>32.6%</td>
<td>38.4%</td>
</tr>
<tr>
<td>Sidewalks and Park &amp; Ride ADA Infrastructure</td>
<td>208,216</td>
<td>0.0%</td>
<td>n/a</td>
</tr>
<tr>
<td>Traffic Related Facilities</td>
<td>3,986,339</td>
<td>21.2%</td>
<td>15.1%</td>
</tr>
<tr>
<td>Weigh in Motion Scales</td>
<td>176</td>
<td>2.8%</td>
<td>97.2%</td>
</tr>
</tbody>
</table>

Source: 2017 SHSMP
Lifecycle Planning

Building the California TAMP Workshop
Overview

- TAMP rule defines life cycle planning (LCP) as “a process to estimate the cost of managing an asset class, or asset sub-group, over its whole life with consideration for minimizing cost while preserving or improving the condition.”

Source: FHWA Interim Guidance on Lifecycle Planning
Overview

- Key elements of LCP required in a TAMP: strategy for managing each asset class by minimizing lifecycle costs while achieving targets
  - Deterioration models
  - Treatments with unit costs
  - Performance targets
  - Strategies for managing each asset class by minimizing lifecycle costs while achieving targets

- The LCP process generates performance scenarios which help guide the development of the financial plan and investment strategies

Source: FHWA Interim Guidance on Lifecycle Planning
Pavement

- Pavement data collected by APCS
- PaveM runs deterioration models
- Based on predicted condition and a set of decision trees, PaveM recommends a type of pavement project
- PaveM results are used by Caltrans districts to develop 10 year project portfolios
- PaveM results are summarized in SHSMP appendix

### Rubber Asphalt Treatment w/ Sacrificial Wearing Surface (40 Year Design)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Schedule (in Years)</th>
<th>Cost $/Lane Mile</th>
<th>Present Value (PV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Pavement</td>
<td>0</td>
<td>1,920,000</td>
<td>1,920,000</td>
</tr>
<tr>
<td>Seal Surface</td>
<td>4</td>
<td>$6,000</td>
<td>$5,129</td>
</tr>
<tr>
<td>Thin Mill &amp; Overlay</td>
<td>8</td>
<td>$152,000</td>
<td>$111,065</td>
</tr>
<tr>
<td>Seal Surface</td>
<td>12</td>
<td>$6,000</td>
<td>$3,748</td>
</tr>
<tr>
<td>Thin Mill &amp; Overlay</td>
<td>16</td>
<td>$152,000</td>
<td>$81,154</td>
</tr>
<tr>
<td>Seal Surface</td>
<td>20</td>
<td>$6,000</td>
<td>$2,738</td>
</tr>
<tr>
<td>Thin Mill &amp; Overlay</td>
<td>24</td>
<td>$152,000</td>
<td>$59,298</td>
</tr>
<tr>
<td>Seal Surface</td>
<td>28</td>
<td>$6,000</td>
<td>$2,001</td>
</tr>
<tr>
<td>Thin Mill &amp; Overlay</td>
<td>32</td>
<td>$170,000</td>
<td>$48,460</td>
</tr>
<tr>
<td>Digout, Crack Seal, &amp; Seal Surface</td>
<td>36</td>
<td>$76,000</td>
<td>$18,519</td>
</tr>
<tr>
<td>Mill &amp; Overlay</td>
<td>40</td>
<td>$325,000</td>
<td>$67,694</td>
</tr>
<tr>
<td>Digout, Crack Seal, &amp; Seal Surface</td>
<td>45</td>
<td>$76,000</td>
<td>$13,011</td>
</tr>
<tr>
<td>Thick Overlay (Rehabilitation)</td>
<td>50</td>
<td>$1,002,000</td>
<td>$140,994</td>
</tr>
<tr>
<td>Seal Surface</td>
<td>55</td>
<td>$6,000</td>
<td>$694</td>
</tr>
<tr>
<td>Thin Mill &amp; Overlay</td>
<td>60</td>
<td>$152,000</td>
<td>$14,449</td>
</tr>
</tbody>
</table>

Net PV: $2,488,954

Example lifecycle treatments and costs
Bridge

- Bridges are inspected in accordance with federal regulations
- Condition data is documented and maintained in SMART
- Bridge inspector develops work recommendations in response to any condition defects
- Work recommendations drive bridge maintenance and rehabilitation projects
- SHSMP appendix includes a network-level lifecycle model for bridges on the SHS

### Example lifecycle treatments and costs

<table>
<thead>
<tr>
<th>Activity</th>
<th>Schedule</th>
<th>Year</th>
<th>Cost</th>
<th>Present Value (PV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Construction</td>
<td></td>
<td>0</td>
<td>$3,000,000</td>
<td>$3,000,000</td>
</tr>
<tr>
<td>Methacrylate Deck</td>
<td></td>
<td>15</td>
<td>$24,400</td>
<td>$13,548</td>
</tr>
<tr>
<td>Replace Joints</td>
<td></td>
<td>30</td>
<td>$114,400</td>
<td>$35,272</td>
</tr>
<tr>
<td>Polyester Concrete Overlay</td>
<td></td>
<td>75</td>
<td>$3,000,000</td>
<td>$156,351</td>
</tr>
</tbody>
</table>

Net PV: $3,414,342

<table>
<thead>
<tr>
<th>Typical Concrete Bridge with ADT of 12,000 (5% trucks) in non-aggressive environmental zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge Width</td>
</tr>
<tr>
<td>Bridge Length</td>
</tr>
<tr>
<td>Deck Area</td>
</tr>
<tr>
<td>Rail Length</td>
</tr>
<tr>
<td>Joint Length</td>
</tr>
<tr>
<td>Replacement Area</td>
</tr>
<tr>
<td>Bridge Age</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Condition Based LCP Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>New Construction</td>
</tr>
<tr>
<td>Methacrylate Deck</td>
</tr>
<tr>
<td>Replace Joints</td>
</tr>
<tr>
<td>Polyester Concrete Overlay</td>
</tr>
</tbody>
</table>

Net PV: $3,414,342
Drainage

- Caltrans is currently inventorying all culverts on the SHS
- Culverts are inspected and assessed as good, fair, poor condition
- Culverts identified as poor are prioritized by district staff for programming
- If a culvert fails, the replacement process is accelerated
- SHSMP appendix includes a network-level lifecycle model
A large portion of the current inventory is past its expected service life and will require replacement.

Expansion of TMS inventory requires additional maintenance/operation costs

Not all components of the system will have the same installation date primarily due to different replacement methods (part of a larger project, by service contract, or by maintenance crews)

In the case of traffic signals, Caltrans owns inventory, but local agencies maintain almost a quarter of the total inventory.

SHSMP appendix includes a network-level lifecycle model

<table>
<thead>
<tr>
<th>TMS Element</th>
<th>Inventory</th>
<th>Estimated Service Life</th>
<th>Annual Estimated Maintenance and Operations (M&amp;O) Cost/Element</th>
<th>Total Estimated Annual M&amp;O Costs</th>
<th>Expected New TMS/Yr</th>
<th>Increase in Estimated Annual M&amp;O Cost/Yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed Circuit Television (CCTV)</td>
<td>2825</td>
<td>10</td>
<td>$3,800</td>
<td>$10,735,706</td>
<td>133</td>
<td>$505,433</td>
</tr>
<tr>
<td>Changeable Message Sign (CMS)</td>
<td>896</td>
<td>25</td>
<td>$5,013</td>
<td>$4,491,648</td>
<td>42</td>
<td>$210,546</td>
</tr>
<tr>
<td>Traffic Monitoring Detection Stations (Detection)</td>
<td>5216</td>
<td>25</td>
<td>$2,762</td>
<td>$14,408,731</td>
<td>246</td>
<td>$679,553</td>
</tr>
<tr>
<td>Highway Advisory Radios (HAR)</td>
<td>186</td>
<td>15</td>
<td>$5,531</td>
<td>$1,028,848</td>
<td>9</td>
<td>$49,783</td>
</tr>
<tr>
<td>Freeway Ramp Meter</td>
<td>2855</td>
<td>25</td>
<td>$4,176</td>
<td>$11,921,424</td>
<td>134</td>
<td>$559,534</td>
</tr>
<tr>
<td>Roadway Weather Information System (RWIS)</td>
<td>149</td>
<td>10</td>
<td>$4,753</td>
<td>$708,206</td>
<td>7</td>
<td>$33,271</td>
</tr>
<tr>
<td>Traffic Signals</td>
<td>6262</td>
<td>25</td>
<td>$5,110</td>
<td>$31,996,816</td>
<td>295</td>
<td>$1,507,356</td>
</tr>
<tr>
<td>Traffic Census Stations (CENSUS)</td>
<td>128</td>
<td>20</td>
<td>$1,953</td>
<td>$249,999</td>
<td>6</td>
<td>$11,719</td>
</tr>
<tr>
<td>Extinguishable Message Signs (EMS)</td>
<td>539</td>
<td>25</td>
<td>$1,723</td>
<td>$928,950</td>
<td>25</td>
<td>$43,087</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>19056</strong></td>
<td></td>
<td><strong>$34,822</strong></td>
<td><strong>$76,470,328</strong></td>
<td><strong>897</strong></td>
<td><strong>$3,600,282</strong></td>
</tr>
</tbody>
</table>

Average Estimated Maintenance & Operations Costs include materials, equipment, training, lifecycle, and support costs. Does not include energy costs.

Assumed M&O costs for traffic signals are the same for state and local.
Key Assumptions for Modeling Local NHS Pavements

- **Deterioration rate (% per year)**
  - Good to Fair: 8.78%
  - Fair to Poor: 3.37%

- **Treatment costs for locals taken from the local needs report**
  - $21.10/sq. yd. for thin overlays
  - $31.50/sq. yd. for thick overlays
  - $70.60/sq. yd. for reconstruction

- Fair pavements typically receive a thin overlay, poor pavements typically receive a thick overlay
- Over the 10-year period a pavement section will remain in good condition once fixed
Key Assumptions for Modeling Local NHS Bridges

- **Deterioration rate (% per year)**
  - Good to Fair: 0.45%
  - Fair to Poor: 0.75%

- **Treatment costs taken from the local needs report**
  - $344/sq. ft. to fix fair bridges
  - $380/sq. ft. to fix poor bridges
  - $500/sq. ft. for new bridges

- **Deterioration rates reflect effects of routine maintenance work to address issues identified through bridge inspections**

- **Over the 10-year period a bridge will remain in good condition once fixed**
Lifecycle Planning Maturity Model

- **LEVEL 1**: Single Asset Based Needs
- **LEVEL 2**: Project Level LCCA
- **LEVEL 3**: Corridor LCP
- **LEVEL 4**: Network Level LCP

Focus on Optimized Funding vs. Focus on Critical Need

Ability to Strategic Investment vs. Focus of Performance

Compliance/Asset Based/Short-term Focus vs. Network/Long-term Focus
Group Discussion

- Are the treatments for modeling local NHS pavements and bridges reasonable?
  - *Caltrans requires Rubber Asphalt treatment as first option for asphalt surfaces. What about for local NHS?*
- Are the unit costs for modeling local NHS pavements and bridges reasonable?
- Where is more work needed?
Building the California TAMP Workshop

Financial Plan & Investment Strategies
SB1 Revenue Distribution

New Revenues

- Diesel Excise Tax: 20 Cent Increase, Effective Nov. 2017, $600M
- Gasoline Excise Tax: 12 Cent Increase, Effective Nov. 2017, $1.09B
- Zero-Emission Vehicles Road Improvement Fee: $100 Per Vehicle, Effective Jul. 2020, $19M
- Transportation Improvement Fee: $25 to $75 Per Vehicle, Effective Jan. 2018, $1.63B
- Diesel Sales Tax: 4% Increase, Effective Nov. 2017, $15S M

Increases to Existing Revenues

- Price-Based Excise Tax: 17.3 Cent Reset + CPI, Effective Jul. 2019, $250M
- Gasoline Excise Tax: CPI Adjustment, Effective Jul. 2020, $201M
- Diesel Excise Tax: CPI Adjustment, Effective Jul. 2020, $128M

Trade Corridor Enhancement Account
- Local Partnership Program $900M
- Active Transportation $100M
- Bridges & Communities $400M
- Workforce Development $5M
- Local Planning Grant $45M
- US or California Research $7M
- Remaining for SHAGP $1.22B
- Remaining for SST $1.22B
- $300M

Road Maintenance & Rehabilitation Account
- Local Partnership Program $900M
- Active Transportation $100M
- Bridges & Communities $400M
- Workforce Development $5M
- Local Planning Grant $45M
- US or California Research $7M
- Remaining for SHAGP $1.22B
- Remaining for SST $1.22B
- $3.21B

Public Transportation Account
- TIRCA $300M
- State Transit Assistance $478M
- Intercity and Commuter Rail $44M
- $769M

State Highway Account
- Maintenance & SHAGP $268M
- STIP $110M
- Congested Corridors $250M
- Freeway Service Patrol $25M
- $653M

Local Streets & Roads
- $254M

Note: Amounts may not sum to totals due to independent rounding.
Figures are averages based on the Department of Finance’s 10-year projection.
1. Totals include one-time fees from representatives of $235M for SHAGP, $215M for Local Streets & Roads, $356M for TIRCA
2. Annual appropriation of $5M for 5 years through fiscal year 2021-22
3. Remaining EXMA balance distributed equally between state and local priorities
4. Portion attributable to self-frastructure vehicles is included in the top priority for federal distribution
5. Total includes annual transfer of $20M for Freeway Service Patrol (SHA)
Estimating Local Pavement and Bridge Spending (pre-SB 1) Distribution

- **FHWA Highway Statistics**
  - $10.0 billion in 2014
  - $6.5 billion for capital and maintenance and operations

- **California Statewide Local Streets and Road Needs**
  - Projects annual spending over next 10 years for pavement, bridges and other essential items
  - $1.98 billion annually for pavement
  - $0.29 billion annually for bridges
  - $1.11 billion annually for essential items
Estimating Local NHS Spending (pre-SB 1)

- Estimated local spending based on portion of the local system on the NHS

- Key figures
  - 5% of local system lane miles are on the NHS
  - 32% of local system bridge area is on the NHS

- Applying these percentages to estimated annual local agency spending on the NHS is approximately
  - $99 million for pavement
  - $93 million for bridges
Estimating Local NHS Spending with SB 1

- SB 1 projected to add ~$1.22 billion per year for local roads and bridges

- Applying same percentages as the previous slide estimated annual local agency spending on the NHS is approximately
  - $134 million for pavement (increase of $35 million)
  - $127 million for bridges (increase of $34 million)
## 10-Year Estimate of Asset Management Funding Uses on the NHS ($M)

<table>
<thead>
<tr>
<th></th>
<th>Pavement</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>State</td>
<td>Local</td>
<td>State + Local</td>
<td></td>
</tr>
<tr>
<td>Pre-SB1</td>
<td>$9,545</td>
<td>$990</td>
<td>$10,535</td>
<td></td>
</tr>
<tr>
<td>SB1</td>
<td>$8,527</td>
<td>$360</td>
<td>$8,887</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$18,072</td>
<td>$1,350</td>
<td>$19,422</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bridge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>State</td>
<td>Local</td>
<td>State + Local</td>
<td></td>
</tr>
<tr>
<td>Pre-SB1</td>
<td>$2,386</td>
<td>$930</td>
<td>$3,316</td>
<td></td>
</tr>
<tr>
<td>SB1</td>
<td>$3,256</td>
<td>$340</td>
<td>$3,596</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$5,642</td>
<td>$1,270</td>
<td>$6,912</td>
<td></td>
</tr>
</tbody>
</table>
Group Discussion

- Are the local NHS spending assumptions reasonable?
- How much SB1 funding will agencies allocate to NHS pavements?
- How much SB1 funding will agencies allocate to NHS bridges?
Investment Strategies

“A set of strategies that result from evaluating various levels of funding to achieve State DOT targets for asset condition and system performance effectiveness at a minimum practicable cost while managing risks.”

- California Strategies
  - Fix It First
  - Leverage Investments (to support broader goals)
  - Focus on Selected Asset Classes
Fix It First

- Aligning with Caltrans current Strategic Plan and the 2017 State Highway Strategic Management Plan
  - Improve or preserve existing assets rather than capacity expansion
- SHOPP Investment Plan follows a “Fix It First” strategy
- Caltrans spends significantly more on SHOPP than STIP ($3.2B for SHOPP vs $472M for STIP in FY2018)
- SB1 created funds specifically for rehabilitation and preservation
  - $1B annual for pavement and TMS
  - $400M annual for bridges and drainage
Leverage Investments

- Support full range of California goals
  - Project not designed to only support asset improvement and preservation but also to support broader goals

- Investments made based on current and projected inventory, current condition, programmed work, expected deterioration rates, mandated funding levels, risks of inaction, historic investment levels, and the varying importance of preservation and rehabilitation needs

- Performance targets calculated for each of the objectives in the broader goal areas
Focus on Select Asset Classes

- California Transportation Commission designated focus areas
  - Pavements
  - Bridges
  - Drainage
  - TMS

- SHSMP includes 10 year needs for assets beyond the four focus areas

- SB1 has funding designated for other assets
Local Strategies

Local investment strategies detailed in the 2016 Local Streets and Roads Needs Assessment:

- **Sustainable Pavement Practices**
  - Sustainable pavement practices include reclaimed or recycled pavements. These technological efficiencies can result in cost savings, environmental benefits, increased pavement life, and other benefits

- **Complete Streets**
  - Many local agencies have adopted Complete Streets policies, requiring that roadways are designed for all users. This ensures that investment in local pavements and bridges will make progress towards broad California transportation goals
Group Discussion

- Given agency budgets, what strategies are being used to get the most out of funding?
- What are investment strategies for local NHS pavements and bridges?
Building the California TAMP Workshop

Risk Management
Risk Management

“The processes and framework for managing potential risks, including identifying, analyzing, evaluating, and addressing the risks to assets and system performance.”

- This includes the following risks
  - Assets will deteriorate faster than expected
  - Projects will cost more than budgeted
  - Asset failure caused by factors such as natural disasters
  - Weather-related risks
# Risk Register

<table>
<thead>
<tr>
<th>ID</th>
<th>Category</th>
<th>Sub Category</th>
<th>Risk Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Asset Performance</td>
<td>Congestion</td>
<td>If SHOPP is not modified to better reflect impact of congestion, then projects that improve mobility may receive less funding.</td>
</tr>
<tr>
<td>2</td>
<td>Asset Performance</td>
<td>Congestion</td>
<td>If we don’t take substantive steps to improve degraded HOV lanes, then we may be sanctioned by FHWA.</td>
</tr>
<tr>
<td>3</td>
<td>Asset Performance</td>
<td>Technology</td>
<td>If pavement technology were embraced such as pre-cast panels then we may minimize the impact to traffic, and save money in long range because of lessened traffic delays.</td>
</tr>
<tr>
<td>4</td>
<td>Business Operations</td>
<td>Program Management</td>
<td>If we continue to have outdated or inconsistent guidance material that does not address quality, then we may lack uniformity in administering contracts, increase construction costs, contribute to inefficient operations, and foster a nonstandard application of policy.</td>
</tr>
<tr>
<td>5</td>
<td>Business Operations</td>
<td>Program Management</td>
<td>If we do not respond to Level of Service service requests in a timely manner and create a maintenance work order, then the department is at risk of potential tort liability.</td>
</tr>
<tr>
<td>6</td>
<td>Business Operations</td>
<td>Technology</td>
<td>If IT security is unable to modify current controls to allow access to innovative technology, then Caltrans may be unable to meet customer and stakeholder expectations.</td>
</tr>
<tr>
<td>7</td>
<td>External Threats</td>
<td>Regulations</td>
<td>If legislation on environmental GHG reduction, MAP 21, local bylaws, etc continue to be implemented, then may see better use of roads that is fair for everyone.</td>
</tr>
</tbody>
</table>
Risk Mitigation Plan

- TAMP rule requires an approach for addressing the top priority risks in the TAMP Risk Register

- Below is an example entry in a Risk Mitigation Plan

<table>
<thead>
<tr>
<th>#</th>
<th>Risk</th>
<th>Action</th>
<th>Owner</th>
<th>Completion Date</th>
<th>First Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bridge vulnerability</td>
<td>Conduct an assessment of bridge vulnerability</td>
<td>State DOT Bridge Group</td>
<td>1/1/18</td>
<td>Review existing bridge evaluation tools / methodologies  Select factors for assessment of bridge vulnerability</td>
</tr>
</tbody>
</table>
Group Discussion

- What should be included in the risk mitigation plan?
- Of the eight TAM risks with identified mitigation actions, which will have the greatest impact on the TAMP?
Improvement Initiatives Exercise

- Organize into the following groups with at least one MPO/local agency representative in the group (see assignments in handout)
  - Life Cycle Planning and Management for All Assets
  - Connecting the Planning and Programming Process with the TAMP
  - Evaluating Risk in a Constrained Budget Environment
  - Financial Plan
  - Data Management and Accessibility
  - Partnerships and Communication Between State and Local Entities
  - Investment Decision Making
  - Linking TAM with Overall Transportation Objectives

- Assign a scribe and a reporter
Improvement Initiatives Exercise

Assignment:

1. Discuss the desired vision for practice in the foreseeable future
2. Identify improvement actions that will result in the desired vision
3. Prioritize a set of at least three improvement initiatives that should be undertaken to improve TAM
4. Use handout with a candidate set of improvement initiatives from previous workshops as a resource

- Use the exercise template to record the group discussion and results
- Report group recommendations
Groups

1. Life Cycle Planning and Management for All Assets
2. Connecting the Planning and Programming Process with the TAMP
3. Evaluating Risk in a Constrained Budget Environment (3A)
4. Evaluating Risk in a Constrained Budget Environment (3B)
5. Financial Plan
6. Data Management and Accessibility
7. Partnerships and Communication Between State and Local Entities
8. Linking TAM with Overall Transportation Objectives
Initiatives Prioritization

- Use the colored dots to rank the TOP THREE TAM improvement initiatives
- Place your dots next to your selections
- Use the extra sticker to cast your vote for the “low-hanging fruit” improvement
Composing the TAMP Story
Large Group Exercise

Building the California TAMP Workshop
Composing the TAMP Story

- Individually generate a list of key messages that need to be communicated to your constituencies in the TAMP
  - Use large sticky paper for each message

- Use the messages to compose the story
  - Everyone uses the sticky paper to cluster messages and orders them in the sequence that the story should be told
Example Messages

“California assets are in great shape!”

“We need to improve the condition of our local pavements and bridges on the NHS.”

“Greater collaboration between Caltrans and local agencies is needed to have a unified view of assets.”

“The additional funds from SB1 is going to help us address the gap between asset needs and asset funding.”

“The link between asset condition and other transportation objectives like mobility, safety, and sustainability needs to be strengthened.”
Summary of Workshop Results and Next Steps
TAMP Development Roadmap

Phase 1 – Setting the Approach and Baseline
- Kick-Off Meeting
- Document Review
- Establish Analysis Scope
- Asset Inventory and Condition

Phase 2 – Setting the Strategic Direction
- Asset Performance Forecasts
- Vision and Direction Workshop
- Risk Management Workshop
- Financial Plan and Investment Strategies Workshop
- Target-Setting Workshop

Phase 3 – Producing the TAMP
- Draft TAMP Components
- TAMP Building Workshop
- Draft TAMP

First Federal Deadline: April 2018