Communicating Maintenance Needs Through a Transportation Asset Management Plan

Presented by: Katie Zimmerman, P.E.

Presented at: 2016 SCOM Pavement TWG Meeting
Presentation Topics

• Introduction to a Transportation Asset Management Plan (TAMP)
• Strategies for Communicating Maintenance Needs
• Information Needed
MAP-21 TAMP Requirements

• State Performance Management-

• (1) IN GENERAL- A State shall develop a risk-based asset management plan for the National Highway System to improve or preserve the condition of the assets and the performance of the system.
• **(4) PLAN CONTENTS-** A State asset management plan shall, at a minimum, be in a form that the Secretary determines to be appropriate and include--
  
  – (A) a summary listing of the pavement and bridge assets on the National Highway System in the State, including a description of the condition of those assets;
  
  – (B) asset management objectives and measures;
  
  – (C) performance gap identification;
  
  – (D) lifecycle cost and risk management analysis;
  
  – (E) a financial plan; and
  
  – (F) investment strategies.
A TAMP Helps Tell Your Story & Align Decisions

- The TAMP outlines current asset management practices, long term revenue forecasts, 10-year investment strategies, and planned improvements to business processes

Agency Goals → Investment Strategies → Improvement Programs

DECISIONS ALIGNED AT ALL LEVELS
Showcasing Maintenance in a TAMP

- Raising the Profile of Maintenance
Showcasing a Focus on Preservation

93%

We spend 93% of our time and resources taking care of what we have.
Strategies For Communicating Maintenance Needs

• Whole Life (or Life Cycle) Costing
• Risk Assessment
• Investment Strategies
• Financial Metrics
Whole Life Costing

- Intended to show that agencies are managing assets cost-effectively
- Provides an opportunity to show the importance of maintenance to preserve asset conditions
- Also provides a way to show future maintenance needs associated with system expansion
Importance of Maintenance

A regular schedule of **BRIDGE PRESERVATION** activities, such as a program where 5% of NHS bridges receive a capital preservation treatment yearly and other bridges are addressed with routine maintenance (such as deck patching, washing, and sweeping), could lead to $50M in yearly savings once a steady state condition is achieved.
Future Maintenance Costs

For every $1 invested in a new mile of road, future maintenance costs range from $1.11 to $2.87 over the analysis period.

From Minnesota DOT TAMP
Future Maintenance Costs

For every $1 invested in a new culvert, future maintenance costs range from $4.43 to $6.58 over the analysis period.

From Minnesota DOT TAMP
## Risks

- Risks should be linked to investment strategies

<table>
<thead>
<tr>
<th>Impact Ratings</th>
<th>Rare (1)</th>
<th>Unlikely (2)</th>
<th>Moderate (3)</th>
<th>Likely (5)</th>
<th>Almost Certain (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catastrophic (5)</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>Extreme</td>
<td>Extreme</td>
</tr>
<tr>
<td>Major (4)</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>Extreme</td>
</tr>
<tr>
<td>Moderate (3)</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Minor (2)</td>
<td>Very Low</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Insignificant (1)</td>
<td>Very Low</td>
<td>Very Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>
Sample Risks Impacting Maintenance

Key Risks:

- **Immediate**
  - Flattened revenues: 15%
  - Changing workforce: 4%
  - Extraordinary weather events: 16%

- **By 2021**
  - 35% will retire

Price volatility
Summary of 10-Year Investments

Total 10-year funding: $1.28 Billion

- Pavement Preservation ($785M, 61%)
- District Maintenance Projects ($262M, 20%)
- Bridges ($115M, 9%)
- Operating Category Betterment Supplies ($94M, 7%)
- TAMP ITS Assets ($36M, 3%)
## Investment Strategies

**Figure ES-9: Targets and Planned or Needed Investment to Achieve Targets**

<table>
<thead>
<tr>
<th>ASSET</th>
<th>CURRENT CONDITION</th>
<th>TARGET RECOMMENDATION</th>
<th>INVESTMENT*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pavement: Interstate</td>
<td>2.4% Poor</td>
<td>≤ 2% Poor</td>
<td>$392 million</td>
</tr>
<tr>
<td>Pavement: Non-Interstate NHS</td>
<td>4.3% Poor</td>
<td>≤ 4% Poor</td>
<td>$1.13 billion</td>
</tr>
<tr>
<td>Pavement: Non-NHS</td>
<td>7.5% Poor</td>
<td>≤ 10% Poor</td>
<td>$1.38 billion</td>
</tr>
</tbody>
</table>

**Pavement: Total**

<table>
<thead>
<tr>
<th>ASSET</th>
<th>NA</th>
<th>NA</th>
<th>$2.9 billion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge: NHS</td>
<td>4.7% Poor</td>
<td>≤ 2% Poor</td>
<td>$1.10 billion</td>
</tr>
<tr>
<td>Bridge: Non-NHS</td>
<td>2.1% Poor</td>
<td>≤ 8% Poor</td>
<td>$430 million</td>
</tr>
</tbody>
</table>

**Bridge: Total**

<table>
<thead>
<tr>
<th>ASSET</th>
<th>NA</th>
<th>NA</th>
<th>$1.53 billion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic Infrastructure: Highway Culverts</td>
<td>10% Poor; 6% Very Poor</td>
<td>≤ 8% Poor; ≤ 3% Very Poor</td>
<td>$400 million</td>
</tr>
<tr>
<td>Hydraulic Infrastructure: Deep Stormwater Tunnels</td>
<td>39% Poor; 14% Very Poor</td>
<td>≤ 8% Poor; ≤ 3% Very Poor</td>
<td>$35 million (condition) + $1.6 million (inspection)</td>
</tr>
<tr>
<td>Other Traffic Structures: Overhead Sign Structures</td>
<td>6% Poor; 8% Very Poor</td>
<td>≤ 4% Poor; ≤ 2% Very Poor</td>
<td>$8 million</td>
</tr>
</tbody>
</table>

From Minnesota DOT TAMP
Investment Strategies

Reducing overall life cycle costs of maintaining pavements, bridges, and culverts requires:

- Increased preservation activities
- A unified approach to maintenance and capital planning

Projected Funding Through 2021

- Pavements: $120 million
- Bridges: $4.432 billion
- Culverts: $2.629 billion

Goals Through 2021

- Priority System CSF: 85
- General System CSF: 80
- General Appraisal CSF: 6.8
  - Percent in Fair or better condition: 98%
- 95% in Fair or better condition
Financial Metrics

- Asset Value

**Figure ES-3: Replacement Cost by Asset Category**

<table>
<thead>
<tr>
<th>ASSET CLASS</th>
<th>REPLACEMENT COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pavements</td>
<td>$29.5 billion</td>
</tr>
<tr>
<td>Bridges (includes large bridges and culverts greater than 10 feet)</td>
<td>$6.6 billion</td>
</tr>
<tr>
<td>Hydraulic Infrastructure: Highway Culverts</td>
<td>$1.7 billion</td>
</tr>
<tr>
<td>Hydraulic Infrastructure: Deep Stormwater Tunnels</td>
<td>$300 million</td>
</tr>
<tr>
<td>Other Traffic Structures: Overhead Sign Structures</td>
<td>$200 million</td>
</tr>
<tr>
<td>Other Traffic Structures: High-Mast Light Tower Structures</td>
<td>$19 million</td>
</tr>
</tbody>
</table>

From Minnesota DOT TAMP
## Financial Metrics

- **Annualized Costs**

Figure ES-7: Asset Annualized Life-Cycle Costs

<table>
<thead>
<tr>
<th>ASSET CLASS</th>
<th>ANNUALIZED COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pavements</td>
<td>$12,000 per lane-mile</td>
</tr>
<tr>
<td>Bridges: Large Bridges</td>
<td>$16,000 per bridge</td>
</tr>
<tr>
<td>Bridges: Culverts 10 feet or greater</td>
<td>$1,300 per large culvert</td>
</tr>
<tr>
<td>Hydraulic Infrastructure: Highway Culverts</td>
<td>$150 per small culvert</td>
</tr>
<tr>
<td>Hydraulic Infrastructure: Deep Stormwater Tunnels</td>
<td>$30,000 per mile of tunnel</td>
</tr>
<tr>
<td>Other Traffic Structures: Overhead Sign Structures</td>
<td>$900 per structure</td>
</tr>
<tr>
<td>Other Traffic Structures: High-Mast Light Tower Structures</td>
<td>$400 per structure</td>
</tr>
</tbody>
</table>

From Minnesota DOT TAMP
Financial Metrics

- Asset Sustainability Ratio (ratio of investment level to annual depreciation)

Are you investing at levels to offset annual depreciation?

Investment Level

Annual Depreciation
Information Needed

• Actual or estimated inventory
• Assessment of performance
  – Condition
  – Age
• Estimate of amount of work being done
• Cost information
Questions?

- For more information, contact:
  - Katie Zimmerman, APTech
  - kzimmerman@appliedpavement.com
  - (217) 398-3977