Twin Cities
Highway Mobility Needs Analysis

Metropolitan Council TAC Funding & Programming
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Consulting Team:
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Texas A&M Transportation Institute (TTI)
Associated Consulting Services (ACS)
• The Minnesota Department of Transportation (MnDOT) and the Metropolitan Council are developing a performance-based approach to mobility investment on highways in the Twin Cities.

• This approach:
  – Sets a **highway mobility target**
  – Estimates a 20-year capital **investment need** on metro-area state highways.
Project approach

- Frame the issue
- Evaluate the risks
- Select measures and targets
- Identify investment needs
- Model performance outcomes

ITERATIVE
Target recommendation

Use a Twin Cities Highway Mobility target of 40-hours of annual delay per person to calculate MnDOT’s 20-year investment needs on the state highway system.

<table>
<thead>
<tr>
<th>Target Value</th>
<th>40-hours annual delay per person</th>
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<tbody>
<tr>
<td>Change from 2018</td>
<td>10%</td>
</tr>
<tr>
<td>Change from 2040 base</td>
<td>25%</td>
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<tr>
<td>20-year cost</td>
<td>$4 to $6 billion</td>
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</table>
Project background
Planning Context

• Twin Cities highway mobility …
  – Requires coordinated, collaborative planning at the local, state, and federal levels
  – Is not currently guided by a performance target
Transportation Policy Plan 2040
Investment Priorities for Highway Mobility

1. Travel Demand Management (TDM)
2. Traffic Management Technologies
3. Spot Mobility (Lower Cost/High Benefit)
4. MnPASS
5. Strategic Capacity Enhancements (e.g., new interchanges or lanes)

These investment principles were used throughout the project.
Connection to Regional Solicitation

– To meet state and federal performance measures, MnDOT has shifted most of its capital resources to asset preservation.
– As a result, metro cities and counties have assisted in the planning and partial funding of highway mobility projects on MnDOT’s system.
– Since the Regional Solicitation redesign, 10 different cities and all 7 counties have been awarded funding for highway mobility projects on MnDOT’s system (primarily new interchanges).
– Typically, the Regional Solicitation pays 1/3 of the project cost, the local city/county 1/3, and MnDOT 1/3.
– The Regional Solicitation helps make these locally-led, multi-agency, partnership projects possible.
Minnesota State Highway Investment Plan (MnSHIP)

• Sets direction (i.e., spending targets) for capital investment on the state highway system for a 20-year period

• Measures used to define need and project outcomes under alternative spending levels
## MnSHIP Investment Categories

<table>
<thead>
<tr>
<th>Investment Category</th>
<th>Performance Measure</th>
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</thead>
<tbody>
<tr>
<td>Pavement Condition</td>
<td>Share of system with Poor ride quality</td>
</tr>
<tr>
<td>Bridge Condition</td>
<td>Share of bridges in Poor condition</td>
</tr>
<tr>
<td>Roadside Infrastructure Condition</td>
<td>Share of other assets (e.g., culverts, signs, etc.) in Poor condition</td>
</tr>
<tr>
<td>Accessible Pedestrian Infrastructure</td>
<td>Share of sidewalks, curb ramps and signalized intersections meeting ADA standards</td>
</tr>
<tr>
<td>Traveler Safety</td>
<td>Traffic fatalities; serious injuries; fatal and serious injury crash rates</td>
</tr>
<tr>
<td>Twin Cities Highway Mobility</td>
<td>TBD</td>
</tr>
</tbody>
</table>
2017 MnSHIP approach to Twin Cities Highway Mobility

- Performance outcomes expressed in terms of strategy implementation
- Delay and reliability referred to as risks
- Performance level 4 (highest level) set at $4.5 billion over 20 years
Assign measure goals

Why measure system performance in terms of delay per capita?

• Simple
• Relatable at the regional, corridor, project and person-level
• Responsive to MnDOT/Met Council highway investment strategies
• Supportive of economic analyses
• Captures the extent to which highway mobility contributes to broader transportation goals
Modeled Results – Average Annual Delay

Delay per person per yearly workdays (in hours)

- Year 2018: 42.0 hours
- 2040 No Investment: 55.0 hours
- 2040 Current Revenue: 50.7 hours
- 2040 Increased Revenue: 45.9 hours
- 2040 Beyond Increased Revenue 1: 43.3 hours
- 2040 Beyond Increased Revenue 2: 39.5 hours
Modeled Results – Job Access

Number of Jobs Accessible to the Average Twin Cities Resident by Auto in 30 minutes (7-8am)

- Year 2018: 735,000
- 2040 No Investment: 735,000
- 2040 Current Revenue: 802,000
- 2040 Increased Revenue: 846,000
- 2040 Beyond Increased Revenue 1: 904,000
- 2040 Beyond Increased Revenue 2: 923,000
Modeled Results – Vehicle Miles Traveled

* Modeled results do not account for impacts of additional transportation investment on land use
Peak hour Travel Time Index for major freight movements

CONGESTED TIME / FREE FLOW TIME

2040 Current Revenue 2040 Increased Revenue 2040 Beyond Increased Revenue 1 2040 Beyond Increased Revenue 2

AM Peak Hour (7 - 8 AM) PM Peak Hour (4 - 5 PM)
Equity analysis

• How does job access of equity populations change under each funding scenario, in absolute terms and in relation to the region as a whole?
  o The number of additional jobs accessible due to the highway mobility investment was similar across income, race, and ethnic groups.

• What is the impact of each funding scenario on transit delay?
  o Transit delay decreased as highway mobility investment increased.
Telecommute Sensitivity Analysis

• Illustrative examples developed to understand outcomes at different levels of telecommuting

• Identify mobility needs with an additional 10%, 20%, and 30% Telecommuting

• Increasing telework participation reduces the need for capital investment to meet the performance target.
Twin Cities Highway Mobility Target Recommendation
Target recommendation

Use a Twin Cities Highway Mobility target of 40-hours of annual delay per person to calculate MnDOT’s 20-year investment needs on the state highway system.
Twin Cities Highway Mobility Performance Levels

- Zero Revenue (PL0)
- Current Revenue (PL1)
- Increased Revenue (PL2)
- Beyond Increased Revenue 1 (PL3)
- Beyond Increased Revenue 2 (PL4)
# Performance Level Information

*Relative to 2040 TPP Current Revenue Scenario*

<table>
<thead>
<tr>
<th></th>
<th>PL0</th>
<th>PL1</th>
<th>PL2</th>
<th>PL3</th>
<th>PL4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
<td>No additional investment</td>
<td>Maintain current investment</td>
<td>Limit growth in congestion</td>
<td>Sustain regional Mobility</td>
<td>Improve regional mobility</td>
</tr>
<tr>
<td><strong>20-year investment</strong></td>
<td>$0</td>
<td>$1 - $2 billion</td>
<td>$2 – $3 billion</td>
<td>$3.5 – $5.5 billion</td>
<td>$4 – $6 billion</td>
</tr>
<tr>
<td><strong>Delay per capita</strong></td>
<td>56 hours per person/per year</td>
<td>52 hours per person/per year</td>
<td>48 hours per person/per year</td>
<td>44 hours per person/per year</td>
<td>40 hours per person/per year</td>
</tr>
<tr>
<td><strong>Travel time savings</strong></td>
<td>-4 hours (5%) per person/per year</td>
<td>N/A</td>
<td>4 hours (5%) per person/per year</td>
<td>8 hours (15%) per person/per year</td>
<td>12 hours (25%) per person/per year</td>
</tr>
<tr>
<td><strong>20-year benefit from travel time savings</strong></td>
<td>- $2 billion</td>
<td>N/A</td>
<td>$2 billion</td>
<td>$5 billion</td>
<td>$8 billion</td>
</tr>
<tr>
<td><strong>Job access benefits</strong></td>
<td>-60,000 jobs accessible by auto within 30 minutes (AM peak)</td>
<td>N/A</td>
<td>+ 40,000 jobs accessible by auto within 30 minutes (AM peak)</td>
<td>+ 80,000 jobs accessible by auto within 30 minutes (AM peak)</td>
<td>+120,000 jobs accessible by auto within 30 minutes (AM peak)</td>
</tr>
<tr>
<td><strong>GHG emissions</strong></td>
<td>Slight decrease (0 – 2.0%)</td>
<td>N/A</td>
<td>Slight increase (0 – 2.0%)</td>
<td>Slight increase (0 – 2.0%)</td>
<td>Slight increase (0 – 2.0%)</td>
</tr>
<tr>
<td><strong>Risk of not reaching target</strong></td>
<td>High</td>
<td>High</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Low</td>
</tr>
</tbody>
</table>
Next steps
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– Use performance data and outcomes in MnSHIP process
– Congestion Management Process Handbook (ongoing)
– Electric Vehicle Planning Study (ongoing)
– TDM Study (fall 2021 start)
– Principal Arterial Intersection Conversion Study Update (late 2021 start)
– Transportation and GHG Measures (2022 start)
– Review Regional Approach to Congestion/TPP Goals (late 2022 start)
More information

• Project website: metrocouncil.org/mobility

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