Twin Cities
Highway Mobility Needs Analysis

TAC Planning
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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
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.
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
  – Helps to make strategic decisions based on data and to focus limited resources on the highest priorities
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) (e.g., roundabouts or turn lanes)
4. MnPASS
5. Strategic Capacity Enhancements (e.g., new interchanges or lanes)

These investment principles were used throughout the project and contributed to the positive outcomes that were identified.
Connection to Regional Solicitation

– 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>
</tr>
</thead>
<tbody>
<tr>
<td>Pavement Condition</td>
<td>Share of system with Poor ride quality</td>
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<tr>
<td>Bridge Condition</td>
<td>Share of bridges in Poor condition</td>
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<tr>
<td>Roadside Infrastructure Condition</td>
<td>Share of other assets (e.g., culverts, signs, etc.) in Poor condition</td>
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<tr>
<td>Accessible Pedestrian Infrastructure</td>
<td>Share of sidewalks, curb ramps and signalized intersections meeting ADA standards</td>
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<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>
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
- 2040 No Investment: 55.0
- 2040 Current Revenue: 50.7
- 2040 Increased Revenue: 45.9
- 2040 Beyond Increased Revenue 1: 43.3
- 2040 Beyond Increased Revenue 2: 39.5
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
Vehicle Miles Traveled 2040 Modeling

• Follows methodology used in the 2040 Transportation Policy Plan (TPP).
• Population growth (+500,000 more people by 2040) is the primary driver of VMT.
• Accounts for some level of induced demand (e.g., an interchange is built and now a person can reach a new job two miles further away in the same amount of time as before the improvement).
• Uses 2040 regional land use allocations by city as approved by the Met Council and shown in approved, local comprehensive plans.
• Holds 2040 land use constant.
• Modeling uses EPA’s MOVES model for assumptions for the rate of EV adoption and future fuel efficiency standards as it relates to emissions.
Freight Bottlenecks Addressed

- 2040 Current Revenue: 39%
- 2040 Increased Revenue: 65%
- 2040 Beyond Increased Revenue 1: 90%
- 2040 Beyond Increased Revenue 2: 95%
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 15%, 25%, and 35% telecommuting
  – Pre-COVID, 5% of workers telecommuted at least one time per month.
  – Peak of COVID, 35% of workers telecommuted at least one time per month

• 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

<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 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>

* Relative to 2040 TPP
Current Revenue Scenario

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*Travel time savings* - 4 hours (5%) per person/per year

*Job access benefits* - 60,000 jobs accessible by auto within 30 minutes (AM peak)

*GHG emissions* - Slight decrease (0 – 2.0%)
Next steps
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– Use mobility performance data and outcomes in MnSHIP
– Congestion Management Process Handbook (ongoing)
– Electric Vehicle Planning Study (ongoing)
– Travel Demand Management Study (fall 2021 start)
– Regional Transportation and Climate Change Measures (2022 start)
– Equity Study (fall 2021 start)
– Principal Arterial Intersection Conversion Study Update (late 2021 start)
– TPP Goals, including a review of the Regional Approach to Congestion (late 2022 start)
More information

• Project website: metrocouncil.org/mobility

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