

Twin Cities Highway Mobility Needs Analysis

Metropolitan Council TAC Funding & Programming
May 20, 2021

Consulting Team:

SRF Consulting Group

Sambatek, Inc.

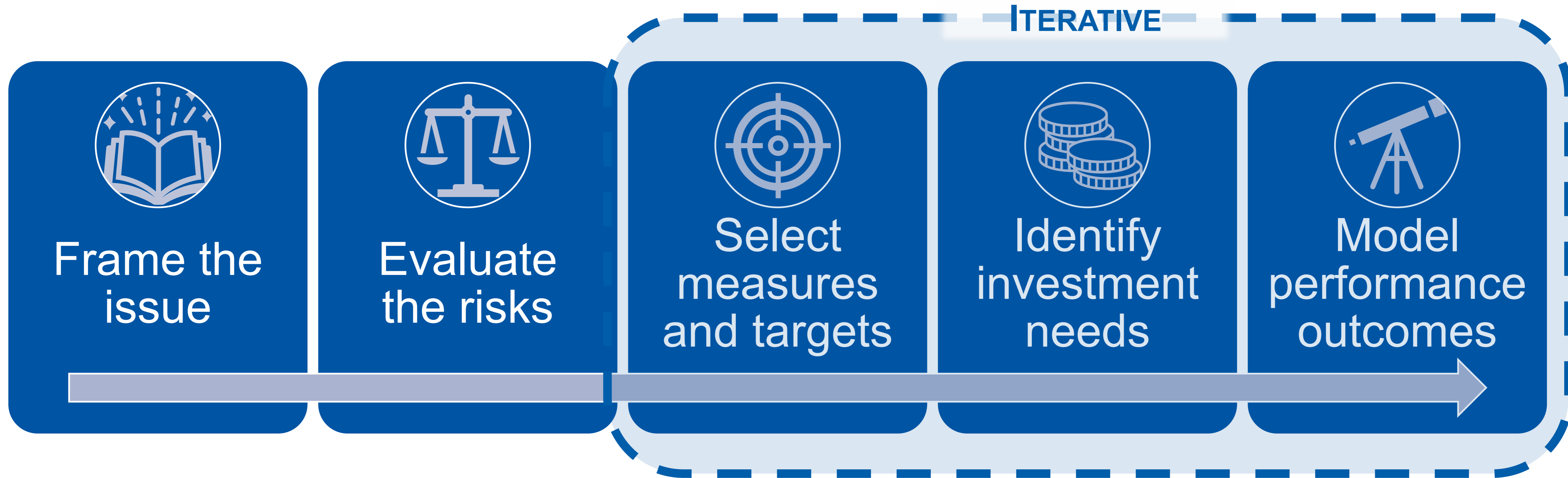
Texas A&M Transportation Institute (TTI)

Associated Consulting Services (ACS)

Project overview



- 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



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

Target Value	40-hours annual delay per person
Change from 2018	 10%
Change from 2040 base	 25%
20-year cost	\$4 to \$6 billion

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



Stewardship | Prosperity
Equity | Livability
Sustainability

Maximize the health of
people, the environment
and the economy

- Transportation System Stewardship
- Safety and Security
- Access to Destinations
- Competitive Economy
- Heathy and Equitable Communities

- Open Decision-Making
- Transportation Safety
- Critical Connections
- System Stewardship
- Heathy Communities

Outcome Measures
Access | Travel Time | Emissions

Performance Measure
Delay per capita

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)

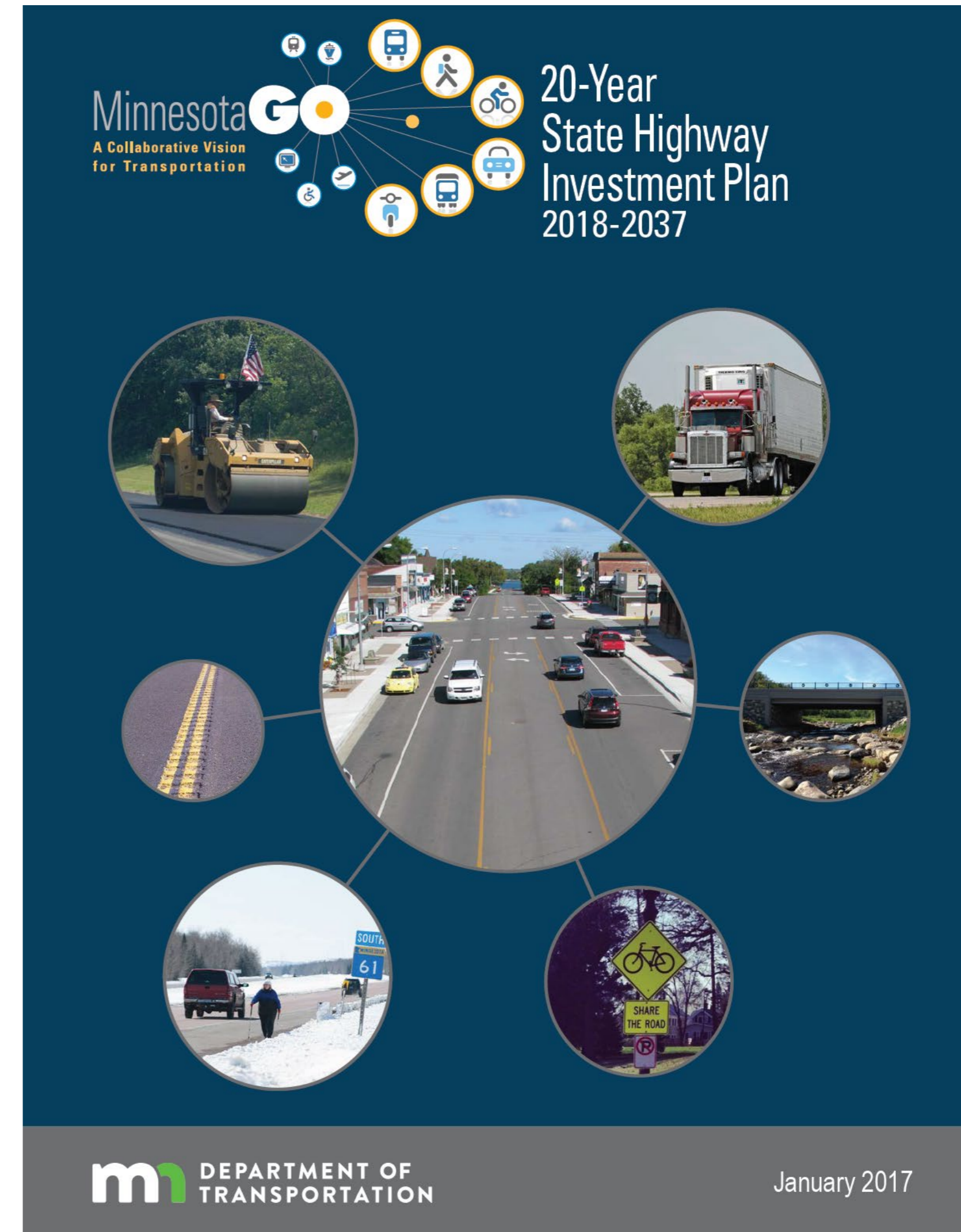
These investment principles were used throughout the project.

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

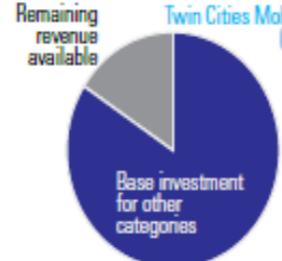
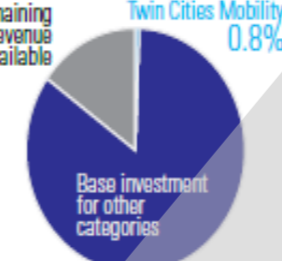
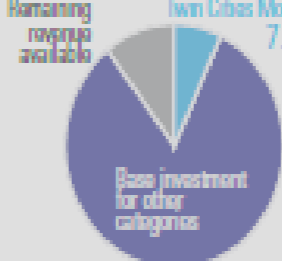
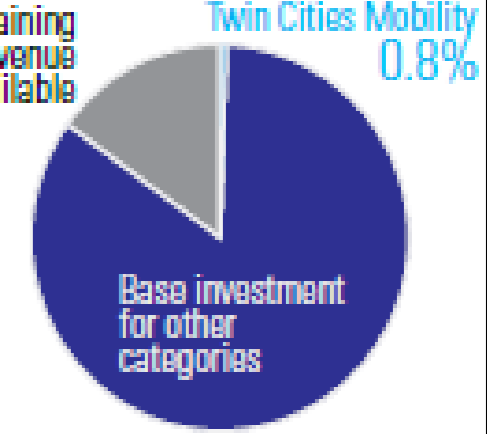


MnSHIP Investment Categories

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

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

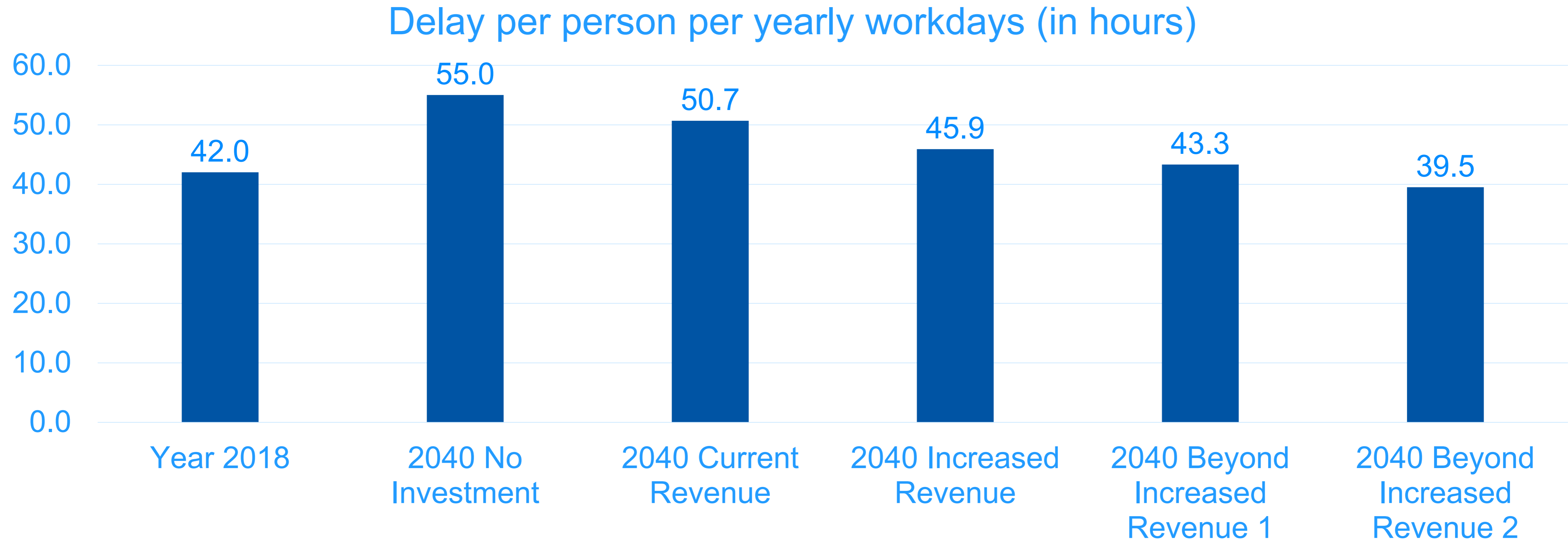
Twin Cities Mobility		Performance Level 0 <i>Lowest cost, greatest risk</i>		Performance Level 1 <i>Lower cost, higher risk</i>		Performance Level 2 <i>Greater cost, lower risk</i>		Performance Level 3 <i>Greater cost, lower risk</i>	
Overarching Goal: Optimize the capacity of the existing system and provide reliable travel alternatives to move people and freight as effectively and efficiently as possible									
Investment Approach <i>(See Approach Folio)</i>		Approach A, C		Approximately corresponds with current investment, Approach B		Does not correspond with an approach		Does not correspond with an approach	
Investment Level <i>Total</i>		\$0 M Years 5-10 (2022-2027) Years 11-20 (2028-2037) 		\$126 M Remaining revenue available Twin Cities Mobility 0.8% 		\$1,204 M Remaining revenue available Twin Cities Mobility 7.2% 		\$2,408 M Remaining revenue available Twin Cities Mobility 0.8% 	
Investment Description		No investment beyond already planned projects		Current level of investment as identified in 2013 MnSHIP		Current level of investment through 2021; \$44 M per year through 2037		Current level of investment through 2021; \$119.4 M/yr through 2037	
Outcomes <i>To what extent would MnDOT meet Twin Cities Mobility goals and objectives?</i>		<ul style="list-style-type: none"> • No MnPASS investment • No spot mobility improvements • No major capacity projects • No ATM investments 		<ul style="list-style-type: none"> • 1 MnPASS investment • 6 spot mobility improvements • No major capacity projects • No ATM investments 		<ul style="list-style-type: none"> • 3-4 MnPASS investments • 10-12 spot mobility improvements • 5-7 major capacity projects focused on projects costing \$ 20-30 million • 5 miles or 1 corridor of ATM investments per year, assuming an increase in RTMC operating budget 		<ul style="list-style-type: none"> • 6+ MnPASS investments • 20-24 spot mobility improvements • 5-7 major capacity projects costing \$ 20-30 million • 10 miles or 1-2 corridors of ATM investments per year, assuming operating budget 	
Risks		High <ul style="list-style-type: none"> • Less predictable travel times and longer lasting congestion for people driving Medium <ul style="list-style-type: none"> • Reduced reliability and efficiency for transit services • Inability to attract/retain people and businesses • Decreased system resiliency for all users • Reduced ability for all users to reach desired destinations 		High <ul style="list-style-type: none"> • Less predictable travel times and longer lasting congestion for people driving Medium <ul style="list-style-type: none"> • Reduced reliability and efficiency for transit services • Inability to attract/retain people and businesses • Decreased system resiliency for all users • Reduced ability for all users to reach desired destinations 		Medium <ul style="list-style-type: none"> • Less predictable travel times and longer lasting congestion for people driving • Reduced reliability and efficiency for transit services • Inability to attract/retain people and businesses • Decreased system resiliency for all users • Reduced ability for all users to reach desired destinations 		Medium <ul style="list-style-type: none"> • Less predictable travel times and longer lasting congestion for people driving • Decreased system resiliency for all users • Reduced reliability and efficiency for transit services • Inability to attract/retain people and businesses • Reduced ability for all users to reach desired destinations 	
System Investment Strategies <i>What strategies would MnDOT use to manage risk?</i>		<ul style="list-style-type: none"> • Invest in currently planned and programmed mobility projects 		<ul style="list-style-type: none"> • Focus on investments that provide reliable congestion-free options for commuters in 1 corridor • Focus on low cost spot mobility projects that provide safety and reduced delays 		<ul style="list-style-type: none"> • Focus on investments that provide reliable congestion-free options for commuters in 4 corridors • Focus on multiple spot mobility projects that provide safety and delay benefits • Focus on lower cost strategic mobility improvements 		<ul style="list-style-type: none"> • Focus on investment in congestion-free options in 13 corridors • Focus on multiple spot mobility projects that provide safety and delay benefits • Focus on low and high cost strategic mobility improvements 	

Assign measure goals

Why measure system performance in terms of delay per capita?

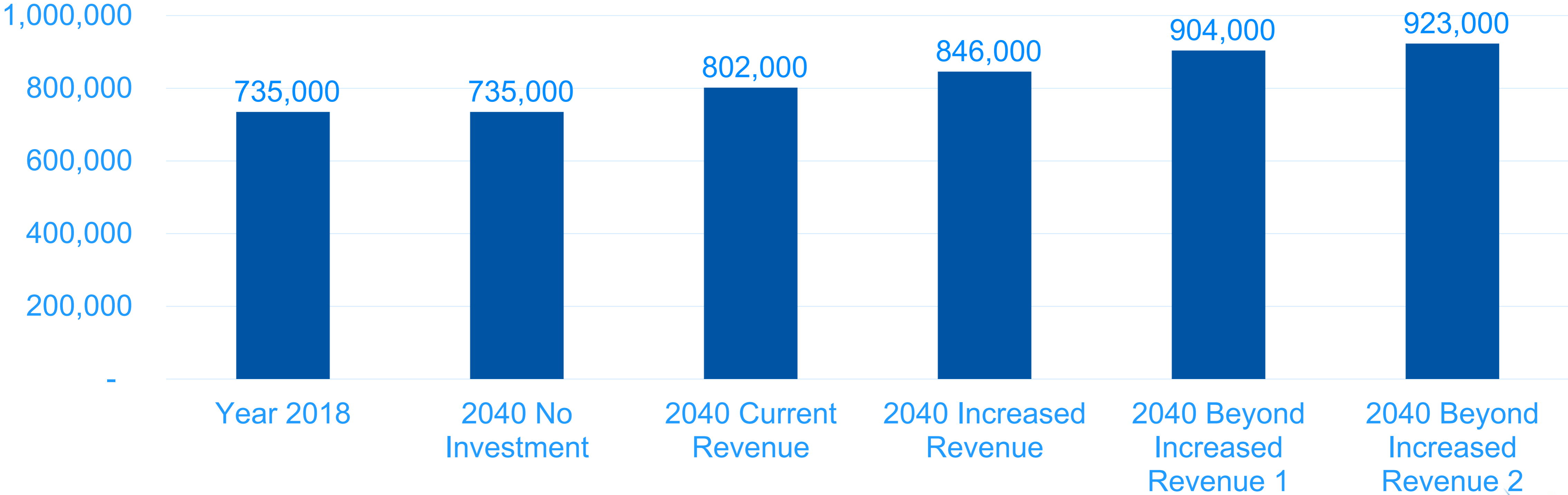
- Simple
- Relatable at the regional, corridor, project and person-level
- Responsive to MnDOT/Met Council highway investment strategies
- Supportive of economic analyses
- Captures the extent to which highway mobility contributes to broader transportation goals

Modeled Results – Average Annual Delay

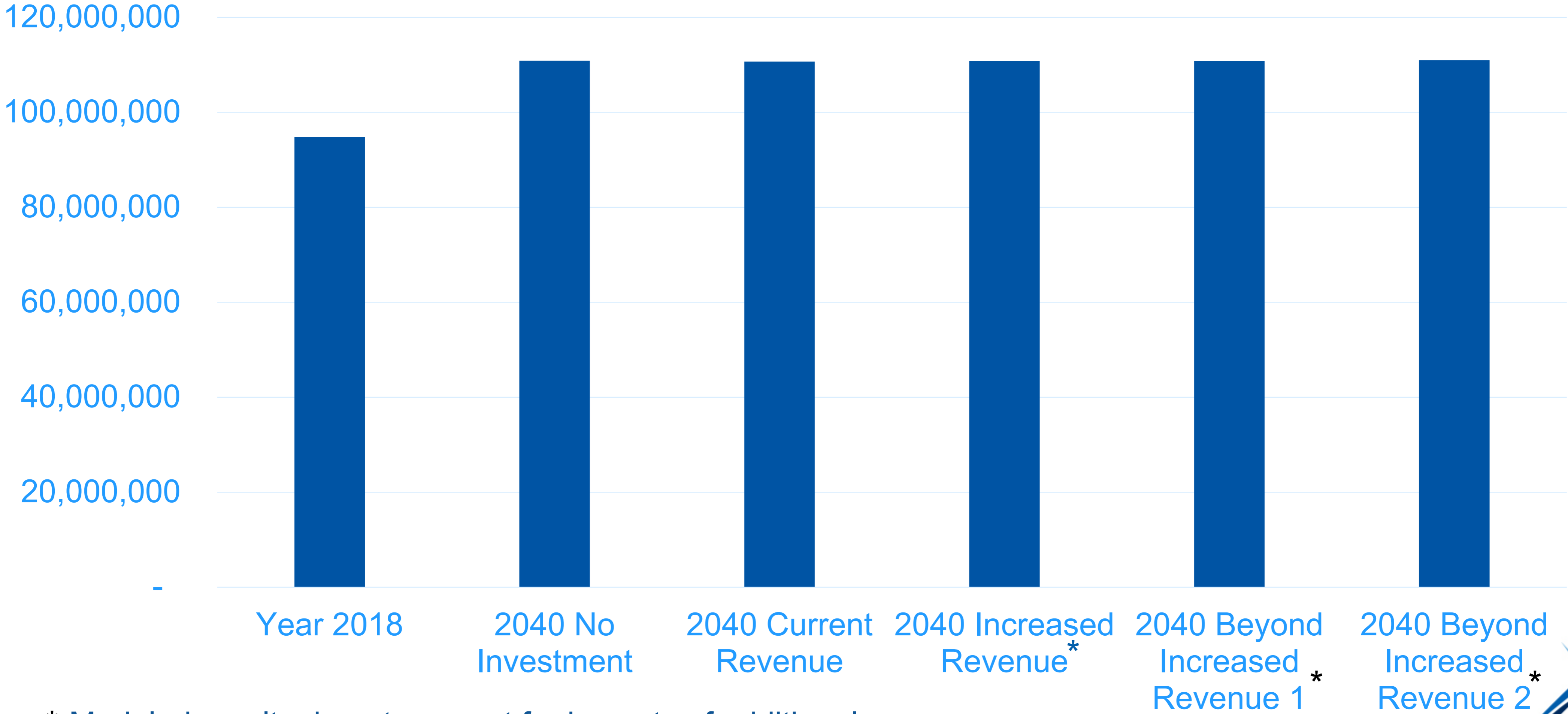


Modeled Results – Job Access

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

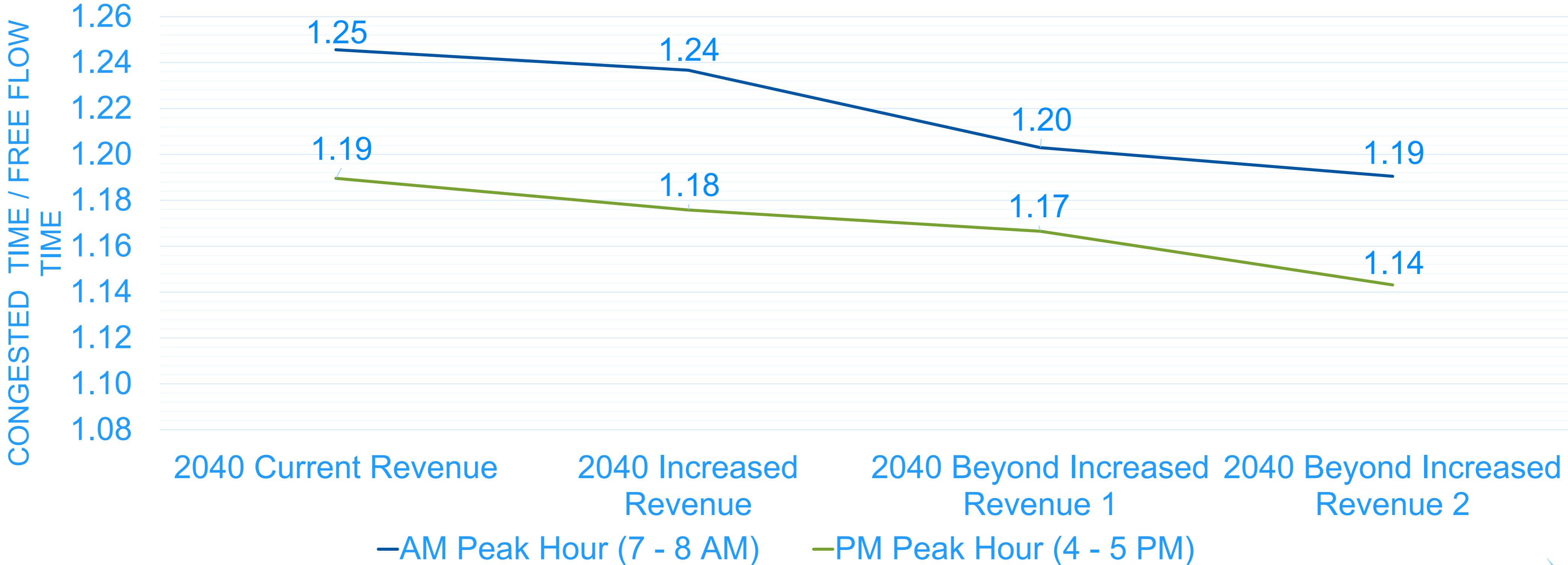


Modeled Results – Vehicle Miles Traveled



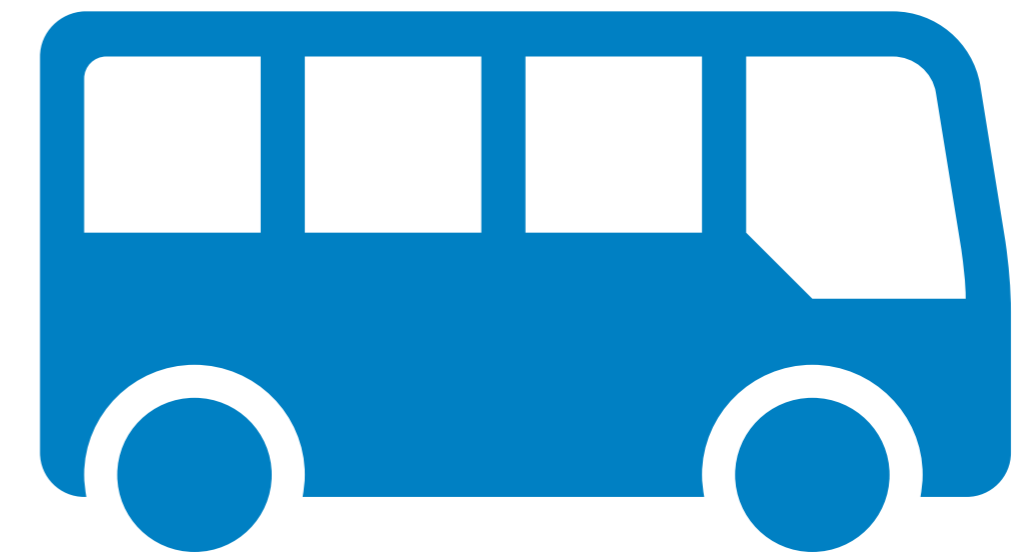
* Modeled results do not account for impacts of additional transportation investment on land use

Peak hour Travel Time Index for major freight movements



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?
 - 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?
 - 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

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Change from 2018	↓ 10%
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20-year cost	\$4 to \$6 billion

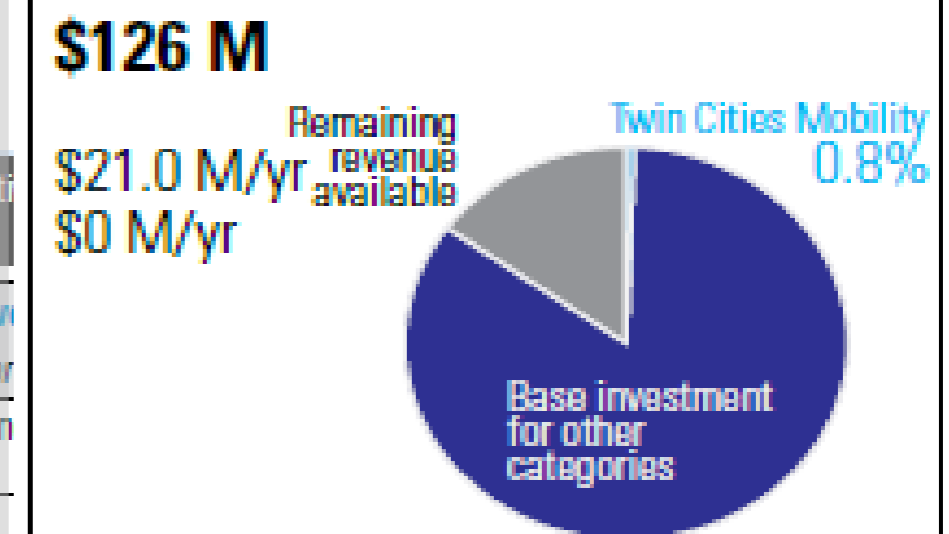
Twin Cities Highway Mobility Performance Levels

- Zero Revenue (PL0)
- Current Revenue (PL1)
- Increased Revenue (PL2)
- Beyond Increased Revenue 1 (PL3)
- Beyond Increased Revenue 2 (PL4)

Twin Cities Mobility		Performance Objectives: Manage delay by providing reliable alternatives to move people and freight as effectively and efficiently as possible	
	Performance Level 0 <i>Lowest cost, greatest risk</i>	Performance Level 1 <i>Lower cost, higher risk</i>	Performance Level 2 <i>Greater cost, lower risk</i>
Investment Approach <i>(See Approach Folio)</i>	Approach A, C	Approximately corresponds with current investment, Approach B	Does not correspond with an approach
Investment Level <i>Total</i>	\$0 M \$0 M \$0 M	\$126 M \$21.0 M/yr \$0 M/yr	\$1,204 M \$59.7 M/yr \$84.6 M/yr
Investment Description	No investment beyond already planned projects	Current level of investment as identified in 2013 MnSHIP	Current level of investment through 2021; \$44 M per year through 2037
Outcomes <i>How will this investment help MnDOT meet Twin Cities Mobility goals and objectives?</i>	<ul style="list-style-type: none"> • No MnPASS investment • 0 spot mobility improvements • 0 major capacity projects • No ATM investments 	<ul style="list-style-type: none"> • 1 MnPASS investment • 6 spot mobility improvements • 0 major capacity projects • No ATM investments 	<ul style="list-style-type: none"> • 3-4 MnPASS investments • 10-12 spot mobility improvements • 5-7 major capacity projects focused on projects costing \$ 20-30 million • 5 miles or 1 corridor of ATM investments per year, assuming an increase in RTMC operating budget
Risks	<p>High</p> <ul style="list-style-type: none"> • Less predictable travel times and longer lasting congestion for people driving <p>Medium</p> <ul style="list-style-type: none"> • Reduced reliability and efficiency for transit services • Inability to attract/retain people and businesses • Decreased system resiliency for all users • Reduced ability for all users to reach desired destinations 	<p>High</p> <ul style="list-style-type: none"> • Less predictable travel times and longer lasting congestion for people driving <p>Medium</p> <ul style="list-style-type: none"> • Reduced reliability and efficiency for transit services • Inability to attract/retain people and businesses • Decreased system resiliency for all users • Reduced ability for all users to reach desired destinations 	<p>Medium</p> <ul style="list-style-type: none"> • Less predictable travel times and longer lasting congestion for people driving • Reduced reliability and efficiency for transit services • Inability to attract/retain people and businesses • Decreased system resiliency for all users • Reduced ability for all users to reach desired destinations
System Investment Strategies <i>What strategies would MnDOT use to manage risk?</i>	<ul style="list-style-type: none"> • Invest in currently planned and programmed mobility projects 	<ul style="list-style-type: none"> • Focus on investments that provide reliable congestion-free options for commuters in 1 corridor • Focus on low cost spot mobility projects that provide safety and reduced delays 	<ul style="list-style-type: none"> • Focus on investments that provide reliable congestion-free options for commuters in 4 corridors • Focus on multiple spot mobility projects that provide safety and delay benefits • Focus on lower cost strategic mobility improvements

Performance Level 1
Lower cost, higher risk

Approximately corresponds with current investment, **Approach B**



Current level of investment as identified in 2013 MnSHIP

- 1 MnPASS investment
- 6 spot mobility improvements
- No major capacity projects
- No ATM investments

High

- Less predictable travel times and longer lasting congestion for people driving

Medium

- Reduced reliability and efficiency for transit services
- Inability to attract/retain people and businesses
- Decreased system resiliency for all users
- Reduced ability for all users to reach desired destinations

Performance Level Information

* Relative to 2040 TPP
Current Revenue Scenario

	PL0	PL1	PL2	PL3	PL4
Objective	No additional investment	Maintain current investment	Limit growth in congestion	Sustain regional Mobility	Improve regional mobility
20-year investment	\$0	\$1 - \$2 billion	\$2 – \$3 billion	\$3.5 – \$5.5 billion	\$4 – \$6 billion
Delay per capita	56 hours per person/per year	52 hours per person/per year	48 hours per person/per year	44 hours per person/per year	40 hours per person/per year
Travel time savings*	- 4 hours (5%) per person/per year	N/A	4 hours (5%) per person/per year	8 hours (15%) per person/per year	12 hours (25%) per person/per year
20-year benefit from travel time savings*	- \$2 billion	N/A	\$2 billion	\$5 billion	\$8 billion
Job access benefits*	- 60,000 jobs accessible by auto within 30 minutes (AM peak)	N/A	+ 40,000 jobs accessible by auto within 30 minutes (AM peak)	+ 80,000 jobs accessible by auto within 30 minutes (AM peak)	+120,000 jobs accessible by auto within 30 minutes (AM peak)
GHG emissions*	Slight decrease (0 – 2.0%)	N/A	Slight increase (0 – 2.0%)	Slight increase (0 – 2.0%)	Slight increase (0 – 2.0%)
Risk of not reaching target	High	High	Moderate	Moderate	Low

Next steps

Next Steps

- 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: metro council.org/mobility
- Contact us:
 - Steve Peterson, Metropolitan Council
Steven.Peterson@metc.state.mn.us
651-602-1819
 - Paul Czech, MnDOT
paul.czech@state.mn.us
651-234-7785