



ASSET MANAGEMENT INVESTMENT FOLIO

Pavement Condition

Pavement Condition is one of the ten investment categories in MnSHIP. MnSHIP is a fiscally constrained plan, meaning that it must balance the needs and risks of this category against those of the other investment categories. Each investment category has its own folio describing the trade-offs of different investment levels. Please see page 4 for a list of additional folios.

Why is Pavement Condition important?

One of MnDOT's largest assets is its pavements. MnDOT maintains over 12,000 miles of state highways that serve vehicles, freight, transit, bicycle users, and pedestrians. On an average day, there are over 90 million vehicle miles traveled on Minnesota highways.

Pavement deterioration is a serious risk that MnDOT is facing. Most pavements last approximately 20 years before deteriorating to a level that requires major rehabilitation. Performing minor repairs on regular intervals can prolong pavement life and reduce total life-cycle costs. MnDOT is better able to fulfill its responsibilities as stewards of the highway system by limiting the proportion of pavements needing major repairs.

How does maintaining high-quality pavements support the Minnesota GO Vision and the Statewide Multimodal Transportation Plan?

Investing in Pavement Condition supports the guiding principles laid out in the 50-year vision for the state's transportation system, Minnesota GO. These include:

- Leveraging public investments to achieve multiple purposes;
- Strategically fixing the system; and
- Ensuring regional connections.

Building upon these principles, investment in Pavement Condition strengthens multiple strategies identified in the Statewide Multimodal Transportation Plan (SMTP), notably:

- Prioritize maintaining and operating assets on identified priority networks;
- Work together to improve accessibility and safety for everyone traveling on, along, and across roads; and
- Ensure that transportation facilities are planned, engineered, operated, and maintained with consideration for the safety of all users.

Example of a road in Poor condition. This pavement would receive a low RQI based on its degree of cracking and smoothness of ride.

How do we measure Pavement Condition?

Each year, MnDOT travels with a special van that evaluates the degree of cracking and the smoothness of the ride to determine the Ride Quality Index (RQI) rating for each section of roadway. MnDOT looks at the percentage of pavements in Good or Poor condition to determine how its future pavement preservation needs.

How is MnDOT performing with respect to Pavement Condition?

As of 2011, MnDOT was not meeting its Good or Poor pavement targets on state highways (targets for principal arterials and non-principal arterials listed in the table on pages 3-4). Conditions are expected to worsen through 2016:

Table 1. Past and Future Statewide Pavement Quality Measures

	2002	2011	2016
Good (%)	68%	63%	63%
Good (miles)	9,730 mi	8,940 mi	9,040 mi
Poor (%)	2%	7%	9%
Poor (miles)	310 mi	940 mi	1,300 mi

Better Roads for a Better Minnesota is a program that Governor Dayton introduced in 2011 to stem the decline of roads in Poor condition in the state. It allocated \$398 million of state and federal funds to improve approximately 5% (700 miles) of state highways needing repair through 2015. This amount is in addition to the \$980 million that MnDOT had already committed to pavement improvements through 2014.



What are we currently spending in Pavement Condition?

Based on the previous investment direction, MnDOT is projected to spend an average of \$240 million annually on pavement for the next 20 years. Despite this investment and the Better Roads monies that are committed through 2015, the number of miles in Poor condition is slated to increase under current funding levels through 2032 (see **Table 1**, page 1).

What roads are affected by MnSHIP?

MnSHIP guides investment on all state highways; however, local and county roads are not controlled by MnDOT. The state highway system includes both principal arterials (**PAs**) and non-principal arterials (**NPA**s). PAs include **interstates** and have the highest traffic volume; 83% of all vehicle miles traveled in the nation are on interstates.

Tips for Using This Table

Performance Levels

- **Performance Level 0 (or PL 0)** represents a strategy in which Pavement would receive less than current funding. PL 0 corresponds to the most extreme risk level MnDOT would potentially consider.
- MnDOT's current spending in Pavement corresponds to **PL 1**.
- PLs for Pavement are independent of other investment categories.

Investment Levels

- The **pie charts** represent the distribution of MnSHIP's total planned investment (\$14.3 billion) at each PL.
- **Minimum Category Investment** is the amount required to invest at PL 0 in every other category. An increased PL in Pavement may increase the investment level of categories that are linked to pavement projects.
- **Discretionary Category Investment** is the remaining revenue available, if any, for additional investment beyond the Minimum Category Investment for all categories in MnSHIP.

Investment Strategy + Outcomes

- Each investment strategy would lead to different performance outcomes that would vary by road type (**PA interstates**, **remaining PAs** roads, and **NPA**s). Outcomes reported as roadway miles.
- The Governmental Accounting Standards Board (**GASB**) establishes standards for state and local government financial reporting as a measure of government accountability. MnDOT reports on the extent to which its pavements and other assets are meeting GASB thresholds.

PERFORMANCE LEVEL OPTIONS		
Pavement Condition		
Overarching Goal: Preserve the structural integrity of MnDOT's pavements to provide a safe and reliable surface for passenger vehicles, freight, transit, and bicycle users.		
	Performance Level 0 <i>Lowest cost, greatest risk</i>	Performance Level 1 <i>Low cost, high risk</i>
Investment Approach <i>(Scenario Planning Folio)</i>	Approach C	Approach B (approximate)
Investment Level	<p><i>Total</i></p> <p>Years 5-10 (2017-2022) \$3.20 B</p> <p>Years 11-20 (2023-2032) \$177 M/yr \$210 M/yr</p>	<p>\$4.20 B</p> <p>\$234 M/yr \$275 M/yr</p>
Investment Description <i>How would MnDOT invest after funding PA interstates to meet targets?</i>	<ul style="list-style-type: none"> • Maximize performance on remaining PA roads • Invest almost nothing on NPA roads 	<ul style="list-style-type: none"> • Maximize performance on remaining PA roads • Invest to make minimal improvements on NPA roads
Outcomes <i>To what extent would MnDOT meet system and performance targets for Pavement Condition by the end of 2032?</i>	<p>Good Target $\geq 70\%$ Good Target $\geq 65\%$</p> <p>Assumes all PA interstates are funded first to meet 70% Good, 2% Poor targets</p>	<p>Good Target $\geq 70\%$ Good Target $\geq 65\%$</p>
Risks	<p>(H) Inability to meet GASB thresholds through 2032</p> <p>(H) Slower travel, higher fuel costs, vehicle wear and tear, increased freight costs</p> <p>(H) Shortened pavement life</p> <p>(H) Increased maint. costs</p> <p>MR = Managed Risk RR = Remaining Risk</p>	<p>(H) Inability to meet GASB thresholds through 2032</p> <p>(H) Slower travel, higher fuel costs, vehicle wear and tear, increased freight costs</p> <p>(M) Shortened pavement life</p> <p>(M) Increased maint. costs</p>
Risk Management Strategies <i>What strategies would MnDOT use to manage risk?</i>	<ul style="list-style-type: none"> • Defer most long-term fixes • Optimal life-cycle fixes limited to PA interstates • Increased focus on maintenance activities to avoid hazardous conditions 	<ul style="list-style-type: none"> • Defer many long-term fixes • Focus optimal life-cycle fixes on PAs • Increased focus on maintenance activities to avoid hazardous conditions

What are the risks to be addressed in the Pavement Condition investment?

Generally, the more MnDOT invests in Pavement Condition, the more we are able to reduce these key risks:

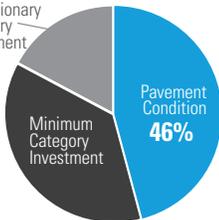
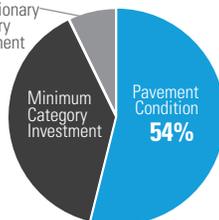
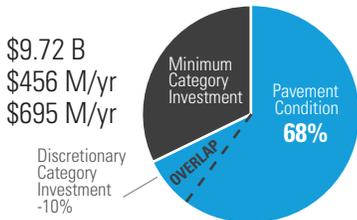
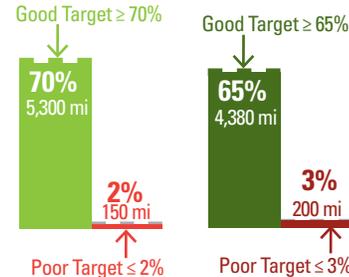
- Failure to repave roads hinders the effectiveness of existing safety features and the installation of new ones.
- Poor quality pavements require more routine and costly maintenance, such as crack sealing and pothole filling;

- Inability to meet the Governmental Accounting Standards Board (GASB) thresholds may have implications to the state's financial ratings;
- Slower travel times due to poor pavement condition may impact economic competitiveness and quality of life;
- Rough roads can lead to greater wear and tear on vehicles; and
- Implementing short-term fixes is not as cost-effective as long-term fixes at extending the remaining service life of pavement.

PERFORMANCE LEVEL OPTIONS

Pavement Condition

Performance Objectives: Maintain pavements in Good condition and minimize the share in Poor condition; use cost-effective treatments for preventive maintenance, repair, rehabilitation; apply short- and long-term fixes at optimum points in the deterioration curves.

	Performance Level 2 <i>Moderate cost, moderate risk</i>	Performance Level 3 <i>Greater cost, low risk</i>	Performance Level 4 <i>Greatest cost, lowest risk</i>
Investment Approach <i>(Scenario Planning Folio)</i>	Approach A	PL does not correspond with an Investment Approach	PL does not correspond with an Investment Approach
Investment Level <i>Total</i> Years 5-10 (2017-2022) Years 11-20 (2023-2032)	\$6.54 B \$271 M/yr \$487 M/yr 	\$7.79 B \$329 M/yr \$578 M/yr 	\$9.72 B \$456 M/yr \$695 M/yr 
Investment Description <i>How would MnDOT invest after funding PA interstates to meet targets?</i>	<ul style="list-style-type: none"> • Invest in remaining PA roads to meet established performance thresholds for GASB 	<ul style="list-style-type: none"> • Invest in PA and NPA roads to maintain pavement conditions at end of 2012-2015 STIP 	<ul style="list-style-type: none"> • Invest in all PA and NPA roads to meet targets by 2022 and maintain through 2032
Outcomes <i>To what extent would MnDOT meet system and performance targets for Pavement Condition by the end of 2032?</i> <i>Assumes all PA interstates are funded first to meet 70% Good, 2% Poor targets</i>	 <p>Remaining PAs NPAs</p>	 <p>Remaining PAs NPAs</p>	 <p>Remaining PAs NPAs</p>
Risks <i>H = High Risk</i> <i>M = Medium Risk</i> <i>L = Low Risk</i> <i>MR = Managed Risk</i> <i>RR = Remaining Risk</i>	<ul style="list-style-type: none"> (L) Inability to meet GASB thresholds through 2032 (M) Slower travel, higher fuel costs, vehicle wear and tear, increased freight costs (M) Shortened pavement life (M) Increased maint. costs <p>MR * RR</p>	<ul style="list-style-type: none"> (L) Inability to meet GASB thresholds through 2032 (M) Slower travel, higher fuel costs, vehicle wear and tear, increased freight costs (M) Shortened pavement life (M) Increased maint. costs <p>MR * RR</p>	<p><i>Performance Level 4 is not a feasible investment level in Pavement Condition. This option would exceed available revenue given that every investment category must achieve at least a minimum performance level (PL 0). This constraint is reflected by the Minimum Category Investment piece on the pie charts.</i></p>
Risk Management Strategies <i>What strategies would MnDOT use to manage risk?</i>	<ul style="list-style-type: none"> • Defer some long-term fixes • Spread optimal life-cycle fixes over PAs and NPAs • Maintenance activities focused on avoiding hazardous conditions 	<ul style="list-style-type: none"> • Defer some long-term fixes • Spread optimal life-cycle fixes over PAs and NPAs • Maintenance activities focused on avoiding hazardous conditions 	

How will we decide where to invest in Pavement Condition in Minnesota?

The Districts that make up the statewide MnDOT system have varying pavement needs. MnDOT uses a Pavement Management System to look at different pavement condition factors, such as condition, age, history, and traffic conditions. MnDOT uses this system to help identify areas that are highest priority for preservation fixes.

The Moving Ahead for Progress in the 21st Century Act (MAP-21) is a federal transportation funding bill that was signed in July 2012. As part of the bill's requirements, MnDOT and other state transportation agencies must meet performance targets for pavement condition and other highway assets. MnSHIP will direct capital improvements on the state highway system to reflect these priorities.

Other highway assets affected by Pavement Condition

When repaving or reconstructing roads, MnDOT often makes improvements related to roadside infrastructure, safety features, bicycle and pedestrian accommodations. This approach helps MnDOT to more effectively use resources and minimize disruptions to the traveling public. It is often the most cost-effective strategy to include these improvements within pavement projects rather than completing them as stand-alone projects.

Pavement preservation projects affect more than just the roadway; MnDOT often makes concurrent enhancements to safety features, drainage infrastructure, and facilities that accommodate bicycles and pedestrians.

How are we optimizing resources?

MnDOT uses the following cost-effective approaches for pavement preservation to provide a safe and reliable riding surface for travelers while minimizing its roadways' life-cycle costs:

- **Low-cost maintenance and repairs**—using recycled materials, innovative pavement design, and preventive maintenance treatments;
- **Performance-based design**—focusing on projects that cost-effectively meet pavement and safety performance needs;
- **Alternate bidding**—planning for two comparable repair strategies (concrete versus bituminous) in the construction plan so that contractors can bid the most cost-effective solution; and
- **Research**—testing innovative materials and construction techniques at MnROAD, a world-class research facility in Albertville.



Look for these additional folios!

Overview + Background

- What is MnSHIP?

Investment Category Folios

- Bridge Condition
- Roadside Infrastructure Condition
- Traveler Safety
- Twin Cities Mobility
- Interregional Corridor Mobility
- Bicycle Infrastructure
- Accessible Pedestrian Infrastructure
- Regional + Community Improvement Priorities
- Project Support

Scenario Planning

- MnSHIP Investment Approaches

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