



Report on

Major Highway Projects and Trunk Highway Fund Expenditures

December 2013



Prepared by

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Legislative request

Legislative requirements

This report was completed to comply with Minn. Stat. 174.56 and Laws of Minnesota 2012, Chapter 287, Article 4, Section 48.

Minnesota Statute 174.56:

174.56 REPORT ON MAJOR HIGHWAY PROJECTS AND TRUNK HIGHWAY FUND EXPENDITURES.

Subdivision 1. Report required.

(a) The commissioner of transportation shall submit a report by December 15 of each year on (1) the status of major highway projects completed during the previous two years or under construction or planned during the year of the report and for the ensuing 15 years, and (2) trunk highway fund expenditures.

(b) For purposes of this section, a "major highway project" is a highway project that has a total cost for all segments that the commissioner estimates at the time of the report to be at least (1) \$15,000,000 in the metropolitan highway construction district, or (2) \$5,000,000 in any nonmetropolitan highway construction district.

Subd. 2. Report contents; major highway projects.

For each major highway project the report must include:

- (1) a description of the project sufficient to specify its scope and location;
- (2) a history of the project, including, but not limited to, previous official actions by the department or the appropriate area transportation partnership, or both, the date on which the project was first included in the state transportation improvement plan, the cost of the project at that time, the planning estimate for the project, the engineer's estimate, the award price, the final cost as of six months after substantial completion, including any supplemental agreements and cost overruns or cost savings, the dates of environmental approval, the dates of municipal approval, the date of final geometric layout, and the date of establishment of any construction limits;
- (3) the project's priority listing or rank within its construction district, if any, as well as the reasons for that listing or rank, the criteria used in prioritization or rank, any changes in that prioritization or rank since the project was first included in a department work plan, and the reasons for those changes;
- (4) past and potential future reasons for delay in letting or completing the project, details of all project cost changes that exceed \$500,000, and specific modifications to the overall program that are made as a result of delays and project cost changes;
- (5) two representative trunk highway construction projects, one each from the department's metropolitan district and from greater Minnesota, and for each project report the cost of environmental mitigation and compliance; and
- (6) the annual budget for products and services for each Department of Transportation district and office, with comparison to actual spending and including measures of productivity for the previous fiscal year.

Subd. 2a. Report contents; trunk highway fund expenditures.

The commissioner shall include in the report information on the total expenditures from the trunk highway fund during the previous fiscal year, for each Department of Transportation district, in the following categories: road construction; planning; design and engineering; labor; compliance with environmental regulations; administration; acquisition of right-of-way, including costs for attorney fees and other compensation for property owners; litigation costs, including payment of claims, settlements, and judgments; maintenance; and road operations.

Subd. 3. Department resources.

The commissioner shall prepare and submit the report with existing department staff and resources.

Laws of Minnesota 2012, Chapter 287, Article 4, Section 48

Sec. 48. ADDITIONS TO REPORTS ON MAJOR HIGHWAY PROJECTS AND TRUNK HIGHWAY FUND EXPENDITURES.

For 2013 and 2014 reports required under Minnesota Statutes, section 174.56, the commissioner of transportation shall include the results of evaluations of management systems currently used by the Department of Transportation. The evaluations must specify the extent to which the management of data in these systems is consistent with existing policies and the need for statewide, reliable, and verifiable information. The evaluations must be performed either by the department's office of internal audit or by an independent external auditor. The 2013 report must include the evaluation of construction management systems and the program and project management system. The 2014 report must include the evaluation of pavement management systems and bridge management systems.

Report cost

The cost of preparing the report required by Minn. Stat. 174.56 is approximately \$300,000. This includes the cost of developing the process and data needed to budget by product and service and develop productivity measures.

The cost of evaluating the construction management and the program and project management systems, as required by Laws of Minn. 2012, Ch. 287, Art. 4, Sec. 48, is approximately \$55,000.

Purpose and scope of this report

Introduction

The first legislative report on Major Highway Projects and Trunk Highway Fund Expenditures report was due in January 2009. In 2012, the legislature made significant changes to the reporting requirements, some of which are included this year for the first time. These changes include:

- A reduction in the cost threshold for what constitutes a “major” project for purposes of this report
- Additional information on project costs and changes in costs
- Information about the annual budget for products and services, with a comparison to actual spending and including measures of productivity for the previous fiscal year (new for 2013)
- Reporting on trunk highway fund expenditures and on environmental costs for representative projects, both of which had previously been in a separate report
- An evaluation of certain management systems used by the department (required for 2013 and 2014 reports)

MnDOT runs the equivalent of a multi-billion dollar business to plan, build, operate and maintain Minnesota's transportation system. As in previous years, this 2013 report provides a snap shot of MnDOT's programming and delivery for larger projects. This is consistent with the agency's focus on improving project schedule management and delivering high quality projects on time and on budget.

In addition, this year's report includes information on MnDOT's overall financial management. MnDOT is moving toward a new system for budgeting by products and services. Because no other state agency budgets this way, existing state systems lack the ability to support this new process, which requires the development of new systems and infrastructure. Six productivity measures were also developed for this report. These measures move beyond measuring effectiveness to evaluate whether resources are used productively. Like the move to a new products and services system for budgeting, the measures will be part of MnDOT's ongoing reporting.

Finally, the report includes objective evaluations of MnDOT's contract management system, and MnDOT's program and project management system.

Together, these changes will help MnDOT reach its goal of enhancing financial effectiveness.

The report is organized into the following sections:

- Major highway projects report
- Environmental mitigation costs
- Trunk highway fund expenditures
- Management systems evaluations
- Products and services budget expenditures report
- Productivity measures
- Major highway project summary sheets

Summary of contents

Major highway projects

This section of the annual report identifies major projects on the state trunk highway system, which includes the interstate and national highway systems. Per Minn. Stat. 174.56, this report includes projects with cost estimates equal to or in excess of \$15 million in the Twin Cities Metro District and with cost estimates equal to or in excess of \$5 million in Greater Minnesota.

This report includes information on projects that meet the total project cost estimate criteria and are either under construction, programmed or planned within the next 15 years. For each project completed in the past two fiscal years (2012-2013) or identified for construction in the next four years (2014-2017), a project summary is included that provides detailed information on project location, purpose, scope, schedule and cost. Each project planned for construction in 2018-2029 is included in a summary table near the end of the report with basic information on project location, description, schedule and cost.

Projects are arranged by construction district, and a map and list of projects precede the project summary pages within each district.

The information provided in this report is current as of November 2013.

The 2013 Minnesota Legislature created the Corridors of Commerce program by authorizing the sale of up to \$300 million in new bonds for the construction, reconstruction and improvement of trunk highways. The legislation establishes two major goals: to provide additional highway capacity on highway segments where there are currently bottlenecks and to improve the movement of freight and reduce barriers to commerce. The projects selected through this program, with basic information regarding project location, a project description, schedule, and cost estimate ranges are included in this section. Project summary pages for all of these projects will be included in the Major Highway Projects report in 2014.

Environmental mitigation costs

Per the legislative requirement, the cost of environmental mitigation and compliance was analyzed for two representative projects.

The Highway 8 project includes the reconstruction of 2.6 miles of highway in Lindstrom. The project had multiple objectives, including safety, increasing capacity, removing obstacles to recreation, and blending with the town's historic fabric. This project was chosen in part because it represents the type of mitigation that MnDOT is implementing more and more frequently. Environmental mitigation costs were \$2.2 million, roughly 11.3 percent of the total project cost of \$19.6 million.

While mitigation related to floodplain modification, threatened and endangered species, and historic properties occur as part of MnDOT projects in Greater Minnesota, wetland and stormwater runoff mitigation are more representative of the types of environmental mitigation that occurs. The Highway 11 project in District 2 was chosen in part because it included wetland and stormwater runoff mitigation measures. Environmental mitigation costs were \$924,140 and account for roughly 11.4 percent of the total project cost of \$8.1 million.

Trunk highway fund expenditures

FY 2013 expenditure information is provided for each of the categories specified in the statute.

Management systems evaluations

This year's report includes the evaluation of MnDOT's construction management and program and project management systems, as required in Minn. Stat. 174.56. These evaluations were conducted by MnDOT's internal audit office.

The evaluations concluded that the management of these systems is consistent with existing policies, the need for statewide, reliable and verifiable information, and the need for properly designed and implemented internal controls. One finding, related to internal controls, was identified in the evaluation of the Construction Management System. Two findings, related to database integrity and security and data accuracy, were identified in the evaluation of the Program and Project Management System.

Product and service line budget

MnDOT is currently developing a new product and service grid focused on external stakeholders, which is targeted for use in the 2016-17 biennial budget.

The expenses and budgets provided in this report represent the department's biennial budget for fiscal years 2012 and 2013, as appropriated in Laws of Minnesota 2011, 1st Special Session, Chapter 3. It also includes expenses for services that may have been rendered in fiscal year 2012, but due to processing time would have been paid in fiscal year 2013.

This report was created by aligning 2013 spending to the six years of average spending (FY 2006-2011) to the product and service line structure used with the Minnesota Accounting and Procurement System.

Key challenges include:

- An inability to match some expenses to budgets due to system limitations in identifying the fiscal year budget to which the expenditures should be aligned. This occurs when an expenditure is made in one budget year and paid in the next.
- Uncommitted and roll-over budgets which may exhibit expenditures exceeding the total budget. These expenditures occur within a biennium and are allowed by statute.

Productivity measures

The measures of productivity project is an effort to identify and/or create, examine and document the current level of productivity within MnDOT by complying with the 2012 legislation requiring the commissioner to submit a report each year, with comparison to actual spending and including measures of productivity for the previous fiscal year.

Performance measures are not new for MnDOT. However, traditional measures reported by MnDOT are measures of effectiveness, designed to measure how effectively products and services are being delivered relative to target service levels. Productivity measures are new to MnDOT and are the next step to evaluate how efficiently these products and services are being delivered. Productivity measures align well with the department goal of enhancing financial effectiveness.

For this first report, MnDOT identified six measures of productivity in five product and service areas:

- Bridge - inspection cost and maintenance cost per square foot of bridge deck area
- Pavement - pavement preservation investment compared to pavement quality
- Snow and ice - cost per plow mile driven
- Pavement markings - cost per mile striped
- Transit - administrative cost per transit passenger trip

While these areas are a subset of MnDOT's products and services, additional areas will be added in subsequent reports as they are identified.

Background for each productivity measure is presented along with data from 2002 through the most current data available. The final year of data presented in this year's report ranges from 2011 to 2013. This year, most measures do not include 2012 because of data issues with the change-over to the new state accounting system SWIFT. Each measure includes a discussion about why the measure presented is a good measure of productivity, how the measure informs decisions and major influencing factors. Additionally, MnDOT's main measures of effectiveness for each area are presented along with results for approximately 10 years.

Four of the six productivity measures show the inflation adjusted cost per unit declining over the time period. These include bridge inspection, snow plow cost per mile, pavement markings cost per mile striped and administrative cost per transit trip.

Bridge maintenance costs per unit show a slight upward trend. Additional funding for bridge preventive maintenance may partially account for this, as might aging bridges requiring more reactive maintenance.

For pavement preservation, the interesting relationship is how closely pavement condition follows the dollars invested. Higher investment in pavement preservation shows associated improvement to the system.

Major highway project report

Major highway projects summary

This annual report identifies major projects constructed within the past two years, as well as all major projects programmed or planned for construction on the state trunk highway system over the next 15 years, which includes the interstate and national highway systems. Per Minn. Stat. 174.56, this report includes projects with cost estimates equal to or in excess of \$15 million in the Twin Cities Metro District and projects with cost estimates equal to or in excess of \$5 million in Greater Minnesota. The information provided in this report is current as of November 2013.

This report includes 326 projects that met the statutory cost threshold requirements of \$15 million or greater in the Twin Cities Metro District, \$5 million or greater in Greater Minnesota.

Projects included in 2013 Major Highway Projects report

District	Completed, under construction or in the STIP	Projects in years 2018-2029	Total projects
1	31	12	43
2	18	0	18
3	21	21	42
4	24	19	43
6	38	26	64
7	31	22	53
8	10	10	20
Metro	28	15	43
State	201	125	326

Of the 326 projects reported this year, 43 are in the Twin Cities metro area and 283 are in Greater Minnesota. Projects vary in type, and include pavement preservation, bridge replacement and rehabilitation, and mobility projects. This year's report is the first that incorporates information from the 20-year State Highway Investment Plan, which identifies planned projects scheduled for construction five to 10 years in the future. Incorporating all of the projects included in MnSHIP increased the number of projects with a summary page from 188 in 2012 to 326 this year.

Chapter 152 bridge improvement program

The Chapter 152 bridge improvement program provided bond funding for approximately 9 percent of the projects in this report. The projects funded through this program include bridges classified as Tier 1 or Tier 2, as required by Laws of Minnesota 2008, Chapter 152.¹

Corridors of Commerce program

The 2013 Minnesota Legislature created the Corridors of Commerce program in Minn. Stat. 161.088 and authorized the sale of up to \$300 million in new trunk highway bonds for the construction, reconstruction and improvement of trunk highways.

The law identifies two major goals for the program:

- Provide additional highway capacity on segments where there are currently bottlenecks in the system
- Improve the movement of freight and reduce barriers to commerce.

Projects considered for the Corridors of Commerce program in 2013 were classified in one of three eligibility categories:

- **Metro Capacity Improvement:** The Metro Capacity Improvement category will include projects within MnDOT's Metro District that increase capacity on segments that do not terminate at other trunk highways or that have fewer lanes than adjacent segments.
- **Interregional Corridor Capacity Improvement:** The Interregional Corridor Capacity Improvement category will include projects outside MnDOT's Metro District that increase capacity on segments that do not connect to other trunk highways or that have fewer lanes than adjacent segments.
- **Statewide Freight Bottlenecks:** This category will include projects that remove or reduce barriers to commerce and ease or preserve freight movement.

Corridors of Commerce projects selected for the 2013 program are identified in the following table.

¹ A Tier 1 bridge consists of any bridge in the program that has an average daily traffic count greater than 1,000 and a sufficiency rating that is at or below 50, or is identified by the commissioner as a priority project. A Tier 2 bridge consists of any bridge that is not a Tier 1 bridge and is classified as fracture critical or has a sufficiency rating that is at or below 80. For more information on the Chapter 152 Bridge Improvement Program, refer to the Trunk Highway Bridge Improvement Program Chapter 152 Annual Report.

Corridors of Commerce projects

Route	Project	Preliminary Cost Estimate (\$ millions)	Estimated Construction Start	C of C Project Category
2	Passing lanes from Cass Lake to Deer River	\$8 to \$10	2014	Freight Bottleneck
94	Add lanes from MN 101 to MN 241	\$35 to \$46	2014	IRC Capacity Improvement
34	Passing lanes from Detroit Lakes to Nevis	\$11 to \$15	2014	Freight Bottleneck
14	4-lane Owatonna to Dodge Center	\$16 to \$20	2014	IRC Capacity Improvement
610	Freeway from CSAH 81 to I-94	\$103 to \$131	2014	Metro Capacity Improvement
14	4-lane N. Mankato to Nicollet	\$20 to \$28	2015	IRC Capacity Improvement
14	Nicollet Bypass (4 lane)	\$15 to \$25	2015	IRC Capacity Improvement
694	Dynamic shoulder lane from Rice to Lexington	\$35 to \$42	2015	Metro Capacity Improvement
169	4-lane from CSAH 15 to 1 mile east of CSAH 7	\$14 to \$20	2016	Freight Bottleneck
23	Passing lanes from Willmar to I-90	\$13 to \$19	2016	Freight Bottleneck

State highway investment planning process

The 20-year Minnesota State Highway Investment Plan is an important link between the guiding principles in the [Minnesota GO 50-Year Vision](#), the strategies in the [Statewide Multimodal Transportation Plan](#) and the capital improvements made to the state highway system. The plan sets a fiscally constrained framework for future capital improvements by identifying investment needs and priorities for available funding. This plan will serve as the framework for statewide investment on trunk highways for the next three years before a new 20-year investment plan is produced.



MnSHIP covers three planning periods: years 1-4, years 5-10 and years 11-20. Projects identified for years 1-4 (2014-17) are those listed in the 2013 Statewide Transportation Improvement Program. MnDOT intends to deliver these projects during the next four years, although the programmed year of construction may be adjusted if actual revenues increase or decrease.

Investments identified for years 5-10 (2018-23) include general funding levels for certain improvement categories (e.g., pavement preservation, traveler safety), as well as construction cost estimates for several specific projects. These projects and their cost estimates should be considered preliminary, as revenue forecasts are uncertain.

Specific projects are not identified for years 11-20 (2024-33); instead MnSHIP has set broad investment priorities associated with funding allocations that focus primarily on preserving the transportation assets that MnDOT currently owns. Such elements include but are not limited to:

- Pavement within MnDOT right-of-way
- Bridges
- Bike and pedestrian facilities
- Drainage structures
- Barriers, guardrails and fences
- Lighting and intelligent transportation system features
- Signs
- Noise walls

Investment priorities may change as a result of system performance conditions, legislative initiatives or federal requirements related to the recently adopted MAP-21 transportation bill.

The flow chart below illustrates the steps in developing MnSHIP.



MnDOT began the process by:

- Reviewing current investment priorities, asset conditions and other system needs
- Projecting the amount of federal and state funds that will be available for investment on the state highway system during the next 20 years
- Reviewing agency policy, as well as federal and state transportation laws
- Identifying emerging significant risks that may affect investment priorities

Next, MnDOT established a range of potential investment levels for nine categories of highway investment priorities. These investment levels were combined into example investment scenarios to solicit feedback from the public. For investment direction for the 20-year plan, MnDOT considered stakeholder input, legislative direction, federal requirements and system-wide risks and outcomes to develop a final mix of investment priorities. This investment direction guided statewide and district investment goals; these goals are achieved by districts developing a schedule of projects that comprise their investment programs and designed to make progress towards these goals.

Impacts of cost changes to the overall program

Changes to project costs and schedules affect the state trunk highway capital investment program. These effects are most directly seen through annual revisions to the State Transportation Improvement Program, which lists projects that MnDOT has committed to completing in the next four construction seasons. Seventy-five percent of the projects listed in the STIP are let and completed in their originally scheduled construction season. The completion date for other projects may be adjusted, and project scope and costs may increase or decrease after being listed in the STIP.

Project costs may change for a variety of reasons including changes in economic conditions e.g., inflationary factors, scope changes, supplemental agreements, cost overruns, right of way acquisition, etc. These costs may change prior to letting or after a contract is awarded. Changes in project costs prior to letting are handled through the STIP process, through which projects are added, revised or removed annually. Project cost changes post-letting are managed at the district level, primarily through the use of set-asides if costs are higher than projected or by advancing additional projects if project

costs are lower than projected. The process of managing project costs is typically done at an aggregated level rather than on a project-by-project basis.

Project selection

MnDOT selects projects through several different planning and programming processes, all designed to address performance-based needs and achieve key objectives on the trunk highway system. These programs are the methods used by MnDOT to decide how to use authorized federal and state funds and revenue from the sale of trunk highway bonds.

The primary framework for project selection is outlined below.

Years 1-3: Projects identified for 2014, 2015 and 2016 were based on investment priorities established in the [2009 State Highway Investment Plan](#) and on the existing [State Transportation Improvement Program](#), covering 2013-2016. MnDOT considers projects listed in the STIP to be commitments. As a result, MnSHIP did not shape project selection for years 1-3, though the timing and scope of these projects might have changed based on project development and coordination with local partners.

Years 4-10: MnDOT created the Statewide Performance program and the District Risk Management program to guide project selection for years 4-10 of MnSHIP and forward. The purpose of establishing these two programs is to ensure the department efficiently and effectively works toward common statewide goals, in particular, meeting Governmental Accounting Standards Board thresholds for pavements and bridges and meeting MAP-21 performance targets, while maintaining some flexibility to address unique risks and circumstances at the district level.

Statewide performance program

Throughout the development of MnSHIP, staff from MnDOT's central office, district offices and specialty offices collaborated to develop the statewide performance program, which prioritizes the use of all federal funds and maintains federal funding flexibility. The SPP provides both funding and a process for selecting projects in years 4-10 of the planning timeframe. This process is designed to address risks related to statewide travel.

MAP-21, the new federal transportation bill, places greater emphasis on National Highway System performance and requires MnDOT to make progress toward national performance goal areas, including those related to asset condition, safety and congestion. Failure to do so results in the loss of some federal funding flexibility. Further, the scenario analysis highlighted the expectation that MnDOT maintain the state's most important routes in a state of good repair. In response, MnDOT developed the SPP to ensure that federal and state performance targets are met on the NHS and that the condition of these routes meets public and MnDOT expectations.

District risk management program

Whereas the SPP focuses funding on addressing key performance targets on NHS routes, the district risk management program focuses funding on all other non-NHS highways, as well as other non-performance-based needs (regional and community improvement

priority projects) on all state highways. The majority of the program supports pavement and bridge rehabilitation or replacement projects. The DRMP project selection process is structured to give districts the flexibility to address their greatest regional and local risks. Districts are also able to make additional investments on the NHS system if the proposed project is in response to a high risk issue.

In the DRMP, each MnDOT district is responsible for selecting projects that mitigate its highest risks that are not addressed through the SPP in the areas of asset management, traveler safety, critical connections and RCIPs. MnDOT distributes different levels of funding to the districts for this program based on a revenue distribution method that accounts for various system factors. MnDOT districts collaborate with area transportation partnerships, metropolitan planning organizations and other key partners to select projects for years 4-10.

MnSHIP directs 45 percent of MnDOT's annual revenues toward DRMP projects in years 4-10, or approximately \$333 million per year, not including the cost of delivering those projects. Coincidentally, this is the same annual amount that resulted from the SPP project selection process. The DRMP's share of MnDOT's annual program may vary in the future depending on the outcomes of MnDOT's ongoing risk-based and performance-based planning efforts. The investment category mixes for each district vary depending on the system characteristics and conditions unique to that area of the state.

If a statewide program (e.g., the statewide performance program) has cumulative cost estimate changes resulting in a significant amount of uncommitted funds, a specific, one-time program may be implemented, such as the recent Better Roads for a Better Minnesota, which focused on achieving statewide performance objectives for overall pavement condition. To deliver the Better Roads program, projects that most effectively achieved these performance objectives and were at an appropriate stage in the project development process were accelerated so they could be completed earlier than previously programmed.

Conversely, if cumulative project cost estimate changes increase by a significant enough level to necessitate revisions to the STIP, a number of projects may be delayed or removed, based on the fiscal ability to fully deliver each annual construction program. Projects that have not yet progressed through the project development process are more subject to these schedule delays or cost revisions.

Project prioritization

All projects identified within the 2014-17 STIP can be funded with current revenue projections (fiscally constrained) and are of a high priority to the districts. Projects within the 2018-28 mid-range and long-range planning periods are a priority, but revenue forecasts, federal program requirements and funding sources are more uncertain and full funding may not have been identified. The [20-year Highway Investment Plan](#) details how investments at a program level are prioritized in this mid-range and long-range timeframe.

Project summary sheets

See Appendix A for one-page summaries, statewide and district maps, and an indexed table of all major highway projects. This section does not include information on the recently selected Corridors of Commerce projects. Those projects are identified on page 14 and will be included in the summary section of next year's report.

An explanation of the information included for each project, common abbreviations and definitions are also included in the appendix.

Environmental mitigation and compliance analysis

Two projects that represent the types of environmental mitigation and compliance MnDOT faces are described below.

The Highway 8 project in Lindstrom is located in the MnDOT Metro District. This project was chosen in part because it represents the type of mitigation that MnDOT is implementing more and more frequently in recent years. Whenever possible, MnDOT tries to incorporate elements that allow a project to blend with the character of a community, and to get the public's input on those concepts throughout the process. Whether it is new development or redevelopment, a historic area or highly built neighborhood, MnDOT strives to assess and mitigate for visual impacts by using a context sensitive solutions approach. This fosters a multi-disciplinary team approach with broad community involvement that ensures adverse and beneficial visual quality impacts can be effectively addressed during planning, design and construction of the project.

While mitigation related to floodplain modification, threatened and endangered species, and historic properties occur as part of MnDOT projects in Greater Minnesota, wetland and stormwater runoff mitigation are more representative of the types of environmental mitigation that occurs across Minnesota. The Highway 11 project in District 2 was chosen in part because it included wetland and stormwater runoff mitigation measures.

Metro District project: Highway 8 (Lindstrom)

The reconstruction of 2.6 miles of Highway 8 from Shoquist to Chisago Lakes Middle School, including through downtown Lindstrom, had multiple objectives, including safety, increasing capacity, removing obstacles to recreation and blending with the town's historic fabric.

Highway 8 was configured into a new "one-way pair" alignment, increasing capacity and improving safety. Stormwater runoff was mitigated with the creation of four stormwater ponds. Frontage roads and turn lanes were added. A recreational corridor was re-established by replacing a box culvert with a bridge over the channel, reconnecting North Lindstrom and South Lindstrom lakes. Due to the historic character of the city of Lindstrom, public input was a critical piece of the environmental mitigation on this project. Several architectural upgrades were included to blend the bridge into its surroundings.

Environmental mitigation costs of \$2.2 million are detailed below and account for roughly 11.3 percent of project costs.

The total project cost, detailed below, was \$19.6 million. The construction cost of the project was \$12.7 million, right-of-way land-related costs were \$4.4 million and project engineering costs were \$2.5 million.

Environmental mitigation costs: TH 8 (Lindstrom)

Environmental documents (Costs **not** included in mitigation costs)

Environmental assessment: \$20,780

Environmental investigation costs

Historical/cultural resources \$ 68,340

Contamination \$ 97,120

Sub-Total: \$165,460

Preconstruction engineering costs

Ponds \$ 12,250

Bridge \$ 75,420

Architectural upgrades \$ 6,460

Sub-total: \$94,130

Construction engineering/administration costs

Ponds \$ 18,370

Bridge/channel \$113,130

Architectural upgrades \$ 9,700

Regulated waste \$ 19,290

Erosion control \$ 38,890

Sub-total: \$199,380

Right of way costs (land-related only)

Ponds \$ 56,000

Wetlands (credits \$ 15,420

Sub-total: \$71,420

Construction costs

Ponds \$153,100

Bridge/channel \$942,780

Architectural upgrades \$ 80,800

Erosion control \$324,050

Regulated waste \$160,790

Sub-total: \$1,661,520

Supplemental agreements and work orders: \$0

Total environmental mitigation costs: \$2,212,690

Total project costs: TH 8 (Lindstrom)

Right of way - total project right of way costs (land only): \$4,355,420

Construction costs - total project construction cost: \$12,687,570

Project delivery costs

Preconstruction engineering \$1,015,010

Construction engineering/administration \$1,522,510

Sub-total: \$2,537,520

Total project cost

Right of way \$ 4,355,420

Construction \$12,687,570

Engineering \$ 2,537,520

Total project costs: \$19,580,510

Percentage of project costs incurred for environmental mitigation and compliance:

$\$2,212,690 / \$19,580,510 = 11.3$ percent

Greater Minnesota project: TH 11 (Koochiching County)

This project is located in District 2. The project included a 1.5-inch bituminous mill and 3-inch bituminous overlay, an approximate one mile re-grade of a vertical curve to improve sight distance and shoulder widening throughout the corridor to achieve a consistent shoulder width of six feet to give the roadway more lateral stability, thereby increasing the embankment strength. There were 21.25 acres of wetlands in the project area, which were dealt with through the purchase of wetland credits. Additionally, this project included a stormwater treatment pond.

Environmental mitigation costs of \$924,140 are detailed below and account for roughly 11.4 percent of project costs.

The total project cost, also detailed below, was \$8.1 million. The construction cost of the project was \$6.6 million, right-of-way land-related costs were \$189,770 and project engineering costs were \$1.3 million.

Environmental Mitigation Costs: TH 11 (Koochiching County)

Environmental documents (Costs **not** included in mitigation costs)

Environmental assessment: \$ 3,800

Environmental investigation costs

Historical/cultural resources \$ 500

Contamination \$ 7,300

Sub-total: \$7,800

Preconstruction engineering costs

Ponds: \$5,050

Construction engineering/administration costs
Ponds \$ 7,200
Erosion control \$70,800
Sub-total: \$78,000

Right of way costs (land-related only)
Ponds \$ 40,200
Wetlands (credits) \$122,270
Sub-total: \$162,470

Environmental mitigation costs: TH 11 (Koochiching County)

Construction costs
Ponds \$ 60,000
Erosion control \$590,000
Contamination construction monitoring \$ 17,020
Sub-total: \$667,020

Supplemental agreements and work orders: \$0

Total environmental mitigation costs: \$924,140

Total project costs: TH 11 (Koochiching County)

Right of way
Total project right of way costs (land only) \$ 67,500
Wetland (credits) \$122,270
Sub-total: \$189,770

Total project construction costs: \$6,594,800

Total project delivery costs
Preconstruction engineering \$527,584
Construction engineering/administration \$791,376
Sub-total: \$1,318,960

Total project cost
Right of way \$ 189,770
Construction \$6,594,800
Engineering \$1,318,960
Total project costs: \$8,103,530

Percentage of project costs incurred for environmental mitigation and compliance:
 $\$924,140/\$8,103,530 = 11.4$ percent

Trunk highway fund expenditures

The following contains fiscal year 2013 cost information for each of the categories specified in Minn. Stat. 161.08, subd. 2. The table lists expenditures by category. A brief explanation follows, describing what is included in each cost category.

Trunk highway fund expenditures

1	Road construction	\$1,023.8
2	Design and engineering	\$221.4
3	Labor	\$356.0
4	Acquisition of right of way	\$43.2
5	Litigation	\$3.1
6	Maintenance	\$89.2
7	Road operations	\$252.6
8	Planning	\$16.6
9	Environmental compliance	\$16.4
10	Administration	\$88.0

In \$ millions

1. Road construction costs include all actual costs and encumbrances for road and bridge construction contracts. It includes both the design and engineering and construction cost portions of design/build contracts.
2. Design and engineering costs include all costs and encumbrances for design, pre-design, construction, and other engineering activities performed internally by MnDOT employees and by consultants.
3. Labor costs include all expenditures for labor by MnDOT employees including overtime and benefits for full-time, part-time, and unclassified employees.
4. Rightofway acquisition costs include all costs and encumbrances to acquire and manage land assets for the trunk highway system.
5. Litigation includes costs such as payments to the State Attorney General's Office for legal services, as well as costs paid for expert witness fees and court reporters and transcribers, tort claims and general and administrative costs related to legal services.

6. Maintenance costs include all costs and encumbrances to operate and maintain the trunk highway system.
7. Road operations costs are all costs and encumbrances related to such activities as snow removal, rest area maintenance, traffic management, and traveler information.
8. Planning costs are all costs for planning related to construction and maintenance of the trunk highway system, paid either to MnDOT employees or consultants.
9. Environmental compliance costs are the costs derived from the completion of environmental review processes and documentation of the results of those processes, such as environmental assessment worksheets and environmental impact statements. Both internal employee and consultant costs are included.
10. Administration costs include all general and administrative costs related to the construction, maintenance and general support of the trunk highway system.

Systems evaluations

This year's report includes the evaluation of MnDOT's construction management and program and project management systems, as required in Minn. Stat. 174.56. These evaluations were conducted by MnDOT internal audit office and specify the extent to which the management of data in these systems is consistent with existing policies and the need for statewide, reliable and verifiable information.

Contract management system

The performance evaluation performed on the contract management system used by MnDOT involved developing a reasonable assurance that the data in the CMS satisfied the need for statewide, reliable and verifiable information. Internal controls were also reviewed for proper design and implementation. As appropriate, detection of fraud, abuse and illegal acts were also considered.

The evaluation was designed to determine the adequacy of controls and the appropriateness of the conduct and responsibilities exercised by users and operators of the CMS. It also considered whether:

- The system was working as designed
- The system was being monitored properly and reviewed on a timely basis
- Data was being input according to system manuals, guidelines and procedures
- All other applicable laws, regulations and administrative requirements were followed

Results

With the exception of one finding, the evaluation concluded that management of CMS data is consistent with existing policies, the need for statewide, reliable and verifiable information, and the need for properly designed and implemented internal controls.

The evaluation also concluded that the CMS database is a well-developed computerized system and clearly fills a need that was lacking in the old MAPS state-wide computer accounting system. With proper oversight and stronger internal controls, the CMS will provide reliable data for all users.

Finding 1: Internal Control

One area where the CMS did not meet compliance requirements pertaining to applicable procedures and controls was considered significant enough to be a finding. This finding was in the area of internal control. Four areas of internal controls (separation of duties, supervisory oversight/review, internal quality control reviews and data integrity) appear weak, most notably when entries are made into the system from contract documents.

Separation of duties

When information is manually entered into the system, it appears the same employee is performing three tasks that should be separated. When entries are made, the data is entered, reviewed for accuracy and saved into the system by the same employee.

Supervisory oversight/review

Supervisory oversight and review procedures over CMS-related duties were present and the tasks being performed were adequate. It appears, however, that the frequency and extent of this monitoring is not always at a high level. This became a concern in the areas of timeliness and proper application usage.

Office of Construction and Innovative Contracting will begin taking the steps necessary to implement increased internal controls to address both the separation of duties and supervisory oversight/review by devising and implementing a system for increased review and supervisory oversight. Accommodations have already been taken to improve accuracy, including larger monitors, changed screen resolution and change in process to ensure fresh data on each document.

Internal quality control reviews

While performing this audit, no evidence was obtained showing reconciliations between CMS and SWIFT. The data flowing through the CMS includes information from vouchers, encumbrances and supplemental agreements; all of which flow through to the MnDOT's financial operations and SWIFT. Information on the CMS should match up with SWIFT.

The evaluation recommends development of a reconciliation spreadsheet for contracts from fiscal year 2013 and future contracts. This spreadsheet should include amounts entered into the CMS and amounts shown on SWIFT for vouchers, encumbrances and supplemental agreements, all with reconciliation steps performed to find discrepancies between the two. Dates and signatures or initials of employees performing the reconciliations should also be included, with supervisory reviews of the reconciliations to verify the data accuracy.

OCIC and Finance are reconciling SWIFT and CMS by formulating a spreadsheet and timeline that work for both offices and satisfies the need for SWIFT and CMS accuracy.

Data Integrity

There were 63 discrepancies found between the data on the system and the contract documents, resulting in an error rate of 11.67 percent. This percentage of discrepancies can affect the integrity of the data within the system. The majority of the data with discrepancies was entered into the system manually.

The evaluation recommends OCIC personnel be cognizant of the previously listed discrepancies when making entries into the CMS. More attention should be paid to the accuracy of the data that is being entered.

Follow-through on recommendations related to the separation of duties and supervisory oversight/review, should strengthen data integrity. In addition, OCIC management will discuss accuracy issues with the goal of moving toward a zero percent error rate.

Program and project management system

The program and project management system is a scheduling software tool used to track projects from pre-construction through letting. The system contains data about the project description, location, limits, estimated costs, development schedule and letting dates for trunk highway, state aid, transit and rail, and intelligent transportation system projects. Each MnDOT district and office is responsible for accurately recording their state projects in the PPMS. The Office of Project Management and Technical Support functions as the PPMS database steward.

The evaluation included an assessment of internal controls over data accuracy, integrity and security. This included a data accuracy check of 100 state projects and an assessment of the need for all existing user IDs and rights. It also evaluated MnDOT's internal controls for compliance with requirements that the management of data in the PPMS is consistent with existing policies and the need for statewide, reliable and verifiable information.

Results

Except for the identified findings, MnDOT substantially complied with the requirement that the management of data in the PPMS is consistent with existing policies and the need for statewide, reliable and verifiable information. With respect to items not tested, nothing indicated that the department had not complied, in all material respects, with those provisions.

It is also important to note that the PPMS is undergoing a long sunseting process and this evaluation occurred during that process. PPMS is being replaced with the Primavera P6, which could possibly mitigate and correct most control issues identified in this evaluation.

Finding 1: Improve controls over database integrity and security

The evaluation identified opportunities to improve internal controls over database access and changes.

Fifty user IDs (47 with rights to make changes) assigned to personnel who are no longer active employees had not been deleted or deactivated. In addition, some accesses assigned to current employees who have been promoted to supervisory or managerial positions may not be operationally needed. MnDOT policy requires that managers and supervisors ensure that accesses are removed upon an employee's reassignment or termination.

The Engineering Services Division responded that the department is on schedule for a target retirement of July 1, 2015 for PPMS. A significant phase of retirement has been accomplished, where rights have been reduced to read-only for schedule information. Schedule information is now managed in "P6" and the majority of the header

information that is currently in PPMS will be managed in P6. Data that needs to be tightly controlled is now limited to a low number of staff. For all other data, user access is managed through a protocol that uses the same username and password needed to authenticate to the active directory domain and requires a password change every three months.

In addition, a one-time cleanup of unnecessary PPMS access is expected to be done by the end of the calendar year. No protocols for future access to PPMS are anticipated to be developed due to the planned retirement of the PPMS system.

The evaluation also noted that PPMS has the capability to log changes, but this capability is not fully implemented at this time. Logging changes can help ensure that changes are authorized, and also help determine if any changes are due to oversight, system hack or malicious attack.

The evaluation recommended that MnDOT consider logging changes to the PPMS and PPMS data. The Engineering Services Division responded that the development of protocols to log changes to PPMS and PPMS data is actively under way and is being accomplished by retiring PPMS and putting in place the appropriate protocols with its replacement software.

Finding II – Improvements for data accuracy

PPMS data accuracy was assessed for 100 state projects with a total value of \$1.7 billion:

- 48 projects (29 federal city/county projects and 19 trunk highway projects) that had been audited as part of the annual single audit for fiscal years 2010-2012 were checked against the PPMS.
 - For all 19 trunk highway projects, PPMS current cost estimates differed by at least 1 percent from current encumbered amounts
 - For five of 29 federal city/county projects reviewed, PPMS current cost estimates differed
 - Bid let dates were incorrect for six of 29 federal city/county projects
 - Other state project data elements in PPMS, such as state project number, MnDOT district, route or road number, project status, project description and type of work appear accurate for the projects sampled
- 52 projects, including federal city/county and trunk highway projects, as well as rail and transit projects, from the 2013-2016 State Transportation Improvement Plan were also checked against PPMS. Overall, PPMS data for these 52 projects appears accurate.

The evaluation recommends that the Engineering Services Division:

- Facilitate development of a process including all divisions and the Office of Finance to ensure that PPMS data, including current cost estimates and bid let dates, are accurate and up to date. The process should consider system edits to prevent large errors, and whether Primavera P6 will correct these errors.

- Consult with the chief financial officer to align improvements in financial data to the department's goal to enhance financial effectiveness.
- Implement system edits or periodic data reconciliation procedures to ensure project estimates are up to date and accurate.

The Engineering Services Division responded that, for non-state aid projects, the Office of Project Management and Technical Support has been working on this process and is vetting it through with district management. In addition, OPM&TS has been in preliminary consultations with the chief financial officer and is planned to be an integral part of the department's vision to improve financial accountability.

State Aid responded that cost estimates for state aid projects are checked by the Office of Capital Programs and Performance Measures as part of the authorization process. It appears the projects that had the large discrepancies were the result of a key individual suffering a medical emergency that resulted in a prolonged absence. This individual's responsibilities have been resumed by another person and updates are being performed in a consistent manner. Process improvements and more experienced individuals are now involved to better ensure accuracy.

Products and services budget expenditures

Product and service line budget

MnDOT is developing a new product and service grid focused on external stakeholders, which is targeted for use in the 2016-17 biennial budget. This is part of a change in MnDOT's processes for managing appropriations in order to more effectively, more efficiently, and more transparently budget and administer public resources, as well as to comply with the requirements of Minn. Stat. 174.56 subd. 2 (6). The expenses and budgets in this section represent the department's biennial budget for fiscal years 2012 and 2013, as appropriated in Laws of Minnesota 2011, 1st Special Session, Chapter 3. It also includes expenses for services that may have been rendered in fiscal year 2012, but due to processing time would have been paid in fiscal year 2013.

Challenges

MnDOT does not currently, and has not in the past, budgeted by product and service. Instead, MnDOT has budgeted by major program areas such as maintenance and operations, and program planning and delivery. MnDOT has only performed activity-based budgeting for the purpose of analysis. The prior product and service grid was internally focused and insufficient to meet the demands of today's business processes.

While MnDOT began creating an activity-based budgeting process over a decade ago, the implementation of budgeting by product and service was incomplete and the effort was abandoned as part of the implementation of SWIFT. Unfortunately, the implementation of SWIFT, the state's new financial and procurement system, did not carry forward the coding from the old system necessary to budget by or account for spending by product and service lines. Thus, this section represents a hypothetical analysis of MnDOT's 2013 budget using 2013 actual spending aligned with the product and service lines used in MAPS.

Key challenges within the reporting structure include:

- An inability to match some expenses to budgets due to system limitations in identifying the fiscal year budget to which the expenditures should be aligned. This occurs when an expenditure is made in one budget year and paid in the next.
- Uncommitted and roll-over budgets which may exhibit expenditures exceeding the total budget. These expenditures occur within a biennium and are allowed by statute.

While these challenges can be more thoroughly analyzed and quantified, the resources necessary to do such an analysis would prove prohibitive, as the process to perform these analyses is labor intensive.

Methodology

A six year average of spending from fiscal years 2006-2011 was aligned to MAPS product and service lines, creating the structure used to categorize 2013 budget and spending data. This involved cross-referencing MnDOT activities and aligning those activities to a potential list of MnDOT's products and services. This process included two distinct and unique tasks: determining where prior expenditures aligned to currently proposed products and services, and then aligning products and services that had been discontinued to currently proposed product and service offerings. Records have been retained for accounting where historical expenditures could be aligned for the purpose of demonstrating the expected outcome of the cost allocation project, summarized previously within this report, and to aid with preparation of roll-out of the new budgeting structure over fiscal year 2015.

2013 products and services analysis

The dollar amounts listed in all tables are in thousands.

Administration

Product or Service Line	2013 Budget	2013 Expenditures
Building Administration	418	416
Communication Services	1	1
County State Aid Administration	12	12
Facilities Investment and Planning	2,679	2,665
Facilities Operations and Maintenance	5,457	5,428
General Administration and Support	2,600	2,587
Totals	11,165	11,106

Aeronautics

Product or Service Line	2013 Budget	2013 Expenditures
Aeronautics Administration	478	471
Air Transportation Operations	1,145	1,127
Airport System Investment Planning	20,335	20,027
Aviation Systems Management	305	301
Aviation Traveler Information	198	195
Totals	22,459	22,119

Affirmative Action

Product or Service Line	2013 Budget	2013 Expenditures
Communication Services	1	1
County State Aid Administration	1	1
Workforce Management Services-Human Resources	496	494
Totals	497	495

Audit

Product or Service Line	2013 Budget	2013 Expenditures
Communication Services	1	1
County State Aid Administration	1	1
Financial Services	1,689	1,542
General Administration and Support	1	1
Totals	1,689	1,543

Bridges

Product or Service Line	2013 Budget	2013 Expenditures
Bridges	985	894
Construction Project Development	4,084	3,706
Construction Project Management	978	888
County State Aid System Investment	198	179
Facilities Management-Maintenance	2	2
Fleet Management Maintenance	74	68
Infrastructure Operations and Maintenance Administration	133	121
Investment and Planning Administration	2,181	1,979
Regulation	20	18
Roadsides	22	20
Statewide System Planning and Integration	970	880
Traffic Management	1	1
Totals	9,643	8,750

Chief Financial Officer and Financial Management

Product or Service Line	2013 Budget	2013 Expenditures
Communication Services	1	1
Construction Project Development	2	1
County State Aid Administration	(19)	(3)
Facilities Management-Maintenance	119	19
Financial Services	2,322	358
Fleet Management Maintenance	20	3
General Administration and Support	9,232	1,423
Highway Debt Service Investment	15,269	2,353
Infrastructure Operations and Maintenance Administration	7,147	1,102
Investment and Planning Administration	442	69
State Roads Investment	6,923	1,067
Totals	41,455	6,387

Civil Rights

Product or Service Line	2013 Budget	2013 Expenditures
Construction Project Development	910	939
Construction Project Management	629	648
Investment and Planning Administration	504	520
Statewide System Planning and Integration	1	1
Totals	2,042	2,107

Construction and Innovative Contracting

Product or Service Line	2013 Budget	2013 Expenditures
Construction Project Development	201	201
Construction Project Management	1,457	1,453
County State Aid System Investment	146	146
Investment and Planning Administration	1,004	1,001
State Roads Investment	1	1
Statewide System Planning and Integration	528	526
Totals	3,334	3,326

Corporate Services Division Administration

Product or Service Line	2013 Budget	2013 Expenditures
Communication Services	2	4
County State Aid Administration	60	127
Workforce Management Services-Human Resources	671	1,428
Totals	731	1,557

Debt Service

Product or Service Line	2013 Budget	2013 Expenditures
Highway Debt Service Investment	167,486	120,305
Totals	167,486	120,305

District 1

Product or Service Line	2013 Budget	2013 Expenditures
Bridges	1,128	1,273
Clear Roads	3,363	3,796
Construction Project Development	4,010	4,527
Construction Project Management	4,446	5,019
Facilities Management-Maintenance	2,274	2,567
Fleet Management Maintenance	4,888	5,518
Infrastructure Operations and Maintenance Administration	3,278	3,700
Inventory Control—Maintenance	3,907	4,411
Investment and Planning Administration	2,650	2,991
Regulation	6	6
Roadsides	1,087	1,227
Smooth Roads	2,453	2,768
State Roads Investment	37	42
Statewide System Planning and Integration	340	384
Traffic Management	1,520	1,716
Traveler Information Services	4	4
Totals	35,382	39,940

District 2

Product or Service Line	2013 Budget	2013 Expenditures
Bridges	505	515
Clear Roads	2,474	2,523
Construction Project Development	2,407	2,455
Construction Project Management	1,911	1,949
County State Aid System Investment	20	20
Facilities Management-Maintenance	1,357	1,384
Fleet Management Maintenance	2,706	2,760
Infrastructure Operations and Maintenance Administration	1,838	1,875
Inventory Control—Maintenance	1,928	1,967
Investment and Planning Administration	2,320	2,366
Regulation	1	1
Roadsides	852	869
Smooth Roads	1,625	1,658
State Roads Investment	3	3
Statewide System Planning and Integration	277	282
Traffic Management	863	880
Totals	21,081	21,500

District 3

Product or Service Line	2013 Budget	2013 Expenditures
Bridges	708	719
Clear Roads	3,762	3,821
Construction Project Development	4,127	4,192
Construction Project Management	3,023	3,070
Facilities Management-Maintenance	2,211	2,245
Fleet Management Maintenance	3,415	3,469
Infrastructure Operations and Maintenance Administration	3,232	3,283
Inventory Control—Maintenance	4,093	4,158
Investment and Planning Administration	2,808	2,852
Regulation	3	3
Roadsides	1,066	1,082
Smooth Roads	3,517	3,572
State Roads Investment	53	53
Statewide System Planning and Integration	338	344
Traffic Management	1,447	1,470
Totals	33,796	34,326

District 4

Product or Service Line	2013 Budget	2013 Expenditures
Bridges	310	352
Clear Roads	2,424	2,754
Construction Project Development	2,017	2,291
Construction Project Management	2,076	2,358
County State Aid System Investment	15	17
Facilities Management-Maintenance	1,273	1,446
Fleet Management Maintenance	2,836	3,222
Infrastructure Operations and Maintenance Administration	1,750	1,988
Inventory Control—Maintenance	2,502	2,842
Investment and Planning Administration	1,978	2,246
Regulation	1	1
Roadsides	686	780
Smooth Roads	2,648	3,008
State Roads Investment	91	103
Statewide System Planning and Integration	390	443
Traffic Management	1,932	2,194
Traveler Information Services	13	15
Totals	22,935	26,053

District 6

Product or Service Line	2013 Budget	2013 Expenditures
Bridges	1,577	1,620
Clear Roads	4,012	4,122
Construction Project Development	3,675	3,776
Construction Project Management	3,116	3,202
County State Aid System Investment	170	175
Facilities Management-Maintenance	1,611	1,655
Fleet Management Maintenance	3,630	3,730
Infrastructure Operations and Maintenance Administration	2,870	2,949
Inventory Control—Maintenance	4,476	4,599
Investment and Planning Administration	4,350	4,471
Regulation	4	4
Roadsides	1,369	1,407
Smooth Roads	4,227	4,343
State Roads Investment	91	94
Statewide System Planning and Integration	417	428
Traffic Management	1,637	1,683
Totals	37,224	38,251

District 7

Product or Service Line	2013 Budget	2013 Expenditures
Bridges	756	801
Clear Roads	2,839	3,007
Construction Project Development	2,192	2,321
Construction Project Management	2,074	2,196
County State Aid System Investment	82	87
Facilities Management-Maintenance	1,261	1,335
Fleet Management Maintenance	3,089	3,271
Infrastructure Operations and Maintenance Administration	2,246	2,379
Inventory Control—Maintenance	3,515	3,723
Investment and Planning Administration	3,234	3,425
Regulation	3	4
Roadsides	1,148	1,216
Smooth Roads	2,619	2,774
State Roads Investment	55	58
Statewide System Planning and Integration	302	320
Traffic Management	742	786
Traveler Information Services	9	10
Totals	26,159	27,706

District 8

Product or Service Line	2013 Budget	2013 Expenditures
Bridges	539	541
Clear Roads	1,527	1,535
Construction Project Development	1,906	1,917
Construction Project Management	1,525	1,534
Facilities Management-Maintenance	987	992
Fleet Management Maintenance	2,169	2,180
Infrastructure Operations and Maintenance Administration	1,776	1,786
Inventory Control—Maintenance	2,092	2,103
Investment and Planning Administration	2,387	2,400
Regulation	10	10
Roadsides	458	461
Smooth Roads	1,810	1,819
State Roads Investment	4	4
Statewide System Planning and Integration	502	505
Traffic Management	730	734
Totals	18,415	18,514

Electronic Communications

Product or Service Line	2013 Budget	2013 Expenditures
Electronic Communications Investment and Planning	2,865	2,827
Electronic Communications Management	1,391	1,373
Electronic Communications Administration	1,013	1,000
State Roads Investment	2	2
Totals	5,270	5,200

Engineering Services Administration

Product or Service Line	2013 Budget	2013 Expenditures
Construction Project Development	356	391
Construction Project Management	104	115
County State Aid System Investment	2	2
Investment and Planning Administration	353	387
State Roads Investment	2	2
Statewide System Planning and Integration	82	90
Totals	896	984

Environmental Stewardship

Product or Service Line	2013 Budget	2013 Expenditures
Clear Roads	29	27
Construction Project Development	2,400	2,220
Construction Project Management	105	97
County State Aid System Investment	8	8
Facilities Management-Maintenance	20	19
Infrastructure Operations and Maintenance Administration	75	69
Inventory Control--Maintenance	12	11
Investment and Planning Administration	982	908
Regulation	24	22
Roadsides	86	79
Smooth Roads	2	2
Statewide System Planning and Integration	670	620
Traffic Management	1	1
Totals	4,408	4,078

Freight and Commercial Vehicle Operations

Product or Service Line	2013 Budget	2013 Expenditures
Freight Administration	1,104	959
Motor Carrier Management	3,179	2,762
Multimodal Innovation	672	584
Rail and Water System Investment and Planning	231	200
Totals	5,184	4,505

Government Affairs, Communications, and Senior Leadership

Product or Service Line	2013 Budget	2013 Expenditures
Communication Services	2,048	306
County State Aid Administration	9	2
Department Leadership and Management	2,077	310
General Administration and Support	931	139
Totals	5,063	756

Human Resources

Product or Service Line	2013 Budget	2013 Expenditures
Bridges	8	7
Clear Roads	5	4
Communication Services	2	2
Construction Project Development	525	449
Construction Project Management	300	257
County State Aid System Investment	9	7
Facilities Management-Maintenance	6	6
General Administration and Support	2	2
Infrastructure Operations and Maintenance Administration	222	190
Investment and Planning Administration	252	216
Roadsides	4	3
Smooth Roads	7	6
Statewide System Planning and Integration	103	88
Traffic Management	29	25
Workforce Management Services-Human Resources	4,152	3,550
Totals	5,619	4,804

Information and Technology Services

Product or Service Line	2013 Budget	2013 Expenditures
Communication Services	7	8
County State Aid Administration	8	8
General Administration and Support	47	49
Technology Services	21,806	22,566
Totals	21,867	22,629

Land Management

Product or Service Line	2013 Budget	2013 Expenditures
Construction Project Development	6,761	6,454
Construction Project Management	3	3
Investment and Planning Administration	2,571	2,455
Statewide System Planning and Integration	210	200
Totals	9,543	9,109

Maintenance

Product or Service Line	2013 Budget	2013 Expenditures
Bridges	795	1,616
Building Administration	82	166
Clear Roads	318	645
Facilities Investment and Planning	1,283	2,608
Facilities Management-Maintenance	98	198
Facilities Operations and Maintenance	2,584	5,254
Fleet Management Maintenance	8,997	18,291
Infrastructure Operations and Maintenance Administration	1,278	2,598
Inventory Control—Maintenance	1,115	2,267
Roadsides	1,995	4,055
Smooth Roads	17	34
Traffic Management	2,724	5,537
Totals	21,279	43,263

Materials and Road Research

Product or Service Line	2013 Budget	2013 Expenditures
Construction Project Development	2,733	2,576
Construction Project Management	3,372	3,179
County State Aid System Investment	18	17
Investment and Planning Administration	2,616	2,466
Statewide System Planning and Integration	2,438	2,298
Totals	11,176	10,534

Metro District

Product or Service Line	2013 Budget	2013 Expenditures
Bridges	3,130	3,128
Clear Roads	11,822	11,815
Construction Project Development	14,908	14,899
Construction Project Management	10,044	10,039
County State Aid System Investment	1,389	1,388
Facilities Management-Maintenance	5,513	5,509
Fleet Management Maintenance	6,205	6,201
Infrastructure Operations and Maintenance Administration	7,510	7,506
Inventory Control--Maintenance	11,259	11,253
Investment and Planning Administration	10,127	10,122
Regulation	72	72
Roadsides	2,379	2,378
Smooth Roads	7,009	7,005
State Roads Investment	12,433	12,425
Statewide System Planning and Integration	2,362	2,361
Traffic Management	10,963	10,957
Traveler Information Services	340	340
Totals	117,459	117,390

Modal Planning and Program Management Administration

Product or Service Line	2013 Budget	2013 Expenditures
Investment and Planning Administration	790	158
Statewide System Planning and Integration	1,718	344
Totals	2,507	502

Operations Division Administration

Product or Service Line	2013 Budget	2013 Expenditures
Bridges	18	8
Clear Roads	57	24
Construction Project Development	1,516	619
Construction Project Management	334	137
County State Aid System Investment	48	20
Facilities Management-Maintenance	226	93
Fleet Management Maintenance	65	27
Infrastructure Operations and Maintenance Administration	1,208	493
Investment and Planning Administration	1,732	707
Roadsides	18	8
Smooth Roads	39	16
Statewide System Planning and Integration	461	188
Traffic Management	1,929	787
Totals	7,644	3,118

Passenger Rail

Product or Service Line	2013 Budget	2013 Expenditures
Transit Administration	77	124
Transit System Investment and Planning	424	680
	500	803

Policy, Safety and Strategic Initiatives Division Administration

Product or Service Line	2013 Budget	2013 Expenditures
Construction Project Development	61	116
Construction Project Management	90	171
Investment and Planning Administration	340	647
State Roads Investment	30	56
Statewide System Planning and Integration	143	273
Totals	661	1,261

State Aid for Local Transportation

Product or Service Line	2013 Budget	2013 Expenditures
County State Aid Administration	2,468	2,440
County State Aid System Investment	448,997	443,955
Federal Local Aid	160,925	159,118
Federal Municipal Aid Administration	349	345
Municipal State Aid System Investment	112,838	111,571
Municipal State Aid Administration	684	676
Totals	726,257	718,102

State Road Investment

Product or Service Line	2013 Budget	2013 Expenditures
State Roads Investment	595,000	967,283
Totals	595,000	967,283

Technical Support

Product or Service Line	2013 Budget	2013 Expenditures
Bridges	1,047	1,155
Clear Roads	1	1
Construction Project Development	6,536	7,207
Construction Project Management	830	915
County State Aid System Investment	56	62
Facilities Management-Maintenance	119	131
Infrastructure Operations and Maintenance Administration	160	176
Inventory Control—Maintenance	3	3
Investment and Planning Administration	6,705	7,394
Roadsides	250	275
Smooth Roads	270	298
State Roads Investment	12	14
Statewide System Planning and Integration	4,240	4,675
Traffic Management	1,326	1,462
Totals	21,548	23,760

Traffic, Safety and Technology

Product or Service Line	2013 Budget	2013 Expenditures
Clear Roads	3	2
Construction Project Development	483	225
Construction Project Management	52	25
County State Aid Administration	118	55
County State Aid System Investment	19	9
Facilities Management-Maintenance	18	9
Fleet Management Maintenance	1	1
General Administration and Support	40	19
Infrastructure Operations and Maintenance Administration	419	196
Inventory Control—Maintenance	15	7
Investment and Planning Administration	3,206	1,495
State Roads Investment	619	289
Statewide System Planning and Integration	11,705	5,457
Traffic Management	2,529	1,179
Traveler Information Services	203	95
Totals	19,423	9,056

Transit

Product or Service Line	2013 Budget	2013 Expenditures
Transit Administration	205	211
Transit Operation and Maintenance	1	1
Transit System Investment and Planning	15,594	16,017
Totals	15,798	16,227

Transportation System Management

Product or Service Line	2013 Budget	2013 Expenditures
Statewide System Planning and Integration	2,701	21,191
Totals	2,701	21,191

Grand Total of All Tables

Product or Service Line	2013 Budget	2013 Expenditures
All Product or Service Lines Grand Total	2,055,286	2,368,522

Productivity measures

Introduction

Performance measures are not new for MnDOT. However, traditional measures reported by MnDOT are measures of effectiveness, designed to measure how effectively products and services are being delivered relative to target service levels. Productivity measures are new to MnDOT and are the next step to evaluate how efficiently these products and services are being delivered. Productivity measures align well with the department goal of enhancing financial effectiveness.

December 2013 marks the first year MnDOT has produced a report on productivity measures. Therefore, this initial report includes additional background information.

Project background

The measures of productivity project is an effort to identify, create, examine and document current level of productivity within MnDOT while complying with new legislation passed in 2012 amending Minn. Stat. 174.56, subd. 2(6). This requires the commissioner to submit a report each year, beginning in December 2013 that includes the annual budget for products and services for each department district and office, with comparison to actual spending and including measures of productivity for the previous fiscal year.

For this first report, MnDOT identified six measures of productivity in five product and service areas:

- Bridge - inspection cost and maintenance cost per square foot of bridge deck area
- Pavement - pavement preservation investment compared to pavement quality
- Snow and ice - cost per plow mile driven
- Pavement markings - cost per mile striped
- Transit - administrative cost per transit passenger trip

While these areas are a subset of MnDOT's products and services, additional areas will be added in subsequent reports as they are identified.

Purpose and scope

The productivity measures contained in this report were identified and developed by each respective operational area, i.e., bridge, pavements, snow and ice, striping and transit. The data is repeatable, verifiable and auditable. Four of the five measures use “job full cost” (for FY years 2006-2011) and “project full cost” (for FY 2013) data, which is actual transaction amounts plus applied operational overhead based on the previous year’s activity. The pavement measure uses planned capital investment for contracted construction work.

The measures in this report are measures the department found relevant to the management of its businesses and that have the potential to increase our understanding of how to improve product and service delivery. In addition, this project has brought forward a new way of thinking, communicating and taking action.

Project challenges

MAPS (historical data reporting) vs. SWIFT (current data reporting)

Although the legislative requirement is to produce a measure of productivity report detailing current (FY13) and prior fiscal year (FY12) input/output data, the report would lack meaning without a wider slice of historical data to produce a trend line.

Unfortunately, due to data anomalies stemming from the agency's transition from MAPS to SWIFT, fiscal year 2012 data is not reportable for business areas that relied on SWIFT to extract data.

Application data gaps

Data used in reports must be repeatable, auditable and tied to the system of record.

Subject matter experts have identified gaps in the capacity of current systems to track and report data used in measuring productivity. The team continues to identify mitigation strategies to address these challenges and gaps.

How this report relates to other MnDOT initiatives

Minnesota Go Statewide Multimodal Transportation Plan

The [Statewide Multimodal Transportation Plan 2012-2031](#) is the result of extensive collaboration between MnDOT and citizens, stakeholders and partners throughout Minnesota. It is based on the Minnesota GO 50-year vision for transportation and provides guidance to help Minnesota achieve this vision. Along with the Minnesota GO Vision, the Statewide Multimodal Transportation Plan will be used to shape subsequent MnDOT plans and investment decisions.

The measures of productivity project will continue to develop and report on measures aligned with MnDOT's plans.

Quality of life

In 2010 and 2011, MnDOT partnered with researchers from the University of Minnesota to seek citizen input on what comprises quality of life and what role transportation plays. In the study, Minnesotans defined the following transportation categories as contributing to or detracting from their quality of life: access, design, environment, maintenance, mobility, safety and transparency (in planning and communications). Maintenance was considered nearly twice as valuable as any other category. Within maintenance, keeping the road surface smooth, including snow and ice removal, ranked as MnDOT's most important activity. The measures of productivity project will continue to develop and report measures that are aligned with the quality of life indicators Minnesotans find important.

Product and service line accounting

The Office of Financial Management is in the process of developing a new streamlined accounting structure for MnDOT's products and services. This new process will produce meaningful accounting codes that accurately reflect the work of MnDOT. The former product services grid account code structure produced a possible combination of codes in the range of 15,800, making budgeting by product and service administratively burdensome.

The new products and services structure will be aligned to the new central accounting system, the Statewide Integrated Financial Tools. This alignment is expected to be completed by fiscal year 2016.

When SWIFT replaced the former Minnesota Accounting and Procurement System, the accounting structure was not set-up to budget or track expenditures by product and service. MnDOT is in the process of trying to connect the old MAPS and new SWIFT accounting structures to allow for meaningful reports and data analysis tying history, fiscal year 2011 and prior (from MAPS) to current (SWIFT) reporting. An alignment of MnDOT's products and services to SWIFT must be developed in order to capture, identify and classify input data. In turn, the measures of productivity project must correctly capture the appropriate input data to accurately produce output measures that align to MnDOT's outcomes by service lines. This will be accomplished by using the new product service line accounting structure once it has been completed.

Cost allocation project

The Office of Finance is developing and implementing a cost allocation methodology to distribute direct and indirect costs from MnDOT administrative and expert offices to the districts, modes, Electronic Communications and State Aid offices. The cost allocation project is related to the development of the MnDOT product service line accounting structure. Once the cost allocation project is complete, the process for reporting direct and indirect expenses will be incorporated into the measures models to more reasonably reflect the total cost of the products and services delivered to the public.

Performance measures

MnDOT has used measurement tools since the 1990s to evaluate its services and guide plans, projects and investments. The effort began with maintenance measures and now spans all of MnDOT's major products, services and priorities. MnDOT uses performance-based planning and programming to guide transportation investment decisions.

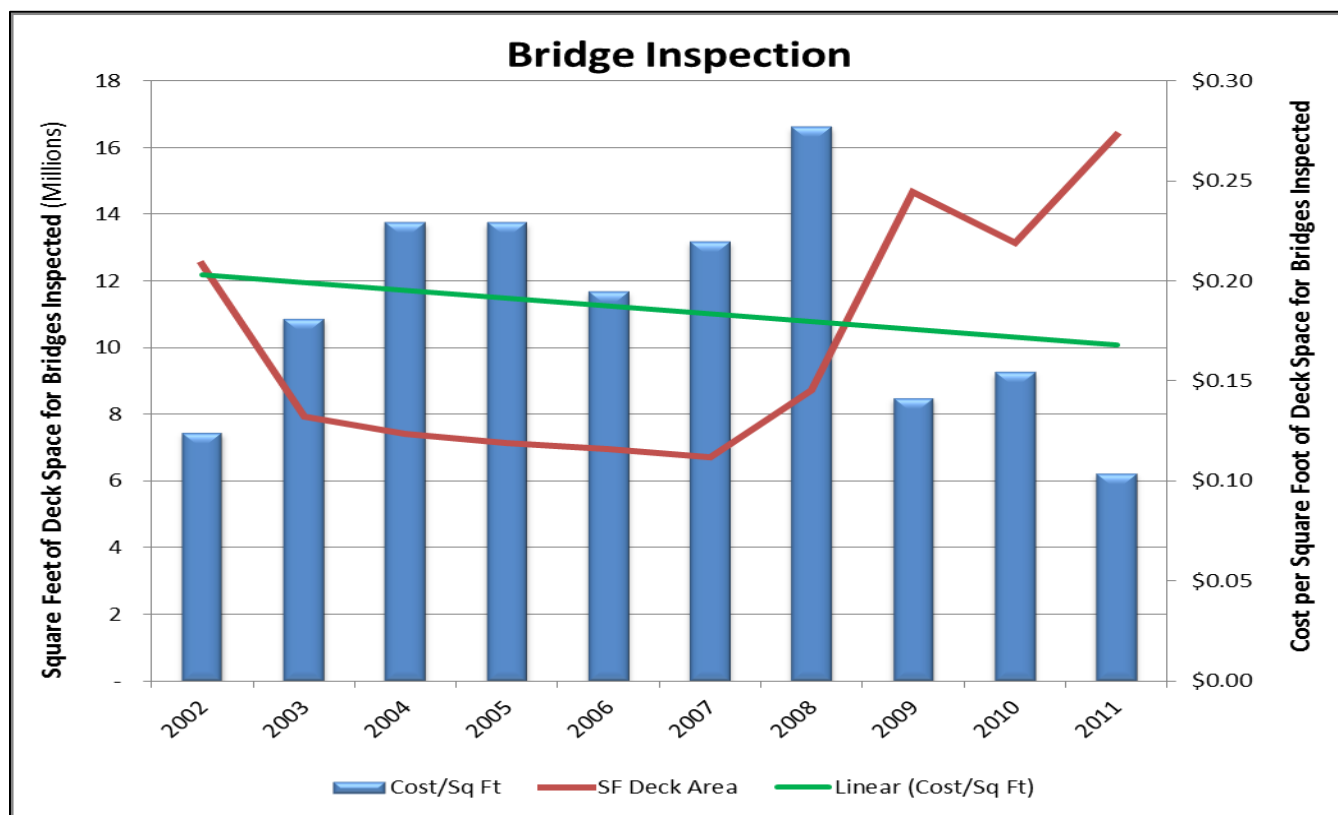
Performance measures are designed to measure effectiveness at delivering products and services according to established targets. The effort to measure productivity is essentially the next step beyond performance measures, and is designed to measure how efficiently MnDOT is delivering its services. The goal for subsequent years of this report is identify additional performance measures that would be good candidates to pair with productivity measures to present a multi-dimensional story.

Bridge inspection cost per square foot

Bridge inspections ensure bridge safety, keep MnDOT in compliance with state and federal law and provide data to support bridge investment decisions.

The primary cost of delivering a high-quality bridge inspection program is the labor and equipment used to access bridges and document their condition. The bridge inspection productivity measure tracks dollars spent on routine inspections against the total deck area of bridges inspected. Comparing labor and equipment costs to the square footage of the bridge deck inspected, it costs roughly 15 cents per square foot to inspect MnDOT's bridges.

Bridge inspection cost per square foot



The SF of deck area for 2002–2008 does not include all bridges inspected due to previous cost accounting practices. Data from 2009 forward is accurate with regard to both cost and SF of deck area inspected. A 2% inflation adjustment was applied to the cost data.

Bridge inspection data

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Bridge inspection expenses (\$1,000)	\$1,123	\$1,071	\$1,304	\$1,293	\$1,102	\$1,236	\$2,083	\$1,846	\$1,860	\$1,600
Sq. ft. of bridge deck inspected (1,000)	12,504	7,936	7,419	7,146	6,966	6,709	8,716	14,669	13,154	16,378
Actual cost per sq. ft. of inspection	\$.09	\$.13	\$.18	\$.18	\$.16	\$.18	\$.24	\$.13	\$.14	\$.10

Numbers contained within the table are not adjusted for inflation

The cost per square foot for bridge inspections is trending downward over the 2002-2011 time period. However, due to incomplete data from 2002-2008 for square feet of deck area inspected, more years of data will be needed to accurately establish a trend starting in 2009.

The quality of MnDOT's bridge inspection program is assessed annually by the Federal Highway Administration as a requirement of the National Bridge Inspection Standards. As part of this process, a series of 23 measures are reviewed and compared to uniform national standards. MnDOT reports biennially on Bridge Inspection Quality Assurance in accordance with Minn. Stat. 165.03, subd. 8. In addition, MnDOT tracks the timeliness of bridge inspections and reports it in the annual Transportation Performance Report. Through these annual reviews, the quality of MnDOT's inspection program is continually monitored and improvement plans are established as appropriate.

Viewing the productivity measure along with our NBIS assessment and MnDOT's performance measures enables MnDOT to gauge the overall productivity of our inspection activities.

Why inspection cost per square foot is a good measure

Bridge safety inspections play a key role in maintaining a safe transportation system. They ensure the structural integrity of our bridges and keep MnDOT in compliance with state and federal law. Bridge inspections also provide the condition assessment data that supports MnDOT investment decisions regarding bridge repair, rehabilitation and replacement.

How this measure informs decisions

This measure helps us to understand the cost of our bridge inspection program and track this cost annually to monitor any significant trends. We can also use this data to benchmark our bridge inspection costs against other states or compare bridge inspection costs between transportation districts within our own state. Understanding the cost of bridge inspections allows us to make appropriate budget and staffing decisions with regard to managing our bridge system.

Major influencing factors

Bridge condition and the complexity of the inspection are major factors that influence inspection cost per square foot. Bridges with advanced deterioration will require additional time and effort to inspect. Large and complex bridges require more advanced equipment and inspection techniques.

The total cost of bridge inspections also includes time coded to culvert inspections. Culverts however, do not have a deck area. Since the number of culverts on the system is relatively stable and culvert inspections require less time and effort, the inclusion of culvert inspection costs does not significantly affect the bridge inspection unit cost.

The indirect costs of MnDOT's bridge inspection program (reporting, training, program management and policy development) are not included in this measure.

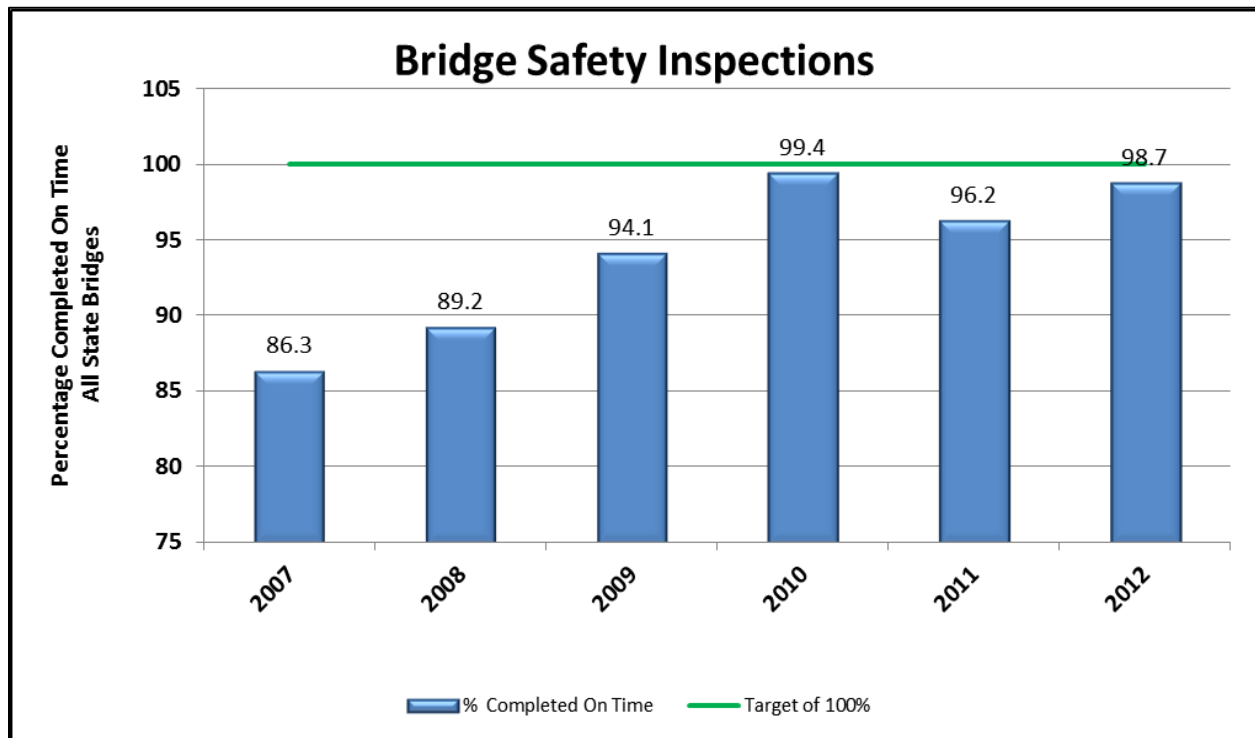
Effectiveness measure

MnDOT's bridge inspection goal is to complete 100 percent of inspections on time. This exceeds the 95 percent target established by the National Bridge Inspection Standards. An inspection is considered on time if it is completed within 30 days of its scheduled due date.

Performance on this measure improved in 2012 after having dropped in 2011 due to a three-week state government shutdown, which stopped bridge inspections for a significant portion of the inspection season.

Per federal requirements, all bridges are inspected on a one- or two-year cycle. MnDOT expects to be consistently at or near the 100 percent target unless there are unavoidable delays such as the 2011 shutdown.

Bridge safety inspections



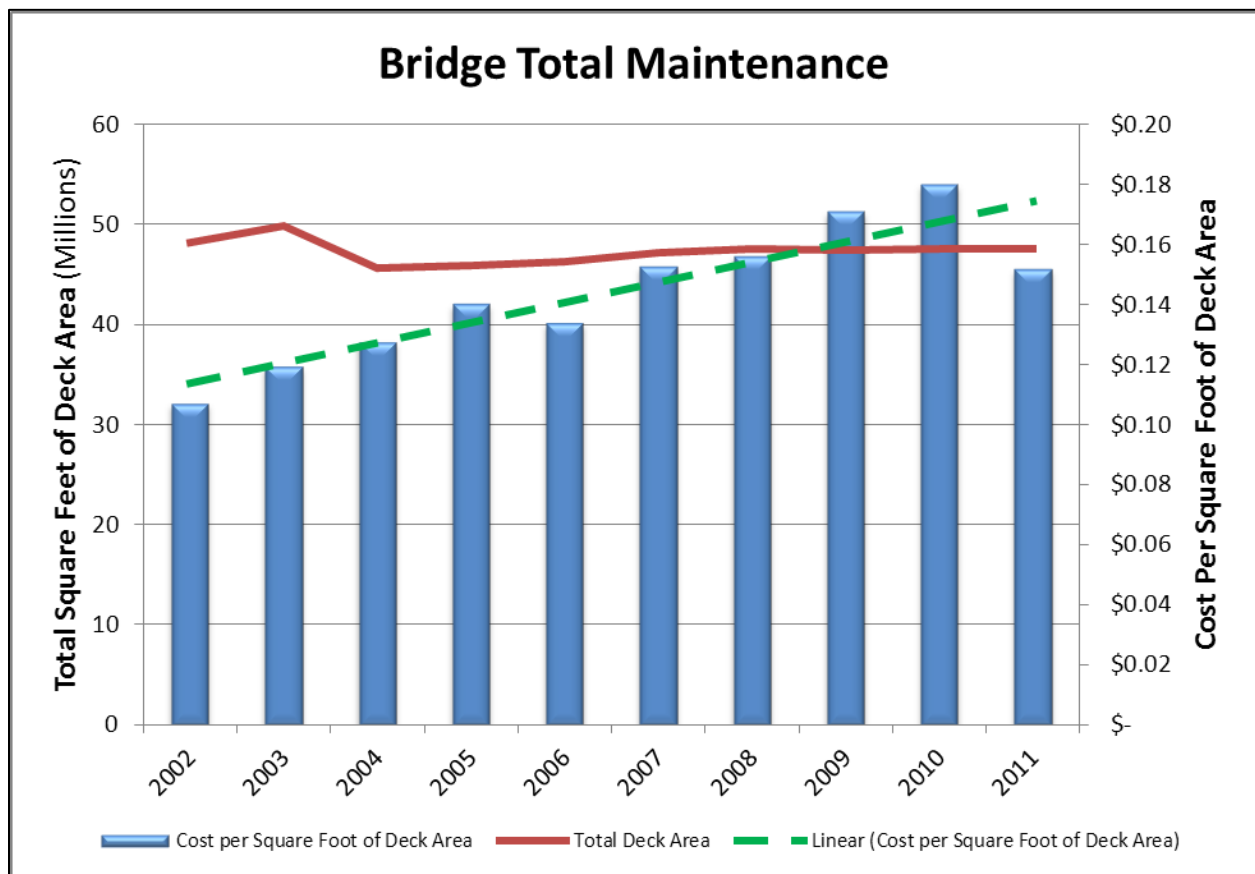
All bridges with safety inspections do receive inspection, but an inspection is considered on time if it is completed within 30 days of its scheduled due date.

Bridge maintenance cost per square foot

Bridge maintenance includes both preventive and reactive maintenance. Preventive bridge maintenance includes routine maintenance activities that keep bridges in good condition and extend their service life. Reactive bridge maintenance includes minor repairs to keep bridges safe and ensure that they serve their transportation function with limited service interruptions.

The bridge maintenance productivity measure compares dollars spent on preventive and reactive maintenance to the deck area of the bridge system. Dividing labor, equipment and material costs over the square footage of bridges in the system demonstrates costs at roughly 15 cents per square foot to perform preventive and reactive maintenance on our bridges. As a reference, it costs an average of \$150 per square foot to construct a new bridge.

Bridge maintenance cost per square foot



A 3% inflation adjustment was applied to the cost data.

Bridge maintenance costs

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2013
Preventive Maintenance Expenditures (\$1,000)	\$1,607	\$1,765	\$1,645	\$2,227	\$2,739	\$3,767	\$3,591	\$3,051	\$3,410	\$3,344	\$2,358
Reactive Maintenance Expenditures (\$1,000)	\$2,124	\$2,659	\$2,812	\$2,855	\$2,295	\$2,260	\$2,818	\$4,148	\$4,422	\$3,462	\$3,418
Total Bridge Deck Sq. Ft. (1,000)	48,245	49,852	45,630	45,945	46,257	47,124	47,576	47,373	47,531	47,543	47,567
Maintenance Cost/Sq. Ft.	\$0.08	\$0.09	\$0.10	\$0.11	\$0.11	\$0.13	\$0.13	\$0.15	\$0.16	\$0.14	\$0.12

Numbers within the table are not adjusted for inflation.

There is a slight upward trend in the square foot cost for bridge maintenance. Highway Systems Operation Plan funding enhances MnDOT's ability to perform preventive maintenance, which may partially account for this upward trend. Additionally, as the bridge system ages the amount of reactive maintenance required will increase, which may also contribute to this upward trend.

Why total maintenance cost per square foot is a good measure

A key component of managing bridges is employing a systematic approach to bridge preservation. Preservation is a program of cyclical and condition-based maintenance activities that keep bridges in sound condition with the intent of slowing their deterioration rate. Preservation activities are categorized as either preventive or reactive maintenance.

- Preventive maintenance includes routine maintenance activities performed according to an assigned frequency, as well as periodic minor repairs. Specific preventive maintenance activities include flushing, painting, joint maintenance and deck sealing. It is generally performed on bridges in good or satisfactory condition.
- Reactive maintenance includes those activities scheduled in response to an identified condition that may compromise public safety or bridge structural function. Specific reactive maintenance activities include repair of the deck, superstructure and substructure. It is generally performed on bridges in fair or poor condition.

Performing preventive maintenance on newer bridges is cost effective and will keep bridges in good condition longer. Performing reactive maintenance when it is needed will delay the need for extensive rehabilitation or replacement.

How this measure informs decisions

This measure establishes the labor, equipment and material costs associated with maintaining our bridges. These costs can be tracked annually to monitor any trends. We can also compare our bridge maintenance costs to national standards, or compare district maintenance program costs within our state. Additionally, this measure assists in determining budget needs for agency-performed bridge preservation.

Major influencing factors

Budget allocations and the condition of the overall bridge system are factors that influence this measure. As the condition of the bridge system trends toward good and satisfactory, preventive maintenance becomes the appropriate treatment. As the condition of the bridge system trends toward fair and poor, reactive maintenance needs increase.

These measures of productivity can be viewed alongside the bridge condition performance measures and the overall age and condition of the bridge system to determine whether MnDOT is making proper investments in bridge preservation.

The total cost of bridge maintenance includes time coded to culvert maintenance. Culverts do not have a deck area, so these costs are excluded. Since the number of culverts on the system is relatively stable and culvert maintenance is not a significant portion of overall costs, the inclusion of culvert maintenance does not significantly affect the unit cost.

The indirect costs of MnDOT's bridge maintenance program such as reporting, training, program management and policy development are not included in this measure.

Preservation activities performed by contract are not included, due to current accounting practice. MnDOT generally self-performs the majority of bridge preservation, but future reporting efforts will attempt to include contract maintenance work.

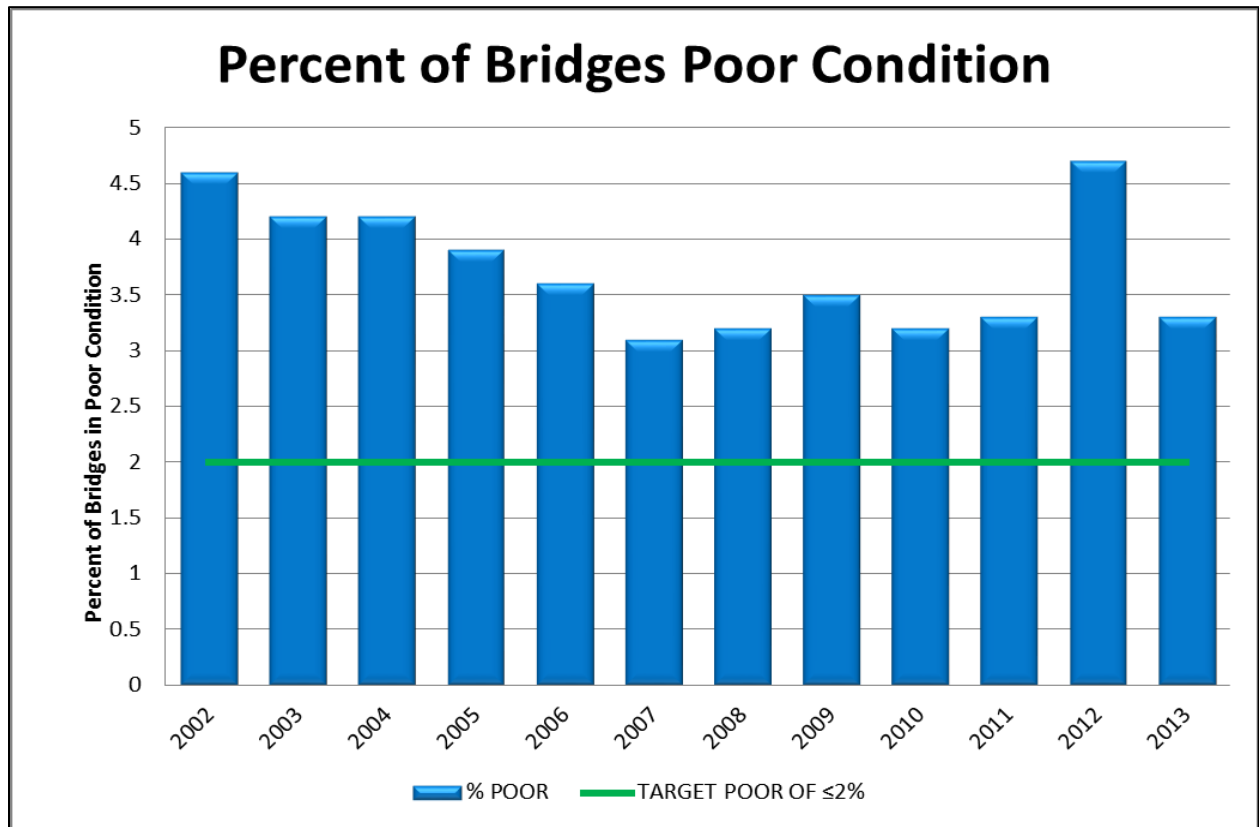
Total deck area of the system was chosen because nearly all bridges receive some form of maintenance activity each season, most commonly a bridge deck flushing operation.

Effectiveness Measure

Bridge condition improved in 2013 after a one year uptick in the percent of National Highway System bridge deck area on "poor" condition bridges. This spike occurred when the Blatnik Bridge connecting Duluth and Superior was assigned a "poor" condition rating following a 2011 inspection. MnDOT has since carried out a major rehabilitation on this bridge that improved its condition and extended its useful life.

NHS bridges are a critical component of Minnesota's transportation network. They are also among the state's most expensive assets to replace. A limited share of NHS bridges in "poor" condition suggests that MnDOT is managing this obligation effectively through repairs and rehabilitation that extends a bridge's useful life, reduces long-term maintenance costs and restricts the number of bridges in need of near-term reconstruction.

National Highway System bridges in poor condition as a percent of total NHS bridge deck area



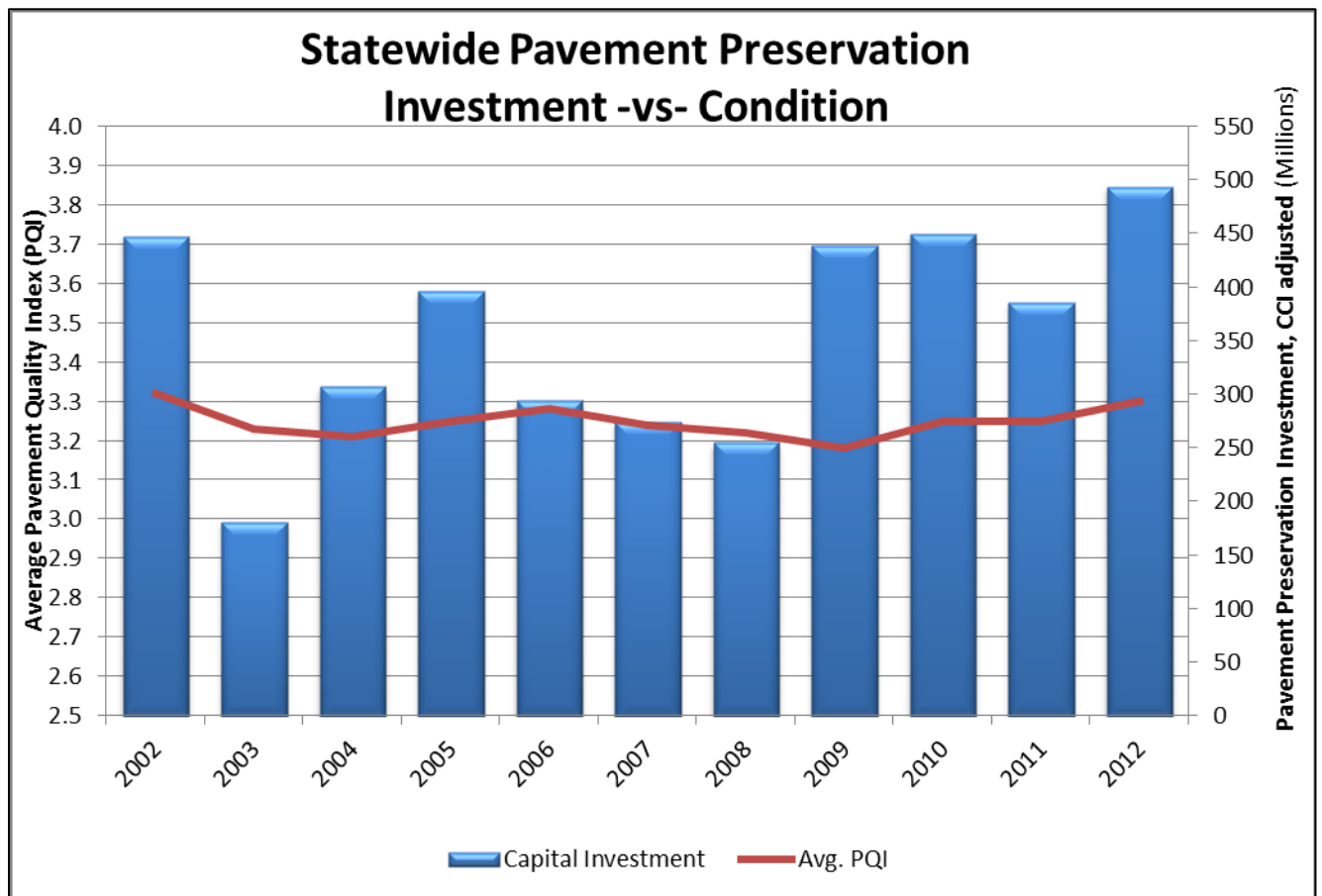
Pavement quality and investment

Pavement preservation

Preserving the functional and structural integrity of Minnesota's highways is a priority for MnDOT. Timely repair and replacement reduces long-term costs. Also, MnDOT customer research has found that Minnesotan's satisfaction with overall state highway maintenance is greatly affected by highway smoothness.

Pavement preservation investment is compared to the Average Pavement Quality Index in the chart below. The investment numbers in the chart include the cost of MnDOT's contracted work. Work performed by MnDOT labor is not included. The results show that the condition of the system, which is 12,000 centerline miles, very closely follows dollars invested. Higher investment into pavement preservation shows associated improvement to the system.

Statewide pavement preservation investment – Condition



Construction costs per lane mile

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Preservation lane miles	3,109	2,195	3,624	3,688	3,259	2,335	2,857	3,257	3,576	2,432
Investment (\$1,000)	\$233,000	\$102,907	\$170,988	\$241,050	\$216,030	\$220,957	\$220,412	\$369,583	\$367,411	\$333,965
Cost per lane mile (\$1,000)	\$75	\$47	\$47	\$65	\$66	\$95	\$77	\$114	\$103	\$137

Numbers within the table are not adjusted for inflation.

MnDOT's pavement condition data is reduced to several indices. Each index captures different aspect of the pavement's health.

- Ride Quality Index measures pavement smoothness
- Surface Rating measures pavement distresses visible on the pavement surface such as cracks, patches and ruts
- Pavement Quality Index is a composite index calculated from RQI and SR, giving an overall indication of the condition of the pavement. The PQI is the index used to determine if the state highway system is meeting performance thresholds established for the Government Accounting Standards Board, Standard 34
- Remaining Service Life is an estimate, in years, until the RQI reaches a value considered the end of a pavement's design life.

For the purposes of GASB 34, MnDOT established that the state highway system will be maintained, at the minimum following levels:

- Principal arterial system: Average PQI of 3.0 or higher
- Non-principal arterial system: Average PQI of 2.8 or higher

Why pavement preservation investment vs. pavement condition is a good measure

This measure shows the dollars invested through contracted work from fiscal year 2002 - 2012 and the associated system averaged PQI after the pavement preservation work was completed. This is an indication of MnDOT efforts to preserve our valuable pavement infrastructure. The measure also shows the sensitivity of system condition to preservation investment.

How this measure informs decisions

This measure shows MnDOT's commitment to preserving pavement infrastructure. There is also a direct correlation between preservation investment and system improvement or decline.

Major influencing factors

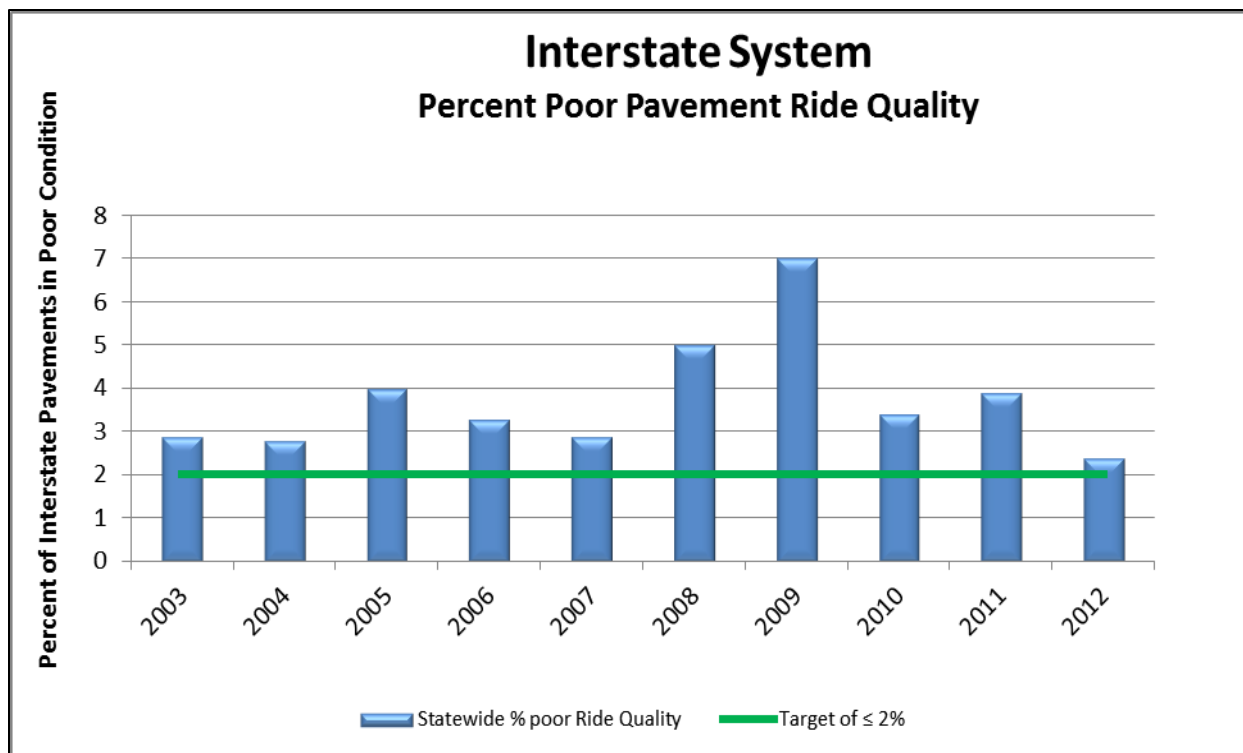
Inflation in construction costs is a major influencing factor, especially when certain items increase in cost faster than others. When the majority of the increase to the construction cost index is due to asphalt and concrete prices, pavement preservation costs increase disproportionately when compared to other construction activities.

High cost, short distance and major construction improvements such as bridge construction, are not included. While bridge construction will improve the PQI on the bridge, the investment includes much more than what is needed to preserve the pavement and would incorrectly skew pavement preservation productivity numbers.

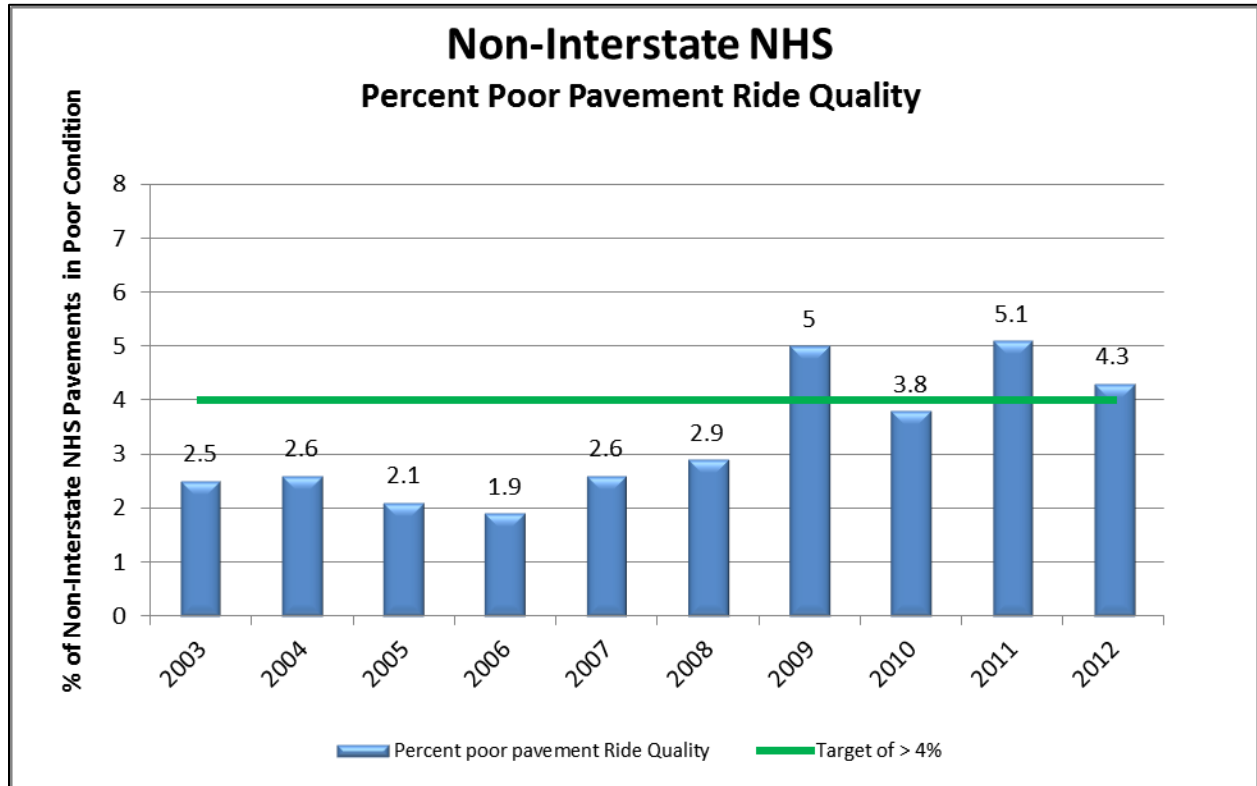
Effectiveness Measure

MnDOT's measure of effectiveness for pavement condition is the share of the system with "poor" ride quality. Pavement rated poor can still be driven on, but the ride is sufficiently rough that most people would find it uncomfortable and decrease their speed as a result. Ride quality improved on interstates, the non-interstate National Highway System and on non-NHS highways in 2012. Overall, there were 150 fewer miles of highway with "poor" ride quality in 2012 compared to 2011. This improvement pushed performance on interstates and the rest of the NHS to within a percentage point of statewide targets.

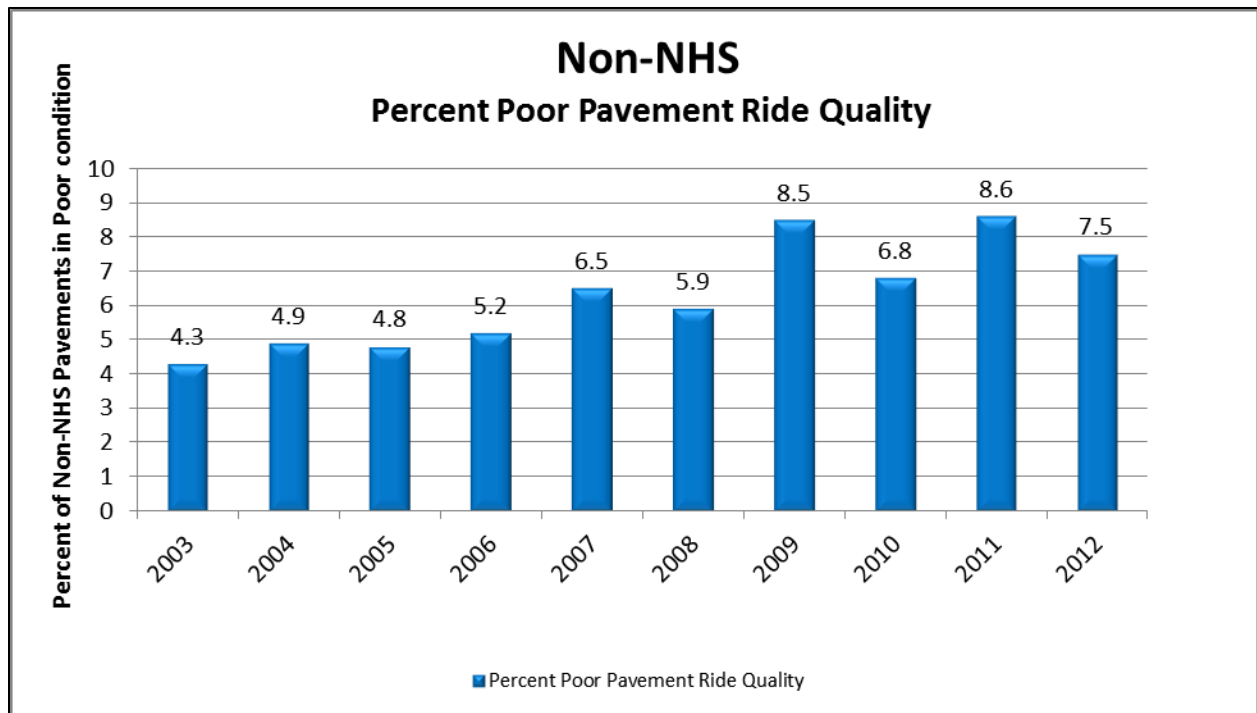
Interstate system: Percent poor pavement ride quality



Non-Interstate NHS: Percent poor pavement ride quality



Non-NHS: Percent poor pavement ride quality



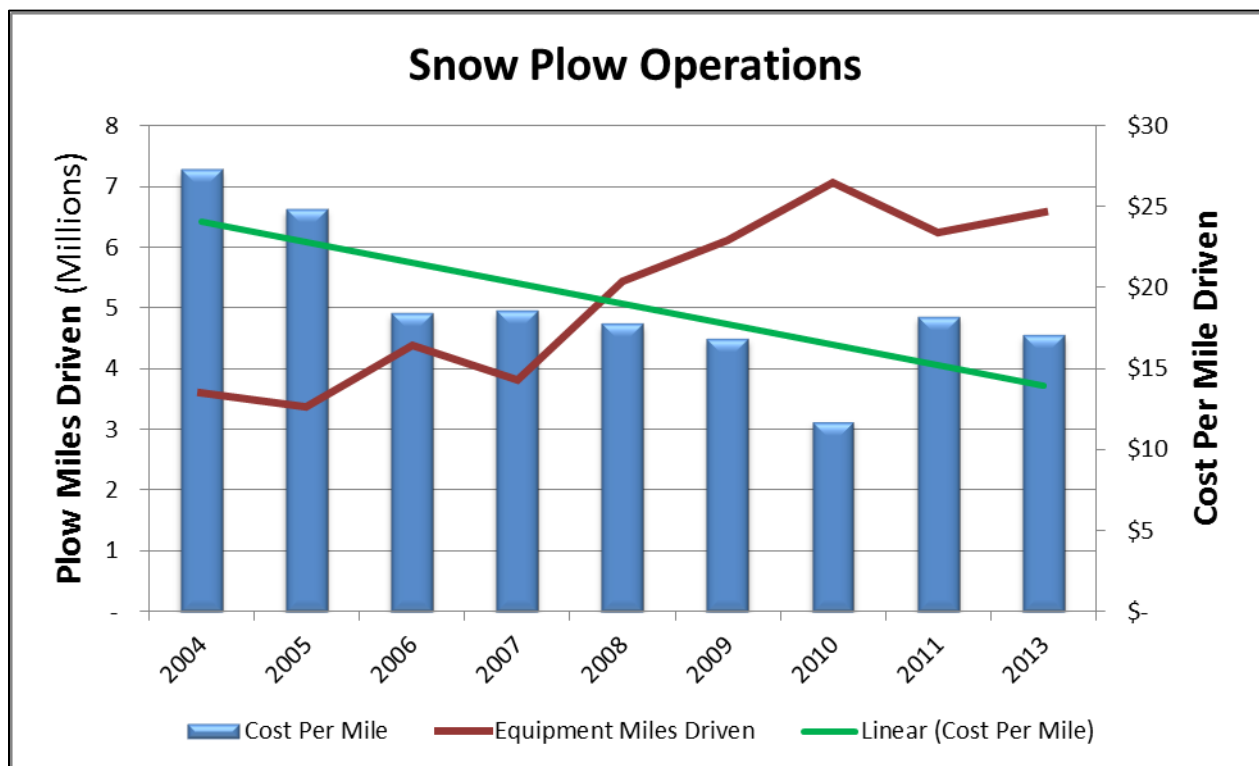
Snow and ice: Cost per plow mile driven

Snow and ice management

The primary goal of MnDOT's snow and ice operations is the safety of Minnesota's traveling public. Citizens expect to be able to carry out normal activities through most weather events and to have transportation facilities that safely accommodate travel shortly after an event has passed.

The chart below shows the cost per plow mile driven, along with the number of miles driven by MnDOT snow plow trucks for plowing and chemical application activities. The data includes miles driven to get to and from routes, since those miles are required to deliver snow and ice operations. Many variables such as congestion, winter severity, type of weather, timing of the winter event, wind, terrain, etc., play into the cost per mile driven.

Snow plow operations



Costs were adjusted using a 3% inflation rate

The trend in cost per plow mile driven is decreasing over the time period. It should be noted that the data is not adjusted for winter severity such as snow accumulation, snow events, freezing rain events and storm duration. Additionally, fiscal year 2013 was an outlier year, roughly three times as much snow fell than in the previous winter. In fiscal year 2013, snow and ice operations extended beyond the standard six month snow and ice season, which then required overtime pay at time and half for plow drivers, increasing the costs over a typical winter.

Plow miles driven and costs

Year	2004	2005	2006	2007	2008	2009	2010	2011	2013
Plow Miles Driven (1000s)	3,597	3,359	4,389	3,814	5,445	6,111	7,068	6,235	6,583
Costs (Millions)	\$75.3	\$65.9	\$65.8	\$59.3	\$83.5	\$91.6	\$75.9	\$107.2	\$112.3

Numbers within the table are not adjusted for inflation.

Why cost per plow mile driven is a good measure of productivity

This data focuses on clearing the roadways of snow and ice, MnDOT’s most visible winter operations service.

How this measure informs decisions

The measure has a correlation to cost/lane mile data that MnDOT currently collects based on snow plow route miles. Cost per lane mile results are used by MnDOT operations staff for route comparison purposes, truck and driver assignments and tracking effectiveness of operations.

Major influencing factors

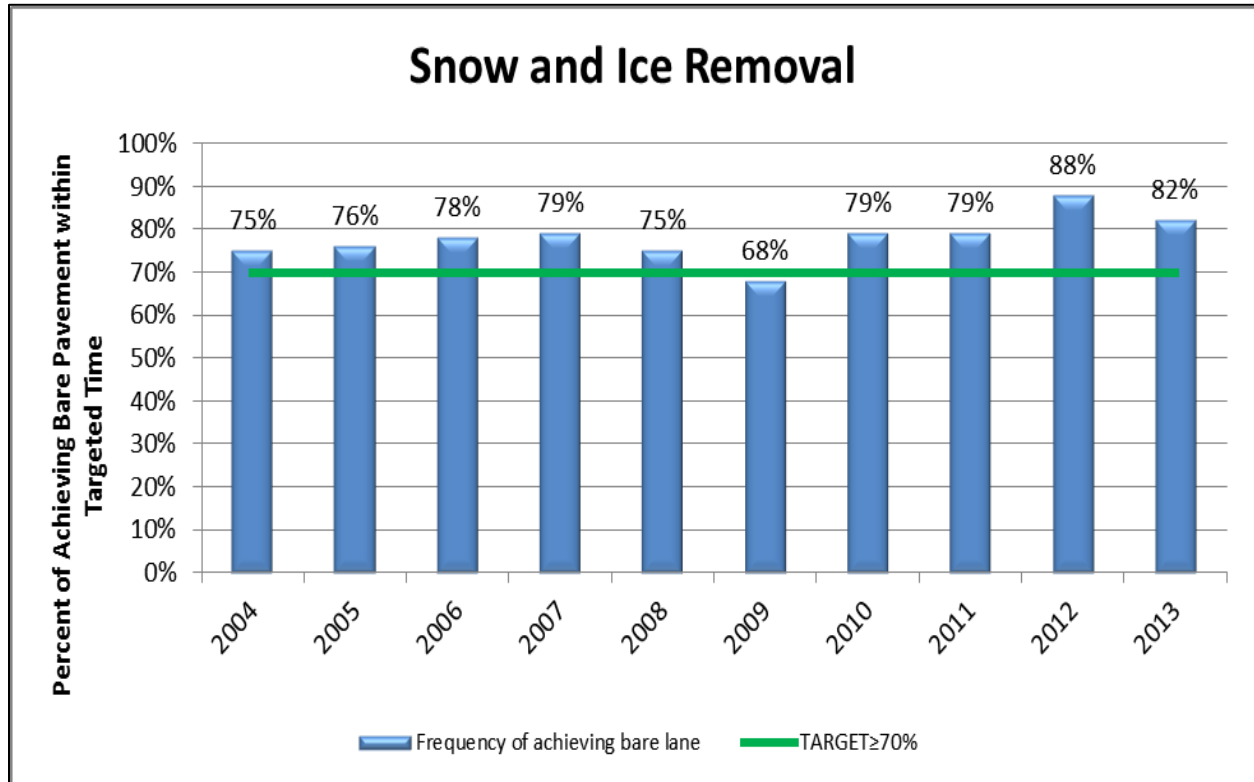
Contributing to higher expenses are congestion, winter severity, type of weather, event timing, wind, clean-up, inventorying materials, maintenance of storage facilities, salt brine production and terrain.

Contributing to added efficiency are innovative technologies including anti-icing, pre-wetting, de-icing, comprehensive snowfighter training and enhanced materials.

Effectiveness measure

MnDOT’s measure of effectiveness for snow and ice removal is to meet its target range for snow and ice clearance at least 70 percent of the time. MnDOT has met its target nine out of the last 10 seasons.

Snow and ice removal



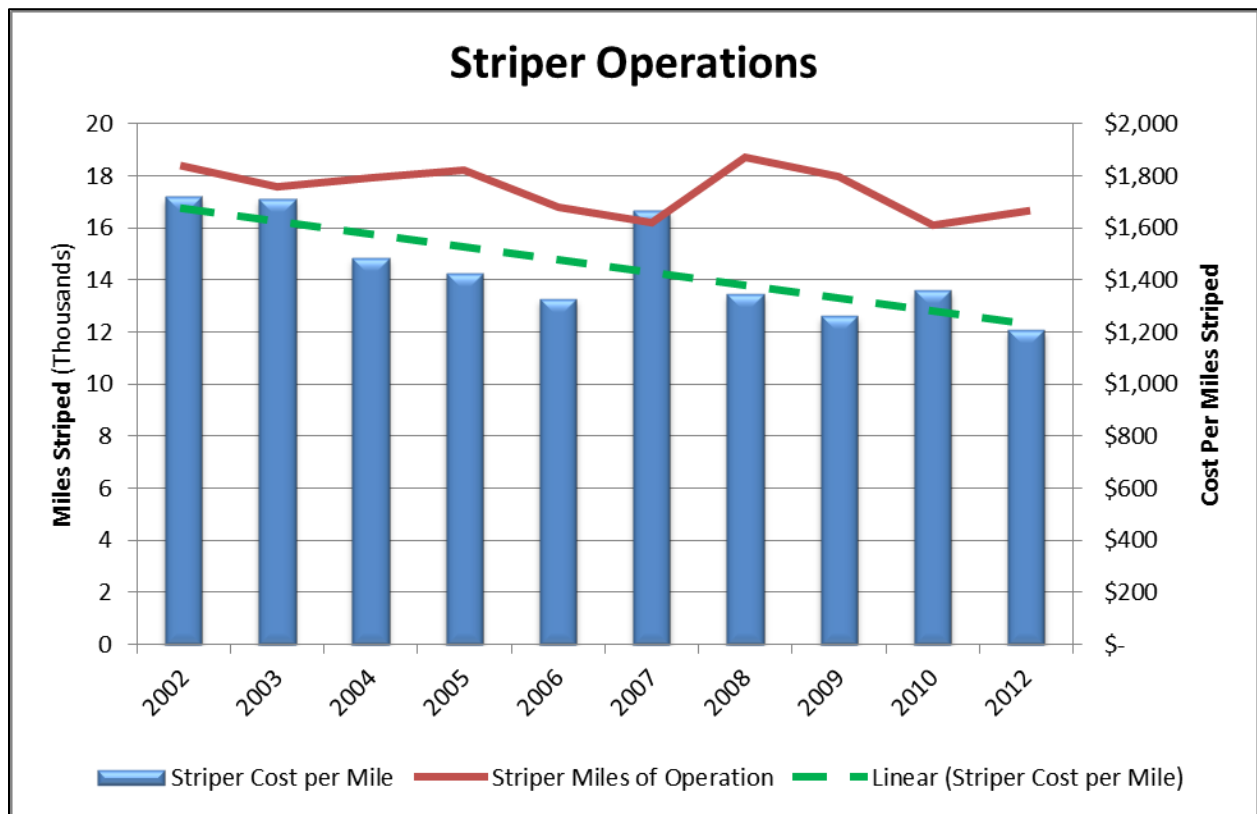
Pavement markings: Cost per striper mile

Pavement markings

Pavement markings perform an important function in managing, directing and controlling traffic. In some cases, they are used to supplement the regulations or warnings of other devices, such as traffic signs or signals. In other instances, they are used alone and produce results that cannot be obtained by the use of any other device.

The chart below shows cost per mile striped in a calendar year. Striper cost per mile trends downward over the reporting period.

Striper operations



Graph data has been adjusted to 3% inflation

Cost per mile striped data

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2012
Total Striping Costs	\$4,682	\$6,056	\$6,423	\$7,153	\$6,859	\$7,438	\$7,887	\$7,404	\$6,822	\$7,202
Striper Miles Driven (1,000s)	20.3	19.6	19.9	20.2	18.8	18.2	20.7	20	18.1	18.7
Cost per Mile	\$1,718	\$1,712	\$1,485	\$1,427	\$1,327	\$1,663	\$1,346	\$1,261	\$1,359	\$1,207

Data contained in the table has not been adjusted for inflation.

Why cost per mile striped is a good measure

Cost per mile and miles striped are measures of productivity because they show what was completed and what it costs. This data is used by the striping business to adjust standard practices and make operational improvements.

How this measure informs decisions

MnDOT strives to conduct its operation more efficiently while maintaining and improving quality. Tracking performance and comparing operational details for each season allows MnDOT to improve practices.

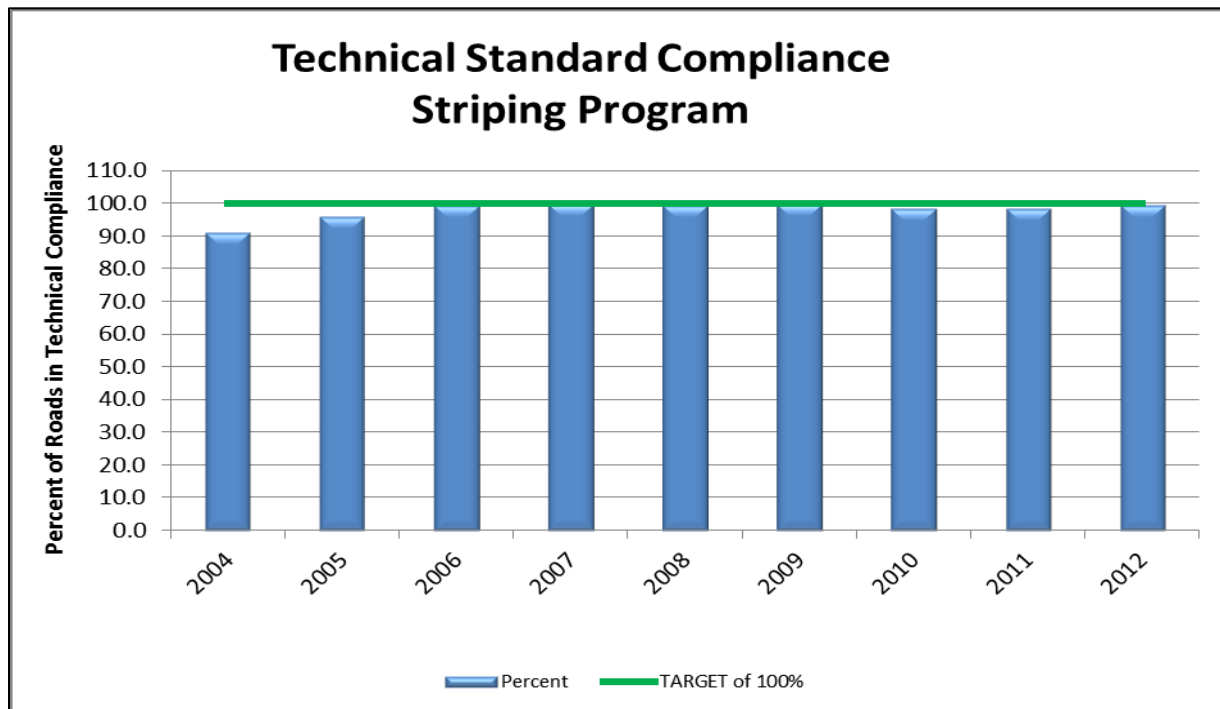
Major influencing factors

Equipment, labor and material costs, along with organization, management, supervision, weather, planning and coordination all influence this measure. The materials used also vary greatly, ranging from less costly and less durable markings like latex, to the midrange product epoxy, to polymer pre-formed tape, which has a long service life and is used for markings that will be exposed to high levels of roadway traffic.

Effectiveness measure

MnDOT districts develop annual striping plans executed by the striping team. MnDOT's success at providing an effective striping program is defined by its compliance with traffic engineering technical standards. MnDOT's goal is to "provide appropriate pavement markings on all highways, 365 days per year." An appropriate pavement marking is defined as one that meets or exceeds the standards defined in the [Minnesota Manual on Uniform Traffic Control Devices](#), providing presence and retroreflectivity (headlights bounce off of tiny glass beads directly back to the driver instead of scattering). This chart shows MnDOT's success at meeting those standards annually.

Technical standard compliance: Striping program

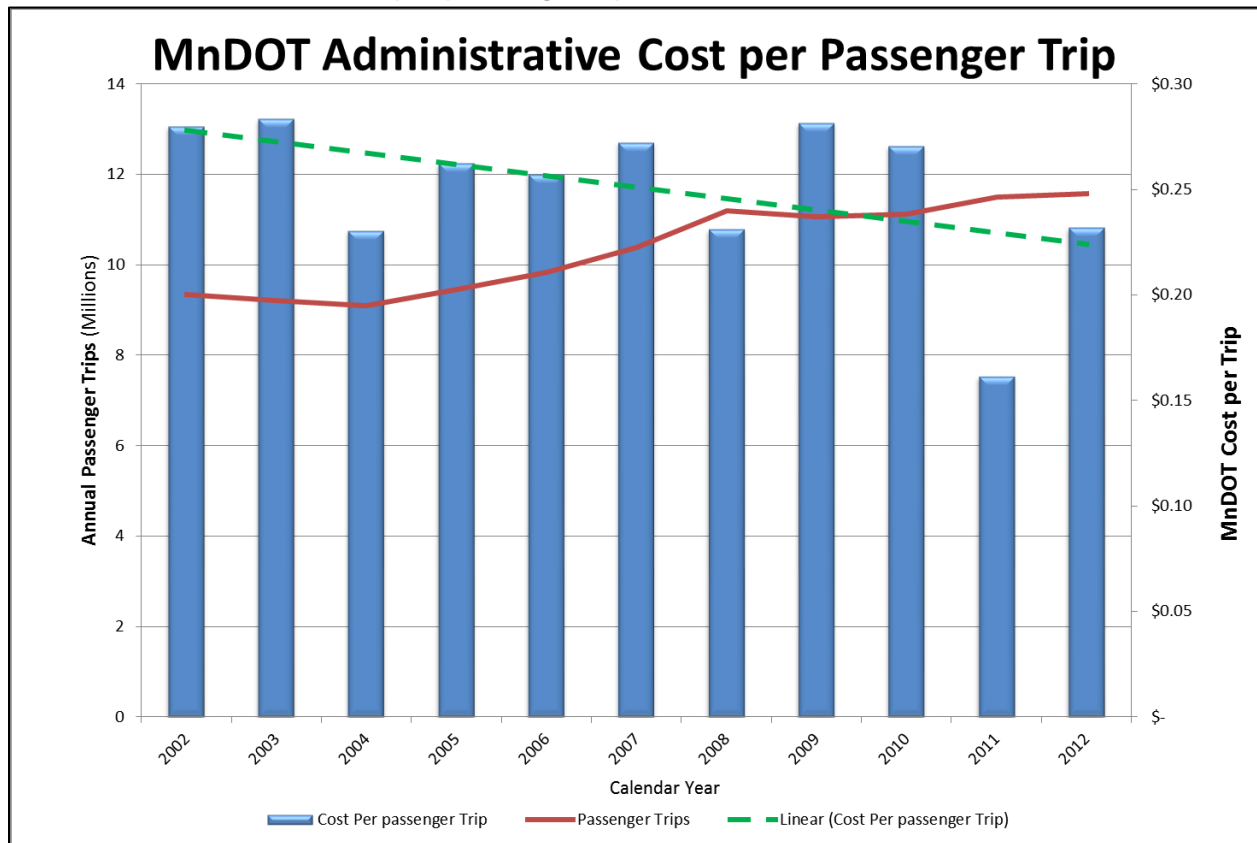


Transit: Administrative cost per transit passenger trip

Transit connects people to jobs, family, schools, shopping, health care centers, sports and cultural events. These systems also enhance the mobility of the elderly and persons with disabilities in communities across the state. Transit is also an alternative to driving that can reduce congestion, fuel consumption and greenhouse gas emissions.

The graph below demonstrates the ultimate goal of transit, which is to provide more trips, against the cost of the administrative activities performed by MnDOT's Office of Transit that help produce those trips. These activities include providing grant contracts and oversight of sub-recipients of transit funds. (MnDOT does not directly provide transit trips.) When the dotted line slopes downward, it means the cost per trip is decreasing over time, which is desired. If the dotted line slopes upward, the administrative cost per trip is rising. That means MnDOT must investigate the efficiency and productivity of the processes used to manage the program.

MnDOT Office of Transit cost per passenger trip



Costs were adjusted for inflation using a 2 percent inflation factor. Note an apparent data anomaly in the administrative costs data: Costs for 2011 seem abnormally low, although the state shutdown could explain at least part of this.

Data for Greater Minnesota transit

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Expenses (\$1,000)	\$2,101	\$2,140	\$1,752	\$2,116	\$2,200	\$2,510	\$2,340	\$2,874	\$2,832	\$1,782	\$2,630
Greater MN Ridership (1,000's)	9,337	9212	9,091	9,450	9,827	10,382	11,188	11,059	11,115	11,495	11,576
Cost per Ride	\$0.23	\$0.23	\$0.19	\$0.22	\$0.22	\$0.24	\$0.21	\$0.26	\$0.25	\$0.16	\$0.23

Figures contained within the table not adjusted for inflation.

The administrative cost per transit passenger trip has been trending downward. The recession that began in late 2008 caused a drop in public transit ridership in 2009 and 2010; fewer people going to work generally means fewer people ride transit. However, two new Federal Transit Administration programs were launched in 2008: the Job Access/Reverse Commute and New Freedoms programs. The trips generated between those programs outnumbered the public transit trips lost due to the recession. Therefore, the trip line continued trending upward. As the effects of the recession subsided in 2011, transit ridership continued to increase. Administrative costs were unusually high during 2009 and 2010 while MnDOT administered American Recovery and Reinvestment Act projects. These were nearly all capital projects, which did not result in additional service that could produce trips. Therefore, the cost per trip productivity measure exhibited poor results in those years.

Why administrative cost per trip is a good measure

Transit passenger trips is the most commonly used measure of transit use. In Minnesota, it is used on the Governor's dashboard to measure transit performance in Greater Minnesota and in the Twin Cities metropolitan. Consistent use of the transit passenger trips measure will make it easier for legislators and taxpayers to understand transit issues.

The cost for MnDOT to administer the programs that support transit trips is the other component of this measure of productivity. The ratio of MnDOT's transit administrative costs to transit passenger trips describes the efficiency of MnDOT's processes in delivering transit. In short, the administrative cost per transit passenger trip productivity measure describes the cost that MnDOT's activities add to each trip.

How this measure informs decisions

This measure illustrates the cost for MnDOT to administer the programs that support transit trips in Greater Minnesota. If the dotted line slopes upward, it may indicate that MnDOT's management of the program is losing efficiency and attention is needed. If it slopes downward, it indicates desired results, transit trips, outpace the costs of MnDOT's administration. This measure will alert MnDOT to concerns about the productivity of processes used to provide grant contracts to and oversight of subrecipients of transit funds.

Major influencing factors

Minn. Stat. 174.01, subd. 2 set goals for MnDOT, two of which relate directly to transit:

(6) to provide transit services to all counties in the state to meet the needs of transit users

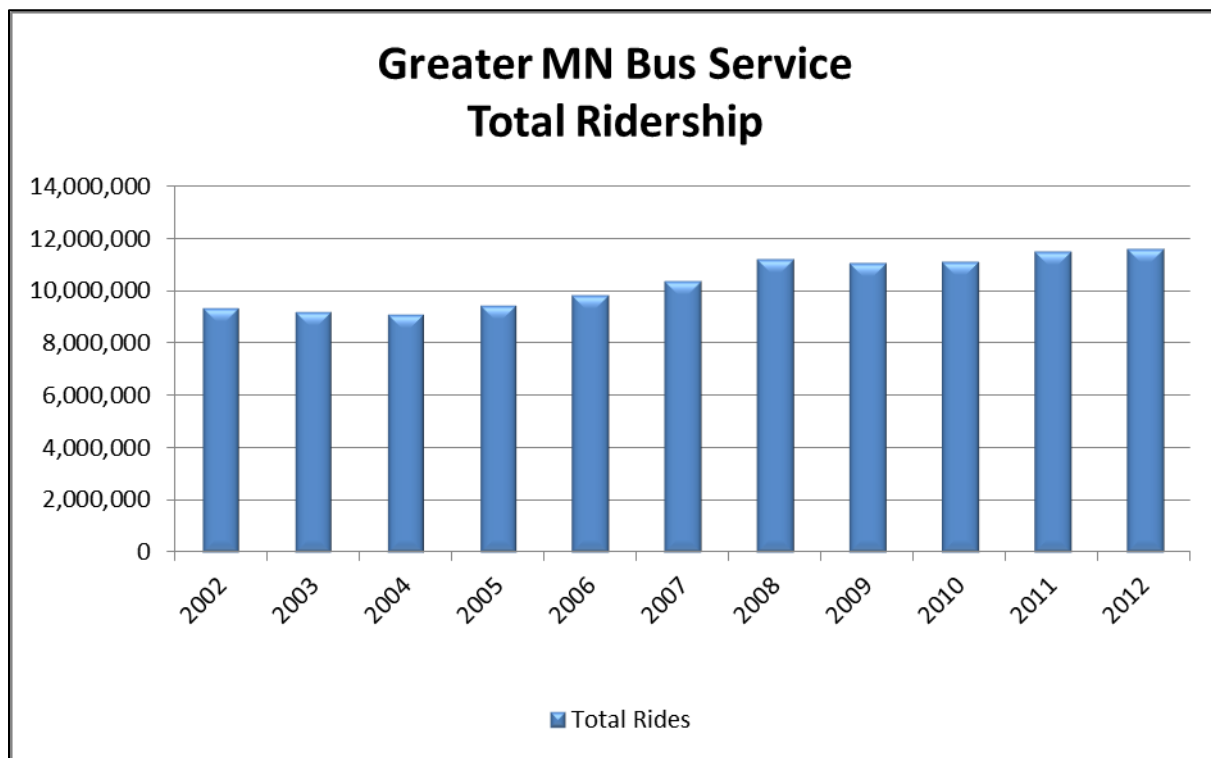
(13) to increase use of transit as a percentage of all trips statewide by giving highest priority to the transportation modes with the greatest people-moving capacity and lowest long-term economic and environmental cost

The number of passenger trips made on transit is commonly used to check progress on these goals.

Effectiveness Measure

Greater Minnesota public transit ridership has increased over the last 10 years. The recession that began in late 2008 caused a drop in public transit ridership in 2009 and 2010, but numbers have rebounded and increased in 2011 and 2012.

Greater Minnesota bus service total ridership



Glossary of terms

The glossary of terms provides definitions of specific terms used in this report.

Construction cost index: The Minnesota Construction Cost Index is an indicator of price trends for highway construction. It is composed of six indicator items: roadway excavation, to indicate the price trends for all roadway excavation; concrete pavement and plant-mixed bituminous, to indicate the price trend for all surfacing types; and reinforcing steel, structural steel, and structural concrete, to indicate the price trend for structures.

Cost - Indirect: Indirect costs are those that cannot be directly tied to a specific output, e.g. depreciation, routine building maintenance, and other administrative and support costs. Indirect costs are frequently referred to as “the cost to keep the lights on.”

Cost - Direct: Direct costs occur when expenditures are tied directly to a project number that can be tracked to a customer deliverable. That is, dollars which buy products and/or services that are delivered directly to the traveling public.

Effectiveness: Effectiveness focuses on achieving the end goal and takes into consideration any variables that may change in the future. Effectiveness encourages innovation as it demands innovation to meet desired goal(s).

Efficiency: Efficiency is often confused with effectiveness as the output to input ratio and focuses on getting the maximum output with minimum resources and still meet effectiveness measures. Efficiency focuses on doing things right and demands documentation and repetition.

Job full cost: Actual transaction amounts plus applied overhead cost rates established by MnDOT based on the previous year’s activity.

Inflation factor: For unit cost growth across all operations and maintenance activities, MnDOT is using a 3 percent inflation factor based on historical data. It incorporates labor compensation rates as well as pricing for major commodity materials and services, such as fuel, asphalt, utilities and salt. A 2 percent inflation factor is used when the bulk of the costs are labor, based on historical MnDOT labor costs.

Performance measures: Performance measures are quantifiable indicators used to assess how well, or how effectively, an organization is achieving its desired objectives. Much of the time results are compared against established targets to determine if improvement is needed.

Trend analysis: The practice of collecting information and developing a pattern or trend in the information. In project management, trend analysis technique uses historical results to predict future outcome.

Effectiveness measure definitions

Term	Measures Definition	System Definition
Bridge safety inspections: percent completed on time	This measure is compiled from the inspection dates in the Pontis bridge database, which are recorded upon completion. All bridges more than 20 feet in length that either carry or cross over a state highway are included. An inspection is considered “on-time” if it occurs no later than 30 days past its due date. This 30-day grace period accounts for variable conditions such as weather and scheduling.	All bridges 20 feet and longer that carry or cross over a state highway (3,657 bridges)
Bridge condition	This measure is compiled from inspection ratings done for all state highway bridges at least every 24 months, as required by the U.S. Department of Transportation. The combined numeric rating includes the deck, superstructure and substructure. It uses the National Bridge Inspection Standards 0 to 9 scale. Bridges rated 7 to 9 are counted as <i>good</i> and those rated 4 or lower are counted as <i>poor</i> (also termed <i>structurally deficient</i>). Bridges rated structurally deficient are safe to drive on, but are approaching the end of their useful life. To arrive at the statewide percent measure, results are weighted based on each bridge’s deck area to fully account for larger bridges.	Bridges 20 feet and longer on the National Highway System (2,307 bridges)
Pavement ride quality	Ride Quality Index measures smoothness and pavement condition. It uses a 0 to 5 scale with 5 being the best. Pavements with an RQI above 3.0 are classified as <i>good</i> . Pavements with an RQI of 2.0 or lower are classified as <i>poor</i> . Pavements rated <i>poor</i> have deteriorated to the point where they may affect the speed of free-flow traffic. Performance measure reporting utilizes three categories of trunk highway system mileage: Interstate, Non-Interstate National Highway System and Non-National Highway System.	Of the 14,310 miles of state highways: 13% are Interstate; 40% are Non-Interstate NHS; and 47% are NHS
Snow and ice: frequency of achieving bare pavement within target time	Target times for removing all snow and ice to bare pavement vary for five traffic volume categories: super commuter (0-3 hours), urban commuter (2-5 hours), rural commuter (4-9 hours), primary collector (6-12 hours) and secondary collector (9-36 hours). This measure tracks the frequency at which targets are met. Targets are based on research with Minnesotans and on historical results.	State highways (approximately 30,000 lane miles); all storms and snowplow routes are included
Greater Minnesota transit ridership	Greater Minnesota public transportation ridership is measured by passenger trips defined as the number of individual one-way trips taken from origin to destination.	53 public transit systems serve 78 of 80 Greater Minnesota counties

Term	Measures Definition	System Definition
Pavement marking	Pavement marking – 100 percent compliance with tech memo 13-13-T-03. Pavement markings meet or exceed the minimum retro reflectivity criteria in accordance with guidance issued by the FHWA. During snow and ice operations, pavement marking should provide presence after bare pavement is attained.	Pavement markings including both long lines and special markings (i.e. crosswalks, messages, etc.) on state trunk highways