

Minnesota
A Collaborative Vision
for Transportation

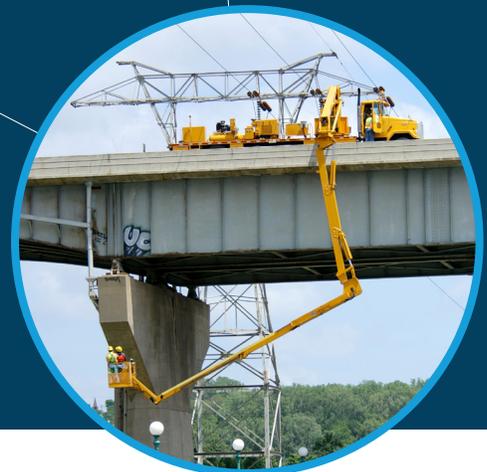


Statewide Highway Systems Operation Plan

2012 - 2015

Executive Summary

September 2012





The Minnesota GO Vision and Guiding Principles were adopted in November of 2011.



Welcome to the Minnesota Department of Transportation's (MnDOT) Statewide Highway Systems Operation Plan (HSOP) 2012 - 2015. The HSOP is part of MnDOT's family of plans. The family of plans includes the Statewide Multimodal Transportation Plan and modal system/investment plans (highway capital, highway operations, rail, transit, freight, bike/pedestrian, and aviation). Together, the family of plans establishes MnDOT's policies, objectives, strategies, performance targets, and investment priorities.

There were three primary objectives for the HSOP 2012 - 2015:

- Expand HSOP into MnDOT's family of investment plans and include it as a chapter in a larger Operations Division Plan.
- Show maintenance/preservation connections to the Statewide Transportation Policy Plan (STPP), which is a 20-year plan, and tie to MnDOT Strategic Directions (Safety, Mobility, Innovation, Leadership, and Transparency).
- Guide management and non-capital highway investments for the next two bienniums (short-term); these investments should work toward the long-term operations and maintenance vision, with the goal of being a world-class transportation agency. This Plan should address what MnDOT must prepare for and respond to in the next 10 to 15 years based on recent trends, the current condition of existing infrastructure, and the public's expectations for a transportation system. This includes:
 - Focusing on maintenance investments and allocating new resources.
 - Explaining the complexities associated with maintaining the State's transportation system.

Major Themes

Several themes were identified for the HSOP 2012 - 2015, which tie into MnDOT's Strategic Direction and Guiding Principles and frame the vision for operations and maintenance activities over the next two bienniums and beyond:

- Safety** – Systematically and holistically improve safety.
- Good Stewards of the Environment** – The transportation system should support other public purposes, such as environmental stewardship, sustainable solutions, economic competitiveness, public health, and energy independence.
- Seek innovation** – Be proactive, innovative, strategic, and more efficient in operations and maintenance activities.
- Infrastructure Asset Management** – Strategically maintain and upgrade critical existing infrastructure. Create a knowledge base to make decisions using lifecycle costs in the future. Identify inventory degradation and trade-offs for maintenance activities.
- Understanding System and Cost Trends** – Consider and minimize long-term obligations – do not over build. Focus on building only what MnDOT can sustain with regard to operations and maintenance with a lifecycle approach. The scale of the system should reflect and respect the facility's surrounding physical and social context, and overall quality of life.

Major Trends & Influencing Factors

The Minnesota Statewide Transportation Policy Plan 2009 - 2028 identifies major trends and travel implications for the State. These include a growing, aging and more diversified population; increased global competition; aging infrastructure and declining physical conditions; concern with energy and the environment; and volatile revenues and costs. Operations and maintenance activities are influenced by numerous factors, from costs of raw materials, traffic levels and operations strategies to weather, regulatory mandates and customer expectations and satisfaction. These are categorized into seven main areas:

- System use
- Economic and cost trends
- System condition
- Operational trends
- Customer expectations and satisfaction
- Regulations and mandates
- Technology and innovation

Plan Development Process

The HSOP 2012 - 2015 was developed during a two-year process that included a significant amount of participation from MnDOT's District Operations staff, Office of Maintenance staff, and specialized groups. Plan development was led by a Steering Team and Project Management Team that included statewide participation and input from specialty offices. Eight Work Teams were formed to investigate and develop maintenance trends, recent mandates and regulatory requirements, performance measures, existing and future service levels, best management practices, benchmarks, and/or performance standards.

Each Work Team met numerous times to review and discuss information that was then funneled through a consultant that was responsible for reviewing, organizing, and assisting plan development. The overall process, findings, and recommendations were reviewed and approved by the Steering Team and the Commissioner of Transportation.

The Work Teams were formed based on the primary operations and maintenance activities:

- Clear Roads
- Smooth Roads
- Structures
- Safety and Guidance Systems
- Arterial and Freeway Operations
- Roadsides
- Fleet and Facility Management
- Supporting Infrastructure



Performance Measures

MnDOT as an organization has embraced a performance-based approach to managing its system. A number of performance measures have been developed and are currently being tracked and monitored. Many of these are included in the 2011 State Road Operations and Maintenance Performance and Investment Snapshot, which provides a quick reference on areas/activities that are performing well and, conversely, those that are not. This information is presented in the table below.

2011 State Road Operations and Maintenance Performance and Investment Snapshot

2006-2010 State-Wide Performance								2010 Performance by District									Investment					
	2006	2007	2008	2009	2010 Current	Target	2006-2010 Trend	1	2	3	4	6	7	8	M	FY2006	FY2007	FY2008	FY2009	FY2010		
Overall State Highway Maintenance																						
Public satisfaction with maintenance (scale of 1-10)	6.2	—	6.4	6.0	▲ 6.1	7.0																
Smooth Roads																						
Pavement patching - Total lane miles with surface rating of 3.2 or less	7,866	8,609	9,482	8,794	9,944	Indicator of system need		1,844	1,078	978	1,342	1,644	1,322	910	826							
Pavement patching - Percent of need addressed	—	—	—	79%	● 98%	90%		89%	100%	100%	93%	100%	100%	100%	100%							
Pavement - Public satisfaction with smooth ride, scale of 1-10	6.1		6.2	6.0	▲ 6.2	7.0																
Drainage infrastructure inspection - Completion of annual culvert inspection cycle	—	—	—	65%	72%	100%		78%	86%	73%	53%	81%	54%	83%	68%							
Drainage infrastructure maintenance - Percent of Condition 4 pipes repaired or replaced annually	—	—	—	20%	24%	NA		19%	39%	36%	12%	30%	9%	21%	14%							
Bridges																						
Routine bridge inspection - Percent completed on time (within 30-day grace period)	—	86%	89%	94%	▲ 99%	100%		● 100%	● 100%	● 100%	▲ 99%	● 100%	● 100%	● 100%	▲ 98%							
Fracture critical bridge inspection - Percent completed on time (within 30-day grace period)	—	100%	100%	99%	▲ 99%	100%		Fracture critical inspections coordinated on statewide basis														
Bridge reactive maintenance - Percent of high priority items complete within 12 months	—	—	—	54%	▲ 89%	100%		▲ 98%	● 100%	● 100%	● 100%	● 100%	▲ 94%	● 100%	▲ 85%							
Bridge preventive maintenance - Percent of strip seal joints in good condition	91%	91%	92%	92%	92%	95%		96%	88%	98%	97%	98%	91%	98%	88%							
Bridge preventive maintenance - Percent of poured joints in good condition	77%	77%	77%	76%	74%	87%		67%	88%	92%	94%	91%	63%	82%	63%							
Bridge preventive maintenance - Percent of crack seals in good condition	54%	56%	59%	59%	51%	80%		61%	90%	67%	91%	72%	55%	79%	37%							
Clear Roads																						
Snow and ice removal - Frequency of meeting bare lane target (for season beginning in year shown)	79%	75%	68%	79%	● 79%	70%		● 79%	● 82%	● 84%	● 73%	● 81%	● 81%	● 72%	● 82%							
Customer satisfaction with snow and ice removal, scale of 1-10	7.6		7.4	7.5	● 7.5	7.0																

Legend: ● At or above target ▲ Moderately below target ● Seriously below target
 □ Customer measure from omnibus survey (Not taken in 2007) — No measure/data not collected
 = Bridge and Road Construction

2011 State Road Operations and Maintenance Performance and Investment Snapshot (continued)

2006-2010 State-Wide Performance								2010 Performance by District									Investment							
	2006	2007	2008	2009	2010 Current	Target	2006-2010 Trend	1	2	3	4	6	7	8	M	FY2006	FY2007	FY2008	FY2009	FY2010				
Traffic Management																								
Incident clearance time - Metro freeways (in minutes, 3-year average)	38.8	37.3	37.2	37.7	NA	35		Measure applies to Metro District only																
FIRST coverage - Percent of metro freeway miles	77%	76%	63%	63%	63%	100%		Measure applies to Metro District only										\$1.1M	\$1.5M	\$1.5M	\$1.6M	\$1.6M		
Metro signal retiming - Percent of signals on major corridors retimed within three years	31%	47%	60%	71%	▲ 68%	80%		Measure applies to Metro District only									▲ 68%	\$150k	\$331k	\$184k	\$516k	\$530k includes \$205k BARC		
Metro signal retiming - Percent of signals on minor corridors retimed within five years	5%	28%	34%	44%	▲ 43%	80%		Measure applies to Metro District only									▲ 43%							
Pavement marking - Percent tech memo compliance	99.4%	99.7%	99.6%	99.7%	● 98.5%	100.0%		● 100.0%	● 98.2%	▲ 94.0%	● 100.0%	● 99.2%	● 100.0%	● 96.5%	● 99.9%	\$12.9M includes \$2.8M BARC	\$9.6M includes \$2.1M BARC	\$11.2M includes \$3.9M BARC	\$11.6M includes \$3.2M BARC	\$12.5M includes \$3.5M BARC				
Pavement marking - Public satisfaction, scale of 1-10	7.5	—	7.5	7.1	● 7.3	7.0																		
Signs - Percent of signs older than 12 yrs (future shift to 15 yrs)	12%	14%	16%	19%	● 23%	5%		▲ 10%	● 21%	● 27%	● 22%	▲ 7%	● 44%	▲ 19%	● 26%	\$7.8M includes \$388k BARC	\$10.6M includes \$291k BARC	\$8.6M includes \$860k BARC	\$10.4M includes \$1.2M BARC	\$11.9M includes \$794k BARC				
Signs - Public satisfaction, scale of 1-10	8.0	—	8.1	7.9	● 7.9	7.0																		
Signal, lighting and ITS maintenance - No formal measure	—	—	—	—	—	NA										\$2.9M signals; \$3.8M lighting; \$2.0M ITS	\$3.4M signals \$4.4M lighting \$2.6M ITS	\$3.2M signals \$3.9M lighting \$2.4M ITS	\$3.3M signals \$4.8M lighting \$3.9M ITS	\$3.9M signals \$5.9M lighting \$3.6M ITS				
Guardrail & cable median barrier - No formal measure	—	—	—	—	—	NA										\$3.5M includes \$327k BARC	\$4.3M includes \$455k BARC	\$1.8M includes \$41k BARC	\$4.8M includes \$21k BARC	\$4.1M includes \$20k BARC				
Roadsides																								
Rest Areas - Mn/DOT Class I rest area facility condition index (FCI)	—	62% with FCI < 25	—	—	74% with FCI < 25 (Est.)	70% with FCI < 25		Estimated number and percent of rest areas with FCI less than 25																
Range is 0-100; lower is better. Replacement recommended at 60.								7 71%	3 67%	7 85%	6 50%	12 92%	10 60%	No Rest Areas	5 80%									
FCI = $\frac{\text{Cost of Assessed Deficiencies}}{\text{Replacement in Kind Value}}$		88% with FCI < 45			90% with FCI < 45 (Est.)	96% with FCI < 45		Estimated percent of rest areas with FCI less than 45																
								100%	100%	85%	67%	100%	80%	No Rest Areas	100%									
								Dollar totals of assessed deferred and routine maintenance (2008)																
								\$1.4M	\$1.1M	\$2.4M	\$2.1M	\$5.7M	\$4.8M	No Rest Areas	\$1.7M									
Rest Areas - Public satisfaction, scale of 1-10	7.8	—	8.0	—	—	7.0																		
Litter removal - Public satisfaction, scale of 1-10	6.8	—	7.0	6.7	● 7.0	7.0																		
Fleet Management																								
Fleet - Units within life cycle (reported in April of following year)	68%	68%	66%	65%	64%	● 90%		● 58%	● 64%	● 61%	▲ 74%	▲ 70%	● 58%	● 68%	● 66%									
Fleet - Equipment achieving minimum utilization (reported in April of following year)	53%	57%	62%	63%	63%	● 95%		● 61%	● 70%	● 69%	● 74%	● 71%	● 64%	● 74%	● 55%									
Fleet - Percent of maintenance preventive vs. reactive (reported in April of following year)	46%	48%	50%	47%	40%	● 70%		● 39%	▲ 61%	● 40%	▲ 52%	● 35%	● 33%	● 44%	● 28%	\$48.7M	\$59.3M	\$47.7M	\$64.4M	\$60.7M				

Legend: ● At or above target ▲ Moderately below target ● Seriously below target
 — Customer measure from omnibus survey (Not taken in 2007) — No measure/data not collected
 BARC = Bridge and Road Construction

Enterprise Risk Management Process

As the HSOP 2012 - 2015 was being developed and trade-offs were being discussed between various maintenance activities and assets, a risk-based approach was being implemented throughout the department to help with trade-off discussions. As such, an Enterprise Risk Management (ERM) assessment was completed for operations and maintenance activities as part of this HSOP.

As shown in the table below and continued on the next page, the current operations and maintenance budget (column 2) does not meet existing needs (column 3) or the risk based needs (column 6). With inflation, this gap is even greater (columns 5 and 7). The next step in this process will be to develop a prioritized budget (column 8) comparing the individual work activities, further discussing the risks associated with each activity, and completing a trade-off analysis.

Enterprise Risk Management, Budget Summary, and Gap Analysis: 2012-2015¹ (Dollar amounts shown in millions)

Risk Area	Current Budget	Need Beyond Current Budget	Current Gap	Gap Including Inflation	Risk Based Need	Risk Based Need Including Inflation ²	Prioritized Budget ³	Summary Notes
Arterial and Freeway Operations								
Signals	\$1.0	\$15.1	\$14.1	\$14.8	\$7.5	\$7.9		- It is likely that there will be increases in motorist delays and crashes due to a lack of signal retiming. - Proposed funding would result in minimal risk and manage the service life over the next four years.
Freeway operations	\$7.2	\$13.0	\$5.8	\$6.1	\$4.0	\$4.2		- Operational needs will exceed the capacity of staffing and resources. - Risk level is low; increased funding will meet needs while accepting only a small amount of risk.
Clear Roads								
Additional trucks and drivers	\$0.0	\$14.2	\$14.2	\$15.0	\$10.5	\$11.1		- Increased traffic volumes will lead to construction of additional lanes, ramps, and interchanges. - Bus-only shoulder lanes impacts the ability for snow storage and removal.
Additional snow/ice equipment	\$0.0	\$16.7	\$16.7	\$17.3	\$12.0	\$12.4		- Additional snow and ice equipment is needed to more efficiently provide service. - New technology/innovations exists that would provide greater efficiencies and environmentally friendly.
Drainage								
	\$43.9	\$68.0	\$24.1	\$25.3	\$24.1	\$25.3		- Drainage issues include plugged culverts, erosion control, saturated road embankments. - Funding will include maintenance of cross/centerline and entrance culverts.
Facilities								
Salt storage	\$37.8	\$45.8	\$8.0	\$8.4	\$2.0	\$2.1		- Cover-all salt shed facilities have design flaws throughout the state. - Impact of not meeting building code requirements and potential safety concerns is small.
Safety rest areas	\$22.0	\$51.5	\$29.5	\$31.1	\$16.0	\$16.8		- Maintenance needed for long-term building operations, ADA, building code requirements, etc. - Lack of funding could result in rest area closures which may have strong negative public reaction.
Truck stations	\$56.6	\$68.6	\$12.0	\$12.6	\$11.0	\$11.5		- Facilities expected to deteriorate beyond a level of acceptance, and possibly beyond a usable state. - Truck station replacement is a high priority.
Fleet								
Catch-up, equipment allotment, maintenance	\$249.2	\$322.0	\$72.8	\$76.3	\$62.0	\$65.0		- Fleet prices, maintenance lifecycle costs, fuel emission standards are likely to increase. - Proposed investment appears high relative to others, but manages a high level of risk.
Attenuators/TL3	\$0.0	\$2.8	\$2.8	\$2.9	\$0.0	\$0.0		- Unable to meet workzone safety (TL3) standards. - Potential work zone safety concerns exist.
Inflation⁴								
Electrical costs	\$0.0	\$4.0	\$4.0	\$4.2	\$0.5	\$0.5		- Likely that utility costs will increase, resulting in a less reliable system and potential safety concerns. - Proposed funding would mitigate the risk at a more acceptable level.
Salt	\$0.0	\$4.6	\$4.6	\$4.8	\$4.6	\$4.8		- Salt price inflation likely to continue. - Relatively inexpensive compared to other needs.
Fuel	\$0.0	\$2.0	\$2.0	\$2.1	\$2.1	\$2.2		- Fuel price inflation very likely to continue. - Proposed investment appears reasonable, but slightly low.

¹ Budget dollars shown in millions over the next two (2) bienniums (2012 - 2015).

² Additional funding is needed to account for inflation over the next four years.

³ This column intentionally left blank. The next step in this process is a comparison of each work activity which includes a trade-off analysis.

⁴ Current budget listed as zero (0); item is listed for the purpose of accounting for inflation.

Enterprise Risk Management, Budget Summary, and Gap Analysis: 2012-2015¹ (Continued)

Risk Area	Current Budget	Need Beyond Current Budget	Current Gap	Gap Including Inflation	Risk Based Need	Risk Based Need Including Inflation ²	Prioritized Budget ³	Summary Notes
Roadsides								
Vegetation management	\$61.6	\$109.7	\$48.1	\$50.1	\$14.0	\$14.6		- Likely unable to control weeds and brush; potential legal responsibilities and safety concerns. - Recommended funding would effectively manage the risk based on the lower risk level.
Litter control and snow fences	\$6.4	\$24.0	\$17.6	\$18.4	\$0.0	\$0.0		- It is unlikely that roadside maintenance services will keep pace with needs. - The relatively very expensive risk is managed at acceptable levels under the current funding levels.
Safety and Guidance								
Sign management	\$42.8	\$83.2	\$40.4	\$42.3	\$25.0	\$26.2		- The sign management program goals will not be met due to a lack of resources. - Proposed funding accepts some risk and would require a prioritization plan.
Pavement markings	\$61.1	\$62.7	\$1.6	\$1.7	\$0.5	\$0.5		- Unknown number of pavement markings do not meet retro-reflectivity requirements throughout the state. - Falling short of requirements will not significantly impact Operations Vision success.
Guardrail	\$16.4	\$18.2	\$1.8	\$1.9	\$0.8	\$0.8		- It is unknown whether guardrail repairs will keep pace with maintenance needs. - Failure to meet needs could result in an inability to meet public expectations and create safety concerns.
Lighting	\$19.0	\$39.8	\$20.8	\$21.8	\$15.0	\$15.7		- A growing inventory and aging drivers increase the need for additional funding. - Proposed funding would result in minimal risk and manage the service life over the next four years.
Smooth Roads								
Roads	\$77.8	\$86.0	\$8.2	\$8.8	\$8.2	\$8.8		- Better Roads Capital Program (BRCP) addressed some needs for pothole patching. - Relatively inexpensive compared to other needs.
Shoulders	\$29.9	\$40.0	\$10.1	\$10.6	\$0.0	\$0.0		- Unlikely shoulder failure will occur statewide. - Acceptable level of risk and should not be a barrier to preserving transportation assets.
Structures								
Bridge preventive	\$16.1	\$27.4	\$13.0	\$13.6	\$9.5	\$10.0		- Funding levels will not keep up with needs, resulting in reduction of service life for some structures. - Proposed funding increase would effectively manage the service life risk over the next four years.
Bridge reactive	\$20.4	\$33.6	\$8.6	\$9.0	\$6.4	\$6.7		- Unclear if MnDOT will have problems with reactive structure maintenance at current budget levels. - Proposed funding would manage some risk and limit unexpected service interruptions.
Other infrastructure - Inspection/Inventory	\$21.2	\$26.0	\$4.8	\$5.0	\$1.6	\$1.7		- Lack of inspections and inventory within "other structures" currently exists. - Any service interruptions are currently being managed at an acceptable level of risk.
Supporting Infrastructure								
Information Technology: Electronic Communication, RWIS, ARMER, etc.	\$69.0	\$73.0	\$4.4	\$4.6	\$3.0	\$3.1		- The impact of an IT breakdown is unknown, but likely not excessive. - Increased funding would manage some risk; still without some existing maintenance and innovation.
Agreements	\$0.0	\$1.0	\$1.0	\$1.0	\$0.5	\$0.5		- Developing maintenance agreements with local agencies requires staff time and resources. - Increased funding would manage some risk and maintain the level of service.
TOTAL	\$859.4	\$1,252.9	\$391.0	\$409.7	\$240.8	\$252.4		

¹ Budget dollars shown in millions over the next two (2) bienniums (2012 - 2015).

² Additional funding is needed to account for inflation over the next four years.

³ This column intentionally left blank. The next step in this process is a comparison of each work activity which includes a trade-off analysis.

⁴ Current budget listed as zero (0); item is listed for the purpose of accounting for inflation.

Findings & Recommendations

The findings and recommendations listed below are based on common themes, trends, and issues that consistently appeared in a number of work activity areas. The findings and recommendations focus on the 2012-2015 timeframe, however, a number of the strategies identified provide direction beyond this timeframe. The recommendations and findings are listed below in no particular order of importance.

1. Aging Infrastructure

Finding: The majority of infrastructure assets continue to age. The age of these infrastructure assets presents operations and maintenance challenges. Similar to an aging automobile that has increasing automotive repair costs, as the system ages, maintenance costs typically increase. This is particularly the case in some work activity areas, including bridges/structures, pavements, and traffic signals. A significant percentage of these assets are either beyond or reaching the useful lifecycle and will need to be replaced or will experience increased maintenance costs with reduced service levels.

Recommendation: Continued emphasis needs to be placed on preserving infrastructure assets that are critical to safety, mobility, and functionality of the transportation system. Given inflation and the increasing number of assets to maintain, this most likely will require an increase in funding.

2. Increasing Costs

Finding: Maintaining the 12,000-plus mile system is a very labor and equipment intensive task. Many of the work activity areas reported that labor, equipment, fuel, and material costs are rising. Efforts to minimize costs and still provide a high level of service continue to be pursued.

Recommendation: New techniques, strategies, and processes are continuously being researched and developed to minimize costs and to stay current with industry standards. However, oftentimes the advancements and gains are not adequate to offset additional costs to maintain existing operations. Therefore, in many areas, increasing costs will result in either a decline in service levels or the need for additional funding in order to maintain the current service level.

3. Growing Number of Infrastructure Assets

Finding: Overall increases in the transportation system and its assets have resulted in a greater need for operations and maintenance funds. While the overall mileage has not increased significantly, the system is now more complex with various interchange designs, traffic control devices, and other system improvements. Increases in other types of infrastructure, while more cost-efficient in terms of capital dollars, also incur ongoing operations and maintenance costs.

Recommendation: MnDOT should continue to explore opportunities to provide low-cost, high-benefit improvements, but recognize that many of these elements place additional burdens on operations and maintenance forces. Consideration should be given to the total project cost, not just the capital cost for construction. While the

system will grow and change with population growth and development, operations and maintenance activities should continue to be included in the benefit-cost analysis for the entire project.

4. Impacts of the Capital Budget/Total Project Cost

Finding: MnDOT's capital budget can greatly affect the operations and maintenance work that is required. Greater investment in the capital budget will typically result in a reduced need for operations and maintenance funding since the key assets, if invested in, will be in better condition. Conversely, a reduced investment in the capital budget would require a greater investment in the operations and maintenance budget since an older system will typically require more maintenance.

Recommendation: MnDOT has historically approached project cost estimating based on the cost to deliver a project from conception through completion, with completion being defined as the end of construction. MnDOT has done considerable work over the last several years to strengthen this process. These efforts have been extremely effective, but have not yet taken the cost estimating process to the next level. The next level would be to approach cost estimating on a total project cost basis which would not only address cost management from conception to completion, but would also take into consideration the operating and maintenance costs associated with the project. In a total project cost approach, increases in operating and maintenance costs would be addressed and funded. For example, on the Crosstown project, additional equipment and operators would have been added to help address the increased maintenance demands that resulted from the reconstructed project. Under the current system in use today, no additional operating or maintenance funding is provided. Maintenance dollars have to be stretched across the system to cover the additional demands created by each reconstructed project.

5. Mandates

Finding: Mandates often come with an increased responsibility and additional cost. While some mandates have been around for a number of years (e.g., noxious weed control and Americans with Disabilities (ADA)), others have just recently been introduced over the past few years. New mandates, such as Emerald Ash Borer removal compliance, require MnDOT to provide additional or new services that typically have not been accounted for in the past.

Recommendation: MnDOT needs to actively communicate the costs and impacts associated with new mandates. Some of the recent mandates have been unfunded, meaning that performing the required service is to be done with existing funding. This often leads to resources being redirected and shortfalls in other areas.

6. Decreasing Staff Levels

Finding: A number of work activity areas stated they are not able to address all of the work tasks with the current number of staff available, or that there are inefficiencies



created due to a lack of staffing. Examples of existing inefficiencies as a result of a lack of staff include the following:

- Using temporary and program delivery employees for snow and ice control, which further delays other projects or results in increased human resources costs for processing new/temporary employees.
- Not being able to fully manage the ITS infrastructure that is deployed throughout the Twin Cities Metropolitan Area and other parts of Minnesota because there are too many devices and not enough staff.
- Various roadside activities (e.g., litter control, EAB removal, etc.) are often not completed or not completed within a reasonable period of time.

Recommendation: Efforts to evaluate staffing needs are a continuous process. As noted in many work activities throughout this report, MnDOT's operations and maintenance responsibilities are constantly changing. Balancing the need to hire additional staff versus cross-training is often difficult. Identifying opportunities to train staff in various work activities should continue to maintain organizational efficiency. Further discussions on the need to hire staff to fully utilize all of the equipment and devices should continue.

7. Use of Technology and Innovations

Finding: MnDOT work activities regularly use technology and innovative strategies to increase efficiencies. MnDOT is involved with a number of research partnerships and activities. MnDOT is on the forefront of many research activities including areas such as environmental, technological, and sustainable solutions.

Recommendation: MnDOT should continue to seek and support technology enhancements that are also able to better track inventories and the condition of assets (e.g., traffic signals, fleet, sign management, etc.). This innovative mentality continues to propel MnDOT forward as a world-class transportation agency.

8. Performance Measures

Finding: The use of performance measures and targets can be used to evaluate operations and maintenance decisions. Sound, reliable measures also enable MnDOT to track performance over time to establish historic patterns. This data can then be used to evaluate current practices as well as predict impacts of changing investment levels.

Recommendation: Further efforts to expand and enhance the use of performance measures should continue to be explored. The areas that have established performance measures should reevaluate them to ensure they remain a true indicator of performance. Other areas that lack measures should consider identifying and developing them assuming that the costs for maintaining the measures are valuable to managing performance.

9. Training

Finding: An emphasis in technology and innovative techniques requires a focus on staff training to ensure that employees are educated and knowledgeable of new tech-

niques and advancements that can provide efficiencies and increased effectiveness. One of the negative effects of MnDOT's early retirement program is that the benefits of an experienced staff have been lost.

Recommendation: MnDOT is highly regarded as an innovative Transportation Department throughout the country. There are various benefits to staff training and outreach. Continued efforts to train and educate staff should be pursued to provide increased efficiency and service delivery.

10. Preventive Maintenance

Finding: A preventive maintenance program can reduce overall operations and maintenance costs by regularly providing service and avoiding larger maintenance/capital costs. Many of the work activity areas reported a regular schedule or process for inspections, maintenance, and system review.

Recommendation: In most cases, increased effort and focus on preventive maintenance activities will lead to a prolonged service life and avoidance of significant capital investments until the product has fulfilled its useful service life. The Department should continue to evaluate preventive maintenance activities where benefits are not clear. Where there is direct evidence of benefits, MnDOT should prioritize these activities to maximize effectiveness.

11. Operations and Maintenance Funding Committee

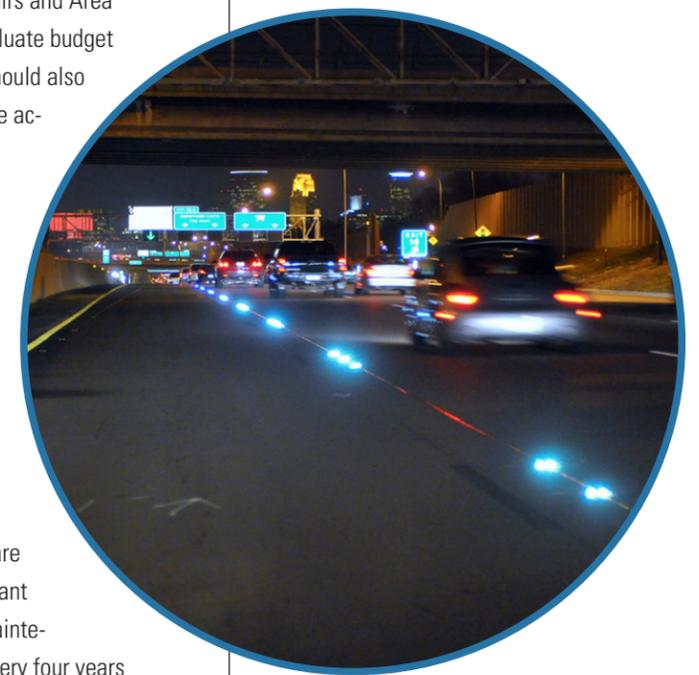
Finding: Additional review and further discussion is needed regarding operations and maintenance funding. Previous discussions did not fully encompass the funding impacts on staffing, inflation, technology/innovation, and regulations/mandates.

Recommendation: A risk committee, made up of Work Team Chairs and Area Maintenance Engineers, should be developed to prioritize and evaluate budget implications and risk management. In particular, this committee should also evaluate the cost-benefit of the risk management effort and ensure action plans are developed and the risks are appropriately managed.

12. HSOP Update

Finding: The heightened awareness of the key issues and true costs associated with providing service was insightful to all of the Work Teams and staff. The development of this document provided an opportunity for each work team to identify key strategies and initiatives that should be pursued. This intangible benefit will continue to serve MnDOT for years to come.

Recommendation: Due to the changing nature associated with many, if not all, Work Team activities, it is important to continue to document the key policies, strategies, and work activities that are performed by the Department. The HSOP report provides a significant role in monitoring the true costs and impacts of operations and maintenance. Therefore, it is recommended this document be updated every four years to coincide with the biennial budget and maintain an accurate record of what it takes to deliver transportation services for the State of Minnesota.





Minnesota Statewide Highway System Operations Plan (HSOP) 2012 - 2015