HENNEPIN COUNTY
PUBLIC WORKS

Asset Management Report 2016

Conditions and needs in our transportation system

Transportation Operations
March 2017

Mission

To support, sustain and enhance the economic vitality and quality of life within Hennepin County by developing and maintaining a safe, efficient, balanced and environmentally sound county transportation system.

Contents

Asset management: How we do it and why

Transportation asset management is a process of evaluating, maintaining and improving the physical assets in our county transportation system in a cost-effective manner throughout their life cycles.

Hennepin County's transportation assets are divided into five groups: **Roadway pavement, Traffic, Drainage, Roadside and Bridge**. These groups are used by Transportation Operations division managers and others for analyzing, reporting and programming.

Categories and attributes

Within these groups, there are 28 asset categories that range from signals and signs, to culverts, curb sections and catch basins. Each asset category has its own attributes, some of which are used to evaluate the asset's overall condition. These are called condition index attributes.

For example, retaining walls are evaluated using six condition index attributes, including water seepage, leaning and condition of cap stones. Medians are evaluated on five attributes, including vegetation overgrowth and buckling of concrete.

Condition ratings and targets

Currently, the county has 13 asset categories with attributes that are surveyed regularly. Evaluators develop a condition status rating for each of these categories based on things like age, functionality and signs of distress. Evaluators also account for changes in public expectations, compliance with recent laws, and new specification requirements.

Based on established criteria, a level of acceptable service (or condition target) is defined. Assets with condition status ratings that fall below the condition target are candidates for maintenance.

Informing decisions

Continuous monitoring of assets enables managers to make proactive, data-driven decisions about how to use available resources for maximum benefit to our system.

In some cases, older assets can be improved with new technologies, for example, adding countdown pedestrian timers or traffic lane video detection to signal systems. These types of improvements can reduce maintenance costs long term and increase safety for all users.

5 asset groups
> 28 asset categories
> 408 asset attributes
> 41 condition index attributes

Thirteen of the county's 28 asset categories have attributes that are surveyed regularly. These categories (listed below) receive a condition status rating that is used to determine the overall health of our system.

Asset category	Quantity in the system
Pavement segments	**3,014** *(equaling 2,207 lane miles)*
Railroad crossings	**63**
Signals	**446** county-owned signalized intersections
Signs	**46,949**
Pavement markings	**13,809**
Culverts	**2,621** *(equaling 54,058 lineal feet)*
Catch basins	**18,082**
Curb sections	**10,856** *(equaling 4,513,934 lineal feet)*
Grit chambers	**97**
Guardrails	**505** *(equaling 116,862 lineal feet)*
Retaining walls	**1,138** *(equaling 139,289 lineal feet)*
Medians	**2,030**
Pedestrian ramps	**13,248**

For a list of all 28 county asset categories and their condition index attributes, see Appendix A.

System health: Fair to good

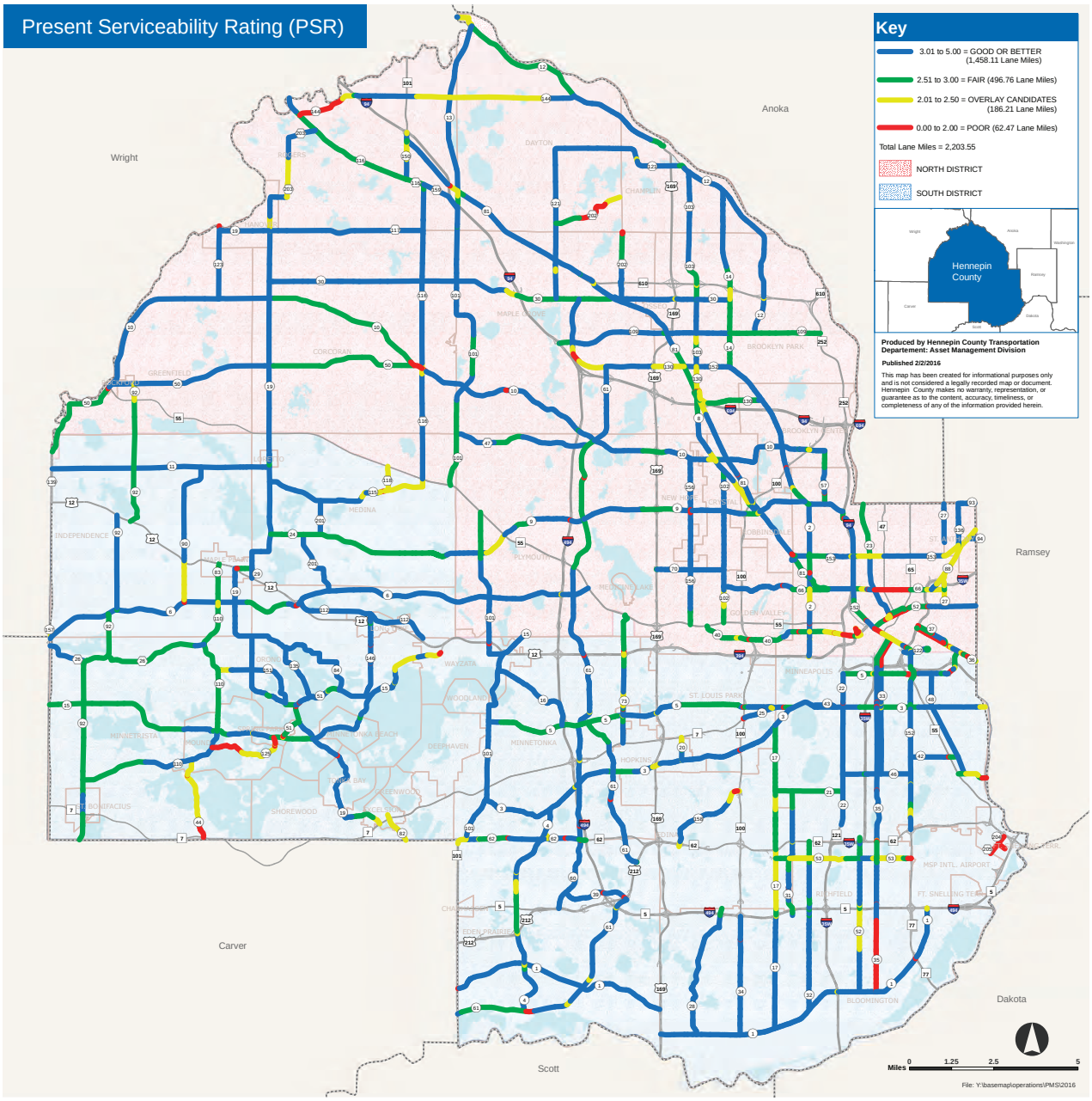
The health of our county transportation system is currently ranked at fair to good, which means most of our assets are operating like they should, with some maintenance needed to increase their overall service life. This assessment is based on a review of the 13 asset categories the county regularly rates.

Condition ratings and targets vary by asset group and category. They are summarized on the following pages and in Appendix B: Asset condition status grids. Needs and opportunities are also listed by asset group.

Immediate needs
corrective action should be initiated without delay

Routine needs
general upkeep practices should be performed on a regular basis

Opportunities
quality or value can be increased or improved



This map shows the Present Serviceability Rating (PSR) of our roadway pavement asset group system-wide. It is one measure of our system's overall health.

Condition summaries: Ratings and needs

Roadway pavement

Surface condition nearly on target, ready for new preservation methods

Asset	Target	Condition			
		Excellent	Good	Fair	Poor
Pavement Surface Rating	67% Good or Better	**7%**	**59%**	**31%**	**3%**
Railroad Crossings	100% Concrete	**52%**	**21%**	**17%**	**10%**

Roadway pavement is a strong measure of the health of our system for a couple of reasons. First, it is one of our most valuable asset groups. It is the most basic need for drivers. Second, it has been tracked and used in defining the condition of our system for many years.

Currently, we are close to reaching our goal of a 67 percent good or better rating for pavement surface condition system-wide.

Since 2010, funding has allowed the resurfacing of 140 lane miles annually. Typically, this is done through a process called mill and overlay. This has both increased the Present Serviceability Rating (PSR), or ride rating (on a scale from 0 to 5), and reduced the number of potholes needing correction.

Year	Overlay miles	PSR (ride)	Potholes reported
2016	**147.2**	**3.23**	**280**
2015	**141.1**	**3.15**	**427**
2014	**163.2**	**3.10**	**865**

With the PSR and overall road smoothness steadily increasing, the goal now is to improve the structural strength of our pavement, especially on our older roads.

Under the right conditions, methods beyond mill and overlay, such as full depth reclamation, can be used to go below the top two inches of pavement structure and preserve it for the longest-possible life.

What is full depth reclamation?

It is the process of pulverizing the in-place pavement to provide a uniform base for a new asphalt surface. It is a growing practice in the industry with excellent results for stabilizing the pavement subgrade, without needing to fully reconstruct a road. It is most effective in rural areas that have limited underlying utilities.

Moving forward, we will continue the mill and overlay program, expanding beyond a one-size-fits-all approach to use the right treatment, for the right road, at the right time.

In addition, we must address the most immediate surface repair needs, for example, deteriorated railroad crossing road surfaces that bring discomfort for drivers and lead to weakening of the adjacent pavements.

Immediate needs

- Repair and replace railroad crossing road surfaces, upgrading all to new concrete surfaces from current timber, rubber or deteriorating concrete

Routine needs

- Continue robust pavement management program using mill and overlay and other methods to maintain road smoothness

Opportunities

- Engage in pavement structure analysis, such as examining pavement core samples, to identify the most effective road improvement options
- Pilot a full depth reclamation project in 2018 on CSAH 115 in Medina
- Explore pavement preservation activities, such as micro surfacing or chip seal operations, in conjunction with current crack sealing operations
- Continue concrete joint and surface repair projects to extend the service life of concrete pavements
- Complete miscellaneous road correction projects
  - Safety Improvement Projects (SIP) such as installing by-pass lanes and right turn lanes, and adding bituminous width to shoulders
  - Bus bay repairs, and concrete damage and other roadway corrections

Traffic

Sign and signal condition strong, transitioning to proactive improvement approach

Asset	Target	Condition			
		Excellent	Good	Fair	Poor
Signals — Painting*	To Be Determined	**51%**	**42%**	**6%**	**1%**
Signs — Reflectivity	100% Pass	**90%** Pass			**10%** Fail
Pavement Markings	100% Excellent	**100%**			

**Individual Poles*

Signals must operate properly to allow smooth traffic flow. Signs not only need to be easily read during the day, but also require proper reflectivity at night.

With 93 percent of signals in good or better condition and 90 percent of signs with a "pass" reflectivity rating, traffic assets are among the healthiest in our system.

We are now proactively identifying traffic projects and programs that improve system safety and operations, for example:

- Advanced transportation management, including coordination of traffic signals to reduce travel times, fuel consumption and crashes
- Longer-lasting grooved in striping in place of paint on pavement

This proactive approach is a change from the past, when traffic work largely followed road and bridge projects, for example, striping and video detection connected only to paving projects in an area.

Immediate needs

- Video detection program aligned with Advanced Transportation Management System (ATMS) capital project
- Signal system upgrades
- Safety upgrades
  - Pedestrian crossings (Rectangular Rapid Flashing Beacons — RRFB)
  - Accessible Pedestrian Signals (APS) and countdown timers
  - Miscellaneous safety improvement projects

Routine needs

- Annual night sign inspection and replacement program
- Durable pavement markings
- Signal pole painting
- LED installation and/or replacement
- Sign maintenance/replacement

Opportunities

- Signal battery backup installation and/or replacement
- Signal synchronization
- Signal controller upgrades/updates
- Grooved in striping

About ATMS

ATMS stands for Advanced Transportation Management System. Typical ATMS components include software, signal controllers and cameras, plus fiber optic cable and wireless solutions. All together, they provide more adaptive traffic control that monitors and responds to traffic demand at intersections, and reduces travel time, fuel consumption and emissions, and crashes.

Drainage

Assets functioning but need additional evaluation and attention

Asset	Target	Condition			
		Excellent	Good	Fair	Poor
Culverts	67% Good or Better	**0%**	**1%**	**62%**	**37%**
Catch Basins	To Be Determined	**44%**	**52%**	**3%**	**1%**
Curb Sections	To Be Determined	**46%**	**44%**	**8%**	**2%**
Grit Chambers	100% Excellent	**100%**			

Drainage assets are helpful for pavement preservation and slope safety. Currently, whenever we upgrade a road, we install drainage assets like curb sections and catch basins, though we rarely reinstall culverts.

The number of drainage assets in our system continues to grow in proportion to the increase in pavement lane miles we maintain.

We are in the process of collecting initial data on drainage assets and establishing condition targets. This data collection can be slow, since many drainage attributes are underground and are often covered in water or sediment.

Immediate needs

- Slope repairs having the greatest risk to safety, and associated structures
- Replacement of culverts in poor condition

Routine needs

- Ditch cleaning and erosion control (rip-rap) activities
- Catch basin repairs
- Grit chamber (catch basin sumps) cleaning
- Curb and gutter repair/replacement for functionality, to improve overall aesthetics and coordinate with adjacent pedestrian ramp upgrades

Roadside

Assets generally in good condition, high level of maintenance continues

Asset	Target	Condition			
		Excellent	Good	Fair	Poor
Guardrails	To Be Determined	**14%**	**74%**	**11%**	**1%**
Retaining Walls	To Be Determined	**77%**	**16%**	**5%**	**2%**
Medians	To Be Determined	**50%**	**43%**	**5%**	**2%**
Pedestrian Ramps*	100% Compliant with Current ADA Standards	**28.4%**	**21.3%**	**47.8%**	**0.1%**

** The remaining 2.4% of pedestrian ramps are non-existent, ramp construction recommended*

Roadside assets can be easily overlooked, as they are often seen as mere aesthetics. However, many of these roadway features contribute to user safety, and their maintenance is important.

Since 2014, we have used funding to repair and maintain our roadside assets, for example improving retaining walls and controlling vegetation.

Based on current data, roadside assets are generally in good condition and functioning as intended. But, we are still determining condition targets for these assets, given the large number and variety of attributes we survey in these categories.

Immediate needs

- Upgrade guardrail end treatments to new standard

Routine needs

- Annual retaining wall projects, from rehabilitation or replacement to elimination, depending on condition and surrounding conditions
- Guardrail damage repair
- Curb and gutter repairs in conjunction with contract overlay projects
- Weed spraying to control weeds growing along curb lines

Bridge

Inventory performing adequately, transitioning to proactive investment approach

	Target	Condition
Sufficiency Rating (SR) *Percent of Inventory with SR > 50*	**96%**	**93%**
Structurally Deficient	**8%**	**12%**

Our bridge metrics should improve this year with the replacement of the CSAH 46 (46th Street) crossing of Godfrey Parkway in Minneapolis, the CSAH 146 (Brown Road) crossing of Long Lake Creek in Orono, and the CSAH 66 (Golden Valley Road) crossing of Basset Creek in Golden Valley. All three crossings are currently structurally deficient and have sufficiency ratings below 50.

Five additional deficient bridges have been identified in the 2017 Capital Improvement Program for replacement or rehabilitation.

Bridge staff are collaborating with an Australian company specializing in bridge asset management and inspection to develop a tool to more accurately forecast bridge deterioration and more strategically allocate resources.

Increased staff use of new technologies, such as tablet computers, are expected to result in process improvements and additional quality control and assurance.

CSAH 46 (46th Street) Bridge rendering

Immediate needs

- Bridge Asset Management Application
  - Funding approved
  - Developing demonstration version; expected in 2017

Routine needs

- Dedicated Bridge Work Force

Opportunities

- 3-D high definition camera(s)
- Unmanned Aerial Vehicle

Other programs and activities

In addition to the work of asset management, Transportation Operations is responsible for other programs and activities related to the county transportation system, including:

Snow and ice control to ensure safer winter driving

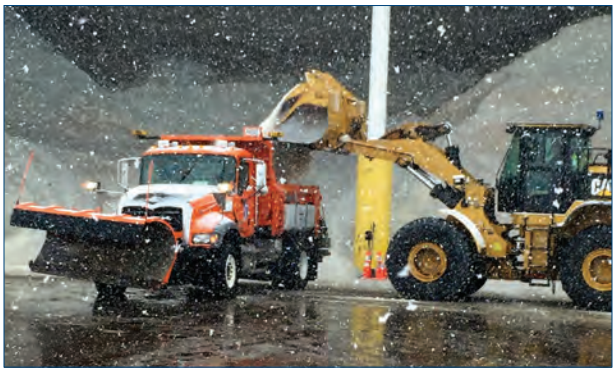
Roadside mowing for aesthetics and weed control

Adopt-a-highway and collection disposal to keep areas around roads clean and garbage out of drainage systems

Issuing permits and ensuring permit compliance to protect our roads from damage and misuse, and coordinate activity by outside groups

Spring and fall roadway sweeping to remove debris, reduce salt runoff into waterbodies, and keep garbage out of drainage systems

Signal timing and coordination to keep traffic moving efficiently and reduce gas consumption by motorists



Funding and programming

The improvements in the condition of the county transportation system are due, in part, to the 2013 decision by the Hennepin County Board of Commissioners to invest in the system with local funding, using wheelage tax.

Prior to that investment, transportation activities outside capital improvement projects were limited mostly to routine maintenance, with less funding available for improvements in preservation, safety, modernization and efficiency.

4 ongoing goals for our county transportation system

Preservation

To extend the service life of all physical assets within the system.

Safety

To improve or sustain highway safety for all users.

Modernization

To improve the use of technologies and savings for the county.

Efficiency

To improve mobility for all road users.

Today, a combination of state aid maintenance and local revenues, including wheelage tax and property tax, are helping to ensure the assets in our transportation system are maintained and enhanced within defined, strategic projects and programs.

Those strategic projects and programs are being developed in Transportation Operations by asset group, taking into account: current asset conditions, immediate and routine needs, opportunities for improvement or innovation, risk mitigation and funding alignment.

Appendix A: Asset categories with condition index attributes

Num	Qty	Category with Condition Index Attributes	Number of Informational Attributes
1	3,014	Pavement Segments	29
2	63	Railroad Crossings	23
		Hazard Index Rating	
		Accident Prediction Model Rating	
		Railroad Crossing	
		Pedestrian Crossing	
3	8	Roundabout	5
4	28	Bump Outs	3
5	5,955	Signals	76
		Painting	
6	212	Signal Interconnect	4
7	6,732	Handholes	7
8	75	Rectuangular Rapid Flash Beacon	14
9	9	Driver Feedback	5
10	12	Emergency Dynamic Msg Board	9
11	46,949	Signs	23
		Retroreflectivity	
12	13,809	Pavement Markings	21
		Checked and refreshed each year	
13	2,254	Long Line Striping	9
14	2,621	Culverts	33
		Pipe	
		End Treatment	
		Ditching	
		Alignment	
		Joints	
15	18,082	Catch Basins	18
		Below Surface Structure	
		Panel Condition	
		Faulting & Sediment Accumulation	
		Grate Cover	
		Vegetation Overgrowth	
		Trash & Debris Accumulation	
		Curb Box	
16	97	Grit Chambers	10
17	10,856	Curb Sections	12
		Joint Cracks/Cracking	
		Scaling	
		Vegetation Overgrowth	

			Restricted Water Flow	
			Faulting & Sediment Accumulation	
18	39	Drainage		11
19	505	Guardrails		13
			Height	
			Leaning	
			Posts	
			Marker Sign	
			Plate Beams or Cable	
			End Treatment	
20	1,138	Retaining Walls		14
			Water Seepage	
			Leaning Forward	
			Settlement/Foundation	
			Vegetation Overgrowth	
			Cap Stones/Top Wall	
			Wall Elements (no cap stones)	
21	2,030	Medians		11
			Surface Condition	
			Curb Height	
			Manhole or Handhole Covers	
			Vegetation Overgrowth	
			Faulting / Buckle	
22	13,248	Pedestrian Ramps		17
23	56	Bollards		5
24	19	Count Stations		7
25	6	Weather Stations		7
26	285	Retention Pond		5
27	511	Street Lighting		11
28	3,830	Asset Height		6

Appendix B: Asset condition status grids

ROADWAY PAVEMENT	Condition Target	CONDITION			
		Excellent	Good	Fair	Poor
Pavement Surface Rating (PSR)	67% Good or Better	7%	59%	31%	3%
Railroad Crossings Road Surface	100% Concrete	52%	21%	17%	10%

TRAFFIC	Condition Target	CONDITION			
		Excellent	Good	Fair	Poor
Signals - Painting (Individual Poles)	To Be Determined	51%	42%	6%	1%
	Pass	Pass			Fail
Signs - Reflectivity	100%	90%			10%
	Excellent	Excellent			
Pavement Markings	100%	100% Checked Yearly			

DRAINAGE	Condition Target	CONDITION			
		Excellent	Good	Fair	Poor
Culverts	67% Good or Better	0%	1%	62%	37%
Catch Basins	To Be Determined	44%	52%	3%	1%
Curb Sections	To Be Determined	46%	44%	8%	2%
	Excellent	Excellent			
Grit Chambers	100%	100% Checked Yearly			

ROADSIDE	Condition Target	CONDITION				
		Excellent	Good	Fair	Poor	
Guardrails	To Be Determined	14%	74%	11%	1%	
Retaining Walls	To Be Determined	77%	16%	5%	2%	
Medians	To Be Determined	50%	43%	5%	2%	
	Compliant with Current ADA Standards	Excellent	Good	Fair	Poor	Non-Existent
Pedestrian Ramps	100%	28.4%	21.3%	47.8%	0.1%	2.4%

BRIDGE	Condition Target	CONDITION
		Percent of Inventory with SR > 50
Sufficiency Rating (SR)	96%	93%
		Structurally Deficient
Structurally Deficient	8%	12%

Hennepin County