

Chapter 6: Highways

The region's roadways provide connections that are essential to the metro area's economic vitality and quality of life. But the demand for travel is enormous – and growing – posing difficult choices as the region attempts to sustain mobility in the face of mounting congestion.

Existing System

Roadways

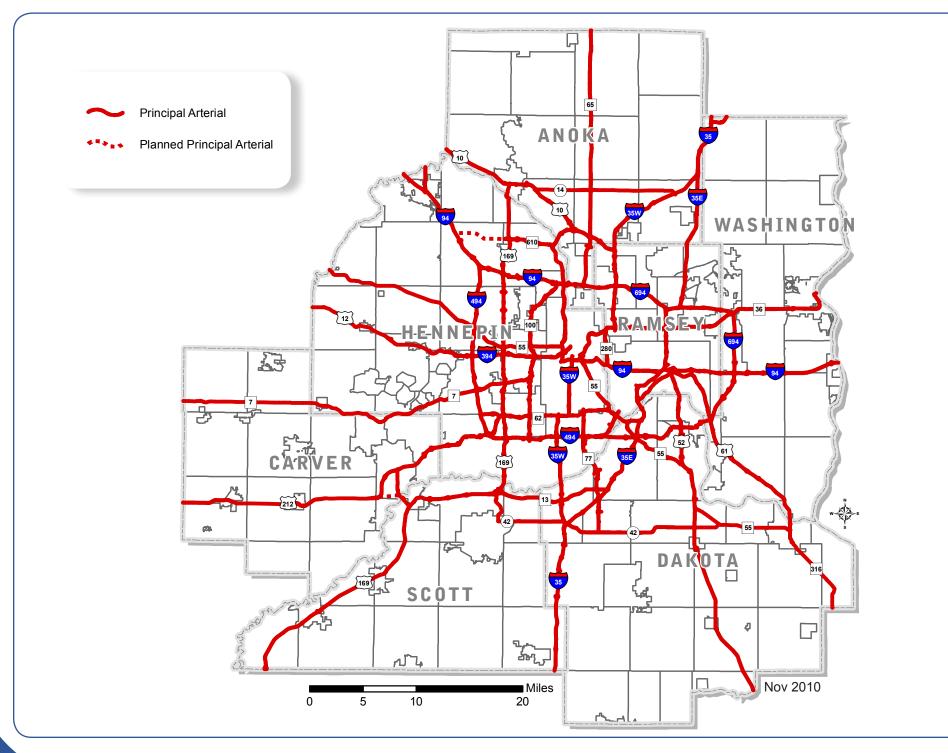
Automobiles and trucks in the region travel on a network of different types of roadways that serve different functions. Arterials, such as freeways or major highways, are designed to carry longer trips at higher speeds, with limited access to adjacent land. At the other end of the spectrum, local roadways provide land use access and lower speeds.

In the Twin Cities region, roadways are classified into four primary categories based on their respective roles:

- Principal Arterials, consist primarily of Interstate highways and other "freeways" or expressways that provide mobility but very limited land access. Most of them are owned and operated by the Minnesota Department of Transportation (Mn/DOT), with six under the jurisdiction of counties or cities;
- Minor Arterials, divided into "A" and "B" groups, are under the jurisdiction of Mn/DOT, the counties
 and some cities. The "A" Minor arterials supplement the mobility function of the principal arterials
 while also providing more land access than freeways or expressways;
- Collectors, under the jurisdiction of counties and cities, provide a balance of mobility and land use access;
- Local Roads, including most city streets and township roads, primarily provide access to the adjacent land parcels.

The Metropolitan Council focuses its planning efforts on the highest-level roadways – the principal arterials and "A" minor arterials – because these are the most heavily used, carrying the majority of vehicular trips in the region. The principal arterials account for about four percent of all the region's roadways, but carry 52 percent of the total vehicle miles traveled in the region. These principal arterials constitute the Metropolitan Highway System (See Figure 6-1).

The "A" minor arterials account for nearly 1,900 miles of the region's roadways, about 11% of the total road mileage. The Regional Highway System consists of both the "A" minor arterials and principal arterials (See Figure 6-2).



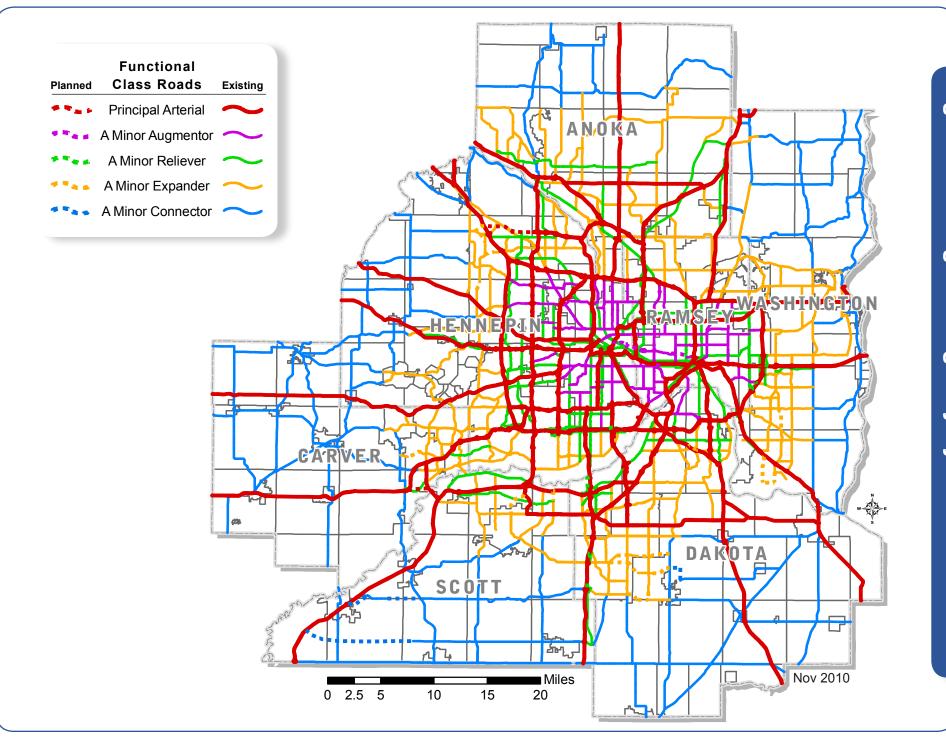


Table 6-3: Freeway Management System Investments *

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Count	Investment				
400	Miles of fiber optic cable				
470	Cameras				
146	Dynamic Message Signs				
174	Intelligent lane controls (there are also 19 older model lane controls in operation)				
4500	Loop detectors				
424	Ramp meters				
101	Ramp meter bypasses for transit and HOV use				
257	Miles of bus-only shoulders (there are 320 miles if other highways are included)				
220	Miles of FIRST coverage (Freeway Incident Response Safety Team)				
10	Miles of I-394 MnPASS lanes (13,600 transponders sold – as of 5/2010)				
15	Miles of I-35W MnPASS lanes ** (4,500 transponders sold – as of 5/2010)				
	511 Traveler Information Call Number				
* Generally, the investments recorded here are made on Metropolitan Highway System freeways					

The approximately 14,400 miles of "B" minors, collectors and local streets, whose primary function is land access, make up almost 85% of the road mileage in the region, and are the responsibility of local units of government. (The details of the roadway classification system and its characteristics are described in Appendix D.)

Road Management System

About 90 percent of the freeway system in the urbanized portion of the region is equipped with electronic surveillance (i.e. fiber cable, loop detectors, ramp meters and cameras). This equipment is used to monitor and manage the system from Mn/DOT's state-of-art Regional Transportation Management Center (RTMC). Key goals of the RTMC are to reduce congestion and crashes, increase freeway capacity and speeds during peak periods, provide quick response to crashes and incidents and provide travelers accurate, real-time information via changeable message signs on the freeway system and local traffic radio and TV stations.

Since May 2005, the RTMC also manages operations on the MnPASS I-394 high-occupancy toll (HOT) lanes. The MnPASS lane system was expanded to the I-35W corridor south of downtown Minneapolis in September 2009. Freeway speeds limits on the 25 miles of MnPASS lanes are maintained by dynamically changing the toll according to the demand and use of the lanes which is observed through road scanners and loop detectors.

The existing freeway management system investments are summarized in Table 6-3.

Progress Since Adoption of the 2004 Transportation Policy Plan

Highway Construction

Mn/DOT has pursued a very aggressive construction program since 2004. Table 6-4 lists the projects included in the *Transportation Policy Plan* adopted in 2004 that have opened to traffic since December 2004, as well as those currently under construction. In addition, an important project not included in that plan is the recently completed rebuilding

of the I-35W Bridge across the Mississippi River, which collapsed in August 2007. The collapse, and the subsequent review of bridge conditions and investments throughout the state, played a key role in the content and passage of Minnesota Laws 2008 Chapter 152.

The state used a number of funding techniques to build expansion projects in the 2004-2010 timeframe. Advance construction was first used in 2000 to allow large projects to be undertaken. This program allows states to "borrow" future federal funds for a current project. The second program, passed by the Legislature in 2003, is known as the Pawlenty/Molnau Transportation Financing Package or BAP (Bond Advance Program). This added \$550 million in Trunk Highway bonds to the region's highway

^{**} When project is completed through the Crosstown

construction budget. These bonds are being repaid by reducing Mn/DOT's operating budget and delaying other investments.

Furthermore, 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 (2013 Session Law, Chapter 117). The legislation establishes two major goals: to provide additional highway capacity on segments where there are currently bottlenecks in the system, and to improve the movement of freight and reduce barriers to commerce. Based on the legislative criteria, the MnDOT Commissioner selected projects across the state. Up to \$177 million is available for two projects in the Twin Cities Metropolitan Area (based on actual project costs). They are I-94 from Rogers to St. Michael, and TH 610 from I-94 to County State Aid Highway 81.

Many of the projects undertaken had been in the region's transportation plan for decades and are finally being completed with these funding approaches. However, this one-time level of funding is not sustainable long term.

Table 6-4: Highway Projects Implemented or Advancing Since 2004

I-94, I-494 to Humboldt Avenue. Reconstruct and widen to six through lanes and auxiliary lane.

TH 100, Glenwood to CSAH 152. Reconstruct, eliminate intersection and widen to six through lanes.

TH 55, Hiawatha Avenue. Reconstruct, widen, add turn lanes and build interchanges with TH 62 and Lake Street.

I-35E, Mississippi River Bridge. Replace four-lane bridge, add auxiliary lanes, and pedestrian/bike trail

I-494 Wakota Bridge over the Mississippi River. Replace westbound bridge. Reconstruct interchange with TH 61 and TH 61 through Newport. The eastbound bridge was completed in 2010.

TH 169 south of CSAH 81 to north of CSAH 109 (Devil's Triangle). Construct interchange, bridges.

UPA / I-35W / Cedar Avenue. A series of projects that received special federal and state funding. Provides transit and priced alternatives to congestion. Convert existing I-35W HOV lane to HOT/managed lane; add priced dynamic shoulder lane northbound from 42nd Street to Minneapolis; install lane control signals, cameras, dynamic signs and tolling infrastructure – (Crosstown/I-35W construction to be open by end of 2010).

TH 62/I-35W. Rebuild interchange and add HOT lane from 66th Street to 42nd Street. (See UPA project above)

I-494, I-394 to TH 100. Rebuild to six through lanes, includes a continuous auxiliary lane.

TH 36, from McKnight St to Margaret Street. Remove signals, grade separate three intersections.

I-694, I-35E "Unweave the Weave". Rebuild this area to provide six through lanes in all directions.

New TH 212 from CSAH 4 to CR 11. Build four-lane freeway.

Lower-cost / high-benefit projects:

- Add I-394 auxiliary lane, westbound between TH 100 and TH 169
- · Add TH 100 lane, from 36th Street to Cedar Lake Road
- Add I-94 lane, from Century Avenue to McKnight Road
- Add NB lane on Snelling Avenue (TH 51) from Roselawn Avenue to TH 36
- Modify TH 212 /I-494 Interchange, add auxiliary lanes
- Modify I-35E/I-494 Interchange, widen ramps

TH 65 and TH 242/CSAH 14 intersection reconstruction to an interchange with additional overpasses and frontage roads.

TH 12, Wayzata Boulevard to CR 6. Build two-lane freeway.

TH 169, Pioneer Trail and Anderson Lakes Parkway. Intersections rebuilt as interchanges.

I-494 Lake Drive to I-94. Connect two auxiliary lanes

I-35W Bridge over Mississippi River. Replacement.



Figure 6-5: Other modes will be used to reduce the impacts of congestion Bloomington Central Hiawatha LRT Station



Figure 6-6: HOV and HOT lanes are two ways to address mobility needs efficiently



Figure 6-7: Changing new construction priorities is another.

Issues and Trends

A number of issues and trends, discussed in more detail in Chapter 3: Regional Transportation Finance, may influence travel patterns and highway investments in unexpected ways and need to be monitored on an ongoing basis:

- Fuel prices and supply
- · Growing costs of maintaining the existing system
- Gas tax receipts not keeping up with inflation
- Uncertainties associated with the 6-year federal transportation funding bill reauthorization

Highway System Policies and Strategies

Policy 9: Highway Planning

The Council, Mn/DOT, and local governments will plan the Metropolitan and Regional Highway Systems and local roads to provide a cost-effective, multimodal and safe roadway system that reflects the needs of a growing population and economy.

Strategy 9a. Planning in the Context of Congestion: The Council, Mn/DOT and local units of government will plan for the Metropolitan Highway System with the understanding that congestion will not be eliminated or significantly reduced. However, congestion should and can be mitigated if travel alternatives are provided, travel demand patterns are changed and appropriate land use configurations are implemented.

Land use and development planning, as well as investments in the arterial systems, should take this into account.

Strategy 9b. Multimodal System: The Council, Mn/DOT, local governments and transit providers will plan for and implement a multimodal roadway system. Highway planning and corridor studies will give priority to alternatives that include high-occupancy vehicle (HOV) and managed lanes (high-occupancy toll (HOT) lanes, bus-only shoulders, priced dynamic shoulder lanes) and other transit advantages that help mitigate congestion.

Corridor planning and design must incorporate the mobility and safety needs of all users including freight vehicles, transit vehicles, pedestrians and bicycles. Mn/DOT and counties must provide advantages for transit where needed, including bus-only shoulders, park-and-ride lots and ramp meter bypasses. The inclusion of facilities for pedestrians and bicyclists, as discussed in the Complete Streets section of Chapter 9, is appropriate for most streets and highways with the exception of freeways and expressways. When bridges are built or rebuilt, the needs of bicyclists and pedestrians must be addressed.

Traffic calming measures on collector and local roads can reduce vehicular speeds to improve bicycle and pedestrian safety. A well-connected collector roadway network is important to support these non-motorized modes. Improvements for bicycle and pedestrian safety and mobility should be made on "B" minor arterials if there are no other options and on "A" minor arterials so long as they do not diminish the capability for multimodal function and capacity.

Strategy 9c. Optimize Metropolitan Trunk Highways: The Council, working with Mn/DOT, will define the most cost-effective techniques and types of projects to optimize the performance of the highway system as measured by person, rather than vehicle, throughput. Optimization techniques and projects will maximize utilization of existing system capacity, pavement and right-of-way and may include, but are not limited to, managed lanes such as high-occupancy vehicle and toll (HOV/HOT) lanes, bus-only shoulders and priced dynamic shoulder lanes.

Strategy 9d. Congestion Management Process: A Congestion Management Process (CMP) that meets federal requirements is included in this plan (Chapter 5, Regional Mobility). The CMP incorporates and coordinates the various activities of Mn/DOT, transit providers, counties, cities and Transportation Management Organizations (TMOs) in increasing the efficiency of the multimodal transportation system, reducing vehicle use and providing lower-cost safety and mobility projects where feasible.

Strategy 9e. Interconnected Roadway Network: Local and county governments shall plan a system of multimodal interconnected collector roads and minor arterials to serve short and medium-length trips.

Unless cities and counties plan an interconnected system of local streets, collectors and minor arterials, motor vehicles have to use streets that do not match the appropriate function. Traffic can be forced to use local streets to move from one neighborhood to another or to commercial nodes, increasing safety problems. At the other end of the spectrum, the principal arterials are used to make short trips from one neighborhood to another because there is no good collector connection. This too produces conflicts and uses valuable roadway capacity.

Strategy 9f. Roadway Jurisdiction: The agency with jurisdiction over, and responsibility for a roadway should be matched to the role the roadway plays in the regional roadway system. For example, Mn/DOT should be responsible for principal arterials.

Given the role of the cities and counties in land use and transportation, and limited financial resources, a partnership is needed between all levels of government if new principal arterials are to be provided in the region. Cities should help plan access to county and state highways to protect their traffic-carrying capacity. Cities and counties may be able to protect right-of-way to widen existing highways or to build new ones. In all cases, land use planning and development should also be closely related to the existing and future transportation system.





Figure 6-9: Cost-effective technology investments will be used in the management process.

Strategy 9g. Corridor Studies: Any corridor study or sub-area study focused on a trunk highway and conducted by a local government or interagency task force must be accepted by Mn/DOT and adopted by the Metropolitan Council as consistent with this policy plan prior to implementing the study recommendations or making regional highway investments.

Strategy 9h. Context-Sensitive Design: All new and reconstructed roads will be planned and designed in a way that protects and enhances the environment and is sensitive to community attributes and objectives.

All highway projects should be designed in coordination with local jurisdictions and should be sensitive to local attributes by balancing economic, social, aesthetic and environmental objectives in

Figure 6-8: Transportation management decisions will be geared toward optimizing person throughput

addition to the mobility objective. Highway projects can often provide opportunities to incorporate many community objectives for livability and enhanced environmental quality.

Strategy 9i. Coordination with Adjacent Counties: The Council will work cooperatively with Mn/DOT, adjacent area transportation partnerships and local units of government to support connections between the Metropolitan Highway System and the counties surrounding the seven-county metropolitan area.

Policy 10: Preserve, Operate and Maintain the Metropolitan Highway System

A high priority for the region is to continue focusing highway investments toward the safe operation, preservation and maintenance of the Metropolitan Highway System.

Strategy 10a. Budget for Preservation: Mn/DOT should regularly budget adequate resources for existing facilities preservation, operations and maintenance to fully utilize the design life and minimize the investment required over the life-cycle of facilities.

Strategy 10b. Diversified Investments: Mn/DOT should strive to meet its preservation performance targets while also recognizing the need for a diversified investment plan that allows for safety and congestion mitigation so as to optimize system performance.

Strategy 10c. Integrate Preservation with Congestion Mitigation and Safety: Mn/DOT should regularly review planned preservation and maintenance projects to determine if there are opportunities to include lower-cost congestion mitigation and safety improvements.



The existing process to identify opportunities to integrate preservation projects with congestion mitigation and safety projects is more important than ever. A similar approach should be used by cities and counties as they undertake local highway projects.

Policy 11: Highway System Management and Improvements

The Metropolitan Highway System and "A" minor arterial system will be managed and improved to provide for maximum person throughput, safety and mobility using existing facility capacity, pavement and right-of-way where feasible.

Strategy 11a. Investments in Managing the Highway System: After preservation, operations and maintenance, investments to manage and optimize performance of the highway system and improve safety are the region's next highest priority.

The region and state have been pioneers in highway system management to increase multimodal efficiency. These efforts must be continued and expanded in the future.

Strategy 11b. Embracing Technology: The Council and Mn/DOT will use and implement cost-effective technology solutions to manage and optimize the performance of the existing highway system as measured by person throughput.

Technology is an important component of system operations and management. Given the limited resources, the investments in new technology must be carefully made to meet the overall policy direction of this plan and be cost effective.

Strategy 11c. Affect Travel Patterns: The Metropolitan Highway System should be managed with the understanding that congestion may be mitigated with greater efficiencies in the highway system performance and changes in travel patterns.

Given that travel demand will continue to grow, incentives to change travel patterns are necessary and can prove beneficial to everyone, not just those making travel changes. The use of transit by some individuals frees up highway capacity for drivers. Bicycling and walking save on energy and other transportation costs for short- and medium-length trips, do not contribute to pollution or congestion, and allow travelers to incorporate exercise into their routines. Bicyclists and pedestrians can be significant elements of the transportation solution within and near congested activity centers because they accommodate short-distance travel and require less space and infrastructure than automobiles.

Strategy 11d. Optimize Highway System Performance: Mn/DOT and the Council will implement techniques to optimize performance of metropolitan highway facilities as measured by person throughput. These optimization projects will maximize use of existing facility capacity, pavement and right-of-way and may include, but are not limited to, implementation of HOV and HOT lanes, priced dynamic shoulders and other roadway pricing initiatives, freeway ramp meters with HOV bypasses, and bus-only shoulders.



Figure 6-10: Congestion management will take on renewed importance.



Figure 6-11: Traffic control facilities will be an important tool to manage congestion Mn/DOT Traffic Control Center -Waters Edge - Roseville



Figure 6-12: Access management requires interjurisdictional cooperation.



Figure 6-13: Construction and related improvements should not negatively affect safe operation of the main roadway

Strategy 11e. Access Management: State, county and local governments will manage access to the Regional Highway System. The capacity, safety, and utility of principal and "A" minor arterials are dictated in large part by how access to these roadways is provided and managed. Managing the location and design and new or reconstructed street and driveway connections to these arterials is a key strategy to preserve the existing capacity and enhance the safety of these roadways. Managing access consistently throughout the system will require a cooperative effort among Mn/DOT, counties, cities and townships. (See Appendix D and E)

Mn/DOT and the counties control access on freeways and some expressways through the outright purchase of the access rights of abutting land owners. However, access to other principal and "A" minor arterials is most effectively managed through local land use planning and development regulation. If considered early in the process of land development or redevelopment, the appropriate location and design of access and the supporting road network can be worked into the plans. If access is not considered until late in the design of development, it may be difficult to accommodate properly without added expense and potential disruption to the community. Therefore, cities, counties and townships exercising land use authority along principal arterials and "A" minor arterials will be expected to incorporate access standards in their subdivision and zoning ordinances and apply them during their development review process. Local access standards should be consistent with standards established in Mn/DOT's Access Management Manual or the appropriate county's access guidelines. Cities and townships should also consult with Mn/DOT or the county whenever reviewing development plans adjacent to principal arterials and "A" minor arterials. For those arterials where the existing access does not conform to the standards, cities should work with Mn/DOT and/or the County to develop a long term corridor plan to adjust and improve the access arrangements as opportunities arise through development or redevelopment of the adjacent property. Mn/DOT has developed a model access management ordinance to serve as a guide for local partners in updating their land use regulations to fully address access considerations.

Strategy 11f. Pricing: The Council supports roadway pricing, including HOT lanes and priced dynamic shoulder lanes, to provide an alternative to congestion and will consider implementing pricing on any expansion project.

Pricing of highway facilities offers a very effective tool to manage traffic, provide choices, and raise some revenues. Priced alternatives are one of the few highway "designs" that can provide long-term congestion relief. The Council and Mn/DOT have supported a spectrum of pricing techniques in the region for the past decade. The I-394 MnPASS lane is the first regional demonstration of variable-rate pricing. Single-occupant vehicles and some commercial vehicles are able to buy their way into the high-occupancy toll lane as long as the level of service does not deteriorate for transit and carpoolers.

Mn/DOT has worked with the Council and numerous partners to implement priced dynamic shoulders on I-35W as part of the Urban Partnership Agreement (UPA). The UPA project and I-35W / Crosstown reconstruction will be fully implemented by the fall of 2010 and subsequently evaluated.

Strategy 11g. Highway Expansion: Strategic capacity expansion projects can mitigate congestion in the region. Because of financial constraints, however, highway expansion projects should not be implemented at the expense of system preservation and management.

Associated Policies and Strategies

Policy 2: Prioritizing Regional Transportation Investments

Strategy 2a. System Preservation

Strategy 2b. Highway System Investments

Strategy 2d. Bicycle and Pedestrian Investments

Strategy 2e. Multimodal Investments

Policy 3: Investments in Regional Mobility

Strategy 3a. Congestion Management Process

Strategy 3b. Person Throughput as Measure

Strategy 3c. Alternatives to Congestion

Strategy 3g. Alleviate Highway Construction Impacts

Strategy 3h. Monitor Congestion Mitigation

CAR POOLS, BUSES & MOTORCYCLES FREE RATES TO 100 OPEN TO 94 \$0.25 ACCESS 900 FT

Figure 6-14: Pricing will be an important tool for the region.

Policy 4: Coordination of Transportation Investments and Land Use

Strategy 4f. Local Transportation Planning

Policy 5: Investments in Regional, National and Global Connections

Strategy 5a. Interregional and National Highway Connections

Strategy 5c. Freight Connections

Policy 6: Public Participation in Transportation Planning and Investment Decisions

Strategy 6a. Public Participation

Strategy 6b. Interjurisdictional Coordination and Participation

Strategy 6c. Participation of Underrepresented Populations

Strategy 6d. Public Awareness of Transportation Issues

Strategy 6e. Transit Customer Involvement

Policy 7: Investments in Preserving Right-of-Way

Strategy 7b. Right-of-Way Acquisition Loan Fund (RALF)

Strategy 7c. Identification of Right-of-Way in Local Plans

Policy 8: Energy and Environmental Considerations in Transportation Investments

Strategy 8c. Preservation of Cultural and Natural Resources

Strategy 8d. Protection of Surface Water

Policy 12: Transit System Planning

Strategy 12d. Park-and-Rides

Policy 15: Transitway Development and Implementation

Strategy 15a. Transitway Modes

Strategy 15d. Transitway Coordination

Strategy 15f. Transitway Coordination with Other Units of Government

Policy 17: Providing for Regional Freight Transportation

Strategy 17a. Freight Terminal Access

Strategy 17b. Congestion Impacts on Freight Movement

Policy 18: Providing Pedestrian and Bicycle Travel Systems

Strategy 18a. Bicycle and Pedestrian Regional Investment Priorities

Strategy 18e. Complete Streets

A Vision for Metropolitan Highway Investments

As the region continues to grow, increased travel demand on an aging Metropolitan Highway System will create additional challenges in terms of preservation, safety and traffic congestion (Table 6-15). The very extensive highway system developed over the last 50 years will require the commitment of a growing amount of resources to basic system maintenance and preservation. In particular, a great deal of funds will be absorbed in the next 10 years by the bridge repair/replacement program mandated by the Legislature during the 2008 session. Basic preservation and bridge projects are expected to absorb about

Table 6-15: Metro Vehicle Trips and Miles Traveled, 2005 and 2030

	2005	2030	Change	Percent
Daily Vehicle Trips	7.0 M	10.7 M	+3.7 M	+53%
Daily Vehicle Miles Traveled	66.5 M	90.3 M	+23.8 M	+36%

75 percent of the state road construction funds anticipated in the 2015-2030 time period, leaving only 25 percent for safety and capacity investments.

It is important, however, to continue to improve the performance of the highway system to maintain mobility levels that promote economic growth and preserve the quality of life of residents. Anticipated population and job growth is expected to push highway traffic in the region to even higher levels by the year 2030 even though the 2008-2010 economic recession, volatile fuel costs, climate change concerns and greater emphasis on alternative modes may moderate this trend. The result will be more intense and more extensive congestion on the region's trunk highways, county highways and city streets. The principal arterials projected to be congested in 2030 are illustrated in Figure 6-16.

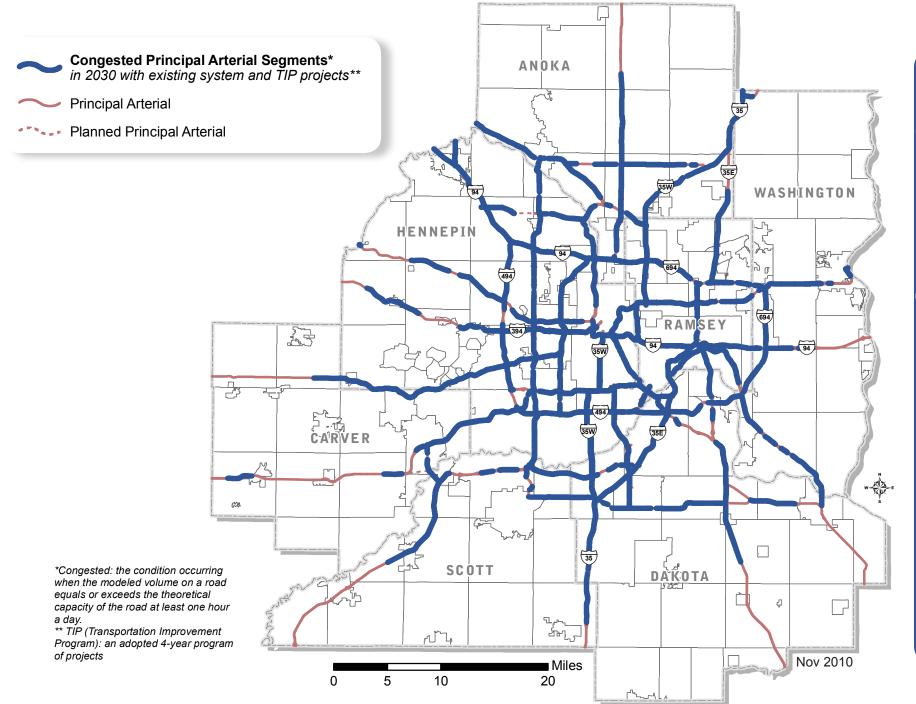
A Principal Arterial Study conducted by Mn/DOT and the Council in 2007 concluded that \$40 billion (2005 dollars) in highway investments would be needed by 2030 to "fix" congestion in the region. This is more than five times the total highway revenues expected to be available to Mn/DOT's Metro District between now and 2030. In addition, the amount of funds available for expansion of the Metropolitan Highway System is severely limited by the bridge repair/replacement investments required by the Legislature in 2008 and growing preservation needs identified in a 2008 Legislative Auditor's report.

In previous plans, a common response to growing traffic congestion was to propose a number of major capacity expansion projects adding general purpose lanes. Even though some of those major projects have been built over time, the reality is that many of them have been carried over from plan to plan without being implemented because of insufficient funds.

The *Transportation Policy Plan* adopted in January 2009 left out 12 major expansion projects previously proposed and funded in the 2004 plan because the updated project cost estimates of \$2.9 billion exceeded the available funds. It also recommended that Mn/DOT reassess those 12 projects in an attempt to reduce their scope and cost, while still achieving substantial preservation, congestion mitigation, capacity expansion and safety benefits. Some of these projects, at a reduced scope and cost, could be easier to implement within projected highway revenues. Improvements on those 12 major corridors, however, may require leveraging limited congestion mitigation funds with preservation and Chapter 152 Bridge funds to make them financially possible. Coordination of different types of improvements, taking advantage of needed pavement and bridge replacement, and combining them into a single larger project may be the key to Mn/DOT's ability to achieve substantial mobility benefits in those corridors.

The specific recommendations from the major project reassessment process are further discussed in this chapter in the expansion section of the Fiscally Constrained Highway Investment Plan.

Potential capacity expansion of the Metropolitan Highway System is also limited by physical, social and environmental constraints. As the region continues to grow, increased urbanization creates severe physical constraints that lead to more complex and costly solutions for major highway expansion projects. In many cases, the cost of expansion is much higher than the original cost of building the freeway, as roadway construction costs skyrocket due to growing global demand for raw materials, including steel and petroleum. Additional right-of-way in urban areas is also more costly, making it critical to search for improvement solutions that can be implemented within the existing corridor right-of-way.



In essence, it is not realistic to assume that congestion will be eliminated and individual projects should not be designed under the assumption that a congestion-free system will exist sometime in the future. While congestion will not be solved because of financial realities and other constraints, congestion impacts can and must be mitigated to the fullest extent possible in order to preserve mobility levels essential to the region's economic vitality and quality of life. In order to achieve those objectives, a more realistic and innovative approach, that allocates limited available resources for the most system-wide benefit, is needed. The strategy articulated in this plan will:

- Address a large number of problem areas region-wide rather than focusing the majority of the limited available resources on a few major expansion projects and leaving the rest of the system's congestion problems unaddressed;
- Rely on innovation, technology, multimodal solutions, and strategic capacity expansions; and
- Use available funds for more effective, lower-cost solutions.
- Provide policy direction for the use of additional or unanticipated funds.

As discussed in Chapter 5: Regional Mobility, the Council and Mn/DOT embarked on a series of planning efforts in preparation of this 2010 update of the Transportation Policy Plan. Key objectives of this effort were to:

- Refine the investment vision contained in the 2009 update of the Transportation Policy Plan and establish overarching principles that govern Metropolitan Highway System investments; and
- Conduct a comprehensive analysis of problem areas on the Metropolitan Highway System.

These objectives have been primarily addressed in a Metropolitan Highway System Investment Study (MHSIS) which examined the role of new managed lanes, strategic capacity expansion and Active Traffic Management (ATM) strategies in mitigating congestion on the Metropolitan Highway System. The MHSIS study was complemented with other planning efforts including:

- MnPASS System Study Phase 2 to establish short-term priorities (2-10 years) for additional MnPASS lanes
- Congestion Management and Safety Plan (CMSP) to identify problem areas and define a process to identify new lower-cost / high-benefit solutions on a system-wide basis
- Travel Demand Management Study (TDMS)
- Major Project Reassessment Process

The planning framework, cost estimates, project evaluations and recommendations of the above planning efforts constitute the technical basis for the highway vision and highway investment strategy in this plan.



A New Highway Investment Strategy

This plan identifies five key objectives to mitigate congestion, improve the performance of the Metropolitan Highway System and preserve high levels of regional mobility:

- · Increase the people-moving throughput of the system;
- Manage and optimize the existing system to the greatest extent possible;
- Manage future demand;
- · Increase trip reliability; and
- · Minimize travel time

In order to achieve the above objectives, this plan recommends emphasizing a system-wide management approach. This new approach, applicable not only to the Metropolitan Highway System but also to the Regional Highway System, which includes the "A" minor arterials because of their important role in carrying regional trips, includes the following strategies for mobility improvements:

1. Implement Active Traffic Management (ATM) System-Wide

Active Traffic Management (ATM) applications smooth the effects of congestion and reduce the number of incidents. Benefits of ATM include increases in average vehicle throughput, overall capacity and travel time reliability as well as decreases in primary and secondary incidents (accidents) and overall travel time.

Examples of ATM applications include traveler information systems, incident response programs, dynamic signing and re-routing, dynamic shoulder lanes, hard shoulder running, speed harmonization, and queue warning.

Full ATM implementation can be more effective when done in conjunction with other corridor-wide improvements such as the construction of a new managed lane. In some cases, however, more limited ATM strategies can be implemented in an effective manner, on a case by case basis to improve freeway and non-freeway highways.

An annual budget has been allocated to ATM investments of \$5 M. The needs of the principal and "A" minor arterials greatly exceed this level.

2. Construct Lower-Cost / High-Benefit Highway Improvements

Lower-cost / high-benefit projects improve traffic flow by providing bottleneck relief, improving geometric design and addressing safety hazards. In some instances, these types of improvements require use of flexible design principles to maximize the use of available pavement and right-of-way. Recently, Mn/DOT has implemented with great success some lower-cost / high-benefit projects such as the widening of TH 100 at Excelsior Boulevard and the addition of a third lane on I-94 between Century and McKnight avenues. In addition, other lower-cost / high-benefit projects have been completed or are under development by Mn/DOT for implementation. Some of these projects entail capacity enhancement and short auxiliary

lanes additions while others focus on system management. Many more projects of this nature will be identified in the future, through the CMSP process, along congested corridors on a system-wide basis for construction.

In an early phase of the CMSP analysis 184 projects were identified with a cost estimate of over \$1.5 billion. This greatly exceeds the \$320 million allocated (\$20 million annually) for lower-cost / high-benefit projects in this plan.

3. Develop a System of Managed Lanes

Priced managed lanes provide a congestion-free travel option at posted speeds for those who are willing to pay or ride transit. Private vehicles and some commercial vehicles can buy their way into the managed lanes as long as the level of service does not deteriorate for transit and carpoolers. Over time, the percentage of managed lanes as part of the Metropolitan Highway System will increase.

Priced managed lanes can move more people, more reliably, produce changes in travel patterns that reduce peak demand, provide increased capacity within existing right-of-way, improve the flow of traffic on adjacent general purpose lanes, provide greater speed and reliability for transit and encourage greater transit use. As previously discussed, the effectiveness of managed lanes can be enhanced when ATM strategies are implemented concurrently.

The Managed Lane Vision (Figure 6-34) is estimated to cost up to \$1.5 billion. This assumes most projects can be built with little or no new right-of-way. The 16-year estimate of funds available for managed lane implementation is less than \$500 million.

4. Implement Strategic Capacity Expansion

In some cases, strategic capacity enhancements in the form of general purpose lanes, rather than managed lanes, may be needed in order to provide lane continuity for short segments of an existing facility or to complete an unfinished segment of the Metropolitan Highway System. These capacity enhancement projects should be scoped and designed using the lower-cost / high-benefit philosophy.

5. Non-Freeway Trunk Highway Improvements

Non-freeway trunk highways are an important element of the overall Regional Highway System in carrying regional trips in a safe and efficient manner. Many of these non-freeway trunk highways are "A" minor arterials which play a critical role in supplementing the capacity of the Metropolitan Highway System. This plan supports cost-effective improvements on those roadways using limited federal, state and regional funds wisely. Special emphasis should be placed on investments that focus on preservation, safety and ATM applications such as fiber optic cable to allow traffic signal interconnection and coordination.

Requests for Congestion Management /Air Quality (CMAQ) funds through the regional solicitation process for ATM investments and other system management projects on non-freeway trunk highways are encouraged. Highway Safety Improvement Program projects are also encouraged on these roadways.

Funds allocated through the Congestion Management and Safety Process (CMSP) are another type of resource available for non-freeway trunk highway improvements. Cooperative agreements between Mn/DOT and local governments can also be used to fund those types of improvements.

Conversion of at-grade intersections to grade-separated interchanges and other mobility and safety/ capacity projects on non-freeway trunk highways should only occur after a Mn/DOT and Council assessment to determine if the proposed project is consistent with existing plans and policies. The main purpose of the assessment will be to identify cost-effective projects that can be supported by the Council and Mn/DOT for local and regional funding. Completion of this assessment and explicit support from Mn/DOT will continue to be necessary to obtain Surface Transportation Program (STP) funds through the Regional Solicitation process for non-freeway trunk highway improvements.

Appendices D and E reinforce the effectiveness of improvements on non-freeway trunk highways in providing benefits for regional travel. As local units of government work with Mn/DOT to improve and convert non-freeway trunk highways to freeways, the following requirements are particularly important to achieve regional objectives:

- The appropriate local units of government exercising land use authority along the trunk highways will be expected to incorporate access standards into their subdivision and zoning ordinances and apply the standards during their development review process;
- Conversion of an at-grade intersection to an interchange should only occur in the urbanized area or in the planned MUSA (Figure E-1 in Appendix E);
- Conversion of an at-grade intersection to an interchange must provide safety and mobility improvements to both the mainline and cross-street. The new interchange should be adjacent to an existing interchange unless Mn/DOT and the Council determine through an assessment that the intermediate access points can be modified or managed to address safety concerns;
- Principal Arterials should only have interchanges with other principal or "A" minor arterials. Exceptions to this criteria will be allowed only under extraordinary circumstances and with the approval of Mn/DOT, the Council and the local road authorities; and
- Interchange spacing outside the I-494 / I-694 ring should be 2 miles or more unless physical constraints or density of existing or planned development require closer spacing.

6. Supporting Strategies

In addition to the five types of actions described above, three supporting strategies, which are key elements of the Congestion Management Process, should also be strongly pursued to further help reduce automobile use, particularly during the most congested times of the day:

• Travel Demand Management (TDM) strategies (e.g. carpools, vanpools, staggered work hours, telework, compressed work weeks)



Figure 6-17: Gas tax revenues have not kept up with inflation.

- Transit Investments (e.g. new transitways, expanded and enhanced transit service, and park-andrides)
- Land use changes (e.g. increased job and housing concentrations)

All three of these supporting strategies combined can help mitigate congestion by either reducing overall travel demand or by increasing the share of travel on the highway system accommodated by modes other than the single-occupant automobile.

Fiscally Constrained Highway Investment Plan

Since the 1990's, the metropolitan area has been required by federal law to prepare a fiscally constrained long-range transportation plan and a four-year Transportation Improvement Program (TIP) in which projected revenues and proposed investments are balanced.

2011-2030 Highway Funding Resources

Highway revenue estimates for this plan include all state and federal fund categories that have historically gone to Mn/DOT. The detailed discussion of these revenues is found in Chapter 3, Regional Transportation Finance. The highway revenue estimates also include the federal funds allocated through the TAB Regional Solicitation process, such as STP Urban Guarantee funds. Mn/DOT typically receives a portion of the regional funds for non-freeway principal arterial and "A" minor arterial projects, with the balance allocated to local government projects.

The actions of the 2008 Legislature increased revenues for the state trunk highway system by an esti-

mated \$2.6 billion (from 2009-2018) and for the cities and counties by \$1.8 billion (2009-2018). Chap-

Table 6-18: 2011-2030 Regional Highway Investments

TIP (2011-2014)	
Local & Mn/DOT Highway	\$1.3 B
Chapter 152 Bridge	\$1.1 B
Est. 2015-2030 Metro Area Funds	
Mn/DOT State Road Construction	\$3.6 - \$4.2 B
Ch. 152 Bridge (2015-2018)	\$0.3 B
Corridors of Commerce (I-94 & TH 610)	\$0.2 B
Regional Solicitation	\$1.7 - \$1.8 B
TOTAL Investment 2011-2030	\$8.2 - \$8.9 B

ter 152 provides a 3.5 cent gas tax primarily to pay for bonds to repair or replace bridges and some smaller allocations, such as for transit advantages and interchanges.

Furthermore, 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 (2013) Session Law, Chapter 117). The legislation establishes two major goals: to provide additional highway capacity on segments where there are currently bottlenecks in the system, and to improve the movement of freight and reduce barriers to commerce. Based on the legislative criteria, the MnDOT Commissioner selected projects across the state. Up to \$177 million is available for two projects in the Twin Cities Metropolitan Area (based on actual project costs). They are I-94 from Rogers to St. Michael, and TH 610 from I-94 to County State Aid Highway 81.

The total highway resources available for the region in the 2011-2030 period, is estimated at \$8.2 to \$8.9 Billion, is shown in Table 6-18. Those funds can be categorized as follows:

- The 2011-2014 TIP, with \$2.4 billion in highway investments in the region, is to be funded by a combination of federal, state and local funds. In addition to Mn/DOT projects, the TIP includes a large number of local projects which are partially funded with federal funds
- The 2015-2030 Metro Area Funds which include the revenues assumed in the Chapter 152 Bridge
 Program beyond the 2011-2014 TIP, the 2015-2030 revenues estimated for the Mn/DOT State Road
 Construction program and the Regional Solicitation funds. These first two funding categories constitute the target funds for Mn/DOT's Metro District.

Table 6-19: Total Metro Area Target Funds Available

	Federal Target Funds	State Target Funds	Total
2015-2020	\$ 1,000	\$ 900	\$ 1,900
2021- 2030	\$ 2,150	\$ 1,550	\$ 3,700
TOTAL	\$ 3,150	\$ 2,450	\$ 5,600

^{*}These funds are exclusive of Chapter 152 Tier 1 & 2 bridge repair or replacement and other bridge preservation.

Table 6-20: Portion of Federal Funds Available for Regional Solicitation

(in millions)

2015 - 2020	\$ 570
2021 - 2030	\$ 1,200
TOTAL	\$ 1,770

Table 6-21: State Road Construction Funds, Metro District

(in millions)

	Federal *	State	Total
2015 - 2020	\$ 430	\$ 1,077	\$ 1,507
2021 - 2030	\$ 950	\$ 1,550	\$ 2,500
TOTAL	\$ 1,380	\$ 2,627	\$ 4,007

^{*}Mn/DOT Metro receives an average 45% of the federal funds that come to the region.

Target Funds

Mn/DOT has established a process for distributing state and federal highway funds among eight areas throughout the state known as Area Transportation Partnerships (ATPs). The amount of money estimated to be available to each ATP is often referred to as the "target funds." Target funds estimates include both federal and state funds for the Mn/DOT district and federal funds available for local areas. These funds are forecast by Mn/DOT Central Office and represent the best estimate of future funds at this time. The target funds available to the Metro ATP are shown in Table 6-19, Table 6-20 and Table 6-21. These tables only include a small portion, \$130 million, of funds for the Chapter 152 Tier 1 and 2 bridge needs

which are primarily to be funded with bonds and are discussed separately from the target funds.

Table 6-19 shows the total federal and state funds estimated for the region for two time frames between 2015 and 2030. $(2011 - 2014 \text{ funds have already been programmed and are shown in the <math>2011 - 2014 \text{ TIP}$ is in Appendix B.) The federal target funds are forecasted to be constant for the next six years. After that, the estimates are increased by 1.6 percent per year. After 2018, the estimates of state funding sources are also increased by 1.5 percent per year.

Approximately 55 percent of the traditional federal highway formula funds that come to the region are allocated by TAB and the Council through the regional solicitation process. These federal funds are shown in Table 6-20. Table 6-21 shows the remaining 45 percent of federal formula funds as well as the state dollars that will be available for Mn/DOT's state road construction program.

Table 6-24 provides a breakdown of state highway construction investments for the 2015-2030 time period, excluding a large portion of the bridge investments. These funding levels reflect the region's priorities for preservation, safety, and congestion mitigation.

In the recent past, the state and region have secured additional federal and state funds for highway construction. The total ranges shown at the bottom of Table 6-24 reflect the uncertainty of predicting future funding levels and the possibility of additional funds coming to the region, but do not assume a significant increase in the base level of state or federal funds. Additional funds for state trunk highway projects may also become available through public-public and public-private partnerships.



Figure 6-22: Preservation is the first investment priority



Figure 6-23: Preservation of bridges is a priority for the region

Table 6-24: TSP Metro District Highway Investment Plan: State Road Construction 2015-2030

(in millions)

Fund Category	2015-2020	2021-2030	Total
Metro Share of Tier 1 and 2 Bridges	\$130	\$0	\$130
Preservation			
Pavement	\$300	\$800	\$1,100
Other Bridge	\$400	\$1000	\$1,400
BARC ¹	\$25	\$30	\$55
Other Infrastructure	\$80	\$140	\$220
Safety			
Safety Capacity	\$100	\$120	\$220
Safety- HSIP ²	\$20	\$30	\$50
Cooperative Agreements	\$30	\$30	\$60
Congestion Mitigation			
Congestion Mitigation	\$397	\$300	\$697
Team Transit	\$10	\$20	\$30
Community Improvements	\$15	\$30	\$45
TOTAL	\$1507	\$2500	\$4007
Total Estimated Range ³	\$ 1427 - \$1627	\$2350 - \$2700	\$3777 - \$4327

^{1.} BARC – Bridge and Road Construction 2. HSIP – Highway Safety Improvement Program 3. The ranges reflect the uncertainty of forecasting revenues over time.

2030 Highway Investment Plan

2011-2014 Transportation Improvement Program (TIP)

The 2011-2014 TIP assumes that \$2.4 billion will be available to the region for highway investments in this 4-year period. This amount includes Federal Title 1 funds as well as state and local highway funds. The entire program is shown in Appendix B and Table 6-25 depicts some of the major highway projects. The higher than normal level of investment is largely due to about \$1.13 billion in one time Chapter 152 Tier 1 Bridge Program and additional Federal ARRA Funds.

Table 6-25: Major Highway Projects Included in 2011-2014 Transportation Improvement Program (TIP)

Highway and Bridge Project	Cost Estimates	Project Description	Status and Other Comments
I-494 and TH 169	\$172 M	Major Interchange reconstruction and local access improvements	Design/build project scheduled to let in fall 2010
TH 610 from TH 169 to CR 81	\$42 M	Complete four-lane freeway on new alignment	Majority of funds included in the TIP for TH 610 will be spent on this section. ARRA funds
TH 52 Lafayette Bridge over Mississippi River in Saint Paul	\$290 M	Reconstruct bridge, auxiliary lane and full shoulders	Chapter 152 funds
TH 61 Hastings bridge over Mississippi River	\$265 M	Reconstruct bridge and TH 61 approaches	Chapter 152 funds
I-35E, I-94 to Maryland Avenue	\$200 M	Reconstruct Cayuga Street bridges	Chapter 152 bridge funds; MnPASS lane possible addition
TH 36 bridge over St. Croix River	\$ 425 M (MN Share)	Construct new four lane bridge	Chapter 152 funds
I-694/TH 51/TH 10 Interchange	\$42 M	Add an eastbound through lane on I-694 to reduce congestion	Lower-cost / high-benefit project
TH 36 and Rice Street	\$ 20 M	Reconstruct interchange	Contract awarded in 2010
TOTAL	\$1,414 M		

2015-2030 Highway Investment Plan

Preservation - the Cornerstone of Safety

The first investment priority must be to preserve the existing Regional Highway System, a significant regional asset that includes 657 miles of metropolitan highways and an additional 450 miles of minor arterial trunk highways, most of which are "A" minors. These investments are essential in achieving safety for the traveling public. A legislative auditor's report in 2008 found the level of preservation funding had been decreasing in recent years and needed to be increased. If funding becomes limited, preserving the Metropolitan Highway System should take precedence over other trunk highways.

Primary preservation activities include preventive maintenance, pavement repair and rehabilitation, and bridge repair and rehabilitation to achieve pavement and bridge performance measures. Additional preservation is needed for components beyond pavement and bridges, such as stormwater management, signs, lighting, signals and intelligent transportation systems (ITS). Preservation investments are shown in Table 6-24 under four broad categories: Pavement, Other Bridges, Bridge



Figure 6-26: Preserving the existing highway system is a priority and essential to public safety

and Road Construction (BARC) and Other. These investments will absorb a very large share of the funds estimated to come to Mn/DOT. In the 20-year planning period, the Metro District preservation performance target will not be met, given the anticipated revenues. Should additional funds become available, they will be allocated to both preservation and congestion mitigation to achieve a balanced investment program.

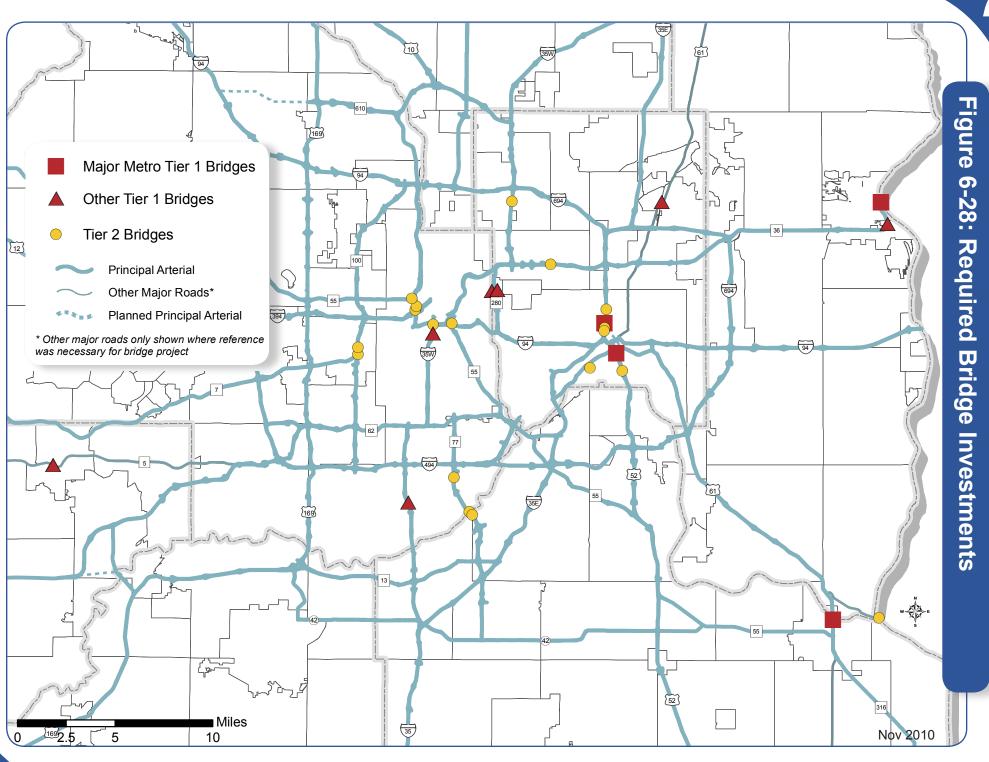
The 2008 funding legislation also directed Mn/DOT to repair or replace a large number of trunk highway bridges and associated approaches throughout the state. Under the legislation, the Tier 1 and 2 bridge improvements must be completed or under contract by 2018. This represents the vast majority of the new funding available to Mn/DOT, with more than \$1.5 billion of the bond funds estimated to go to Tier 1 and 2 bridges in the metro area. In addition, Mn/DOT will spend more than \$300 million of federal money from its Statewide Bridge Preservation Fund on these bridges.

Thirty Tier 1 and 2 bridges in Mn/DOT's Metro District will be repaired, replaced or prioritized for rehabilitation under the bond program. Figure 6-28 shows the location of the 30 metro area bridges, including four major metro Tier 1 bridges which must be repaired or replaced to meet the 2018 deadline. The current cost estimate for these four bridges (included in Table 6-25), with approaches, is approximately \$1.2 billion, although more detailed scoping reports and cost estimates will be prepared. The remaining Tier 1 bridges and the Tier 2 bridges which require additional investment before 2018 in the metro area are listed in Table 6-27. The specific treatment and scope of work required for the bridge projects is still being analyzed. While the bridge projects are included in the preservation investment category, many of the projects will include capacity improvements.

Table 6-27: Tier 1 and Tier 2 Bridges Requiring Investment before 2018

Bridge	Tier	Program Year	Cost Estimate (in millions)
TH 5 over recreation trail	Other Tier 1	2013	4
I-35W SB over TH 65 NB	Other Tier 1	2018	53
W 94TH St over I-35W	Other Tier 1	2013	14
US 61 over BNSF RR	Other Tier 1	2010	7
TH 243 (Osceola) over St Croix River *	Tier 2	2010	1
TH 77 SB Coll Rd over Killebrew Dr	Tier 2	2018	1
I-94 SB off ramp over Lyndale Avenue N & RR	Tier 2	2018	0.6
I-94 SB on ramp over Glenwood Avenue & RRs	Tier 2	2018	1.2
I-94 WB on ramp over I-94 & TH 65	Tier 2	2018	60
I-94 WB off ramp over CP RAIL & city street	Tier 2	2011	1
TH 7 (CSAH 25) over TH 100	Tier 2	2016	157
TH 100 - Minnetonka Blvd over TH 100	Tier 2	2016	157
TH 55 over Bassett Creek	Tier 2	2018	2
TH 77 NB over Minnesota River & Black Dog	Tier 2	2015	14
TH 77 SB over Minnesota River & Black Dog	Tier 2	2015	14
TH 36 over Lexington Avenue	Tier 2	2015	30
US 52 (Lafayette) over UP RR & Eaton Street	Tier 2	2015	9
TH 149 (Smith Avenue) over Mississippi River & RR redeck	Tier 2	2018	19
I-35W - Co Rd E2 (CSAH 73) over I-35W	Tier 2	1028	23
US 10 (Prescott) over St Croix River	Tier 2	2018	1

^{*} Project in Chisago County (part of Mn/DOT Metro District) - not shown on map of Required Bridge Investments (Figure 6-28)





Safety

The federal SAFETEA-LU law elevated safety to a high priority and a "core" funding program. Federal guidance establishes funding levels each state must meet. In the Twin Cities region, these funds are supplemented with state funds to address this critical need. Because of this added emphasis, safety considerations must become an essential element in the development of all projects.

The safety category consists of three parts; Capacity, Highway Safety Improvement Program (HSIP), and Cooperative Agreements (See Table 6-24, Safety Section.) Highway Safety Improvement Program (HSIP) are funds allocated through a competitive process by Mn/DOT and the TAB. Other safety projects are selected by Mn/DOT to address known and anticipated safety problems.

Community Improvements

Although there are significant local land access interchange needs in the Twin Cities area, the Metro District will focus its Regional Community Improvement Projects (RCIP) investments on much needed noise walls and its highly effective cooperation agreements program. The construction of new, and maintenance of existing, noise walls will continue to be an important investment strategy for Metro District. Because the Twin Cities is the State's hub of economic activity and access to the region's highway system is critical, Metro District will work with local partners on potential investment strategies for interchanges should resources become available in the future. Metro District recognizes that RCIP interchanges are important for supporting economic development in the region.

Congestion Mitigation / Mobility Enhancements

This plan supports the implementation of ATM improvements, lower-cost / high-benefit projects and new managed lane and affordable strategic capacity expansion to mitigate congestion and improve mobility. However, only about \$1.1 billion is forecasted to be available for these types of projects in the 2015-2030 period. This makes it critical that limited resources available for congestion mitigation and mobility be used, whenever possible, to augment preservation and safety funds and funds from the Chapter 152

Table 6-29: 2015-2030 Congestion Mitigation and Safety Investment Plan

•	,		
	2015-2020	2021-2030	2015-2030
Active Traffic Management (ATM)	\$ 30	\$ 50	\$ 80
Lower-Cost / High-Benefit (CMSP Projects)	\$ 120	\$ 200	\$ 320
Managed Lane / Strategic Capacity Enhancements	\$ 347	\$ 330	\$ 677
TOTALS	\$ 497	\$ 580	\$ 1077*

^{*} The \$1.1B funding level assumes the Metro District will receive supplemental funds in addition to its formula funding through special funding programs such as Corridors of Commerce

bridge program to implement projects that meet multiple objectives. Table 6-29 shows a sub-allocation of the estimated \$1.1 billion by investment type. This allocation reflects the policy direction in this plan and will be used in project programming decisions. These funds represent the level of effort that will be made to mitigate congestion, provide increased safety and improve regional mobility.



Figure 6-30: Congestion mitigation efforts will also include implementing priced lanes

ATM funds will be used not only on the freeway system but also on non-freeway principal arterials and "A" minor arterials. Mn/DOT may obtain some of these funds from federal funds allocated through the Regional Solicitation process.

Lower-cost / high-benefit funds will also be used for both principal and "A" minor arterial projects. These projects may be initiated by Mn/DOT or local governmental units and will use a variety of funding sources. Some of these projects may rank well in the regional solicitation process because of their emphasis on addressing an existing problem in a cost-effective manner. Other lower-cost / high-benefit projects may take advantage of cooperative agreements between Mn/DOT and local partners.

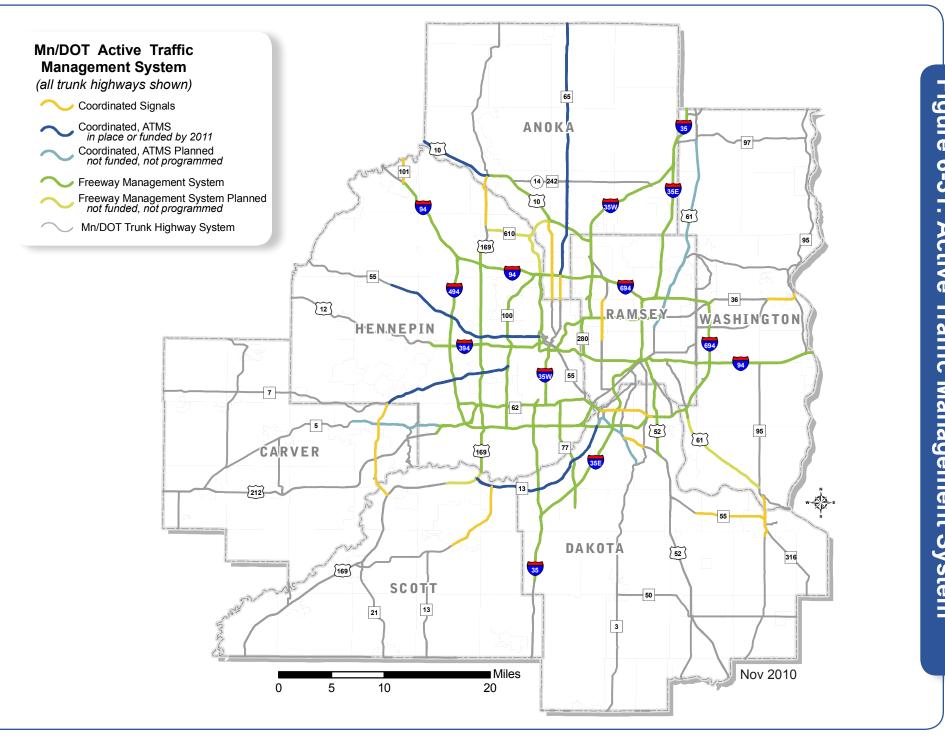
The third category of congestion mitigation will primarily be used to implement priced managed lanes, generally built within the existing right-of-way and using the existing pavement to the greatest extent possible. The funds will also be used for new strategic capacity enhancements that: help mitigate congestion or relieve a bottleneck, cannot be addressed by managed lanes, and are approached and scoped under the lower-cost / high-benefit philosophy.

ATM Improvements

Currently, Mn/DOT allocates funds annually to basic Freeway Management System (FMS) investments that typically include fiber optic cable, surveillance cameras and changeable message signs. On non-freeway highways, traffic signals are upgraded to allow for signal coordination, cameras for surveillance and electronic signs for travel information. These types of improvements are expected to continue in the future, on non-freeway principal arterials (i.e. TH61 TH36 TH65 TH10 TH55 TH12 TH7 TH169 TH 52) and "A" minor arterials. Figure 6-31 depicts Mn/DOT's Active Traffic Management System on the trunk highway system with additional planned investments.

In many cases, ATM improvements will become a reality in conjunction with a broader corridor improvement project (i.e. new managed lanes including priced MnPASS lanes) to enhance the effectiveness of those improvements and mitigate potential negative impacts. In the short term, ATM improvements are also expected to be implemented in the I-94 corridor between the two downtowns in conjunction with major preservation improvements already programmed in the current TIP.

In the 2015-2020 time period \$30 million is estimated to be available for ATM applications. In the 2021-2030 time period an additional \$50 million is estimated to be available for these activities.



Lower-Cost / High-Benefit Projects

The Congestion Management and Safety Plan (CMSP) defines a process and evaluation criteria to select lower-cost / high-benefit projects to address mobility constraints throughout the entire metropolitan area. During the 2009 planning effort, approximately 180 problem areas were identified and evaluated. A number of those projects are included in the 2011-2014 TIP, and others are part of the major corridor reassessment recommendations which are included in Table 6-36. Table 6-32 and Figure 6-33 show lower-cost / high-benefit projects which have been completed or are under development by Mn/DOT. Some of these projects include capacity enhancements, such as short auxiliary lanes, and ATM projects, such as installing additional ramp meters. \$120 million is available to implement these and other lower-cost / high-benefit projects in the 2015-2020 period. An additional \$200 million is projected for the 2021-2030 period to be allocated in accordance with the process and evaluation criteria defined in the CMSP. Additional funds may be generated in the 2015-2030 time period for lower-cost / high-benefit projects through the Regional Solicitation process.

Managed Lanes Vision

A number of corridors were evaluated in the MHSIS and MnPASS 2 planning efforts as potential candidates for managed lanes. The MHSIS evaluated projects that may be viable in the long-term future, while MnPASS 2 had a shorter term investment window. The key performance measures used to evaluate potential managed lane projects, in both studies, included:

- Person and vehicle throughput
- Travel time savings, peak period delay (in managed lane) and VMT reductions
- Transit suitability, transit/carpool attractiveness
- · Cost-effectiveness
- · Opportunity for implementation

MnPASS 2 Study Recommendations

Mn/DOT, working with the Council, during 2010 completed the MnPASS 2 Study. The objective of that work was to analyze and make recommendations for the next generation of MnPASS managed lane projects for implementation in the Twin Cities metropolitan region. In the study, Mn/DOT assessed its priorities for short term (2 to 10 years) MnPASS lane implementation in light of evolving policies, actual experience with two operating MnPASS lanes, and in close coordination with the Managed Lane Vision developed as part of the MHSIS. An important aspect of identifying shorter term MnPASS 2 projects for implementation was the desire to avoid costly road widening and right-of-way takings. The study compared different managed lane options, but did not analyze other types of transportation investments.

The recommendations of the MnPASS 2 study for short term priority investments are as follows:

Tier 1 Investments: I-35E (I-94 to Little Canada Road, Little Canada Road to Co. Rd. E)

A great opportunity exists to build this lane coincident with the replacement of the Cayuga Bridges, a Chapter 152 funded project which is moving forward now. This corridor has moderately high transit service, directly serves downtown St. Paul, can be built in two phases without major challenges, and extends MnPASS to the northeastern sector of the metro region. The benefits to users will increase with a direct connection provided to downtown St. Paul via the 10th Street/ Wacouta Avenue exit.

Tier 2 Investments: TH 36 Eastbound from I-35W to I-35E, I-35W from downtown Minneapolis to TH 36, I-35W from TH 36 to Blaine, and I-94 between the downtowns.

TH 36 is also an opportunistic project in that it can be relatively easy and inexpensive to build coincident with the replacement of the Lexington Avenue bridge at TH 36. Combined with the I-35W project serving downtown Minneapolis it will ultimately become part of a viable northern and eastern metro MnPASS system. I-94 can provide direct connections to both Minneapolis and St. Paul and eventually connect to the existing MnPASS system. All of these corridors provide direct service to the downtown cores have high transit service levels and should be studied further. As financing and approvals are obtained, engineering challenges resolved, and opportunities arise to combine implementation of the MnPASS lane with other preservation projects these projects should be built.

All MnPASS 2, Tier 3 recommended project investments are contained in the Managed Lane Vision shown in Figure 6-34 along with other longer term implementation opportunities.

Based on the analysis performed in the MHSIS and MnPASS 2 studies, a managed lane system long-term vision was developed. This vision, shown in Figure 6-34 and in Table 6-35, includes the highest ranking corridors from the evaluation process. The I-94 corridor east of downtown St Paul is also included in the vision, even though it was not one of the highest ranking managed lane corridors, because it is currently undergoing an Alternatives Analysis which will include managed lanes as one of the options under consideration.

The intent is to implement managed lane corridors either within the existing right-of-way, or with minimal additional right-of-way. It is also the intent to implement these projects in accordance with existing design standards, to the greatest extent possible. In some instances, however, some design flexibility may be necessary to reduce costs and make it possible to implement the project within existing funding constraints. In all cases, the safety of the public will be maintained or even improved with the implementation of managed lanes.

The majority of the managed corridors will have a left hand or median location for the managed lanes. In all cases an array of ATM applications will be implemented to ensure safe and effective use of the managed lanes and to mitigate any potential negative impact.

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Table 6-32: Lower-Cost / High-Benefit Projects Recently Completed/Under Development

ID	Hwy	Beginning	End	Location	Dir.	Project Description	Year
1	I-394			I-494		Modify Interchanges at I-494 to add exiting capacity	2013
2	I-394			Xenia Ave	EB	Separate exit to CD to add capacity	2010
3	I-94	TH 101	95th Ave	Maple Grove/Rogers		Install ramp meters	
4	I-94	TH 101		Rogers		New ramp that bypasses first signal	2010
5	I-94	I-394		Minneapolis		Convert exit, striping and signing	2010
6	I-94			Maplewood/St. Paul/ Woodbury		Install ramp meters at White Bear Avenue, McKnight Road, Radio Drive	2011
7	I-94	TH 61	White Bear Avenue	St. Paul	EB	Install auxiliary lane	2011
8	I-494	I-35E		Mendota Heights	SB	Modify interchange by separating merged ramps	2009
9	I-694	I-35W		New Brighton	EB	Modify interchange to I-35W. Create auxiliary lane/safety lane.	2010
10	TH 100			Brooklyn Center/ Golden Valley/ Robbinsdale		Install ramp meters at TH 55, Duluth Street, 36th Avenue, CR 8, France Avenue	2008
11	TH 10	Hanson	Egret Blvd	Coon Rapids		Add lanes in both directions	2009
12	I-35			I-35W, I-35E Merge	NB	Add auxiliary lane in Columbus	2009
13	I-35W	Burnsville Pkwy.	CR 42	Burnsville	SB	Auxiliary lane	2007
14	I-35W	TH 13	106th Street	Burnsville	SB	Auxiliary lane	2009
15	I-94	I-694		Brooklyn Center	NB	Add extended parallel exit	2007 TR
16	I-94	TH 280	I-35W	St. Paul / Lauderdale		Add lanes in both directions by re-striping	2007 TR
17	I-35E	I-494		Mendota Heights	NB	Expand CD exit to 2 lanes	2008
18	I-694	TH 47	TH 65	Fridley	EB	Add auxiliary lane	2007 TR
19	TH 100	Duluth Street	TH 55	Golden Valley	SB	Add auxiliary lane	2007 TR
20	TH 100	I-694		Brooklyn Center	EB	Expand to 2-lane on ramp	2007 TR
21	I-35E	CR 11	TH 77	Apple Valley, Burnsville	SB	Add auxiliary lane	

^{*} Not all projects under development are funded in the fiscally constrained plan or included in the Regional Air Quality Conformity Analysis.

TR = Traffic Restoration projects implemented in response to I-35W bridge collapse

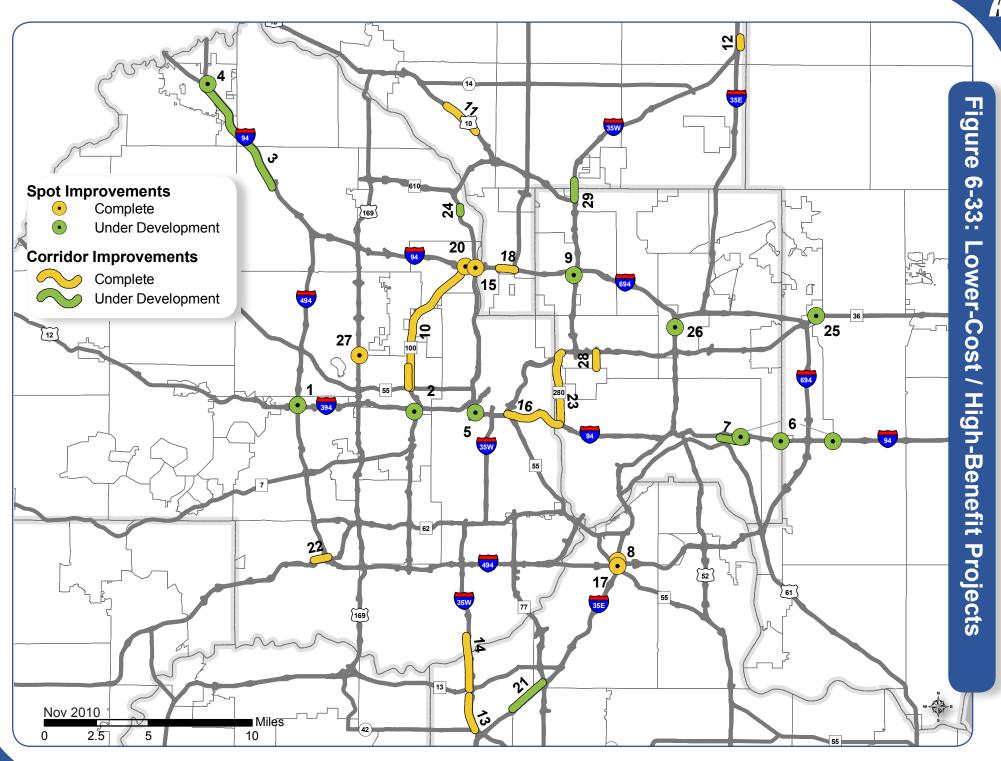


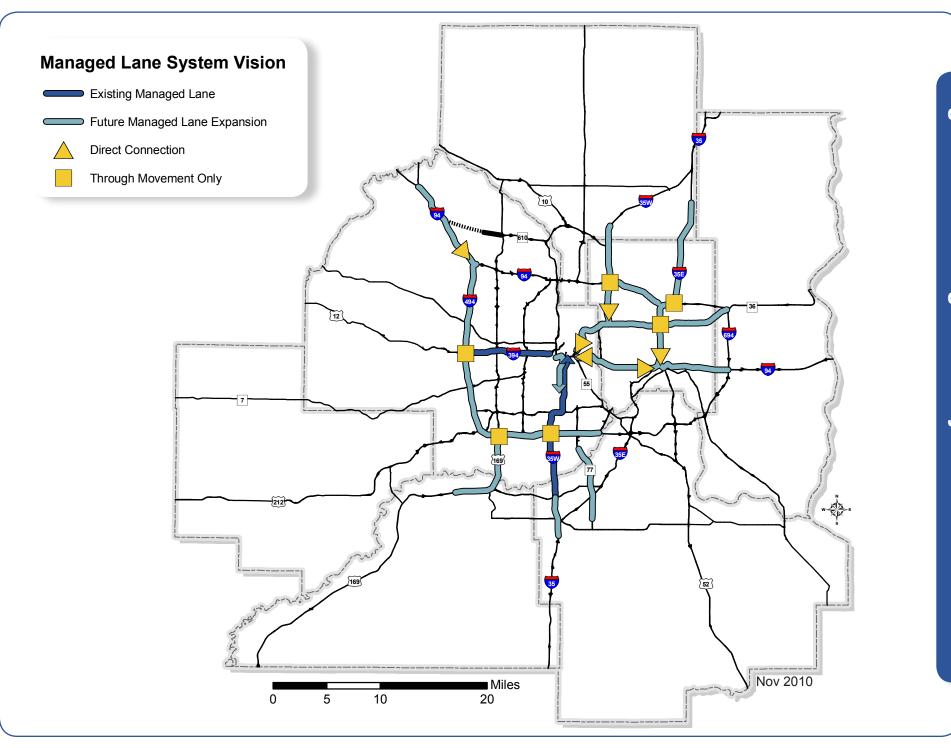
Table 6-32: Lower-Cost / High-Benefit Projects Recently Completed/Under Development

ID	Hwy	Beginning	End	Location	Dir.	Project Description	Year
22	TH 212	I-494	Prairie Center Drive	Eden Prairie	WB	Add auxiliary lane	2009
23	TH 280	Broadway	I-35W	Roseville		Convert to Freeway	2007 TR
24	TH 252	85th Ave		Brooklyn Park	NB	Add 3rd Lane	2010
25	TH 36	Hilton Trail		Pine Spring		Convert intersection to low cost interchange	2013
26	I-35E	I-694		Little Canada		Widen north to west ramp so queue of traffic removed from I-35E	2010
27	US 169	Medicine Lk Rd		Plymouth		Extend deceleration lane for south exit	2009
28	TH 51	Roselawn	TH 36	Roseville	NB	Add 3rd lane	2008
29	I-35W	Lake Dr	US 10	Blaine	SB	Add auxiliary lane	2010

^{*} Not all projects under development are funded in the fiscally constrained plan or included in the Regional Air Quality Conformity Analysis.

TR = Traffic Restoration projects implemented in response to I-35W bridge collapse





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Table 6-35: Managed Lane Vision Projects

					aged Lane Vi				<u> </u>
Corridor	Termini		Miles	Type of Treatment	Direct Connections	Move through System to System	Cost in Millions		Comments
						Interchange	Low	High	
I-35E N/S A	194/ Downtown Streets St. Paul	Little Can- ada Rd.	3.9	Add left MnPASS lane	St. Paul 10th Street and Wacouta	TH 36	\$35	\$90	Some reduced shoulders
I-35E N/S B	Little Canada Rd.	TH 96		Add left MnPASS lane		I-694 TH 96			Extension to I-35E Segment A
I-35W A	DT Mpls	TH 36	5.3	Add left MnPASS lane	CR 122/Mpls S 4th Street	TH 280	\$47	\$115	Some reduced shoulders
I-35W B	TH 36	95th St Blaine	10.8	Add left MnPASS lane	I-35W A	I-694	\$140	\$190	Some reduced shoulders
TH 36 EB	I-35W	I-35E	5	Add left MnPASS lane			\$35	\$60	
TH 36 WB	I-35W	I-35E	5	Add left MnPASS lane	I-35W SB	I-35E			Direct Connection at I-35W \$ 50-70M
TH 36	I-35E	I-694	5	Add left MnPASS					
I-94 A	Downtown Mpls	TH 280	3	Add left MnPASS lane	Mpls S 11th Ave	TH 280	\$41	\$41	Right bus shoulder eliminated. Some reduced shoulders
I-94 B	TH 280	Downtown St. Paul	5.1	Add left MnPASS lane	St. Paul Street Peter Street	TH 280	\$62	\$62	Right bus shoulder eliminated. Some reduced shoulders
I-94 C	Rogers/TH 101	I-494/split	9	Add left MnPASS lane	SB to I-494 MnPASS lane	TH 101	\$68	\$95	Direct connection \$ 35-50 M
I-494 A	I-94	I-394	8.5	Add left MnPASS lane		I-394	\$61	\$61	
I-494 B	I-394	TH 212	7.6	PDSL		TH 212	\$70	\$150	Note PDSL
I-494 C	TH 212	Airport	10.6	Add left MnPASS lane		TH 169 I-35W	\$130	\$185	Some reduced shoulders
TH 77	141st	I-494	6.9	Add left MnPASS lane			\$41	\$41	Some reduced shoulders
TH 169	CR 17	I-494	10	Add left MnPASS lane		I-494	\$93	\$115	Reduced width of shoulder and lane over Mn. River
I-694	I-35W	I-35E	6	Add WB DSL					Evaluate as a peak period only GP lane or truck only lane

Under current funding projections, it is not possible to build all the managed lane projects included in this long-term vision by 2030. Their aggregate construction cost of about \$1.25 to \$1.5 billion greatly exceeds the \$500 million estimated to be available. For that reason, they cannot all be included in the fiscally constrained regional transportation plan. Implementation of this vision, however, should be a key regional policy objective to be pursued through competitive federal funding, public/private partnerships and other funding opportunities.

Early implementation opportunities for new managed lanes will be sought with the objective to grow a system that builds upon and connects to managed corridors already in place and serves the two downtowns and other major traffic generators. In identifying early implementation opportunities, it will be essential to ensure that such a system of managed lanes is developed rather than a number of individual corridors with little system continuity. Where possible and affordable, direct connections between managed lane corridors and employment centers' local street systems will be included as this vision is implemented.

Corridors where major preservation and bridge rehabilitation/replacement projects are already planned or programmed are a good possibility for early implementation. In those cases, the incremental congestion mitigation/mobility funds needed to add the managed lanes can be significantly reduced.

A good example of leveraging multiple resources to implement managed lanes is the I-35E corridor between downtown St Paul and Little Canada Road. Mn/DOT has already programmed the Tier 1 Cayuga Bridge project in 2010/2013 which will replace 3 bridges south of Maryland Avenue in this congested corridor. The intent is to add any new capacity as MnPASS lanes using anticipated funding for this project. The goal is also to include a direct connection of these MnPASS lanes into downtown St. Paul if the cost is reasonable and there are sufficient funds available. Eventually, these managed lanes could be extended to TH 96 through the recently improved I-35E/I-694 section increasing the benefits and use of the new lanes.

The region will monitor and evaluate, through the Congestion Management Process, the development of this system of managed lanes and the number of lane-miles implemented, on an ongoing basis.

Strategic Capacity Expansion

Completing the unfinished segment of TH 610 and its connection to I-94 is a strategic capacity expansion project with new general purpose lanes to close a significant gap in the Metropolitan Highway System. Some strategic capacity enhancements may also be achieved by implementing interchange consolidation/closure initiatives and adding short general purpose lane additions, such as the TH 252 improvement discussed under the Major Project Reassessment section. In addition, the I-94 project from TH 101 to TH 241 is being funded as part of the Corridors of Commerce program. In the case of the I-94 project, the improvements will not preclude future development of MnPASS lanes.

Major Project Reassessment

Because of the aforementioned financial constraints many of the expansion projects proposed in the past have been reassessed to bring them more in line with projected revenues and Mn/DOT's ability to implement them. This reassessment was performed with the recognition that it is not realistic to assume that congestion will be eliminated and that each individual project can be designed as if a congestion-free system can be achieved.

Particular emphasis was placed in the reassessment process to identify lower-cost / high-benefit improvements. Major preservation and bridge replacement projects, already planned and/or programmed in those corridors, have been used to leverage limited mobility funds to implement improvements that provide substantial mobility benefits to the travelling public.

Table 6-36 describes the initial recommended improvements in those corridors based upon the findings and conclusions of the MHSIS, CMSP, MnPASS 2 and Major Project Reassessment Effort.

The projects included in the 2011-2014 TIP are fully funded and the projects in the 2015-2020 period are anticipated with projected funding. Projects included in the 2021-2030 period must be consistent with the projected revenue allocation levels shown in Table 6-29.

As previously discussed, the region will select other ATM, lower-cost / high-benefit, and managed lanes projects, in addition to the projects included in Table 6-36, through the CMSP and CMP processes based on funding availability.

Table 6-36: Major Project Reassessment, MnPASS 2 and Managed Lane Vision Recommendations

-	•	•	
Corridor	TIP (2011-2014)	2015-2020	2021-2030
I-494/TH 169 Interchange	Remove signals and rebuild interchange		
TH 100		TH 7, Minnetonka Blvd and RR bridges over TH 100 replacement and shoulder widening, Chapter 152 Funds	
I-694; I-35@ to I-35E	Rebuild bridges, add frontage road, add one new general purpose lane in each direction (TH 10 to Lexington Avenue)		* Lexington to I-35E, Managed Lane Vision
TH 610	Ongoing work west of TH 169	Advance the connection to I-94	
I-35E; I-94 to Maryland	Chapter 152 funding for the Tier 1 bridges and add MnPASS lane (MnPASS 2, Tier 1 Recommendation)		

^{*} These investments are not included in the Fiscally Constrained Plan Allocations



Table 6-36: Major Project Reassessment, MnPASS 2 and Managed Lane Vision Recommendations

Corridor	TIP (2011-2014)	2015-2020	2021-2030
I-494; TH 100 to 34th Avenue	Build managed auxiliary lane from I-35W to TH 100 WB (MnPASS 2, Tier 3 Recommendation)		I-35W northbound/I-494 westbound flyover ramp. Coordinated with Xerxes bridge over I-494 and interchange consolidation at 12th Ave/Portland and elimination of Nicollet Ave interchange
I-35W; SB I-94 to 46th Street			* Managed Lane Vision, southbound from I-94 to 42nd Street
I-494: I-94 to South of I-394			* Managed Lane Vision, from I-94 through I-394 interchange (MnPASS 2, Tier 3 Recommendation)
TH 252	Northbound lane addition for 2/3 of a mile on either side of 81st Ave		
TH 36: I-35W to I-35E		* EB Managed Lane Vision (MnPASS 2, Tier 2 Recommendation)	* WB Managed Lane Vision
I-694; I-35E to TH 36			Bridge work needed, no expansion planned
I-35E; TH 5 to TH 110			*SB, general purpose lane, lower cost/ high benefit project

^{*} These investments are not included in the Fiscally Constrained Plan Allocations

The following recommendations for right-of-way preservation for post-2030 projects have been made with respect to the two major river crossings:

- Future right-of-way preservation by local governments for a minor arterial instead of a principal arterial connecting the cities of Dayton and Ramsey. The designation of TH 101 as a principal arterial in replaced the Dayton/Ramsey bridge as a principal arterial in this area.
- Mn/DOT should assess the TH 41 river crossing to identify short-term lower-cost / high-benefit solutions and longer-term future right-of-way needs.

Fiscally Constrained Mobility / Congestion Mitigation Priorities

This plan provides a highway vision and identifies an investment need that greatly exceeds the revenues reasonably expected to be received over the next 20 years. The cost of implementing



the Managed Lane System Vision shown in Figure 6-34 is estimated to cost up to \$1.5 billion. An early stage of the Congestion Mitigation Safety Plan (CMSP) led by Mn/DOT identified more than 184 potential lower cost /high benefit CMSP projects totaling over \$1.5 billion. Mn/DOT continues to work on identifying these potential projects and anticipates the list and cost to grow. The cost to provide Active Traffic Management (ATM) technology improvements on all principal and "A" minor arterials as called for in this plan will require an investment in the range of hundreds of millions of dollars, while the fiscally constrained plan is able to fund only \$5 million in ATM investments annually. The plan's highway vision also supports implementation of strategic capacity enhancements such as the completion of TH 610 or other capacity additions in strategic locations that are scoped and designed under the lower cost/high benefit philosophy. Fully funding the highway mobility and congestion mitigation investments supported by the policy direction of this plan will require funding in the range of \$3.0 - \$4.0 billion.

As demonstrated earlier, the fiscally constrained state road construction budget is estimated to provide \$4 billion through 2030 (see Table 6-21 and Table 6-24), with only \$1.1 billion (28%) available for mobility and congestion mitigation in the 2015-2030 time period. This plan calls for the \$1.1 billion to be sub-allocated into three categories: ATM investments, lower cost/high benefit projects managed lanes/strategic capacity projects as shown in Table 6-37. The allocation of these funds assumes the implementation of projects that meet multiple objectives, such as preservation and congestion mitigation within one project. Should any project increase in cost above that shown in Table 6-37, adjustments will be needed within the investment category or other projects will be delayed. The region, working with Mn/DOT, will continue to seek additional revenues to ensure that these projects and possibly more can be advanced to actual implementation. As additional revenues are secured through increased funding levels or competitive grants the funds should be used to increase the spending levels for the investment categories shown in Table 6-37 and bring the region closer to fully funding the investment needs identified in this plan.

Table 6-37 allocates only a portion of the 2015-2020 funds to specific projects. The rest of the funds have been set aside for broad project categories pending further analysis of costs and benefits. The intent is to continue to monitor, as part of the Congestion Management Process, the performance of the MnPASS lanes on I-394 and I-35W, the I-94 ATM project and the new projects proposed in Table 6-37 and to verify their costs and impacts on the system. This analysis will be used in the 2014 update of this plan, or sooner if warranted, to adjust investment priorities and include new investments that are deemed to be most beneficial to the region. Also based on this analysis, some of the 2021-2030 funds may be committed to advance MnPASS and CMSP projects through an amendment to this plan.

Additional Highway Needs

There are now, and will continue to be, highway needs in the region that are not addressed in this plan. While the region does not support attempts at building general purpose capacity to eliminate congestion, there are other needs that should be recognized.

New Principal or "A" Minor Arterials to Support Expanding Urban Development

The need for new principal or "A" minor arterials in developing areas where the arterial grid is not adequate to serve future growth is well documented. Principal arterials are the most efficient and safe way to accommodate longer and faster regional vehicle trips. Identified needs for future principal arterials are found in Anoka County (east-west), Dakota County (east-west and north-south) Washington County (north-south), and Scott County (east-west and north-south). Anoka County has determined that CSAH 22/Viking Boulevard from Sherburne Co. on the west to Chisago and Washington counties on the east is the preferred location for the potential future principal arterial. Scott County has determined that the future potential north-south principal arterial should be CSAH 17 and TH 13 from TH 169 to TH 19, and the future east-west principal arterial should be Scott Co. Rd. 8 / Dakota Co. Rd. 70 from I-35 to TH 169. Since principal arterials should end with a connection to another principal arterial, actual endpoints can be determined in the future. These proposed principal arterials will be considered further in the 2014 update of the TPP when new regional forecasts based on the 2010 census have been developed.

Non-Mn/DOT Principal Arterials

At present, there are six principal arterials in the metropolitan area that are not under Mn/DOT jurisdiction: Dakota/Scott CSAH 42, Dakota CSAH 23 (138th St. to CR 42), Dakota CSAH 32 (TH 13 to I-35E), Anoka CSAH 14, Scott CR 18 (CSAH 42 to TH 169), and Shepard Road. Given their regional importance, these metropolitan highways should be under Mn/DOT jurisdiction.

Table 6-37: 2015-2020 Fiscally Constrained Congestion Mitigation/Mobility Investments

Active Traffic Management (ATM)	Add and enhance electronic infrastructure to Trunk Highways throughout region	
Estimated 6-year Budget \$30 M	ATM required for I-494 Managed Auxiliary Lane, Westbound I-35W to TH 100	\$ 7 M
Lower-Cost / High-Benefit	Set aside to be programmed through CMSP process (under development)	
Estimated 6-year Budget \$120M	Available for lower-cost / high-benefit projects in Table 6-32 and others	\$ 57 M
	TH 252, add general purpose lane north and south of 81st Avenue Intersection to complete 3 general purpose lanes northbound	\$ 3 M
Managed Lane/Strategic Capacity Co	Advance the connection of TH 610 to I-94 with lower-cost investment through the Corridors of Commerce program	
	ROW funded from original strategic capacity allocation	\$ 50 M
Estimated 6-year Budget \$347M	Help fund I-35E/Cayuga managed lane, MnPASS 2, Tier I recommendation with direct connection to CBD and/or extension beyond little Canada Rd.	\$ 15-50 M
	Set aside for MnPASS 2, Tier 2 recommendations. (This allocation will be reduced if TH 610 or I-35E project costs increase)	\$ 70-105 M
	I-94 from TH 101 to TH 241 lane addition through the Corridors of Commerce program	\$ 46 M