CHAPTER 9: Promote Transportation Efficiencies

WisDOT's vision for transportation efficiencies is a transportation system that moves people and goods to their destinations safely and within a reasonable time frame. WisDOT will continue to manage the state transportation system so that it is reliable, resilient and seamlessly connected.

Effective, coordinated and economical operations are part of an efficient transportation system that helps maximize traffic flow. This can reduce travel delays for freight and people, and improve safety.

WisDOT and other transportation providers achieve efficiencies through traditional actions, technologies and partnerships. Traditional actions such as using larger aircraft, scheduling more frequent bus service or expanding highways can make the system operate more efficiently.

Efficiencies are gained in other ways, including technologies like Intelligent Transportation Systems (ITS). ITS makes real-time travel information accessible to all users and can help travelers make decisions before or during their trips if incidents or travel slow-downs occur. Encouraging the use of other transportation modes, and participating in RIDESHARE and other carpooling programs can also help to improve system efficiencies. Driving at lower speeds and reducing vehicle and train idling time can improve fuel efficiency and potentially improve air quality.

WisDOT also achieves efficiencies by collaborating among business areas, with federal and state agencies, local governments, Native American tribes, regional planning commissions, metropolitan planning organizations and other stakeholders. These collaborations encourage up-front communication, technical assistance, coordination and planning, and cooperative efforts to reduce administrative barriers.

Achieving efficiencies and ensuring strong collaboration across WisDOT business areas and between WisDOT and other jurisdictions is critical to incident management, emergency response preparedness planning, and traffic management.

▶ ***POLICIES IN THIS CHAPTER FOR PROMOTING TRANSPORTATION EFFICIENCIES:***

- *Improve the reliability and efficiency of state trunk highway system operations*
- *Actively manage the daily operation of the state trunk highway network via the State Traffic Operations Center and other technology systems*
- *Optimize traffic movement on the state trunk highway system by utilizing tools to improve existing capacity and, where necessary, adding capacity*
- *Manage access on Wisconsin's state trunk highway system*

Continuing to provide a reliable transportation system enables the department and other transportation providers to meet changing user needs. A reliable transportation system ensures that users can plan their schedules around basic assumptions of travel times. Many Wisconsin businesses require a reliable transportation system.

For example, a food processing plant may schedule bulk cheese to be delivered at the time it will be needed for processing and packaging — so the cheese arrives "just in time." The finished cheese product may then be shipped "just in time" to distribution centers and grocery stores to replenish store shelves. "Just in time" shipping reduces warehousing costs and is especially useful for producing and distributing perishable goods (see Chapter 7, *Foster Wisconsin's Economic Growth*).

Unexpected delays in delivery of items such as cheese, corn or potatoes can add to production costs, and can cause possible spoilage or contamination of the perishable food. Delays can also affect the shelf life of the finished products in grocery stores.

FOR TRANSPORTATION TO BE BOTH RELIABLE AND RESILIENT, *WisDOT and other transportation providers need to balance traffic movement, safety and security needs with potential environmental impacts.*

A resilient transportation system is able to quickly respond to unexpected conditions and return to its usual operational state. For example, in the case of a crash or scheduled road construction, alternate route options may be provided.

For transportation to be both reliable and resilient, WisDOT and other transportation providers need to balance traffic movement, safety and security needs with potential environmental impacts. For example, a freight rail operator might want to construct a siding to allow freight trains to more easily pass each other and increase safety. However, the rail operator will also need to address any potential environmental impacts before construction. The extent of potential impacts may cause the rail operator to either not construct the siding at all or perhaps construct it in a location other than the place originally planned.

Providing seamless connections focuses not only on connecting Wisconsin's transportation system to local, regional, national and international networks, but also in facilitating convenient movement among different transportation modes. This requires investments in a multimodal transportation system that integrates both physical and technological infrastructure. Efforts must focus not only on maintaining and preserving the existing system, but also on improving system performance through systems management techniques, ITS technologies and, where appropriate, also on adding capacity to bikeways, sidewalks, transit, rail, highways, ports and airports .

The state's transportation system must be managed to enable people and goods to move with minimal delay or disruption from one area to another, while using a variety of modes. This is critical to serving travelers' needs and remaining economically competitive. WisDOT will continue to focus on building a strong and connected transportation network that links to local, regional, national and international networks, as well as intermodal terminals.

Challenges

Maintaining and improving the efficiency of Wisconsin's transportation system is crucial to supporting economic growth; however, transportation providers, including WisDOT, are facing several challenges:

» Balancing cost-effective strategies with efficiency and safety

» Increasing costs

Achieving transportation efficiencies

Effective, coordinated and economical operations are part of an efficient transportation system that helps maximize traffic flow. WisDOT and other transportation providers achieve efficiencies through traditional actions, technologies and partnerships.

▲ *Figure 9-1: Technologies such as Intelligent Transportation Systems can help travelers make decisions before or during their trips if incidents or travel slow-downs occur.*

» Changing technology

» Balancing highway access needs with economic growth initiatives

Increasing transportation costs, particularly costs related to energy, real estate and construction materials, can negatively impact the transportation system's efficiency. Without the ability to make needed improvements at the appropriate times over the life of all transportation modes, transportation providers will find it difficult to keep pace with both emerging and existing needs. For example, transit systems are facing increased fuel and operating costs while federal and state aid has remained relatively constant.

At the same time, many systems are receiving requests for expanded service areas. As a result, many transit systems have either reduced existing service to keep pace with current costs or increased fares to try to expand service into new areas.

In addition, transportation demands are likely to go up as Wisconsin continues to experience increases in the overall population and as the aging population stops driving and turns to public transit and other transportation options for their mobility.

Technology presents challenges and opportunities. Keeping pace with ongoing updates and improvements in technology can be expensive. A technological system that may have been state-of-the-art five to 10 years ago may no longer be used or supported today. In addition, using technology for data collection to monitor traffic flow, and identify system needs and potential improvements has raised questions about individual privacy concerns and data storage requirements.

Finally, ensuring that the technologies are available during an emergency or incident requires system redundancy or backups. For example, many signalized intersections also have stop signs that can be uncovered if the traffic signals malfunction.

Technology also presents opportunities. Emerging technologies offer options to manage the transportation system more efficiently. They also help to seamlessly connect transportation modes. For example, the Milwaukee Intermodal Station links highway, intercity passenger rail, intercity bus and transit travel. A traveler may arrive at the station by intercity bus to board an intercity passenger train to another city. Or a traveler may arrive by intercity passenger rail to use the local transit system to reach a final destination.

The majority of Wisconsin's highways were built during the 1950s and 1960s, when traffic volumes and system demands were very different than they are today. Increasing traffic volumes and freight movements, as well as development pressures, have resulted in a strained transportation system. Efforts to address system preservation needs while enhancing safety and efficiencies remains a challenge.

Finally, balancing transportation and land use continues to be a challenge. By protecting the safety, capacity and traffic flow on state trunk highways, public investment can also be preserved. Through sound access management techniques, the public and local governments can work with WisDOT to preserve the state's roadway investments and promote investment in the local economy through safe access points. In addition, providing increased access to transit provides more options for individuals, particularly those who do not or cannot drive.

Increased access to transit could provide more accessibility but may be cost prohibitive if transit operators lack funds to sustain added services. Likewise, limiting crossings along proposed high-speed passenger rail lines may improve safety, but may also impact individual property owners.

US 41 Interstate conversion

Interstate conversion of US 41 from Milwaukee to Green Bay is required under the Safe, Accountable, Flexible, Efficient Transportation Equity - a Legacy for Users (SAFETEA-LU) Act.

To qualify as an Interstate, US 41 will be studied to assess facility needs such as bridge clearance, interchange upgrades, truck weight exemptions and signage to ensure that federal Interstate standards are met.

WisDOT will also conduct an environmental review to identify and address impacts that may result from upgrading the facility to Interstate standards.

Opportunities

Even though this chapter primarily focuses on the state trunk highway system, WisDOT's focus is not limited to highways. WisDOT has identified specific policies and actions for improving the efficiency of all

Definition of highway operations and highway maintenance

Highway operations and highway maintenance are closely related. The primary goal of both is to maximize the reliability of the highway system. Highway operations activities focus on traffic flow on the roadway. Highway maintenance activities focus on the infrastructure along the highway right of way. WisDOT's efforts to improve daily highway operations include implementing and integrating traffic control devices and other applicable technology, as well as facilitating real time traveler warnings and information.

transportation modes; however, WisDOT's role varies depending on the mode.

The department has primary responsibility for the state trunk highway system, and for the rest of the transportation system, WisDOT manages available federal and state funding, and provides both technical assistance and data resources.

For details about actions to improve efficiency for other modes, see:

» Chapter 7, *Foster Wisconsin's Economic Growth,* for actions related to freight rail, local roads, harbors and airports

» Chapter 8, *Provide Mobility and Transportation Choice,* for actions related to bicycle and pedestrian accommodations, transit and intercity passenger travel

WisDOT identified several policies in response to the challenges in achieving it's vision and commitment to transportation system efficiencies. Specifically, WisDOT will:

» Improve the reliability and efficiency of state trunk highway system operations

» Actively manage the daily operation of the state trunk highway network via the State Traffic Operations Center and other technologies

» Optimize traffic movement on the state trunk highway system by utilizing tools to improve existing capacity and, where necessary, adding capacity

» Manage access on Wisconsin's state trunk highway system

Two WisDOT projects highlight how the policies, tools and strategies identified in this chapter can work together to improve system efficiency and are key components on Wisconsin's highway network: the US 41 Interstate conversion project and the Southeast Freeway System.

Southeast Freeway System

The Southeast Freeway System supports nearly one-third of all travel in southeastern Wisconsin on an average weekday.

The Southeast Wisconsin Regional Planning Commission, the designated metropolitan planning organization for the area, recommends:

› System reconstruction to address modernization and infrastructure deterioration

› System expansion for parts of the system to address congestion

Without the additional capacity, the regional planning commission forecasts 47 percent of the freeway system will experience moderate to severe congestion by 2035, almost double the level of congestion in 2001. Forecasts assume:

› Implementation of a region-wide travel demand management program

› Increased use of Intelligent Transportation Systems

› Expanded transit service

› Improved access management

▲ *Figure 9-2: By protecting the safety, capacity and traffic flow on state trunk highways, public investment can also be preserved.*

US 41 serves as a major arterial for Green Bay and the Fox Valley area, while the Southeast Freeway System is an economic lifeline not only for the southeastern region, but also for the entire state. Both systems face:

» Increased travel delays

» Increased development resulting in congestion and safety concerns

» Crash rates exceeding state averages along some segments

» Outdated facility designs

Throughout both of these projects, WisDOT will work with metropolitan planning organizations, regional planning commissions, local governments, businesses and citizens to identify ways to reduce project impacts, manage project-related congestion and improve safety.

To address congestion and safety, as well as to support continued economic growth, WisDOT will:

» Use operational tools, such as ramp meters and traffic cameras, to improve and add to existing capacity

» Update outdated facility designs to meet current standards, such as increasing vertical clearance on some bridges and redesigning some interchanges to improve safety

» Construct additional lanes to enhance capacity, pursuant to the environmental review process recommendations

THE MAJORITY OF WISCONSIN'S HIGHWAYS *were built in the 1950s and 1960s, when traffic volumes and system demands were very different than they are today. Increasing traffic volumes and freight movements, as well as development pressures, have resulted in a strained transportation system.*

▶ ***POLICY:***
Improve the reliability and efficiency of state trunk highway system operations

Highway operations are critical to efficiently move people and goods reliably and safely. To maximize the state trunk highway system operations, WisDOT will:

» Continue to plan and prepare for the department's prompt and consistent response to incidents

» Continually monitor the state trunk highway network and respond to operational needs

Background

Highways are designed to move people and goods safely and efficiently. State trunk highway reliability – or predictability – is a basic user expectation and necessary for a robust economy. People who travel on Wisconsin's highways expect to reach their destinations within a reasonable period of time. Shippers and businesses require a reasonable level of system reliability to support their efforts to compete and, where possible, expand. A wide range of daily events or incidents can disrupt the safe and efficient flow of traffic and affect overall system operation. Vehicle crashes, work zones, natural disasters, special events, and the number and distance of access points such as cross streets or driveways can disrupt system reliability.

In addition, current and future user demand will also negatively impact the system's reliability and safety, if unaddressed. For example, during the next 20 years, freight truck traffic is expected to increase twice as fast as total highway traffic growth. This increase will add significantly to the number of vehicles traveling on the state's highways.

Highway operations include the active, daily management of the highway system, and include two key components:

» Winter operations, which includes ice and snow removal, and roadway treatments

» Incident management, which is essential to managing traffic flow before, during and immediately after a roadway incident

Decisions that address highway operations needs are often interrelated with a wide range of other system considerations including safety, security, congestion and access management. Congestion and access management issues are covered later in this chapter. See Chapter 6, *Promote Transportation Safety*, and Chapter 11, *Promote Transportation Security*, for more information.

Highway maintenance needs, such as painting, sign repair and mowing, can also require highway operations activities. Highway maintenance is discussed in Chapter 5, *Preserve and Maintain Wisconsin's Transportation System*.

▲ *Figure 9-3: Highway operations include ice and snow removal and roadway treatments.*

Continue to plan and prepare for WisDOT's prompt and consistent response to incidents

WisDOT already uses work zone analysis and alternate route planning to plan and prepare for incidents or events that disrupt traffic. The department is also developing a third tool – traffic operations infrastructure planning. These three tools are described below.

Work zone management and safety

WisDOT's ongoing efforts to address Wisconsin's aging highway system result in numerous construction work zones. WisDOT plans for and manages construction impacts to traffic flow through and around work zones by:

» Using operational tools such as signing, marking, ITS and, where necessary, re-routing traffic

» Conducting work zone safety and mobility analyses in cooperation with local agencies to identify and coordinate enforcement needs; identifying potential routing alternatives; and addressing any other issues or concerns

WisDOT tracks the locations and number of work zones in a given corridor from year to year, and strives to schedule projects to minimize the number of work zones through which a driver must travel along a corridor. Another strategy to minimize traffic flow disruptions and user delays is to schedule project work during non-peak or nighttime hours, when there is less traffic on the road. Night work often includes additional costs for night-shift pay and work zone lighting, so WisDOT carefully weighs these costs against the benefits of this approach.

In compliance with new federal regulations, WisDOT will incorporate lane closure guidelines into transportation management planning and plans for work zones. WisDOT will also complete development of, and implement, a Web-based lane closure management tool to best determine construction closure schedules. This will minimize user delay and feed into other traffic management applications. WisDOT will continue to use effective signage to inform drivers of the locations and lengths of work zones, alternate routes and expected time delays.

Finally, WisDOT will continue to identify and expand available training for staff performing traffic control functions.

WisDOT work zone goals

› Reduce crashes in work zones

› Provide a safe environment for workers and the traveling public

› Minimize work zone related delays

› Provide traveler information to improve safety, mobility and efficiency

› Provide work zone training

› Evaluate and continuously improve work zone safety and mobility performance

Emergency alternate route planning

When an incident or event on a highway makes it unsafe or impassable, alternate route plans redirect traffic to other roadways to keep traffic moving. As noted in the "Improve the operability of the transportation system during disruptive events" policy in Chapter 11, *Promote Transportation Security*, these plans are crucial to maintaining overall system reliability and safety.

WisDOT has developed alternate route plans around the state to identify appropriate alternative routes during an incident. Examples include the Southeastern Integrated Corridor Operations Project (ICOP), a priority initiative for Southeastern Wisconsin, and the "Blue Routes," which are a priority for Madison and south central Wisconsin.

In conjunction with ICOP and the Blue Routes, WisDOT staff have identified roads that could serve as alternate

▲ *Figure 9-4: WisDOT will modernize traffic signal system technologies, which may include replacing and updating traffic signal electronic controllers, as well as linking traffic signals into the statewide communications network.*

routes for freeway traffic in key corridors across the state. WisDOT will continue to analyze priority roadways for alternate route planning. During the *Connections 2030* plan period, WisDOT will strive for statewide consistency in alternate route plan development procedures, including route naming and signage, to minimize confusion for travelers.

In addition, alternate routes are critical to WisDOT's security preparedness efforts, especially in the context of evacuation planning. When the severity of a transportation-related event or emergency requires the need to quickly and safely evacuate people, WisDOT will be prepared to support traffic management through a series of designated alternate routes and other tools designed to keep traffic moving as efficiently as possible. See Chapter 11, *Promote Transportation Security,* for more information.

Traffic operations infrastructure planning

Traffic operations infrastructure planning will integrate traffic management and transportation planning along key transportation corridors throughout the state. When completed, this approach will consider corridor traffic densities statewide and recommend appropriate tools to manage facility operation and traffic flow within specific corridors. These tools include ramp metering and surveillance, travel warning and information systems, and traffic signal systems. As part of this effort, WisDOT will collect and analyze corridor-level traffic data to identify best practices and improve future implementation of traffic management tools.

WisDOT will modernize traffic signal system technologies, which may include replacing and updating traffic signal electronic controllers, as well as linking traffic signals into the statewide WisDOT traffic management and public safety communications network. Data will be continuously accessible for managing operations and maintenance activities. With these improvements, technology controlling traffic signals will automatically respond to variations in traffic conditions.

Continually monitor the state trunk highway network and respond to operational needs

The department's efforts to monitor the daily traffic flow on the state trunk highway network are conducted primarily through close coordination of law enforcement, first responders, other agencies, the media and staff at WisDOT's State Traffic Operations Center.

With the aid of cameras, road sensors and area responders throughout the state, center staff work with others to identify and track incidents, and initiate appropriate responses. Currently, the center has cameras and direct responsibility to monitor and coordinate responses to incidents in Southeast Wisconsin, Madison and Wausau. To serve statewide needs, the center coordinates incident response with local emergency providers and contact via a toll-free number to the center. The center provides information to the public using direct communication, variable message signs, Highway Advisory Radio, and weather displays at rest areas.

The STOC plays an important role in highway safety by coordinating statewide emergency response (see Chapter 6, *Promote Transportation Safety*). For a more detailed discussion of the center, see the policy in this chapter called, "Actively manage the daily operation of

the state trunk highway network via the State Traffic Operations Center and other technologies." WisDOT will continue to fund the center and, where necessary, expand its coverage to other areas.

Monitoring daily traffic enables WisDOT to respond to highway operational needs through:

» Traffic incident management

» Emergency transportation operations

» Winter operations

» Facility design modification as appropriate

WisDOT uses traffic incident management to facilitate quick, efficient and coordinated responses to highway incidents. Traffic incident management focuses on detection and verification of traffic incidents, safe management of personnel at the scene, and clearance of vehicles or debris from the scene. WisDOT leads a partnership among the Wisconsin State Patrol, local law enforcement, emergency medical responders, Wisconsin Emergency Management and tow operators that has greatly improved traffic incident management in the Southeast region of the state. WisDOT will continue to share information quickly with all appropriate partner agencies and organizations throughout the state.

WisDOT will also continue to coordinate traffic incident response efforts among partner agencies and organizations with a focus on safety, expediency and efficiency. WisDOT will investigate the application of traffic incident management techniques along key corridors around the state.

Emergency transportation operations is a coordinated, multi-agency, multi-function approach for incorporating evacuation planning and implementation when managing transportation incidents with security considerations. WisDOT will integrate emergency transportation operations and traffic incident management efforts to increase operational efficiencies in key state corridors. WisDOT will also work with partners to develop agreements on responsibilities

▲ *Figure 9-5: WisDOT uses traffic incident management to facilitate quick, efficient and coordinated responses to highway incidents.*

▲ *Figure 9-6: WisDOT continues to collect, analyze and use traffic data to improve designs and overall highway system reliability.*

for traffic incident management and emergency transportation operations.

WisDOT's Emergency Transportation Operations (ETO) Plan consists of two sections: The ETO Program and the ETO Response. The programmatic aspect of the plan addresses the components and activities necessary to sustain an active, ongoingemergency transportation operations program. In the plan's Response section, procedures and other information are provided as guidance to WisDOT personnel in their response to emergencies. One such aspect is ongoing training activities. WisDOT is organizing a coordinated, department-wide training strategy that combines enhanced planning, realistic risk assessment

and practical exercises managed through a multi-year training program.

In addition, WisDOT's emergency transportation operations training philosophy conforms to the Homeland Security Exercise and Evaluation Program. For more information about emergency response and transportation security, see Chapter 6, *Promote Transportation Safety*, and Chapter 11, *Promote Transportation Security*.

A key element of emergency transportation operations is communicating with travelers. WisDOT works with partners to disseminate road and weather-related information quickly. This helps minimize delays for drivers and facilitates operational efforts to clear or repair the roadway. Travel communication tools include:

» 511 Traveler Information Program

» Highway Advisory Radio

» WisDOT's online travel center (www.dot.state.wi.us/travel)

» WisDOT's toll-free telephone number (1-800-ROAD-WIS)

The 511 Traveler Information Program allows travelers to dial 5-1-1 and receive real-time, route-specific travel information statewide. Similarly, Highway Advisory Radio provides recorded information via dedicated low-power AM radio frequencies in specific locations across the state. WisDOT's online travel center (www.dot.state.wi.us/travel), provides information about several topics, including weather and winter road conditions, work zone maps, and rest areas.

Travelers can listen to work zone reports during the construction season and winter road condition reports by calling Wisconsin's toll-free 1-800-ROAD-WIS telephone number.

WisDOT will continue to share information with travelers using the Internet, Highway Advisory Radio and other methods, and monitor opportunities to expand these services as demands increase.

Winter operations

Winter operations – snow plowing, sanding, salting and chemical application – account for a large part of highway operations activities and are extremely important to maintaining system reliability. Equipment needs are concentrated during the winter months and often for extended periods of time.

Prompt attention to winter conditions is a primary goal and depends on the number of trucks available to treat the roadways: the more trucks available, the shorter the roadway segments for which a single truck is responsible; the shorter the segments, the more frequently and efficiently each segment can be treated during snow and ice conditions.

WisDOT will continue efforts to improve reliability during winter driving conditions by:

» Assisting local partners with the acquisition of more equipment and staffing to allow treatment for snow and ice on more state trunk highway segments in the same amount of time

» Using automatic vehicle location and global positioning system technology to coordinate patrols and monitor salt and chemical application rates and locations

» Improving performance monitoring and standards to measure the effectiveness of snow and ice removal equipment and chemical applications to improve the consistency of application along highway corridors (Performance standards vary depending on class of highway — service expectations are greater on high-traffic-volume roads than on low-traffic-volume roads)

» Developing new performance measures as needed

» Continually evaluating new equipment and treatment methods and making recommendations to local partners

Design

As a highway operations response strategy, design involves the long-term study of traffic conditions to determine how best to improve traffic flow and system reliability. The ongoing, regular or periodic deployment of operational

tools, along with analysis of the corresponding benefits, may point to potential future roadway improvements.

Planners and designers use WisDOT's transportation models to determine how various road construction alternatives might affect traffic flow. WisDOT will continue to collect and analyze traffic data over time, and use it in roadway design to improve highway system reliability. For more information about addressing and managing traffic flow, see the policies in this chapter called, "Optimize traffic movement on the state trunk highway system by utilizing tools to improve existing capacity and, where necessary, adding capacity" and "Manage access on Wisconsin's state trunk highway system."

▶ *SUMMARY OF POLICY ACTION ITEMS:*
Improve the reliability and efficiency of state trunk highway system operation

Short-term (2008 – 2013)

- Work with partners to develop agreements on responsibilities for transportation incident management and emergency transportation operations.
- Modernize traffic signal system technologies, which may include replacing and updating traffic signal electronic controllers, and linking traffic signals into the statewide WisDOT traffic management and public safety communications network.
- Complete development of, and implement, a Web-based lane-closure management tool.

Mid-term (2014 – 2019)

- Investigate the application of traffic incident management techniques along key corridors around the state.

Entire planning period (2008 – 2030)

- Continue to use operational tools such as signing, marking, Intelligent Transportation Systems and, where necessary, re-routing traffic.
- In cooperation with local agencies, conduct work zone safety and mobility analyses, identify and coordinate enforcement needs, incorporate lane-closure guidelines into work zone plans, identify potential routing alternatives, and use signage to communicate relevant information such as expected time delays.
- Continue to identify and expand training for staff performing traffic control functions.
- Continue to strive for statewide operational consistency, including during determination of alternate routes, route naming and signage.
- Continue to fund the State Traffic Operations Center and, where necessary, expand its coverage.
- For winter driving conditions, improve existing performance monitoring and develop new measures (as needed), evaluate new equipment/treatment methods, assist local partners with the acquisition of more equipment and staff, and improve operations through technology advancements.
- Continue to share information with travelers using the Internet, Highway Advisory Radio and other technologies, and monitor opportunities to expand these services as demands increase.
- Collect and analyze corridor-level traffic data to identify best practices and improve future implementation of traffic management tools.
- Integrate emergency transportation operations and traffic incident management programs into a statewide initiative. Continue to coordinate response efforts and share information quickly with all appropriate partner agencies and organizations.
- Continue to study, collect and analyze traffic data over time and incorporate findings when designing roadways.

▶ ***POLICY:***
Actively manage the daily operation of the state trunk highway network via the State Traffic Operations Center and other technology systems

When systematically applied and targeted to priority needs, technology can improve efficiencies and enhance WisDOT's efforts to manage the transportation network. To actively manage the daily operations of the state trunk highway network, WisDOT will:

» Improve motor carrier efficiency and enforcement

» Continue to develop, implement and expand technology

» Cooperate with federal, state, local and private partners for communication and information sharing

» Maximize efficiency of multimodal transportation options

SmartWays technologies

Detection

› Roadway sensors detect vehicles moving on the highway network and are the primary source of data used to understand traffic patterns

› Traffic condition cameras provide live video of traffic on the highway network

Response

› Variable message signs inform travelers about current travel times to various destinations, and locations of lane and ramp closures

› Ramp meters (traffic signals) on freeway entrance ramps disperse the volume of vehicles entering the freeway to minimize congestion

› Highway Advisory Radio is a network of low-power radio transmitters that provide prerecorded messages in areas with highway construction projects and high volumes of traffic due to special events

Background

In response to increasing demands on Wisconsin's state trunk highway system, WisDOT uses a wide range of technologies to manage the growing volume of traffic, provide real-time traffic information to system users and first responders, and assess existing and future operational and infrastructure needs.

WisDOT's "SmartWays" technologies consist of numerous tools to help manage highway system traffic flow from detection and response to data collection. Most of the traffic management technologies used by the department to detect and respond to transportation incidents are intelligent transportation systems applications such as variable message signs and portable changeable message signs, ramp meters, closed circuit cameras, and telephone and Internet information systems.

WisDOT will expand the use of intelligent transportation systems to key intercity corridors statewide. WisDOT will also mainstream intelligent transportation systems as a tool for other types of routine highway operations activities including winter weather activities and work zone management. WisDOT currently uses Web-based technologies for the Wisconsin Lane Closure System and the oversize/overweight truck permitting processes.

Technological advancements have enabled WisDOT staff to improve collection of bike trail use data, enhance pedestrian crosswalk signals to help users more safely cross roadways, and provide real-time information at intermodal facilities such as the Milwaukee Intermodal Station. WisDOT will monitor the use of technologies to further enhance the state's multimodal transportation system.

Table 9-1: Examples of traffic management technologies

Technology	Status	Description
511 National Travel Information	Currently in use	• State-federal cooperative effort to provide real-time, route-specific information on construction zones, weather conditions, weather-related road conditions, congestion, detours, bus schedules and numerous other items • Currently 43 active systems in 32 states • 46 states, including Wisconsin, and the District of Columbia have received funding through the 511 Planning Assistance Program
Highway Advisory Radio	Currently in use	• Provides recorded information via dedicated low-power AM radio frequencies • Implemented in specific locations across the state
Wisconsin Lane Closure System	Under development	• Provides standard interface for lane closure operations, closure tracking and data retrieval • Facilitates data-sharing with other WisDOT applications such as the 511 Traveler Information program, State Traffic Operations Center incident management system, and the oversize/overweight permitting system • Archives data for future analysis, as well as integration with other traffic engineering applications
GPS traffic tracking	Currently in use	• Monitors and addresses real-time traffic conditions and enhances the current and future state trunk highway network by archiving traffic activity • Public-private cooperative effort • Uses cell phone and fleet-based GPS traffic tracking technology to collect traffic flow data • Eliminates all personally identifiable information • Sends anonymous vehicle position to State Traffic Operations Center
Vehicle infrastructure integration	Under development and testing	• Requires a cooperative effort among private-sector companies and federal and state agencies in multiple states • Allows vehicles equipped with vehicle infrastructure integration to communicate with embedded roadway technology and other vehicles in real-time

While technology is crucial to real-time operational data needs, monitoring data over time helps analyze potential trends. Storing data in a logical and accessible way for long-term analysis and future planning is extremely important.

Measures of technological performance can take place on several levels. First is the ability of the technology system to collect and store appropriate, uncorrupted data. Second is the ability of the organization to put the right people and processes in place to access, understand, and ultimately make sound business decisions based on analysis of the data. WisDOT will develop and implement performance measures for technology system management.

Continue to develop, implement and expand technology

WisDOT's State Traffic Operations Center is a centralized facility for monitoring highway operations and managing traffic on the state trunk highway network.

The center manages traffic on the highway system by detecting and coordinating operational activities

State Traffic Operations Center mission

To help maximize the reliability of the transportation system by improving transportation safety, mobility and efficiency, and managing congestion.

among partner agencies, and responding through the compilation and dissemination of information to numerous users and audiences.

» **Detection:** The center monitors and collects information from numerous sources such as traffic detectors, closed-circuit TV cameras (in Milwaukee, Madison and Wausau), computer-aided dispatch and local law enforcement radio.

» **Response:** The center coordinates response activities among partner agencies and compiles and disseminates information to numerous users and audiences.

The State Traffic Operations Center implements the following response actions:

1. Manage traffic control activities in response to expected traffic congestion such as special events or traffic incidents such as work zones.

2. Disseminate real-time traffic information – including incident location and construction-related closures, and anticipated or known delays – to other WisDOT personnel, emergency service providers, public safety agencies, media and the public. Variable message signs, Highway Advisory Radio and ramp meters are examples of WisDOT response to delays.

3. Coordinate state highway network emergency response activities via a toll-free telephone number available to law-enforcement agencies

Because of its central role in collecting and disseminating traffic information, the Statewide Traffic Operations Center is staffed 365 days a year, 24 hours a day, and acts as a highway operations "nerve center." Statewide expansion of the center began in 2005, and its functions are gradually increasing throughout the state.

As with any technology, implementation and expansion of the Statewide Traffic Operations Center are determined by the extent and immediacy of current and projected needs. WisDOT will continue its efforts to fund the center's operation and development across the state.

WisDOT will continue to implement and monitor technologies to help manage and monitor highway operations. Table 9-1 provides examples of these technologies.

Specifically, WisDOT will continue to:

» Implement the 511 Traveler Information Program statewide

» Implement Highway Advisory Radio

» Develop and implement the Wisconsin Lane Closure System

STATEWIDE EXPANSION OF THE STATE TRAFFIC OPERATIONS CENTER *began in 2005, and its functions are gradually increasing throughout the state. WisDOT will continue to fund the center's operation and development across the state.*

Table 9-2: Examples of cooperative information-sharing efforts between WisDOT and others

Effort	Cooperation between	Activity
State highway incident notification process	State-local	Established the State Traffic Operations Center as a hub for the collection and dissemination of traffic data. The state highway incident notification process is the single point of contact for local law enforcement agencies statewide.
Amber alert	State-local	In partnership with Wisconsin's Department of Justice and Dane County Public Safety Communications Center, WisDOT broadcasts Amber Alert information on the state's variable message signs.
Freeway service patrols	State-local	WisDOT State Patrol officers work with local personnel to assist travelers and other responders to traffic incidents.
Interstate operations working group	Multi-state	WisDOT, the Illinois Department of Transportation and the Illinois State Tollway Authority meet regularly to share information and discuss daily highway operations issues.
Computer-aided dispatch	Inter-divisional (within WisDOT)	Public safety operations and communications are assisted by this automated system.

» Participate in studies, collaborate with partners and monitor new technologies (such as vehicle infrastructure integration)

» Use of GPS tracking technology

Cooperate with federal, state, local and private partners for communication and information sharing

Technology has enhanced the department's ability to share and receive information. Table 9-2 provides examples of cooperative information sharing efforts under way. WisDOT will continue to maintain existing partnerships, and create new ones to promote solutions to efficiency challenges. The department will also continue to work closely with partner agencies to identify and implement mutually beneficial solutions.

WisDOT will continue to develop improved seamless connections and interfaces between its technology systems and those of other agencies, jurisdictions, states and private organizations. See Chapter 11, *Promote Transportation Security*, for additional information. WisDOT will continue to partner with stakeholders and monitor national efforts to research new and emerging technologies and develop cost-effective, beneficial and efficient technology systems.

Improve motor carrier efficiency and enforcement

Commercial Vehicle Information Systems and Networks (CVISN, pronounced "see-vision") provide the department with tools to improve motor carrier safety and enforcement, as well as enhance the state's revenue collection.

There are numerous CVISN applications designed to improve efficiency of traffic flow and enforcement of motor carrier regulations. Primary regulatory components addressed using CVISN technology include monitoring truck weight and size, and ensuring that each truck has proper insurance and necessary safety equipment.

The majority of the department's CVISN tools and technologies are housed at each of the state's 13 Safety and Weight Enforcement Facilities, commonly called weigh stations. WisDOT's Motor Carrier Enforcement unit in the Division of State Patrol uses CVISN technology to monitor and enforce commercial truck operations in Wisconsin. Specifically, they monitor the legal weight, length and height of loads. They also identify the registration, insurance, authority/permits, and fuel tax collection for the operators. Currently, weigh stations are located along the state's Interstates, U.S. Highways and at entry points to the state.

Table 9-3: Summary of technologies used to monitor commercial motor vehicle activity

Technology	Use
Weigh-In-Motion	• Detects the approximate weight of commercial motor vehicles via inductance loops, axle sensors and load cell scales beneath the pavement • Transmits information to weigh station • Instructs (via changeable message sign) vehicles measured as overweight/oversize to exit the roadway for additional measurements • Allows vehicles that are not overweight/oversize to continue without stopping • Allows staff to focus on vehicles most likely to be in violation of statutory limits
Virtual Scales	• Detects approximate vehicle weights • Captures vehicle images • Identifies overweight commercial motor vehicles attempting to bypass weigh stations or avoid detection by driving in the opposite lane or on the shoulder • Accessible via laptop computers in State Patrol squad cars • Currently located along two routes bypassing the Kegonsa weigh station; an additional scale is proposed along I-43 northeast of Beloit
PrePass	• Allows vehicles to bypass weigh stations by using electronic weight detection and Automatic Vehicle Identification technologies • Allows safety and enforcement inspections to focus on commercial motor vehicles most likely to be in violation of statutory requirements • Currently approximately 25 percent of commercial motor vehicles operating in Wisconsin participate

Commercial Vehicle Information Systems and Networks (CVISN)

Benefits of CVISN include:

› Focusing enforcement efforts on problem carriers

› Reducing delays for drivers and trucks stopped at facilities

› Reducing collisions, injuries and fatality rates (due to fewer on/off movements of vehicles passing through enforcement facilities)

To support these facilities and enhance their function, WisDOT will upgrade older facilities and implement technology improvements such as electronic monitoring at higher-volume locations. Three new facilities in Kenosha, Kegonsa (near Madison) and Beloit have been constructed or are under construction.

In addition to the technology applications used at the state's weigh stations, WisDOT also uses three technology systems to more effectively monitor commercial motor vehicle activity: Weigh-In-Motion, Virtual Scales, and PrePass. These technology systems are summarized in Table 9-3.

WisDOT issues permits for oversize/overweight vehicles and loads to provide for their safe and efficient movement. WisDOT will continue to maintain its Internet-based oversize/overweight automated permit issuance system for customers to apply for and self-issue new permits and to renew existing permits. WisDOT will continue to apply Weigh-In-Motion, Virtual Scales, PrePass and other technologies for motor carrier enforcement operations.

WisDOT will integrate roadside data captured by these systems with the commercial motor vehicle data networks maintained by the department through CVISN. Integration will provide seamless monitoring for compliance and allow better data analysis of commercial motor vehicle carrier operations.

Further, WisDOT will research bridges using virtual scale technology and similar applications for detecting and measuring the severity of needed bridge repairs. Weight data and bridge strain caused by moving vehicles (provided by bridge sensors) can be used to study the immediate and long-term effects of commercial motor vehicle traffic on bridges.

▲ *Figure 9-7: The Milwaukee Intermodal Station is a showcase for WisDOT's efforts to use technology to improve the availability of information to travelers.*

WisDOT will examine other emerging technologies related to commercial motor vehicles, and may cooperate on pilot projects to test concepts such as:

» Real-time tracking of hazardous materials shipping for commercial motor vehicles and freight rail

» Radio frequency identification to track freight shipments

» Use of GPS to notify commercial motor vehicle drivers of weight restrictions, overhead clearance restrictions, and navigation, including real-time re-routing options to avoid incidents and congestion

Maximize efficiency of multimodal transportation options

Wisconsin supports and actively participates in technology-related projects including intelligent transportation systems for transit, rail, bicycle, pedestrian and aviation modes.

Technology for transit

Transit systems are continually looking for ways to improve efficiency, safety and customer service. Technology is playing an increasing role in managing transit – from how the transit system addresses customer concerns and needs, to operations and how operators manage limited resources.

In the past, WisDOT has supported the study of intelligent transportation systems options for transit by organizing and funding statewide evaluation and purchasing initiatives, and by funding technology through state and federal grant programs. Past examples of transit technology advances supported by the department include:

» Web-based route assistance for riders

» Dispatching software for rural providers

» GPS-based passenger information and transit dispatch systems

» Automated distribution and collection of program applications, reports and other materials

Recently, WisDOT began a statewide intelligent transportation systems initiative for public transit systems and operators. (See Chapter 8, *Provide Mobility and Transportation Choice*, for more information about public transit.)

The goals of this initiative include:

» Evaluating options and developing procurement guidelines, selection criteria and recommendations to assist transit providers, ensure service continuity and coordination, and promote technology-based efficiencies and options

» Ongoing strategic thinking and planning mechanisms for intelligent transportation systems with involvement from WisDOT staff, transit providers and stakeholders

» Exploring existing and emerging intelligent transportation system options for all types

of transit: urban, suburban, rural, public and specialized transit

WisDOT will continually identify, evaluate and provide appropriate funding options for intelligent transportation systems equipment and services. It will support the use of technology for transit systems to improve efficiency, cost-effectiveness, and service options and information for riders.

Technology for intercity passenger rail and freight rail

Although WisDOT's applications of intelligent transportation systems for intercity passenger rail are still in their infancy, the department is committed to using technology to improve the availability of information to travelers. The Milwaukee Intermodal Station is a showcase for these efforts.

Current projects at the station include installing multimodal schedule display boards with audible announcements for passenger rail, intercity bus and passenger air. Eventually, these schedule boards will reflect real-time schedules through use of GPS, freeway speed monitoring and other integrated technologies.

WisDOT is evaluating opportunities to include power auxiliary units or on-site electrification for the Hiawatha service at the station. Amtrak's Milwaukee Airport Station at General Mitchell International Airport is scheduled to receive similar equipment that lists air and rail schedules. The new Sturtevant Amtrak station also has this type of messaging system.

WisDOT will seek federal security funding to install and operate flat-panel displays and remote audio announcement technology at all Amtrak stations in Wisconsin.

WisDOT will support a variety of other technologies including but not limited to:

» Streamlined traveler information at intermodal facilities (see Chapter 8, *Provide Mobility and Transportation Choice*, for information about intermodal facilities)

» On-board wireless Internet access for riders and at rail stations along Wisconsin's Midwest Regional Rail System routes (see Chapter 8, *Provide Mobility and Transportation Choice* for information on intercity passenger rail)

» Positive train-control technology

Technology for bicycle and pedestrian facilities

Technology plays a large role at pedestrian crossings for persons with disabilities. Accessible pedestrian signals include audible tones and speech messages to communicate the status of the signal cycle ("walk, "don't walk"). This technology can include countdown indicators stating the time remaining to clear the intersection, as well as information about the location, direction of travel and the name of the street to be crossed.

Emerging technologies include variable walk-light timing to give pedestrians options for the length of time they have to cross the street.

WisDOT will ensure that new pedestrian signal systems meet all federal regulations. In conjunction with scheduled intersection signal system improvements on state highways, WisDOT will update existing pedestrian signal systems to comply with federal regulations.

Similar to technology enhancing pedestrian travel, technology that would enhance bicycle travel includes bicyclist detection, especially at those areas of an intersection where motor vehicles do not often line up. In these cases, bicyclist detection often relies on loop detectors, or wires embedded in pavement that can detect metal and can be configured with the right amount of sensitivity to detect bicyclists.

WisDOT will continue to consider loop detectors for bicycle lanes and shared-lanes located at signalized intersections.

Wisconsin uses small electronic devices to count bicyclists on multi-use paths. These devices use high-sensitivity, infrared-sensing technology to count the

number of people who pass the counter. The devices transmit the data directly to a personal digital assistant device, allowing staff to analyze multi-use path data for consideration in proposed projects that have similar attributes.

WisDOT will continue to monitor these emerging technologies in bicycle and pedestrian transportation, and will collaborate with local governments to determine implementation opportunities with the greatest potential benefits.

Technology for aviation

While WisDOT's use of technology systems with the aviation industry is minimal, WisDOT will continue to support future efforts to implement technology systems that improve air safety and reduce delays for passengers.

▶ *SUMMARY OF POLICY ACTION ITEMS:*

Actively manage the daily operation of the state trunk highway network via the State Traffic Operations Center and other technology systems

Short-term (2008 – 2013)

- Develop and implement performance measures for technology systems management.
- Implement the 511 Traveler Information Program statewide.
- Upgrade older safety and weight enforcement facilities and implement technology improvements.
- Study the immediate and long-term effects of commercial motor vehicle traffic on bridges and research virtual scale and other technologies for detecting and measuring the severity of needed bridge repairs.

Long-term (2020 – 2030)

- Examine emerging technologies related to commercial motor vehicles and cooperate on pilot projects to test concepts such as radio frequency identification, use of global positioning systems (GPS), overhead clearance restrictions and navigation and real-time tracking of hazardous materials.

Entire planning period (2008 – 2030)

- Mainstream intelligent transportation systems for routine highway operations activities
- Continue to fund the State Traffic Operations Center and, where necessary, expand its coverage statewide.
- Continue to apply Weigh-In-Motion, Virtual Scales, PrePass and other technologies, integrating captured data with the commercial motor vehicle data networks through Commercial Vehicle Information Systems and Networks (CVISN).
- Maintain and upgrade the 511 Traveler Information Program.
- Set the framework for, monitor, research, develop and support technologies applicable to the state trunk highway system and other transportation modes.
- Continue to work closely with partner agencies, jurisdictions, states, stakeholders and others to determine implementation opportunities allowing seamless connections between technology systems.
- To assist transit providers, identify, evaluate and provide appropriate funding options for the procurement of ITS equipment and services.
- Ensure that new pedestrian signal systems meet federal regulations and bring existing signals in to compliance.
- Continue to consider loop detectors for bike lanes and shared lanes at signalized intersections.

▶ ***POLICY:***
Optimize traffic movement on the state trunk highway system by utilizing tools to improve existing capacity and, where necessary, adding capacity

WisDOT's vision for optimizing traffic movement on the state trunk highway system is to improve the system to reduce congestion, improve safety and support economic growth in Wisconsin.

To achieve this vision, WisDOT will:

» Use tools and strategies to improve capacity on existing facilities

» Construct new facilities to increase capacity where appropriate and warranted

Background

The efficiency and reliability of Wisconsin's state trunk highway system are impacted by several factors such as traffic volume, roadway design, bad weather and incidents such as crashes, stalled vehicles and construction. These factors can result in increased congestion. A safe, efficient and reliable state trunk highway system requires routine monitoring, maintenance and preservation to meet established performance thresholds.

Use tools and strategies to improve capacity on existing facilities

To enhance and improve capacity on existing facilities, WisDOT will:

» Continue to use existing tools and performance thresholds for safety and traffic movement

» Continue to manage the daily operation of the highway system

» Develop a statewide congestion management plan and program

State trunk highway congestion

Two types of congestion affect system reliability:

› Unexpected congestion – the three main causes are incidents, work zones and weather. About one-half of all congestion is caused by these temporary, unexpected disruptions.

› Expected congestion – routinely happens when the level of traffic approaches the capacity of the road; for example, slowdowns during the daily (or "weekday") rush hour.

» Improve traffic congestion modeling

» Work with transportation management areas to develop congestion management processes

» Coordinate with local governments and developers to manage the state trunk highway system more effectively and identify critical links and access points with the local road system

Continue to use existing tools and performance thresholds for safety and traffic movement
WisDOT has established performance thresholds to identify changing state trunk highway conditions and WisDOT's warranted response. WisDOT uses performance thresholds for:

» Pavement and bridges (see Chapter 5, *Preserve and Maintain Wisconsin's Transportation System* for more information)

» Safety

» Traffic movement

WisDOT will continue to use these thresholds and monitor national efforts to identify whether new thresholds are needed.

Safety performance threshold

Safety and traffic movement performance thresholds determine whether additional infrastructure is needed. WisDOT uses two primary methods for measuring highway safety:

» Annually evaluating crash statistics based on the number of crashes, injuries and fatalities

» Adjusting the crash statistics for the amount of travel on the state trunk highway system using vehicle miles traveled (VMT) (known as the rate of crashes, injuries or fatalities, expressed in terms of one crash per 100 million VMT)

When measuring highway safety, WisDOT compares the crash rates of similar roadways. For example, WisDOT compares Interstate routes to other Interstate routes, and *Corridors 2030* Connector routes to other *Corridors 2030* Connector routes, etc.

WisDOT uses a safety performance threshold of 2.00 standard deviations above the mean crash rate for similar highway segments as the threshold for the entire state trunk highway system. When a roadway segment exceeds the corresponding threshold, WisDOT examines whether any action is needed.

Deficient roadway design characteristics will likely point to safety improvements designed to reduce crashes and associated injuries and fatalities. However, a significant number of crashes result from driver behavior such as inattentive driving, speeding, and intoxicated driving. Therefore, WisDOT will continue to address transportation safety in a comprehensive manner that includes public education and enforcement activities, as well as emerging engineering improvements. See Chapter 6, *Promote Transportation Safety*, for more information about safety-related issues and policies.

Traffic movement

As stated earlier, safety and traffic movement performance thresholds determine whether additional infrastructure is needed. WisDOT measures traffic movement or congestion levels using a level of service (LOS) performance threshold. Level of service compares the amount of traffic on a road to its capacity. It takes into consideration traffic conditions (number of vehicles, vehicle types, directional distribution) as well as roadway conditions (lane width, shoulder width, passing opportunities, design speed). Level of service is measured on a scale of A to F and ranges from "no congestion" to "extreme congestion" (Table 9-4).

WisDOT developed traffic movement performance thresholds for the state trunk highway system using the level of service categories (Table 9-4). The thresholds differ according to road classification and function.

The thresholds also vary for state trunk highways in urbanized and non-urbanized areas. A need is not triggered on a *Corridors 2030* Backbone or Connector road located in a non-urbanized area until Level D is reached. For *Corridors 2030* routes located in urbanized areas, the level of service trigger varies depending on whether the route is a Backbone or Connector.

Backbone routes have a lower level of service threshold because they function as higher-level

Roadway capacity

For the purposes of this policy, roadway capacity is defined as the number of vehicles a roadway can carry.

Capacity is determined by several factors, including the number of lanes; width of lanes and shoulders; traffic signal timing; intersection controls; number and type of access points such as interchanges, driveways and intersections; and speed and alignment points such as grades and curves.

Enhanced roadway capacity should improve mobility, traffic flow and safety.

Table 9-4: Level of service performance thresholds

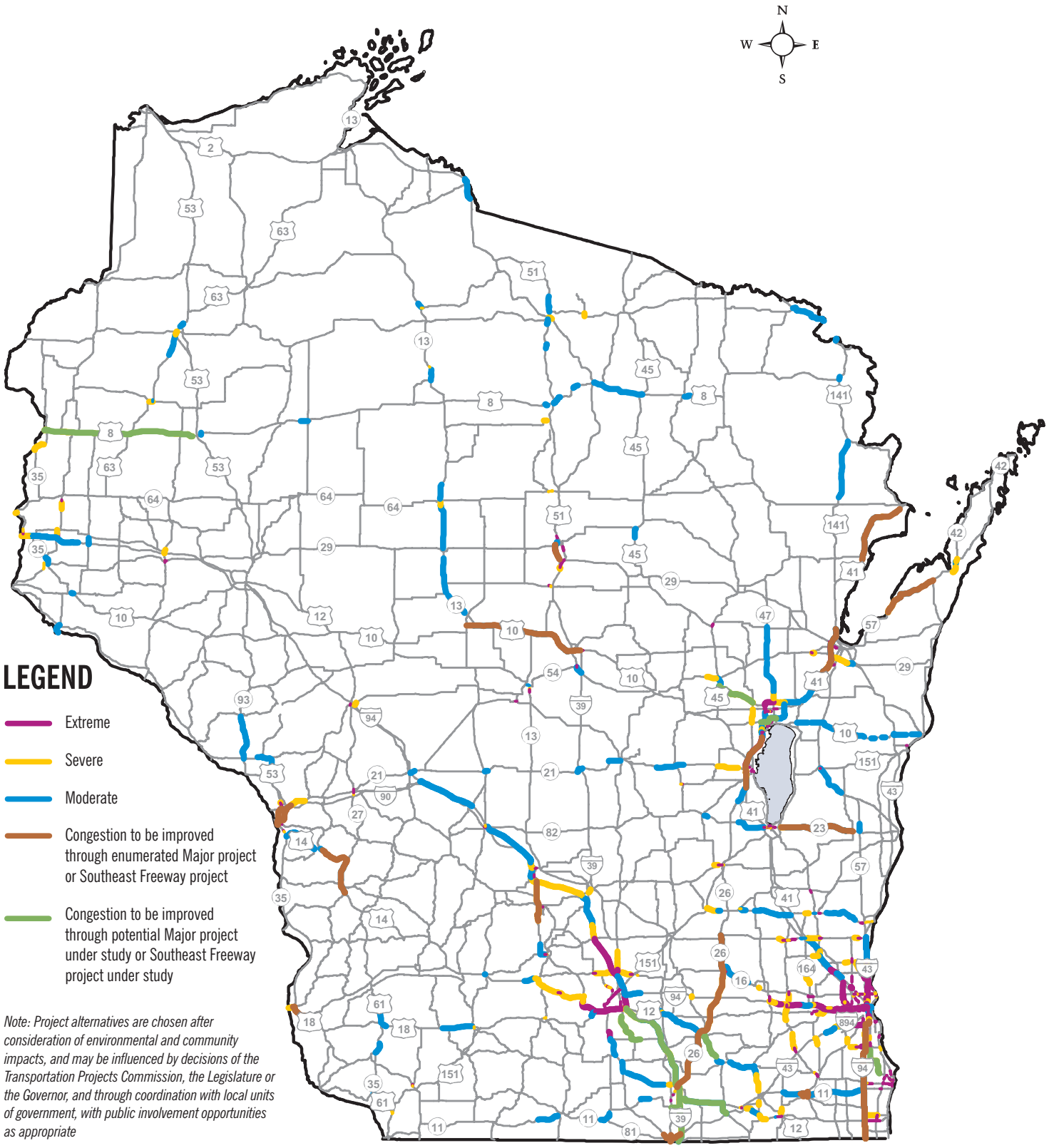
Level of Service	Description	Characteristics
A	No congestion; traffic flows smoothly	On both two-lane and four-lane highways • Free-flow operating speeds can be maintained • Vehicles can maneuver freely within traffic • Vehicles can enter the highway with little problem
B	No congestion; traffic flows smoothly	On both two-lane and four-lane highways • Speeds generally can be maintained • Vehicles' ability to maneuver within traffic is only slightly restricted
C	Minimal congestion; traffic flow and speeds are slightly restricted	• Drivers must be more vigilant when changing lanes on a 4-lane highway • Minor incidents along the roadway can be absorbed, but tie-ups may form behind any significant blockage
D	Moderate congestion; speeds and distance between vehicles are reduced, constricting traffic flow	• Freedom of drivers to maneuver within the traffic stream or enter the highway is more noticeably limited • Minor incidents can result in traffic jams because the traffic stream has little space to absorb disruptions • Passing slow-moving vehicles on a two-lane highway becomes very difficult because gaps in traffic occur less frequently • Turning vehicles and roadside distractions cause major shock waves in the traffic system
E	Severe congestion; vehicle speeds and spacing severely restricted	• The roadway is reaching capacity • Vehicles are closely spaced leaving little room to safely accommodate vehicles changing lanes or entering the roadway • Even minor incidents can impact traffic flow, resulting in extensive traffic back-ups • Passing vehicles on a two-lane highway is virtually impossible, as slower vehicles or other interruptions are encountered
F	Extreme congestion; stop-and-go, bumper-to-bumper traffic	• Traffic demand exceeds the carrying capacity of the roadways • Serious delays in travel occur when congestion reaches this level

roadways carrying traffic at higher speeds between communities. See the "Preserve Wisconsin's state trunk highway system infrastructure" policy in Chapter 5, *Preserve and Maintain Wisconsin's Transportation System* for information regarding *Corridors 2030*.

When traffic movement is forecasted to exceed an acceptable congestion level, WisDOT examines whether action is needed, including identifying the appropriate tools and range of financial investments that could be made.

Projected 2030 congestion is shown on Map 9-1. Throughout the plan period, forecasted congestion levels may change due to such factors as new land use patterns, road construction or traffic generators. The map accounts for all currently enumerated Major Highway Development Program projects. There are currently 27 enumerated Major Highway Development Program projects for construction and eight projects approved for study by the Transportation Projects Commission. To qualify as a Major Highway Development Program project, specific statutory criteria must be met. See the "Continue and improve the performance of the Major Highway Development Program" policy in Chapter 7, *Foster Wisconsin's Economic Growth* for more information.

Major Highway Development Program projects are some of the most complex and costly WisDOT projects. Because they typically include changes to highway operations, preservation strategies and new facilities, these projects are expected to address congestion concerns within the project area.



▲ *Map 9-1: Forecast state trunk highway system congestion (2030)*

Map 9-1 shows areas where Major Highway Development Program projects will improve the traffic movement or the level of service. Projected passing lanes, lane additions and other highway operations techniques will likely also improve the level of service, but they are not included on this map.

Improve traffic congestion modeling

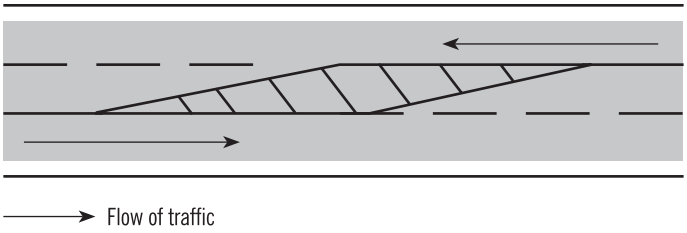
WisDOT recognizes the importance of managing and reducing congestion. The department's traffic movement performance measure, level of service, describes the extent of congestion during peak periods, the times of day with the highest traffic volumes.

Because peak period travel times are extending beyond traditional peak periods – morning and evening commute times – it is necessary to account for the duration of congestion; whether it occurs for one hour or four hours on a given corridor per day.

Historically, WisDOT has focused on congestion on the total length of the roadway. In many instances, specific segments are congested while other segments are not. Roadway users usually think of their trips in terms of how much time it takes to travel the total length of the corridor. Small segments of severe congestion can add significantly to travel time. In these instances, drivers will perceive the entire roadway as congested, not just a particular segment.

For this reason, WisDOT will develop a travel delay model. In developing the model, WisDOT will research additional performance measures that may provide a better understanding of how many hours drivers are delayed due to congestion, and the time savings that may result from improvements or alternative strategies such as roadway design changes.

These additional measures will address both expected and unexpected congestion. In most instances, drivers tend to expect some congestion (for example, the daily commute during peak hours takes 10 minutes longer than the same trip during off-peak hours). Unexpected congestion typically has a higher perceived impact because drivers do not anticipate the travel delay.



▲ *Figure 9-8: 2+1 roadway design*

Develop a statewide congestion management plan and program

WisDOT will develop a statewide congestion management plan and program to provide information on state trunk highway system performance, and strategies to reduce congestion and improve mobility.

The process will coordinate with activities identified in the congestion management processes developed by the state's transportation management areas. As part of this process, WisDOT will:

» Prepare periodic reports of system performance using the traffic congestion models

» Evaluate combined strategies to reduce congestion, such as design improvements combined with operational improvements

» Identify new strategies to reduce congestion, and test their effectiveness through modeling and pilot programs. For example, the 2+1 roadway design in Figure 9-6 is a strategy that has worked well in Europe. The 2+1 design is a continuous three-lane roadway with alternating passing lanes, which differs from traditional passing lane improvements that provide isolated alternating three-lane passing lanes

Continue to manage the daily operation of the highway system

Highway operations activities focus on the daily management of traffic flow. Operational strategies and tools typically do not require changes to the physical roadway.

Transportation management areas

Transportation management areas should not be confused with transportation management associations. Transportation management areas are designated by the U.S. DOT in urbanized areas with populations of more than 200,000. Transportation management associations are voluntary and help identify and implement transportation demand management strategies to reduce the number of single-occupant vehicles.

Examples of highway operations include:

» Intelligent transportation systems – includes the use of technologies such as ramp meters, changeable message signs, improved signage (such as better route markings) and designating alternate routes to manage traffic movement (see the "Improve the reliability and efficiency of state trunk highway system operations" policy in this chapter for more information)

» Incident management – improves response and coordination between law enforcement, fire and rescue, emergency medical services, etc. (See Chapter 6, Promote Transportation Safety for additional information)

» Work zone management – includes conducting roadway project activities during non-peak travel times and adding temporary travel lanes (see Chapter 5, *Preserve and Maintain Wisconsin's Transportation System* for additional information)

» Event management and coordination – minimizes negative traffic impacts during scheduled special events and, where necessary, coordinates with law enforcement to help manage traffic flow before, during and after the event

WisDOT will continue to study, collect and analyze traffic data and incorporate findings into roadway designs. This process will involve up-front policy and planning at the state level, followed by more detailed corridor plan development to identify specific approaches. WisDOT is developing a transportation operations infrastructure planning methodology to assess the use of traffic operations elements such as ramp meters and surveillance, travel warning and information systems, and traffic signal systems to determine appropriate tools for specific regions and corridors. For more information, see the "Improve the reliability and efficiency of the state trunk highway system operations" policy in this chapter.

In addition, WisDOT uses many other strategies to meet the safety and traffic movement thresholds. These include:

» Encouraging transportation demand management strategies such as carpooling to reduce single-occupant vehicles (see Chapter 8, *Provide Mobility and Transportation Choice* for more information)

» Addressing operational and safety characteristics to improve the function of the highway system (see "Improve the reliability and efficiency of state trunk highway system operations" policy in this chapter)

» Managing state trunk highway system access (see "Manage access on Wisconsin's state trunk highway system" policy in this chapter)

TO HELP DECREASE URBAN CONGESTION, *transportation demand management strategies can be employed such as carpooling, ridesharing and telecommuting.*

▲ *Figure 9-9: Whenever traffic movement or safety concerns are identified, WisDOT determines whether roadway design may also be a factor and if roadway widening is warranted.*

» Using technologies to communicate roadway conditions or incidents (see "Actively manage the daily operation of the state trunk highway network via the State Traffic Operations Center and other technology systems" policy in this chapter)

Work with transportation management areas to develop congestion management processes

The federal Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU) requires that transportation management areas implement a congestion management process. A congestion management process includes defining performance measures for existing and predicted future traffic congestion; assessing existing and historic traffic congestion trends; and developing, evaluating and recommending actions to address existing and future congestion.

The congestion management processes in transportation management areas are updated every four to five years as part of a metropolitan planning organization's long-range transportation plan update. Transportation management areas are defined as urbanized areas with populations of more than 200,000. Currently, the Madison, Milwaukee and Round Lake Beach (predominantly located in Illinois with a small area located in Walworth County) urbanized areas are classified as transportation management areas by the federal government. Based on current population projections, WisDOT expects Green Bay and the Fox Cities may reach the 200,000 population threshold and be designated as separate transportation management areas as a result of the 2010 U.S. Census.

Because urbanized areas typically have the highest levels of congestion, WisDOT will continue to work with the affected urbanized areas that reach the population threshold as they develop and update their congestion management processes. The processes developed for transportation management areas will become part of the statewide congestion management plan and program.

The statewide congestion management plan and program will consist of periodic reports on state trunk highway system performance (in cooperation

Corridor plans and studies

WisDOT will develop corridor plans and implement the plan's recommendations, if supported by an environmental document. Plans help identify efficiencies in the use of state resources. See Chapter 13, *Implementing Connections 2030*, for more information.

with the traffic congestion models within urbanized areas), an evaluation of system effectiveness, and strategies to reduce congestion through modeling and pilot programs. To help decrease urban congestion, transportation demand management strategies such as carpooling, ridesharing and telecommuting can be employed. See Chapter 8, *Provide Mobility and Transportation Choice*, for more information on transportation demand management.

Coordinate with local governments and developers to manage the state trunk system more effectively and identify critical links and access points with the local road system

WisDOT will continue to assess roadway conditions and performance thresholds to identify appropriate actions to reduce congestion. However, because of the nature of travel patterns, solutions to particular problems will continue to require coordination between WisDOT and local governments. WisDOT will continue to work with local governments and others to identify the appropriate methods to improve traffic movement. A key component of this will include the department's continuing efforts to participate in local comprehensive planning processes. WisDOT will also continue to work with local units of government to identify critical links and access points between the state trunk highway and local road systems. (See the "Preserve the local road and bridge system" policy in Chapter 7, F*oster Wisconsin's Economic Growth*, for more information.) Coordination enables both the state and local governments to assess appropriate access points, consider development patterns and maximize the flow of traffic along existing (and future) state and local systems.

Case study: US 41 in Oshkosh between WIS 21 and US 45

Motorists traveling between WIS 21 and US 45 typically use US 41. WIS 21, US 41 and US 45 are four-lane highways. When the combined traffic on US 41 meets or exceeds the highway's carrying capacity, a bottleneck occurs.

In areas where real estate development is occurring, WisDOT will work with adjacent property owners to encourage development of cross-easements to reduce short local trips. Cross-easements encourage adjacent property owners to use a single access driveway, rather than having a driveway for each individual property, and to develop connections between adjacent properties. This reduces the number of access points to the roadway, and helps to improve safety and reduce congestion.

In developing suburban areas and in urban settings (where feasible), WisDOT will work with local governments to develop plans to create and enhance local road networks that parallel state trunk highways.

A strong local road network can provide sufficient property access and reduce the number of access points to the state trunk highway system. When developed, these networks encourage drivers to use local roads for short local trips instead of the state trunk highway system. For this to be effective, local governments need to preserve the parallel

WisDOT will continue to work with *local governments, adjacent landowners, environmental resource agencies and planning entities when conducting interchange studies and during all construction-related activities.*

local road system. See "Preserve the local road and bridge system" policy in Chapter 7, *Foster Wisconsin's Economic Growth,* for more information.

Construct new facilities to increase capacity where appropriate and warranted

WisDOT carefully considers any decision to increase roadway capacity (defined as the number of vehicles a roadway can carry). Before WisDOT constructs additional lane miles and completes any infrastructure changes, such as bypasses or interchanges, the department prepares a clear statement of purpose and need. For example, purpose and need can be outlined in an environmental impact statement (EIS) or a tiered EIS.[1] The review of potential environmental impacts typically includes an analysis of a range of alternatives from a "no build," or "no change" alternative to a full-build-out alternative (see Chapter 10, *Preserve Wisconsin's Quality of Life*, for more information).

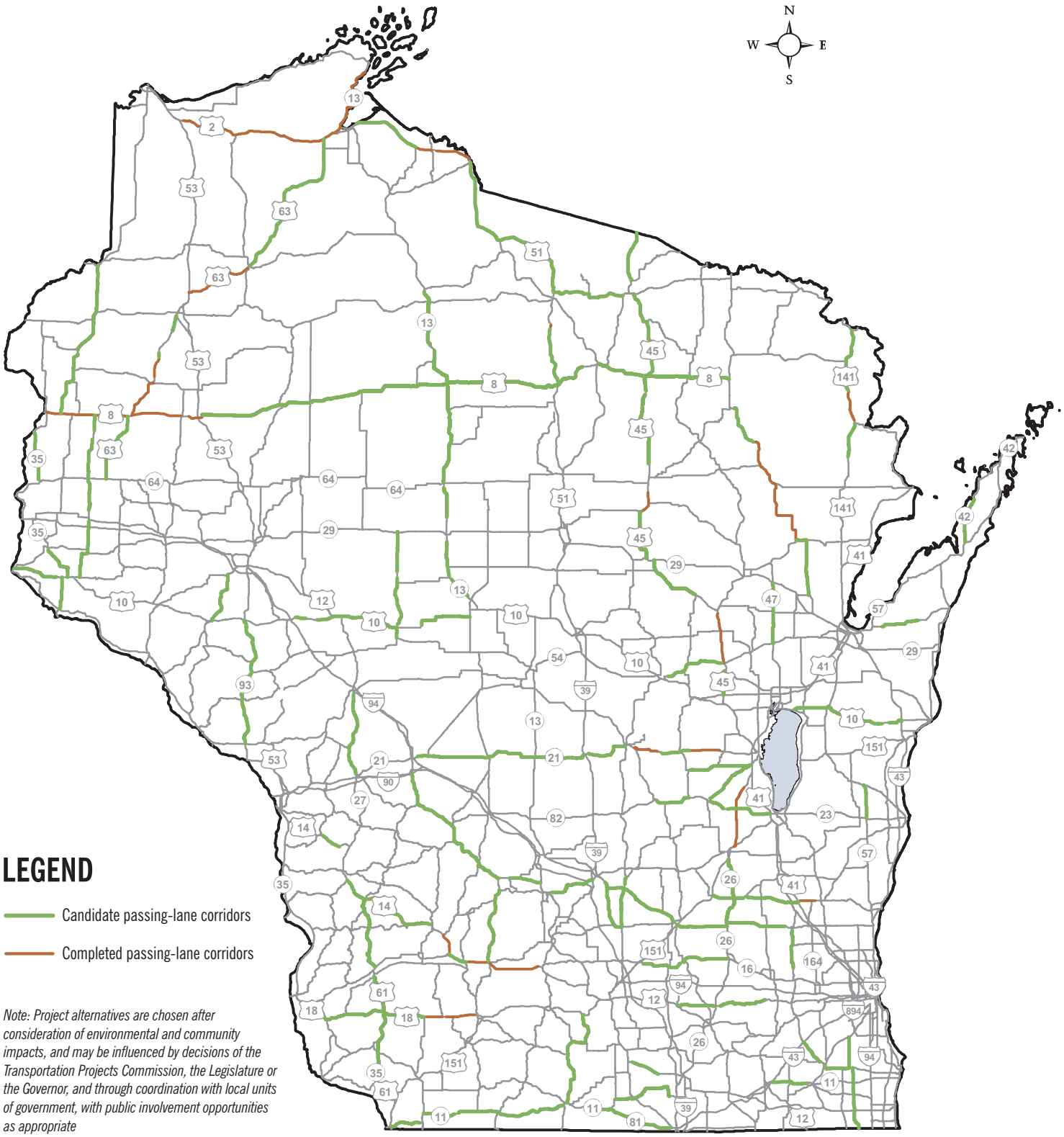
Expansion can be an expensive alternative to improve traffic movement, but in some instances it may be the best alternative in terms of safety, efficiency and overall cost, both to the individual project and to the overall economy. For example, long before the construction of a Major Highway Development Program project occurs, the candidate projects are studied to identify all environmental and social implications (see the "Continue and improve the performance of the Major Highway Development Program" policy in Chapter 7, *Foster Wisconsin's Economic Growth*, for more information).
Business and civic leaders often cite four- or six-lane highway access as a critical component in business location or expansion decisions. Moreover, shifts toward "just in time" manufacturing operations have created competitive pressures on industries to reach their markets in a timely and predictable manner. Interstate designation, for example, has helped encourage economic growth in many Wisconsin communities, as they are able to gain regional and national coverage.

Whenever traffic movement or safety concerns are identified, WisDOT determines whether roadway design may also be a factor, and if roadway widening is warranted. For example, eliminating poor sight distances, sharp curves, steep hills, and narrow lanes and shoulders, as well as improving intersections, can significantly improve safety. Safe roadways minimize the probability of traffic crashes and increase roadway efficiency and reliability. Coupled with less congestion, a safe roadway means less financial strain where property and freight shipments can be compromised.

WisDOT will sometimes undertake a project even if the safety threshold has not been exceeded, but there are safety issues at hand. These situations include updating a roadway design to meet modern design standards and completing appropriate spot safety improvements – such as installing median or cable barriers, guard rails, reflective markings, lighting and signage – during pavement replacement or reconstruction projects.

All transportation projects, including adding lane miles, are scheduled and made part of the department's Six-Year Highway Improvement Program.

[1] Tiered EIS - a method in which the National Environmental Policy Act process may be initiated in conjunction with transportation planning studies in a number of ways. General travel corridors, modes, or packages of projects are evaluated at a planning level of detail, leading to the refinement of purpose and need and, ideally, selection of the design concept and scope for a subsequent project or series of projects. The tiered EIS uses the NEPA process as a tool to involve environmental, regulatory, and resource agencies, and the public in these decisions, as well as to ensure the appropriate consideration of environmental factors in these planning-level decisions.



▲ *Map 9-2: Completed and candidate passing-lane corridors*

To address congestion and capacity needs, WisDOT will:

» Implement candidate passing-lane corridors where appropriate

» Identify large traffic bottleneck locations

» Implement candidate expressway upgrades and candidate expressway-to-freeway conversions

» Study, reconstruct and construct interchanges where needed

Implement candidate passing-lane corridors where appropriate

Passing-lane corridors are primarily used in rural areas as a means of improving safety and traffic movement through an area. Adding passing lanes can be a cost-effective strategy if it is done during repaving or reconstruction of a highway segment.

WisDOT identifies passing-lane corridors by considering the following:

» Forecasted design hour traffic

» Truck traffic

» *Corridors 2030* Connector designations

» Routes with a high percentage of recreational traffic

When an initial analysis determines that a highway segment might meet the criteria for the addition of a potential passing lane, a benefit-cost analysis is conducted to analyze the investment benefit versus the mobility or the increase expected in roadway capacity. Map 9-2 shows the proposed locations of candidate passing-lane corridors through 2030, although further studies must be conducted to determine whether the additions should occur.

Identify large traffic bottleneck locations

Bottlenecks typically result from roadway design limitations. This may happen when there is a reduction in the number of lanes, or at interchanges or intersection locations.

▲ *Figure 9-10: The department will continue to work with local governments and provide technical assistance on planning for land use around interchanges and identifying mitigation strategies for effects related to project impacts.*

Traffic bottlenecks can increase the cost and time associated with the movement of freight traffic, which can affect economic growth. WisDOT will identify large traffic bottlenecks and identify potential solutions for reducing them such as adding auxiliary lanes, providing alternate routes or enhancing capacity.

WisDOT will also monitor national efforts to identify potential strategies that may work in Wisconsin.

Implement candidate expressway upgrades and candidate expressway-to-freeway conversions

The safety and traffic movement performance thresholds help the department determine whether candidate

▲ *Map 9-3: Candidate expressway upgrades and candidate expressway-to-freeway conversions*

expressway upgrades or candidate expressway-to-freeway conversions should be recommended.

An expressway is a multi-lane highway with at-grade intersections and some interchanges. Freeways are multi-lane routes with access only at interchanges. WisDOT will complete the necessary studies and, where appropriate, will either upgrade existing expressways and/or convert expressways to freeways on routes where future traffic movement and safety are in jeopardy. Map 9-3 identifies candidate expressway upgrades and candidate expressway-to-freeway conversions.

Some expressways may not have capacity or traffic movement concerns, but have safety concerns due to high crash rates at at-grade intersections. WisDOT will identify these high-risk locations and determine whether upgrades to interchanges or overpasses, or access closures are needed to maintain safety.

Ideally, converting this type of expressway to a freeway is a desired goal; however, it may not be economically beneficial to upgrade entire segments where only specific locations experience safety issues. In such cases, WisDOT will upgrade expressways to strategically replace existing at-grade intersections with interchanges or overpasses, or close the intersection where necessary and as funding and time allow.

In addition, WisDOT will designate and construct to freeway standards any rural community bypasses and any new construction located on the Interstate or *Corridors 2030* Backbone system. Converting from an expressway (at-grade access) to full freeway status (access at interchanges only) may occur where freeway goals have been identified in a corridor plan and WisDOT has met all the requirements for either enumeration (through the Major Highway Development Program) or through WisDOT policy action.

However, even when the route is mapped as a future freeway (either by a community or WisDOT action), budgetary limitations and/or operational criteria may necessitate incremental road construction activities.

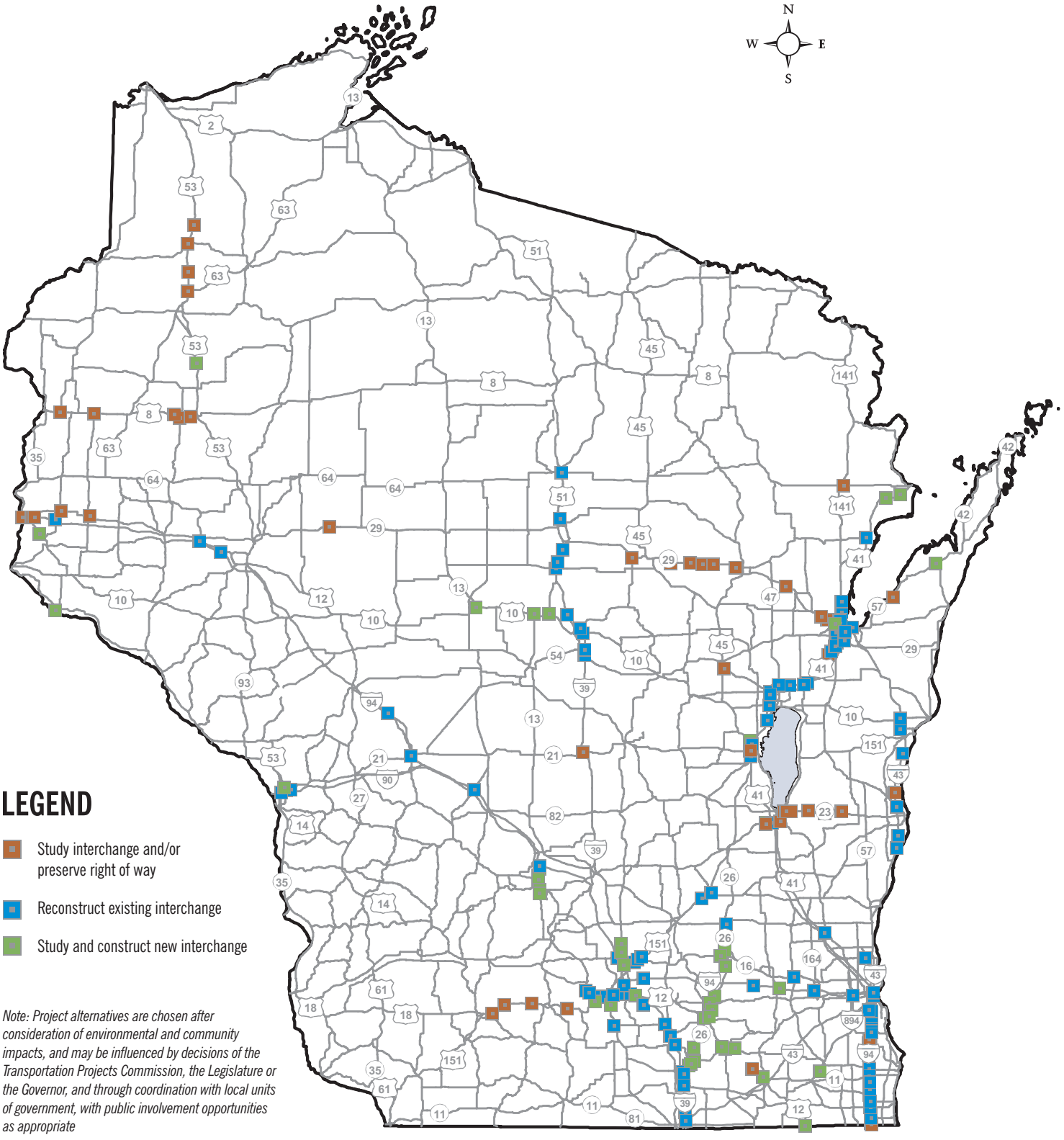
Study, reconstruct and construct interchanges where needed

Interchanges create opportunities and challenges for the state and for communities' land use and economic development. Development of an effective highway system, designed to carry large numbers of vehicles rapidly and safely over long distances, requires smooth functioning of interchanges that connect the main highway to other intersecting highways.

Major Highway Development Program

Major highway development projects are generally the most complex, costly and potentially controversial projects initiated by the Wisconsin Department of Transportation (WisDOT). They are long-term solutions to the most serious deficiencies on highly traveled segments of the highway system. By statute, a "Major highway project" denotes a project that has a total cost over $5 million, among other criteria.

WisDOT will complete the necessary studies *and, where appropriate, will either upgrade existing expressways and/or convert expressways to freeways on routes where future traffic movement and safety are in jeopardy.*



▲ *Map 9-4: Candidate statewide interchanges for study, reconstruction and/or construction*

More than 560 interchanges are located on Wisconsin's state trunk highway system. Interchanges help maintain the system's safety and efficiency, and they improve traffic flow onto and across the system. Interchanges may support commercial activity along highway corridors, which in turn supports local and regional economies.

Interchanges also present several challenges. Unplanned land use around an interchange or poorly managed development can negatively impact the effectiveness of an interchange, which may reduce traffic flow, particularly if the streets and interchange were designed under different land use plans. Interchanges are also expensive to build, and new interchanges may require large amounts of land.

The department will continue to work with local governments, provide technical assistance on planning for land use around interchanges, and identify mitigation strategies for direct and indirect effects related to interchange impacts (see Chapter 5, *Preserve Wisconsin's Quality of Life*, for more information).

Criteria for studying interchanges include analysis of the operational and capacity needs at a particular location. To aid the department in defining statewide priority needs, in 2007 WisDOT initiated the Backbone Interchange Study of the Corridors 2030 Backbone system in areas outside southeastern Wisconsin. The study evaluated and prioritized the most pressing Backbone system interchange needs and developed improvement alternatives to mitigate safety and capacity problems.

WisDOT will use the study results to focus funding and resources to key interchange needs around the state. WisDOT will use the study methodology to evaluate other interchange needs on the Backbone system and elsewhere in Wisconsin.

In addition to identifying interchange needs using the process described, additional state trunk highway interchange needs are identified by:

» Working with local governments to identify potential new interchange locations

» Evaluating new federally designated Interstate routes in Wisconsin

» Following the corridor management plan/study development process

Throughout the *Connections 2030* planning period, WisDOT will study, preserve right of way, reconstruct deteriorating interchanges and, where needed, construct new interchanges. Map 9-4 identifies interchange locations that will be studied, or where WisDOT will work to preserve the right of way within the plan horizon (approximately 50 candidate locations). Map 9-4 also identifies existing candidate interchanges to be reconstructed (approximately 100) and new candidate interchanges to be constructed (approximately 50). Project-specific studies will be used to determine if an interchange is needed and to preserve the land required for future construction, as appropriate.

WisDOT will continue to work with local governments, adjacent landowners, environmental resource agencies and planning entities when conducting interchange studies and during all construction-related activities.

Corridors 2030

Corridors 2030 is an update to the Corridors 2020 plan, which was first published in 1988 and most recently updated in 2000.

The Corridors 2030 network continues a system of Backbone and Connector routes. Backbone routes are the highest value multilane (or planned multi-lane) divided highways, interconnecting all regions and major economic centers statewide and tying them to the national transportation network. Connector routes include high quality two- and four-lane highways connecting all other significant economic and tourist centers to the Backbone system.

▶ *SUMMARY OF POLICY ACTION ITEMS:*

Optimize traffic movement on the state trunk highway system by utilizing tools to improve existing capacity and, where necessary, adding capacity

Short-term (2008 – 2013)

- Develop a statewide congestion management plan and program.

Mid-term (2014 – 2019)

- Develop a travel delay model.

Entire planning period (2008 – 2030)

- Continue to use pavement, bridge, safety and traffic movement performance thresholds, and monitor national efforts identifying new thresholds.
- Continue to study, collect and analyze traffic data over time, and incorporate findings during the design phase of subsequent projects.
- Continue to work with transportation management areas to develop and update their congestion management processes.
- Monitor national efforts to reduce traffic bottlenecks to identify potential strategies that may work in Wisconsin.
- Identify large traffic bottlenecks and potential solutions.
- Implement candidate passing lane corridors, where appropriate.
- Continue to work with local governments and others to:
  - Identify appropriate methods to improve traffic movements.
  - Identify critical links and access points between the state trunk highway system and the local road system.
  - Encourage development of cross-easements.
  - Develop plans that encourage development and enhancement of local road networks paralleling state trunk highway facilities.
  - Provide technical assistance on land use planning around interchanges.
  - Identify mitigation strategies for direct and indirect effects related to interchange project impacts.
- Complete studies and implement candidate expressway upgrades and/or candidate expressway-to-freeway conversions.
- Address transportation safety comprehensively through public education and enforcement activities and utilize emerging engineering improvements.
- Identify high-risk state trunk highway locations and determine whether design changes are needed to maintain safety.
- Use the Backbone Interchange Study methodology to evaluate interchange needs and focus funding and resources to key interchange needs across the state.
- Study, preserve right of way, reconstruct deteriorating interchanges and, where needed, construct new interchanges.
- Designate and construct to freeway standards rural bypasses and new construction on the Interstate system or on Corridors 2030 Backbone system.

▶ ***POLICY:***
Manage access on Wisconsin's state trunk highway system

Access management is the key to preserving a highway's two primary functions; mobility and access to adjacent lands. It is defined as the process of planning and maintaining appropriate access spacing, access-point design, and the total number of access points to a highway system to safely maintain its traffic carrying capacity. The overall goal for access management is to protect the safety of, capacity of, traffic flow on, and public investment in, state trunk highways as well as work with the public and local governments to provide access where it is possible with minimal conflicts.

To effectively manage access on state trunk highway system, WisDOT will:

» Manage access according to the *State Access Management Plan*

» Address daily state trunk highway system operational goals through sound access management decision-making

Background

Access points are connections between local roads and the state trunk highway system, and may include driveways, median openings, and interchange and street connections. Access management activities range from the daily decisions – such as responding to a private landowner driveway access request or as part of the design of traffic signals – to the long-range visioning process between WisDOT and local governments (see the "Preserve the local road and bridge system" policy in Chapter 7, *Foster Wisconsin's Economic Growth*).

The intent of access management is to allow adequate, safe and reasonably convenient access to the highway system, as well as to adjacent land and land uses, consistent with the interest of public safety and preservation of the public investment in the highway facility. WisDOT's *State Access Management Plan* defines highway mobility goals and coordinates access requirements for land use.

Benefits of access management

› Improved public safety by reducing crash potential

› Extended useful life of the state trunk highway system by preserving capacity

› Extended useful life of the local road system by diverting or encouraging through-traffic on state trunk highways, as well as promoting and preserving the local street system for local vehicle, bicycle and pedestrian trips

› Efficient movement of people and goods using any surface transportation mode by minimizing travel delay and congestion. This supports a safe and effective multimodal system

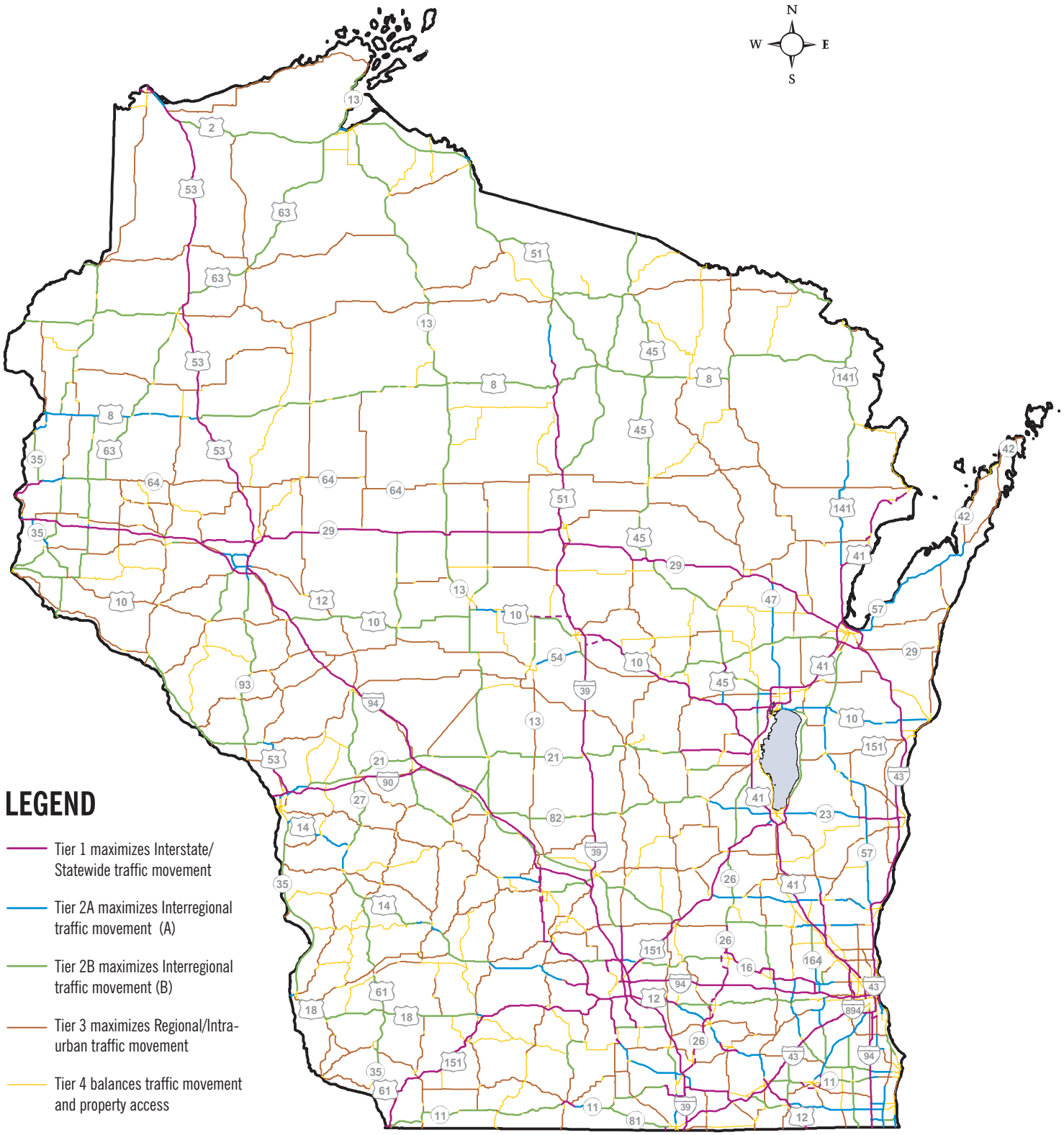
› Sustained economic development that is consistent with safety and operational goals

› Improved intergovernmental coordination and cooperation by participating in and implementing state, regional and local plans

Manage access according to the State Access Management Plan

The *State Access Management Plan* defines the vision and policy for appropriate access on Wisconsin's state trunk highway system. The plan recommends that all access decisions balance current needs with safety risks and be consistent with the long-range mobility vision described in Map 9-5.

Five state trunk highway access types are defined as part of the *State Access Management Plan* (Map 9-5), ranging from a high degree of access control or a Tier 1 (state trunk highways that maximize Interstate or



▲ *Map 9-5:* State Access Management Plan *tiers*

Table 9-5: Guidelines for new access points

Goal for access and traffic movement	Type of new access allowed
Tier 1 maximizes Interstate/Statewide traffic movement	• Interchanges • Locked/gated driveways for emergency vehicles • On an interim basis – isolated field entrances
Tier 2A maximizes Interregional traffic movement	• At-grade public road intersections, with some interchanges possible at higher volume routes • Locked/gated driveways for emergency vehicles • On an interim basis – isolated field entrances
Tier 2B maximizes Interregional traffic movement	• At-grade public road intersections • Lower volume residential, commercial, and field
Tier 3 maximizes Regional/Intra-urban traffic movement	• At-grade public road intersections • Higher volume residential, commercial, and field
Tier 4 balances traffic movement and property access	• All types, provided they meet safety standards

Table 9-6: Guidelines for existing access points

Decisions regarding access management are challenging. Efforts to maintain roadway safety and minimize traffic crashes and achieve a desired level of access for adjacent landowners can be difficult to manage. Sometimes adjacent landowners do not recognize safety and traffic flow concerns. WisDOT will seek to curtail traffic crashes, maximize highway safety and manage access according to the *State Access Management Plan* vision.

When an existing access point does not meet the desired level of access control, it is often because no reasonable alternative access exists (a side road, for example) or no opportunity to obtain an alternative access exists. In response, decisions and actions will consider the following:

- Alter all existing access points to meet departmental and operational safety standards as opportunities arise
- Develop a long-term plan to remove existing hazardous access points when opportunities arise
- Restrict access with a covenant, a formal sealed contract or agreement. When a property is restricted-access via covenant, its owners will not be granted further access beyond the agreement indicated

WisDOT will work with the general public and local governments to achieve a safe and efficient state trunk highway system in the public interest.

statewide mobility goals, such as I-94) to state trunk highways with a balance between mobility and access on Tier 4 routes (for example, WIS 127, WIS 175, WIS 86). Guidelines for both new and existing access types are outlined on Tables 9-5 and 9-6.

WisDOT will follow the guidelines for new and existing access points (see Tables 9-5 and 9-6) as closely as possible out to the year 2030 to achieve the *State Access Management Plan* vision. Along with the *State Access Management Plan*, corridor plans and local comprehensive plans, several state statutes and administrative codes help WisDOT and local governments achieve access management goals in a given corridor.

For example, designating a highway as an Interstate means that specific requirements for access are met. Ultimately, WisDOT will implement the *State Access Management Plan* as an integral component of the corridor management approach and continue to monitor and evaluate implementation on an ongoing basis.

Further, access management should be properly coordinated with local comprehensive plans and land development decisions. During this joint planning process, local governments can disclose their ideas for the type of land uses that might influence the state trunk highway carrying capacity in the future. In light of the guiding principles that the *State Access*

CONTINUED DILLIGENCE IN WORKING *with the public, local units of government, the private sector and other state and federal agencies helps to ensure proper management of access as an ongoing successful activity.*

Management Plan promotes, every access decision may be different but will be sound in its respect for the common good in Wisconsin and be focused on statewide access goals.

Address daily state trunk highway operational goals through sound access management decision-making

State trunk highway operations staff are concerned with the daily decisions that affect how traffic movement flows. They respond to everyday events and perform a handful of critical actions impacting access and operational goals for state highways. WisDOT will use access management measures such as standard traffic control devices and highway connection permits to control the degree of state trunk highway access according to the *State Access Management Plan*.

Standard traffic control devices include signals, roundabouts and intelligent transportation systems options. Traffic signal timing can affect traffic and ultimately traffic flow by improving efficiencies and system performance. In terms of access management, WisDOT will continue to manage traffic control devices on state-owned facilities, in cooperation with local governments.

Driveway and utility permits are another way WisDOT controls state trunk highway access. WisDOT must issue a permit to a property owner to allow encroachment onto WisDOT right of way either for an access point, such as a driveway, or for features such as buried utilities, which often run along highways in the right of way.

Throughout the plan period, WisDOT will work to ensure that driveways and utilities within WisDOT right of way all have legal permits.

Another way to manage access is through new construction. See the policy in this chapter called "Optimize traffic movement on the state trunk highway system by utilizing tools to improve existing capacity and, where necessary adding capacity" for more information. WisDOT will designate and construct to freeway standards rural community bypasses and new construction on the Interstate system and on the Corridors 2030 Backbone system.

Further, when roadway capacity changes, access to local roads and streets can also change. By providing local road or private interconnections between adjacent parcels or neighborhoods, access can be shared to create one access location instead of many. WisDOT supports accommodations and linkages to create a connected network that provides accessibility along and across highways.

WisDOT will study, preserve right of way, reconstruct and where needed, construct new interchanges as outlined in the policy in this chapter, "Optimize traffic movement on the state trunk highway system by utilizing tools to improve existing capacity and, where necessary adding capacity."

Continued diligence in working with the public, local units of government, the private sector and other state and federal agencies helps to ensure proper management of access as an ongoing successful activity. WisDOT will continue to work with local governments and others to:

» Provide technical assistance on land use planning around interchanges

» Identify methods to improve traffic movement

» Identify critical links and access points between the state trunk highway system and the local road system

» Encourage development of cross-easements

» Develop plans that encourage development and enhancement of local road networks paralleling state trunk highway facilities

» Identify mitigation strategies for direct and indirect effects related to interchange project impacts

See the policy in this chapter called, "Maximize traffic movement on the state trunk highway system by utilizing tools to improve existing capacity and, where necessary adding capacity" and the policy called, "Preserve the local road and bridge system" in Chapter 7, *Foster Wisconsin's Economic Growth*, for more information.

▶ *SUMMARY OF POLICY ACTION ITEMS:*
Manage access on Wisconsin's state trunk highway system

Entire planning period (2008 – 2030)

- Seek to curtail traffic crashes, maximize highway safety and manage access for new and existing access points according to the State Access Management Plan as closely as possible (see Tables 9-5 and 9-6).
- Continue to work with local governments and others to:
  - Identify appropriate methods to improve traffic movements.
  - Identify critical links and access points between the state trunk highway system and the local road system.
  - Encourage development of cross-easements.
  - Draft plans that encourage development and enhancement of local road networks paralleling state trunk highway facilities.
  - Provide technical assistance on land use planning around interchanges.
  - Identify mitigation strategies for direct and indirect effects related to interchange project impacts.
- Implement the State Access Management Plan as an integral component of the corridor management approach and continue to monitor and evaluate access management implementation on an ongoing basis.
- Throughout the plan period, WisDOT will work to ensure that driveways and utilities within WisDOT rights of way all have legal permits.
- Use access control measures such as standard traffic control devices and highway connection permits to control the degree of state trunk highway access according to the State Access Management Plan.
- Designate and construct to freeway standards rural bypasses and new construction on the Interstate system or on Corridors 2030 Backbone system.
- Study, preserve right of way, reconstruct deteriorating interchanges and, where needed, construct new interchanges.