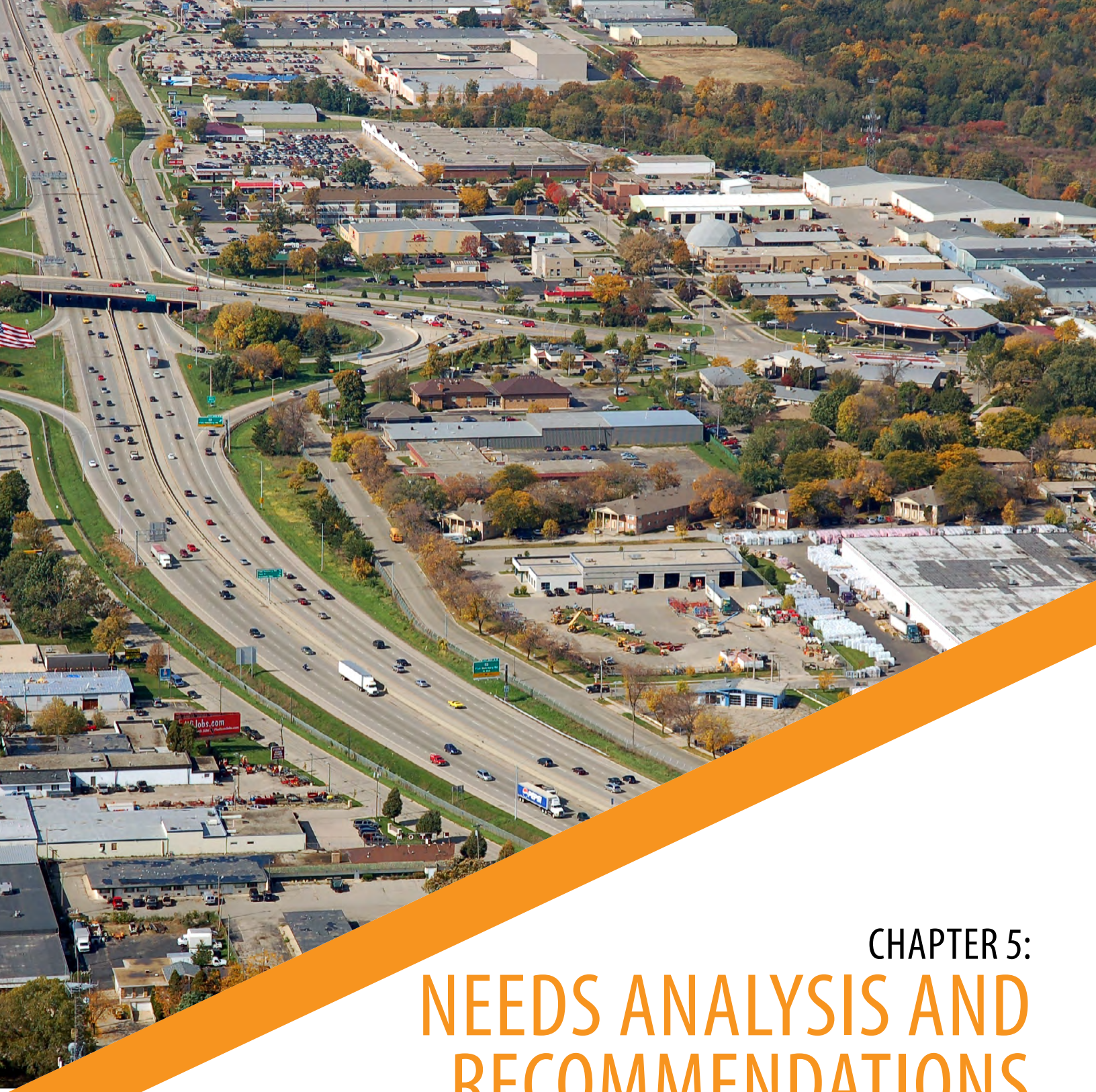


CHAPTER 5: NEEDS ANALYSIS AND RECOMMENDATIONS

- Introduction
- Land Use and Transportation Integration
- Streets and Roadways
- Public Transit
- Bicycles
- Pedestrians
- Specialized Transit
- Transportation Demand Management
- TSM, Operations, and ITS
- Freight, Air, and Rail
- Parking

INTRODUCTION

MATPB undertook an exhaustive analysis of the existing transportation network, prior and ongoing planning efforts, and input received from stakeholders and the public. MPO staff then synthesized the transportation system needs and developed a series of recommendations with supporting actions for each mode of transportation, TDM and TSM strategies to optimize use and capacity of existing facilities, and general recommendations for land use and transportation integration.

Implementing agencies, including WisDOT and local governments, are encouraged to use the following recommendations when undertaking planning efforts and implementing transportation projects to ensure regional continuity and consistency of the transportation system and support regional transportation goals and policies. The discussion of needs and the recommendations is organized by topic area and mode with the recommendations and supporting actions/strategies or implementation steps highlighted in the tables.

Needs and Recommendations are organized as follows:

- Land Use and Transportation Integration
- Streets and Roadways
- Public Transit
- Bicycles
- Pedestrians
- Inter-Regional Travel
- Specialized Transit
- Travel Demand Management (TDM)
- Transportation System Management (TSM), Operations and Intelligent Transportation Systems (ITS)
- Freight, Air, and Rail
- Parking

Appendix A contains a complete table of the recommendations and supporting actions.

LAND USE AND TRANSPORTATION INTEGRATION

Land use and transportation are inextricably related. The ultimate role of transportation is to connect people with opportunities, services, goods, and other resources. In order for transportation policies and investments to be successful in achieving this, they must be coupled with supportive land use policies. Spread out land use patterns and single use developments increase automobile dependency for accessing economic opportunities and needs, thereby placing other travel modes at a disadvantage. Pedestrian-friendly neighborhoods, with a variety of land uses in close proximity, improve access to destinations and promote affordability by making alternative travel modes more convenient.

Coordinate land use and transportation. Coordinating land use and transportation requires that local communities evaluate how land use decisions affect the transportation system and travel options for people to access jobs, services, and other destinations. It requires that transportation agencies and providers consider the effects of transportation investments on land use development demand, travel choices, and regional land use patterns. This also means that transportation agencies and local communities must communicate to craft coordinated strategies, plans, and programs.

The following recommendations can help ensure the compatibility and integration of local land use plans with the regional transportation plan.

Recommendations and Supporting Actions		Timeframe	Implementing Party
1	Adopt local land use plans and policies that support RTP goals and policies.		
A	Update land use ordinances, street design, and parking standards to remove barriers to mixed-use, pedestrian-friendly development, where appropriate.	Ongoing	Local governments
B	Prepare detailed neighborhood development plans in areas slated for growth prior to development in order to ensure good street connectivity, adequate bicycle accommodations, and efficient transit routes (where appropriate).	Ongoing	Local governments
C	Require or provide incentives for including pedestrian, bicycle, and transit facilities (where appropriate) in (re)developments.	Ongoing	Local governments
D	Plan, zone for, and encourage transit-supportive development in planned transit corridors.	Ongoing	Local governments
2	Develop urban areas with a mix of housing types and land uses to provide walkable, affordable neighborhoods.		
A	Plan for mixed-use centers of varying scales and types to provide housing in proximity to a mix of uses.	Ongoing	Local governments
B	Develop new employment centers and government/institutional developments in mixed-use settings, where compatible, to provide for housing near jobs and schools.	Ongoing	Local governments
C	Support the revitalization of downtown areas and walkable neighborhoods with infrastructure investments and incentives.	Ongoing	Local governments
D	Promote new development in multi-modal mobility corridors to maximize the efficiency of transportation system and the accessibility of jobs and services.	Ongoing	Local governments

STREETS AND ROADWAYS

Streets and roadways provide mobility for the vast majority of the residents in the region, regardless of whether they drive, take transit, or ride a bicycle. Streets can also be considered the "living rooms" of neighborhoods throughout the community, providing an outdoor space to congregate, recreate, and socialize. It is important to preserve this infrastructure and make targeted enhancements, when appropriate. The following highlights the major needs and recommendations to ensure the efficiency, safety, and cost effectiveness of the roadway network.

Preserve existing regional roadway infrastructure. Preserving the regional roadway system—including pavement, bridges, and associated infrastructure such as signals, lighting, and storm water facilities—is critical for safe and efficient travel. Well-maintained roads also help to reduce vehicle operating costs, retain and attract businesses, and improve quality of life for the region's residents.

Roadways and bridges can last a long time before they need to be reconstructed or replaced (typically 50+ years for roads and 50-75 years for bridges). However, routine small-scale maintenance and periodic rehabilitation are necessary to combat the steady deterioration that results from roadway use and weathering, and avoid the need for premature pavement reconstruction.

Figure A-1 in Appendix A lists programmed, planned, and other potential cost-high preservation projects that may be needed during the planning period. This includes both peripheral area arterial roadways that will need to be reconstructed to urban standards to accommodate planned development and arterial streets within developed areas that will require reconstruction due to their age and condition.

Recommendations and Supporting Actions		Timeframe	Implementing Party
1	Preserve and maintain the region's street and highway system in a manner that minimizes life cycle cost, maintains safety, and minimizes driver costs while reducing their impact on the environment.		
A	Monitor regional roadway system pavement and bridge condition and coordinate with WisDOT to establish performance targets.	1-5 years	MPO, WisDOT
B	Develop and implement asset management plans to facilitate cost-effective decision-making concerning the maintenance and rehabilitation of roadways, bridges, and associated infrastructure.	Ongoing	WisDOT, Dane County, local governments
C	Provide for ongoing maintenance activities in major state and local arterial corridors planned for future potential expansion until capacity is needed and major project funding can be secured.	Ongoing	WisDOT, Dane County, local governments
D	Continue enforcement of truck weight regulations to reduce premature deterioration of roadways and bridges.	Ongoing	WisDOT
E	Support additional research and demonstration projects, including use of emerging technologies, to provide safe roadways in the winter while minimizing the use of road salt.	1-5 years	WisDOT, Dane County, local governments

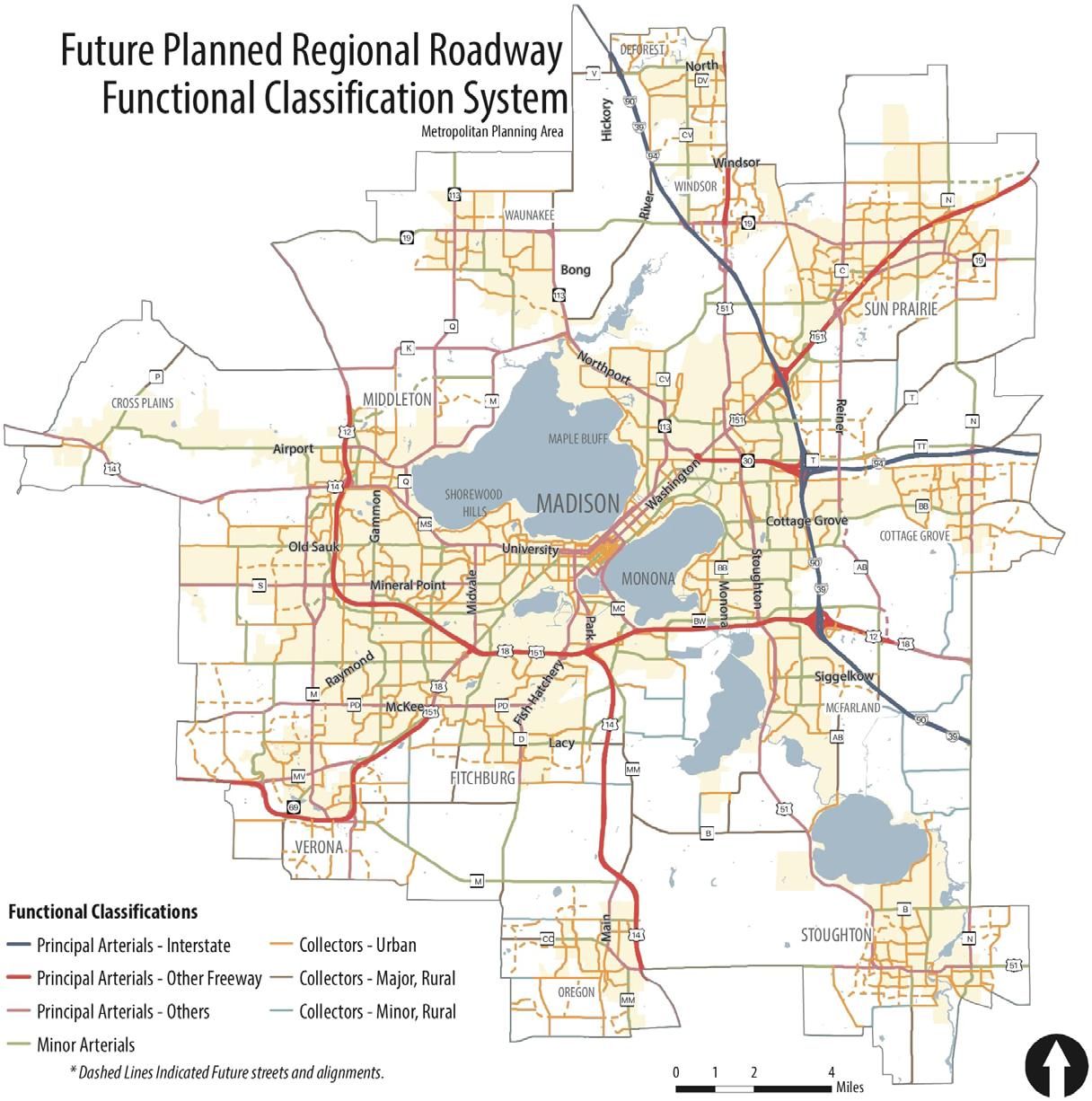


Figure 5-1: Future Planned Roadway Functional Classification System.

Construct new roadways to efficiently accommodate future growth. Planning for and building a well-connected roadway network to serve developing areas is crucial for efficiently distributing traffic on the regional system. As connectivity of the system increases, travel distances decrease and route options increase, creating a more efficient and resilient system. Dispersing traffic over a larger number of routes benefits traffic circulation and better supports alternative travel modes by providing more route options and limiting the need for overly wide arterials and intersections that serve as barriers to pedestrians. Other benefits of a well-connected network include improved emergency response and increased efficiency and safety of services such as garbage collection and street sweeping.

The traditional roadway functional classification system described on pages 3-3 to 3-5 provides a good starting point for planning and managing our roadway system to provide mobility for moving passenger and freight traffic while also providing property access, parking, and safe, convenient, and comfortable travel for non-motorists. Traffic speeds, access, and level of street connectivity should vary depending on the function of the street. The design of streets and the level of traffic congestion

tolerated must also consider the land use context, community development goals, and all modes of travel.

Figure 5-1 illustrates the planned future roadway functional classification system, including important planned collector streets and existing collectors that are likely to transition into minor arterials in the future to serve new development. Examples include the Pioneer/Meadow/Woods/Nine Mound Road corridor on Madison's west side, the planned Belle Fontaine Boulevard in Middleton, Portage Road on the north side, and Egre Road (including planning extension to US 151) in Sun Prairie. The Grand Avenue/Reiner Road/Sprecher Road/CTH AB corridor on the east side is anticipated to function as a principal arterial in the future.

Recommendations and Supporting Actions		Timeframe	Implementing Party
2	Build a well-connected network of regional roadways to accommodate future growth and avoid the need for overly wide streets and intersections that create barriers for pedestrians and bicyclists.		
A	Conduct detailed planning for new collector streets and utilize official mapping, right-of-way dedications, and other methods to preserve existing and planned regional roadway corridors for potential expansion.	Ongoing	Local governments
3	Incorporate complete streets and green streets concepts for regional and local roadways.		
A	Utilize evaluation criteria and scoring guidelines for selecting MPO funded projects that encourage the inclusion of complete and green streets elements.	Ongoing	MPO
B	Adopt and implement a formal complete streets policy.	1-5 years	WisDOT, Dane County, Local governments

<u>Expand the regional roadway system strategically to address critical bottlenecks and accommodate future growth.</u>
Household and employment growth and development and travel trends, such as increased suburb-to-suburb travel, have led to increasing traffic volumes and congestion levels on the regional roadway system. If conditions continue to get worse, delays caused by congestion will negatively affect the region's economic competitiveness and quality of life.

Traffic volumes have increased the most on the Beltline, the Interstate, and other circumferential arterials such as CTH K, WIS 19, and Stoughton Road (US 51). Volumes have also spiked on radial arterials leading to the Beltline and Interstate system, including Verona Road (US 18/151), Fish Hatchery Road, and US 151. The Beltline exhibits by far the highest congestion levels. Other arterial roadway corridors with high congestion levels include: University Avenue, Johnson/Gorham Streets, East Washington Avenue, Fish Hatchery Road, Verona Road, and CTH M. Projects are underway to provide needed capacity in the Verona Road and CTH M corridors, while studies are underway to develop long-term solutions in the Beltline and Stoughton Road corridors.

In addition to addressing existing traffic congestion, future projected traffic from planned growth must also be accommodated. A regional travel demand model is used to forecast future travel based on forecast growth and assumed changes to the roadway and transit system. An iterative process was used whereby the planned future transportation system - including Bus Rapid Transit, planned new two-lane collector streets, and street extensions - was modeled first to determine its ability to accommodate expected traffic prior to consideration of new capacity expansion projects on the periphery.

Major local arterial expansion projects identified as needed to serve developing or planned new development areas include: Pleasant View Road; CTH PD west of CTH M; Reiner/Sprecher/CTH AB corridor; CTH T (N. Thompson Drive to Reiner Rd.), and the extension of Lien Road. It is recommended that new arterial streets with more than two travel lanes generally include medians, where possible, with appropriate openings for turning movements and turn lanes. Access management strategies, such as restricting driveway access, should also be used for arterial streets. These and other design strategies provide for more efficient travel and improve safety.

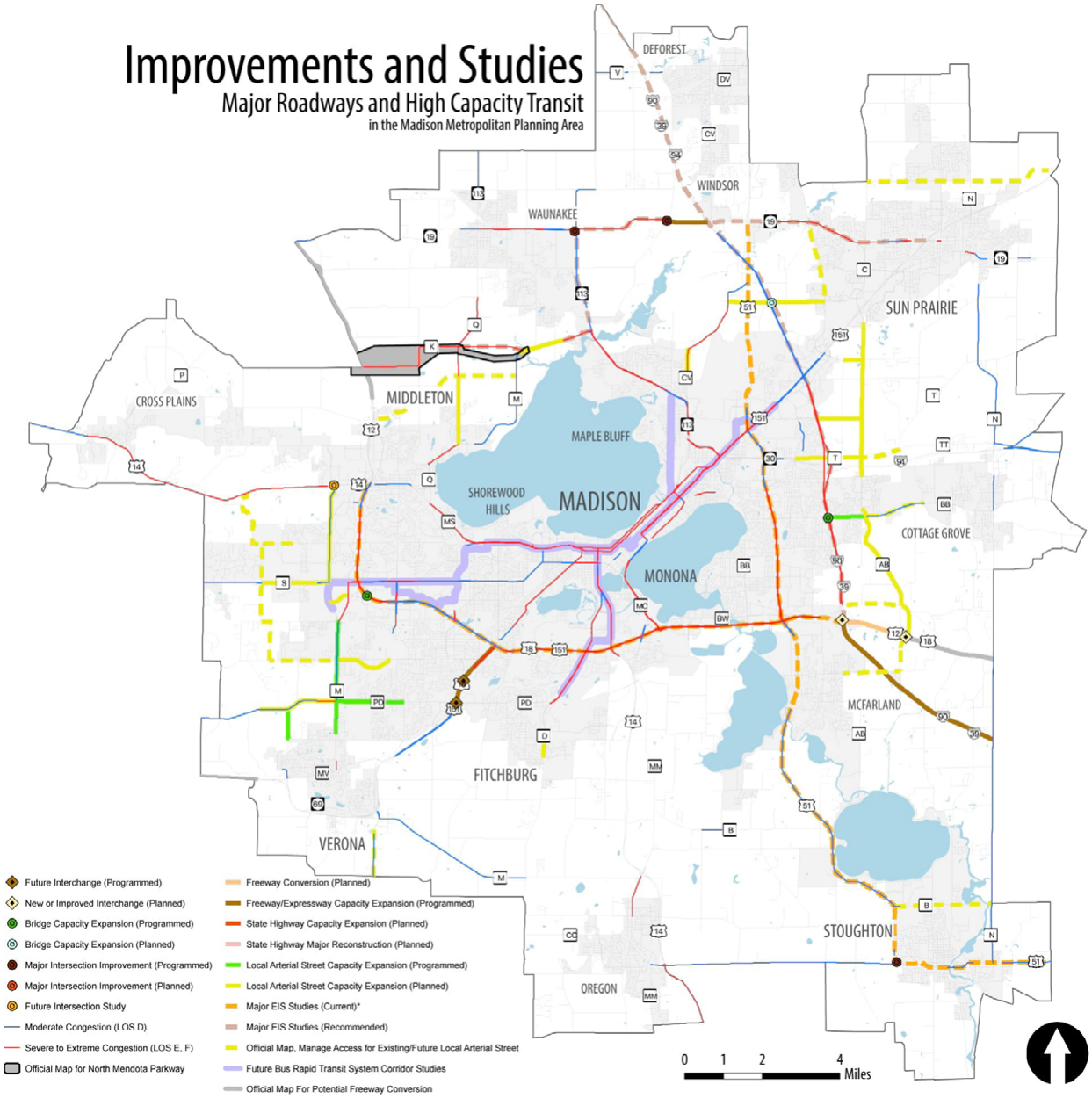


Figure 5-2: Major Roadway and High Capacity Transit Improvements and Studies.

Other than the programmed Verona Road (US 18/151) and Interstate 39/90 projects, the only other state highway capacity expansion projects included in the plan at this time are: Beltline/Interstate interchange, which is technically part of the Interstate expansion project; and US 12/18 freeway conversion with new CTH AB interchange, which is Phase 3 of the Beltline/Interstate interchange project. Additional state highway capacity expansion project recommendations are expected to come out of the ongoing major corridor studies of Stoughton Road (US 51) and the Beltline (US 12/14/18/151). A future study is recommended for both the WIS 19/WIS 113/CTH M (North Mendota Parkway) and I-39/90/94 Interstate corridors. Because the scope of improvements in these corridors is unknown and funding has not been identified, the corridors are listed as studies. Once the studies are completed, the scope of improvements identified, regional agreement reached on them, and funding determined to be available in the future, the projects will be amended into the plan.

Figure 5-2 illustrates and Figure A-1 in Appendix A lists recommended major capacity expansion, intersection, interchange,

and bridge widening projects as well as major state highway corridor studies. Section 1 of Figure A-1 in Appendix A lists programmed projects for 2017-2020 and Section 2 lists additional planned projects grouped into two 15-year time periods (2021-2035, 2036-2050). The actual timing of the planned projects will depend on future development and traffic growth, impacts of congestion management strategies, system preservation needs, available funding, and other factors. Figure 5-2 highlights remaining areas of high peak period traffic congestion on the arterial roadway system that will need to be addressed with congestion management strategies as part of the regional Congestion Management Process.

Section 5 of the Figure A-1 in Appendix A includes a short list of "illustrative" major capacity expansion projects that are not part of the fiscally constrained, federally recognized plan. These include the two ongoing major state highway corridor studies of the Beltline and Stoughton Road, the environmental assessment study of the US 51 corridor study, which includes a segment west of Stoughton proposed for expansion, and the western segment of the North Mendota Parkway project on new alignment between CTH M and US 12 along with CTH CV and Q. Inclusion of these projects in the federally recognized plan is dependent upon completion of the environmental studies and demonstration that funding is likely to be available for them.

Recommendations and Supporting Actions		Timeframe	Implementing Party
4	Expand regional roadway system capacity to address critical bottlenecks and accommodate future planned growth consistent with RTP goals and policies.		
A	Continue or initiate detailed planning, design, and construction of state and local arterial capacity roadway, bridge, and interchange projects shown in Figure 5-2 and listed in Figure A-1 as needed with consideration given to project phasing where appropriate.	Ongoing	WisDOT, Dane County, Local governments
B	Complete study of the Beltline/Interstate interchange. Upon completion of accepted EIS, advance recommended alternative, with consideration given to phasing, compatibility of the design with potential Beltline/Stoughton Road interchange improvements, and planned US 12/18 freeway conversion east to CTH AB.	1-10 years	WisDOT
C	Complete major corridor studies of the Beltline and Stoughton Road/US 51. Upon completion of accepted EISs, seek enumeration as Majors projects and advance recommended alternatives using a phased approach. Continue to implement short-term TSM, safety, and multi-modal improvements in the corridors in the interim until Majors program funding is secured.	1-10 years	WisDOT
D	Complete environmental assessment and refine the design for the preferred alternative for the US 51 (McFarland to Stoughton) corridor, which includes reconstruction of most of the roadway, intersection improvements, and expansion to 4 lanes between WIS 138 and CTH B. Upon completion, seek enumeration as Majors project or alternative funding and advance project using a phased approach. Implement safety and TSM improvements and maintenance work in corridor in the interim if Majors program or other funding is not secured.	1-10 years	WisDOT
E	Initiate major study of the WIS 19/WIS 113/CTH M corridor to identify the long term solution to existing and future congestion and safety issues in the east-west corridor north of Lake Mendota. Officially map the corridor and initiate detailed planning of the recommended alternative, including appropriate phasing and funding strategies. Continue in the meantime to implement TSM, safety, and multi-modal improvements.	1-10 years	WisDOT, Dane County, MPO
F	Identify the appropriate limits and initiate study of the I-39/90/94 corridor north of the Beltline to address safety, operations, and congestion issues and in the meantime implement TSM and safety improvements.	1-10 years	WisDOT, MPO

Continue to pursue safety improvements. Traffic safety affects the metro area on many levels. Crashes cause personal tragedy, lost productivity, rising insurance costs, increased costs for police, emergency medical, and other social services, and also disrupt the movement of people and goods in the region. Safety concerns can also prevent people from choosing to walk or bicycle.

User behavior is a contributing factor in nearly every crash. For example, alcohol and drugs were a contributing factor in 57% of the county's fatal crashes between January 2010 and December 2015. Excessive speed, aggressive driving, and driver inattention are other common contributors to serious crashes. Other factors contributing to crashes are roadway and environmental conditions and in some cases vehicle failure. The types and designs of roadways can help minimize the potential for crashes and the likelihood of serious injury in the event of a crash.

Motor vehicles today are the safest they have ever been, with many features to protect the occupants in the event of a crash. The advent of connected vehicle technology is now shifting the focus of efforts to crash avoidance. Connected vehicle applications allow vehicles to "talk" to each other (V2V) and to roadway infrastructure (V2I) such as traffic lights, stop signs, and work zones. Using this information, vehicles can identify risks and provide warnings to drivers to avoid imminent crashes or even automatically take over driving functions such as braking. The National Highway Traffic Safety Administration (NHTSA) estimates that safety applications enabled by V2V and V2I technology could eliminate or mitigate the severity of up to 80 percent of non-impaired crashes at intersections and while changing lanes.

Source: Madison Fire Department

	Recommendations and Supporting Actions	Timeframe	Implementing Party
5	Address safety needs on the regional roadway system through a comprehensive "3-E" approach that includes implementation of cost-effective engineering counter measures (i.e., roadway reconfiguration, new or modified traffic control devices, etc.), education, and enforcement.		
A	Implement WisDOT's 2014-2016 Wisconsin Strategic Highway Safety Plan (SHSP) and future updates to the plan.	Ongoing	WisDOT, Dane County, local governments, state agencies, law enforcement agencies, private organizations
B	Undertake planning process to identify regional roadway corridors and intersections with the highest crash rates and conduct further detailed study of these locations to identify countermeasures and prioritize projects for federal and state Highway Safety Improvement program funding.	1-5 years	MPO, Dane County, local governments
C	Continue efforts to implement short-term safety-related and TSM improvement recommendations from preservation/safety studies in state highway corridors, including US 14 (West), WIS 19, and WIS 138.	Ongoing	WisDOT
D	Develop and implement access management plans and standards for existing and future arterial roadways as development and street reconstruction occur.	Ongoing	WisDOT, Dane County, Local governments
E	Continue to implement cost-effective changes to traffic signals and signs that have been found to reduce crashes (e.g., use of light emitting diode (LED) lighting, overhead street signs on arterials, etc.).	Ongoing	WisDOT, Local public works/traffic engineering agencies
F	Officially map the US 12 (Parmenter St. to WIS 19 West), US 12/18 (Interstate to CTH N), and US 18/151 corridors for potential future freeway conversion based on recommended study alternatives. Continue to implement interim access management improvements, with future conversion dependent upon ongoing needs assessment and available funding.	Ongoing	WisDOT
G	Continue to expand state and local safety education efforts, including neighborhood-based initiatives.	Ongoing	WisDOT, local governments, non-profit organizations
H	Continue to support and expand local traffic enforcement activities such as use of local traffic teams and undertaking special enforcement initiatives.	Ongoing	Dane County and local law enforcement agencies
6	Address security needs related to the regional roadway system.		
A	Update the vulnerability assessment of critical transportation infrastructure in the state as part of development of the State Highway Investment Plan. Monitor identified facilities and make improvements as needed.	Ongoing	WisDOT
B	Complete current update and update as necessary Dane County Hazard Mitigation Plan to reduce risk of disruptions to the regional roadway system due to severe weather conditions, flooding, terrorism, hazardous material spills, civil disorder, climate change, and other events.	1-5 years	Dane County, Local governments
C	Initiate study to identify transportation facilities that are susceptible to flooding, identify alternate routes when flooding occurs, and identify improvements to make the facilities more resilient to flooding.	1-5 years	MPO, Dane County, Local governments
D	Update the county's Emergency Evacuation Plan, as necessary.	1-5 years	Dane County

Simplify navigation of the regional roadway system. There are numerous instances on the regional roadway system where the name of a roadway changes due to crossing jurisdictional boundaries or due to another historic anomaly. Instances such as the one illustrated below should be rectified to ensure that wayfinding is simple for residents, tourists, and freight carriers alike.

This roadway's name changes from Portage Road to Rattman Road to American Parkway and finally to Nelson Road within a 4 mile stretch. Source: Google Maps.

Recommendations and Supporting Actions		Timeframe	Implementing Party
7	Address roadway naming inconsistency along corridors.		
A	Initiate a study of regional roadway naming conventions to simplify wayfinding in the region.	1-5 years	MPO

PUBLIC TRANSIT

The short- and medium-term needs of the Madison area transit system are identified and well documented in the current *Transit Development Plan for the Madison Urban Area* and *Madison Transit Corridor Study – Investigating Bus Rapid Transit in the Madison Area*. The transit element of the Regional Transportation Plan builds upon these planning efforts to identify a long-term vision for the regional transit system.

Figure 5-5 on page 5-13 illustrates this future planned transit network. With implementation of the planned transit network, the number of average weekday boardings on the system is projected to more than double from around 41,000 to 91,000 by 2050 with assumed growth, while the number of trips (excluding transfers) is projected to grow 80% to 74,000. This excludes supplemental school

service ridership. The larger increase in boardings compared to trips is due to the increased transfer rate with the BRT system and additional peripheral routes. BRT system ridership is projected at 26,300, 29% of the system total.

Implementation of the planned transit system would greatly increase job accessibility by transit. Figure 5-3 and 5-4 illustrate the percent of existing jobs that can be reached within 45 minutes (including walking and waiting time) using the existing and planned transit system.

While Figure 5-5 is the transit system vision, a significant new infusion of funding—most likely through creation of a regional transit authority providing a dedicated funding source—will be needed to achieve it. For more information, see Financial Analysis in Chapter 6. The following describes the identified transit facility and service needs and recommendations with supporting actions to address them.

Implement a Bus Rapid Transit System and restructure routes accordingly.
MATPB and Metro Transit led the *Madison Transit Corridor Study* in 2013 using funding secured by the Capital Area Regional Planning Commission through a Sustainable Communities grant. The study identified four corridors that are suitable for BRT. BRT elements identified in the plan include frequent, direct, limited-stop service, branded buses, stations with level boarding, and off-board fare collection, and transit priority measures like bus lanes and transit signal priority. These corridor improvements will increase capacity and reduce travel times for transit riders throughout the Madison area, allowing Metro to reverse the recent downward

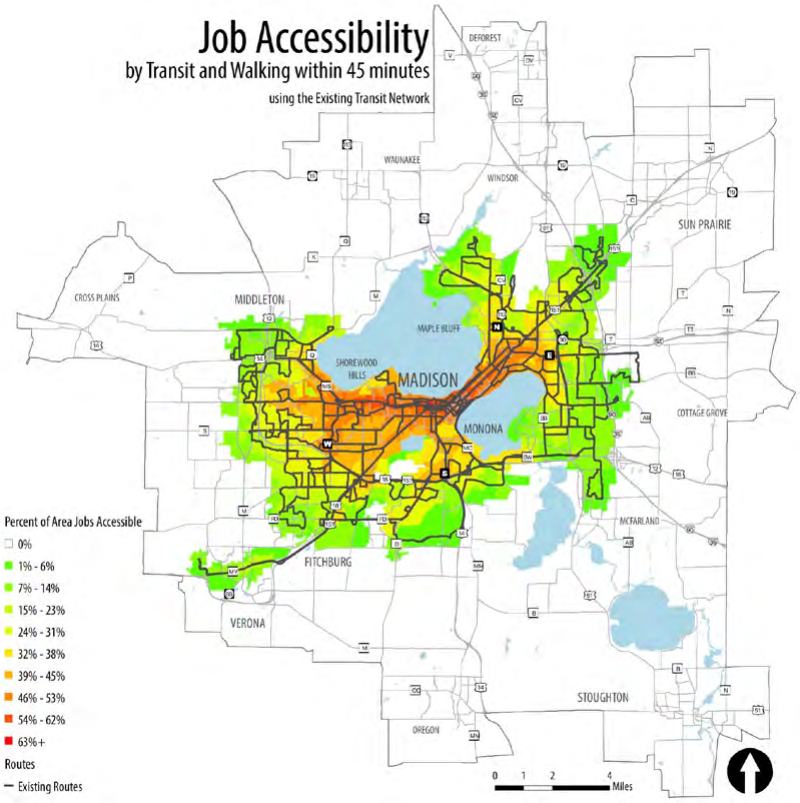


Figure 5-3: Job accessibility within 45 minutes by using existing transit system and walking.

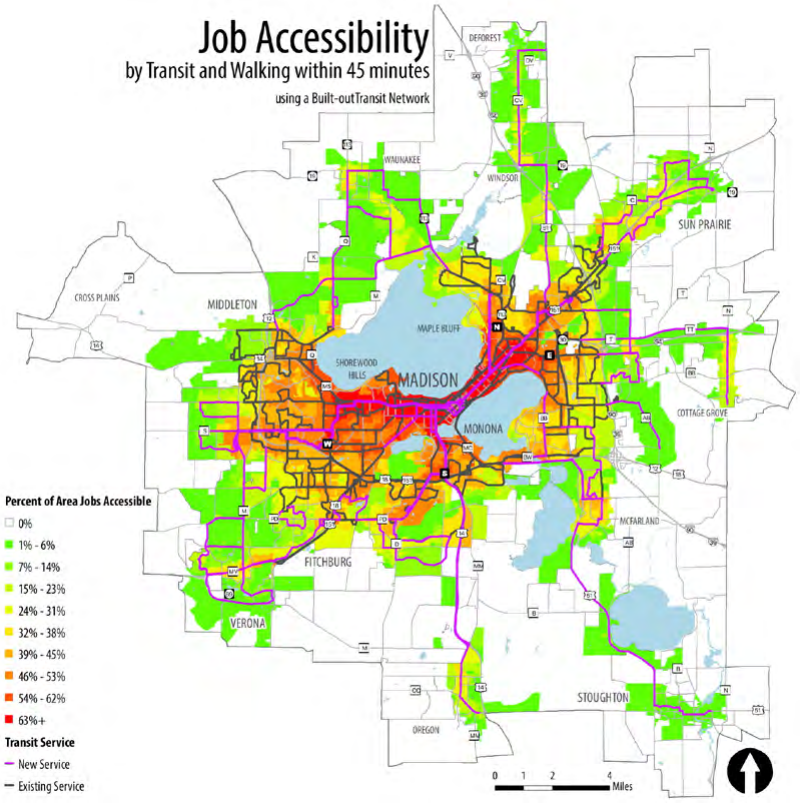


Figure 5-4: Job accessibility within 45 minutes by using planned transit system and walking.

trend in bus ridership over the past two years. Capital costs could be funded in large part through a federal Small Starts grant.

Policy-makers and planners in the Madison area have recognized the need for a large-scale investment in public transportation like light rail, commuter rail, and bus rapid transit for several decades. Planning documents in the 1980s showed a combination of light rail and bus rapid transit. In the 1990s and 2000s the focus shifted to commuter rail using underused and abandoned rail corridors. The Transport 2020

Example BRT configuration. Source: CDOT

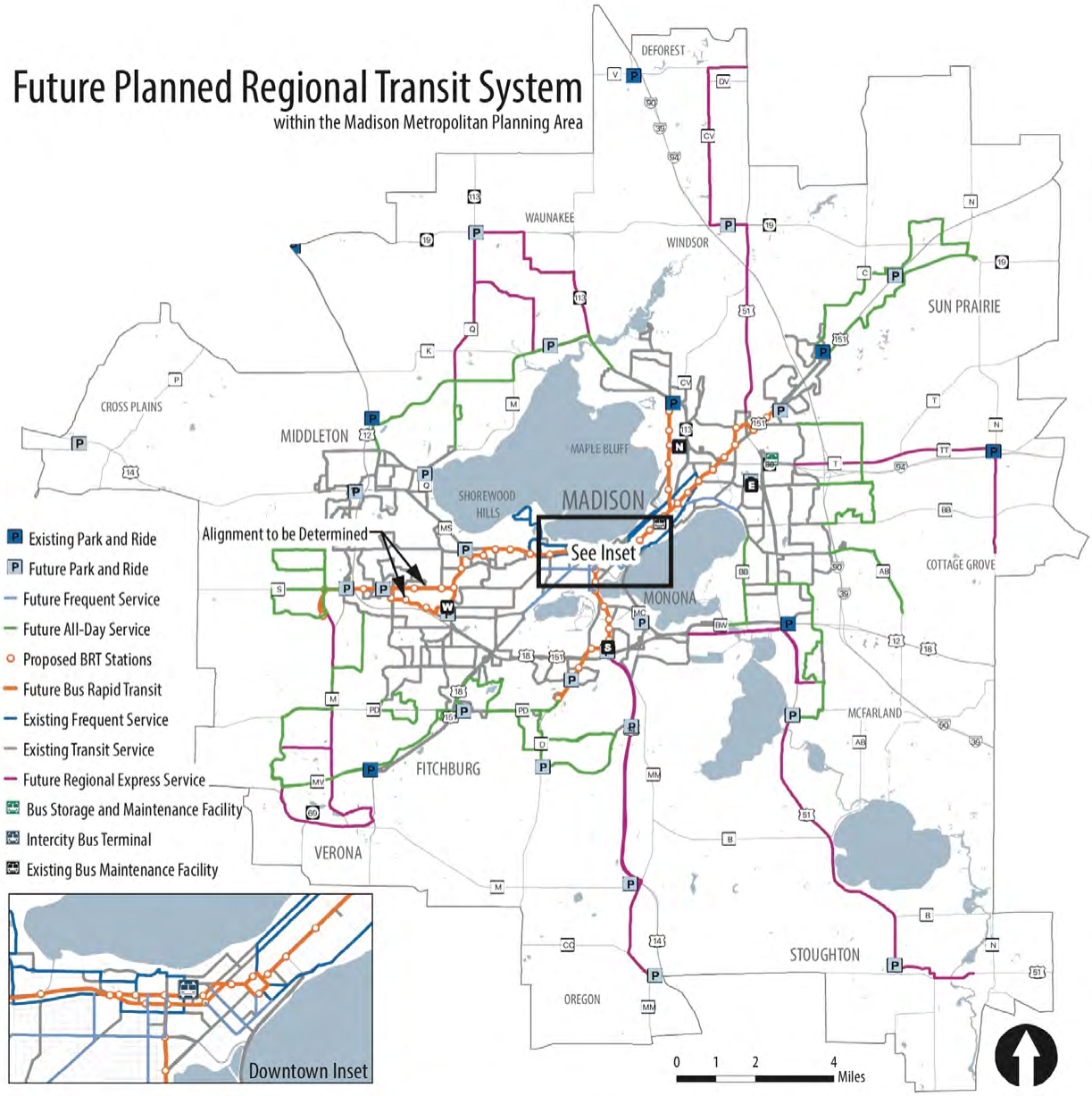


Figure 5-5: Future Planned Regional Transit System

study culminated in a locally preferred alternative in 2008 including a hybrid light rail / commuter rail line in the east-west corridor between Middleton and northeast Madison. The project was put on hold due to lack of funding.

BRT is essentially rail-like bus service, with many of the advantages of rail at a small fraction of the cost. The introduction of a BRT system will necessitate a restructuring of the bus routes on a scale similar to the 1998 restructuring when the transfer point system was adopted. Local routes will be adjusted to reduce duplication with BRT and provide better connections to the new high quality service. Besides better integration with BRT, restructuring routes will address other local transit needs, such as making the system easier to understand by replacing many overlapping low-frequency routes with fewer high-frequency routes.

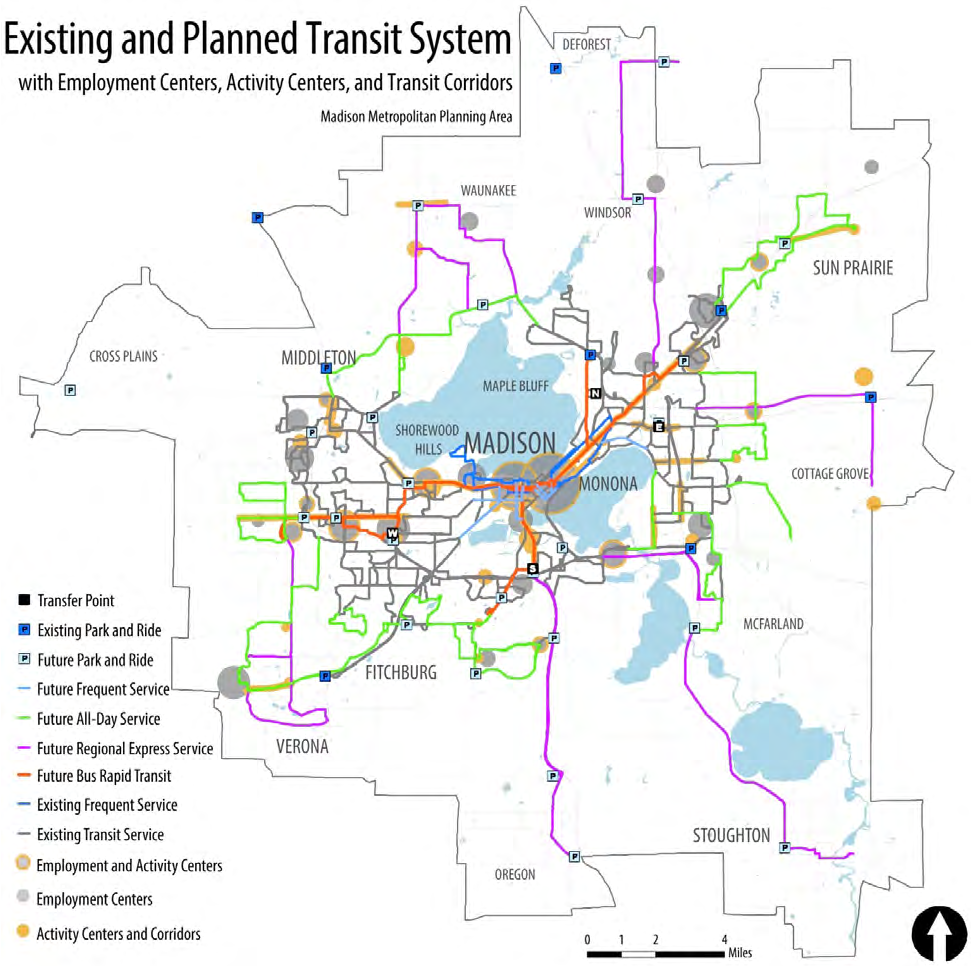


Figure 5-6 Existing and Planned Transit System with Employment Centers and Activity Centers and Corridors

Recommendations and Supporting Actions		Timeframe	Implementing Party
1	**Implement a Bus Rapid Transit System.**		
A	Complete an alternatives analysis and project planning, leading to an initial BRT Project.	1-5 years	City of Madison and other Local Governments, Metro, MPO
B	Expand the BRT network to fulfill the BRT Vision in the Madison area.	5-15+ years	Cities of Madison and Fitchburg, Metro, MPO
C	Plan for the expansion of BRT into other corridors, including Middleton, southwest Madison, Fitchburg, southeast Madison, and Sun Prairie.	15+ years	Metro, MPO, Local Governments
D	Expand the use of transit priority treatments, focusing on the BRT corridors.	Ongoing	Metro, MPO, Local Governments

Improve the existing local bus network by reducing travel times, increasing frequency, increasing capacity, providing service to new neighborhoods, and enhancing first and last mile connections. With a growing service area and limited service outside peak periods and on weekends, transit travel times for longer distance trips are far greater than driving. Many cross-town trips take an hour or longer due to routing through neighborhoods and transfers. Travel times must be shortened and more direct service added throughout the day.

Related to the need for reduced travel times is a need increase service frequency in some parts of the network in the greater Isthmus area. High-frequency routes are generally defined as those in which a rider does not have to check a schedule before traveling to a transit stop – generally 15 minute service or better. Currently, a limited number of neighborhoods in the region are served with high-frequency service and are predominantly located in central Madison. High density corridors need consistent, frequent local all-day service. Such corridors include Monroe Street, Regent Street, Mills Street, Broom and Bassett Streets, and Atwood Avenue.

Along with frequency improvements, capacity improvements must be made on heavily traveled routes. Metro operates a fixed-route fleet of 40-foot transit coaches that seat about 35 and allow for about 20 standees. Several routes routinely suffer from overcrowded conditions, including instances where passengers are passed by because the bus is full. Constructing the Nakoosa Trail bus storage and maintenance facility will allow Metro to increase its fleet and introduce larger articulated buses which will be required to accommodate future high-capacity transit, new all-day service, and regional routes.

When new neighborhoods are fully developed, full transit service should be provided. Some neighborhoods in peripheral Madison, Middleton, Fitchburg, and Verona currently only have service during weekday peak periods and require service throughout the day to provide access to jobs with nontraditional schedules as well as trips serving other purposes. Sun Prairie arguably has the most urgent need for all-day fixed-route bus service. With a population of about 30,000, Sun Prairie is now served by a publicly subsidized shared-ride taxi system. While popular, this system is strained by capacity limitations and does not provide convenient and affordable service to Madison.

Finally, the transit system must be accessible for those that live and work near transit stops, but outside of reasonable walking distance. Connecting transit routes provide a good option, but their typical low frequencies and circuitous routes, combined with transfers, drive up travel times. Further, they sometimes have low usage and can be expensive to operate, providing relatively low utility to the community.

Alternative first mile/last mile strategies are emerging that may be a viable alternative to new fixed-route service in low-density, peripheral areas. Improving pedestrian and bicycle access to transit stops may provide riders with increased access to the transit network. Bike-share programs like BCycle are an option but they require a high density of docking stations to be successful and are not an option for everybody, especially during cold and rainy weather. Public shared-ride taxi systems and other rideshare schemes may be effective in very low demand areas.

Point-deviation routes have not historically been widely deployed in the Madison area, but with Madison's peripheral neighborhoods growing and stretching Metro Transit's resources, they may fill a limited niche. Point-deviation routes typically follow a route with a conventional schedule, but are allowed to deviate slightly in order to serve riders. In low-density areas, point-deviation routes have the potential to serve larger areas within a fixed budget compared to fixed routes. They also have

the potential to reduce the number of transfers for long cross-town trips, which are more likely to be relied upon by low-income and minority riders, according to the 2015 Metro Transit Onboard Passenger Survey.

In the example route shown in figure 5-7, a bus would travel between the South Transfer Point and West Towne Mall along the dark blue line, but could make reasonable deviations to serve the light blue shaded area. Such a route may provide cost-effective all-day service to neighborhoods that currently have no all-day service, with reasonable travel times.

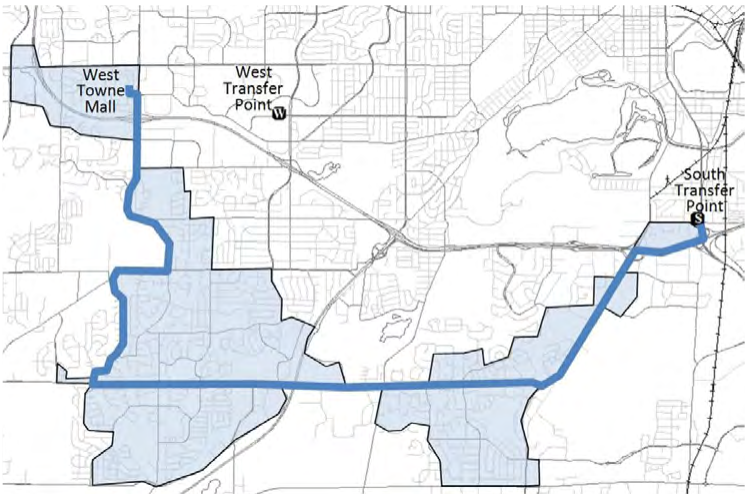


Figure 5-7: An example of route deviation.

Recommendations and Supporting Actions		Timeframe	Implementing Party
2	Improve the local bus network.		
A	Continue to optimize the local bus network to maximize its utility with available resources.	Ongoing	Metro, MPO
B	Measure and monitor the effects of service changes on low-income and minority populations.	Ongoing	Metro, MPO
C	Improve integration with bordering transit systems in Monona and Sun Prairie.	Ongoing	Metro, MPO
D	Reduce travel times and simplify service.	Ongoing	Metro
E	Expand and enhance the network of frequent local service in central Madison.	5-15 years	Metro
F	Make changes to local routes when BRT is opened in order to reduce duplication and enhance connections.	5-15+ years	Metro, MPO
G	Improve and expand data collection and analysis to support service planning.	Ongoing	Metro, MPO
3	Add service in developing neighborhoods.		
A	As developing neighborhoods are built out, enhance limited-service routes so that they provide regular service throughout the day.	Ongoing	Metro, Local governments
B	Add new all-day service in unserved peripheral neighborhoods and suburban communities such as Sun Prairie, McFarland, and Verona.	5-15+ years	Metro, Local governments
4	Enhance transit stops with improved pedestrian/bicycle access and amenities.		
A	Coordinate with municipalities, businesses, and neighborhood associations to plan and provide funding for stop improvements.	Ongoing	Metro, MPO, Local governments
B	Utilize TID funding and other alternative financing mechanisms to fund stop improvements.	Ongoing	Local governments
C	Plan and reserve space for transit stops/stations as part of new developments where appropriate.	Ongoing	Local governments
5	Utilize alternative service delivery models to serve low-demand areas.		
A	Analyze bus route productivity and identify service with low use and high travel times that may better serve neighborhoods with alternative transit models.	1-5 years	Metro, MPO
B	Develop peripheral routes with small vehicles that can deviate from their route with the goal of providing service in low density areas at a lower cost and reducing multiple-transfer trips.	1-5 years	Metro, MPO, Private Providers, Non-Profits
C	Investigate using transportation network companies and shared-ride taxi service to connect to transfer points, BRT, and regional express service.	1-5 years	Metro, MPO, Private Providers, Non-Profits
D	Plan for the use of driverless shuttles in low-density transit markets and niche areas like business parks and campuses.	1-5 years	Madison Traffic Eng, UW, Metro, MPO

Manage and improve the quality of transit capital assets. Aging infrastructure needs to be maintained and updated. Transit buses last 12 to 15 years and need to be regularly replaced. Metro's four transfer points were constructed in 1998 and will need to be replaced or in some cases relocated and/or expanded by 2050. Metro currently uses a diesel-powered fleet, about 10% of which is hybrid diesel-electric. Transitioning to a low-emission or emission-free fleet will reduce Metro's dependency on petroleum fuel, improve public health, air quality, and the pedestrian environment in bus route corridors. Metro is in the process of developing a comprehensive transit asset management plan in accordance with new federal rules. The plan must cover all transit agency assets, including vehicles, facilities, equipment, and other infrastructure.

Recommendations and Supporting Actions		Timeframe	Implementing Party
6	Maintain, expand, and enhance bus rolling stock and supporting facilities.		
A	Renovate and remodel the existing Metro maintenance/bus storage facility and address maintenance issues.	1-5 years	Metro
B	Build a new satellite bus facility on Nakoosa Trail to accommodate a larger fleet, including articulated buses and electric buses.	1-5 years	Metro
C	Replace buses on a regular cycle to ensure reliability and comfort.	Ongoing	Metro
D	Expand the use of alternative fuel vehicles with a goal of having a fully emission-free electric fleet by 2050.	Ongoing	Metro
E	Introduce articulated 60-foot buses to the fleet to reduce overcrowding and accommodate BRT.	5-15 years	Metro

Improve regional access to the transit network. Regional transit service in the Madison area is extremely limited with bus service confined to some of the contiguous municipalities bordering Madison and Verona. Workers living in DeForest, Windsor, Waunakee, Sun Prairie, Cottage Grove, McFarland, Stoughton, Oregon, and Cross Plains that work in the Madison area have effectively no public transit options outside of commuting to a park-and-ride lot or transfer point within Madison.

A new regional express service network will address the needs of people in these communities to commute to many jobs, particularly in central Madison. It will also provide access to people living within the existing transit service area to jobs in suburban employment centers. Employers in some of the communities have indicated they have difficulty filling entry level, lower wage jobs because of the lack of transit service. With direct, limited-stop service within Madison, the regional service will be time-competitive with driving and carpooling.

New park-and-ride lots will help supply passenger demand for the new regional express service. Many suburban communities are not well laid out for one route to serve all neighborhoods – many commuters will be best served if they have the option of making a short trip by auto or bicycle and using transit for the majority of their trip. Park-and-ride lots may be newly constructed, publicly owned lots, or private lots (e.g., at a shopping center) with lease agreements.

Recommendations and Supporting Actions		Timeframe	Implementing Party
7	Implement a regional express bus network.		
A	Expand and optimize the existing regional express service to Middleton and Verona.	5+ years	Metro, Local governments, MPO
B	Operate new routes primarily during the morning and afternoon peak periods to suburban Madison communities.	5-15 years	Metro, Local governments
C	Optimize the regional express transit service to provide service from Madison to suburban job centers as well as from residential areas to central Madison.	5-15 years	Metro, MPO, local governments
D	Provide limited stop service within City of Madison to provide fast service within Madison and connections to BRT and local service.	5-15 years	Metro, Local governments

Recommendations and Supporting Actions		Timeframe	Implementing Party
8	Expand park-and-ride facilities in conjunction with BRT and express services.		
A	Investigate opportunities to share space at shopping centers, churches, and other private facilities as well as public facilities such as parks, where appropriate. See Fig. 5-5, Planned transit System.	1-5 years	Metro, MPO, Local governments
B	Explore partnerships with local communities and agencies to maintain park-and-ride facilities.	1-5 years	Metro, Local governments

Implement a regional transportation entity to ensure financial solvency of the transit agency. A regional funding mechanism such as a regional transit authority with taxing authority is necessary to implement the vision of expanded transit service in the Madison region, including construction and operation of a bus rapid transit system and expansion of bus storage and maintenance facilities. A regional governance structure would also improve service efficiency and allow for more equitable decision-making.

Recommendations and Supporting Actions		Timeframe	Implementing Party
9	Implement a regional transit entity with stable funding and representative governance.		
A	Ensure that funding for transit remains equitable and that decisions are made fairly, with communities represented appropriately.	Ongoing	Metro, Local governments
B	Explore alternatives to supplement or replace the property tax for local public funding, including a vehicle registration fee and sales tax (if state enabling legislation passed).	1-5+ years	Local governments
C	Implement a new regional transit authority or district with the mission of providing regional transit service if state enabling legislation is passed.	1-5+ years	Metro, Local governments

BICYCLES

Although the region's bikeway network is well developed compared to peer communities, gaps in the network persist. Bicycle planners need to consider the needs of bicyclists of all abilities, including young and old people, and people who are not comfortable biking in traffic.

The 2015 Bicycle Transportation Plan identified streets that do not have bicycle accommodations or have insufficient bicycle accommodations. However, as these facilities are generally evaluated when opportunities arise, such as street reconstruction, they were not prioritized. This plan goes one step further and identifies missing facilities that represent major gaps and barriers in the bikeway network.

Expand the regional shared-use path network and retrofit and expand on-street accommodations. The Bicycle Transportation Plan describes a network of major regional shared-use paths that will connect communities with high quality biking infrastructure. Examples of regional paths include the popular Capital City Trail and Southwest Path. Although they are long and continuous, they also serve as high-volume bike arterials in the central city.

The Lower Yahara River Trail will open to the public in 2017 with a new bridge and boardwalk over Lake Waubesa, substantially shortening and easing a bicycle trip between Fitchburg or central Madison and McFarland. This new facility is planned to be extended about 10 miles south to Stoughton. The City of Madison and Dane County are working to close the gap between the Capital City Trail in Madison and the Glacial Drumlin Trail in Cottage Grove, creating a complete route between Madison and Milwaukee.

Other major recommended regional paths include the Good Neighbor Trail to Middleton and to the west, a path around the north side of Lake Mendota, a path between Fitchburg and Oregon with a connection to the Capital City Trail, a path between Madison and Sun Prairie along the rail corridor, and paths serving the north side connecting to Waunakee and DeForest. These paths will address the major regional deficiencies in the bike network, connecting neighborhoods and municipalities that are isolated for people traveling by bike.

On-street accommodations for bicycles are found on a number of regional roadways that serve high-volumes of motor vehicle traffic. In many instances, these facilities provide the most direct route to and from a variety of destinations. Providing safe on-street bicycle facilities ensure that more riders are able to comfortably ride on these regional roadways. The network should be expanded as roadway reconstruction projects occur and facilities should be considered whenever new arterial or collector streets are constructed.

Figure 5-8 illustrates and Figure A-2 in Appendix A lists the major regional priority shared-use path projects that will help complete the planned regional network and fill some important gaps in the network in the urban area. See page D-23 for a map of the complete bicycle network plan.

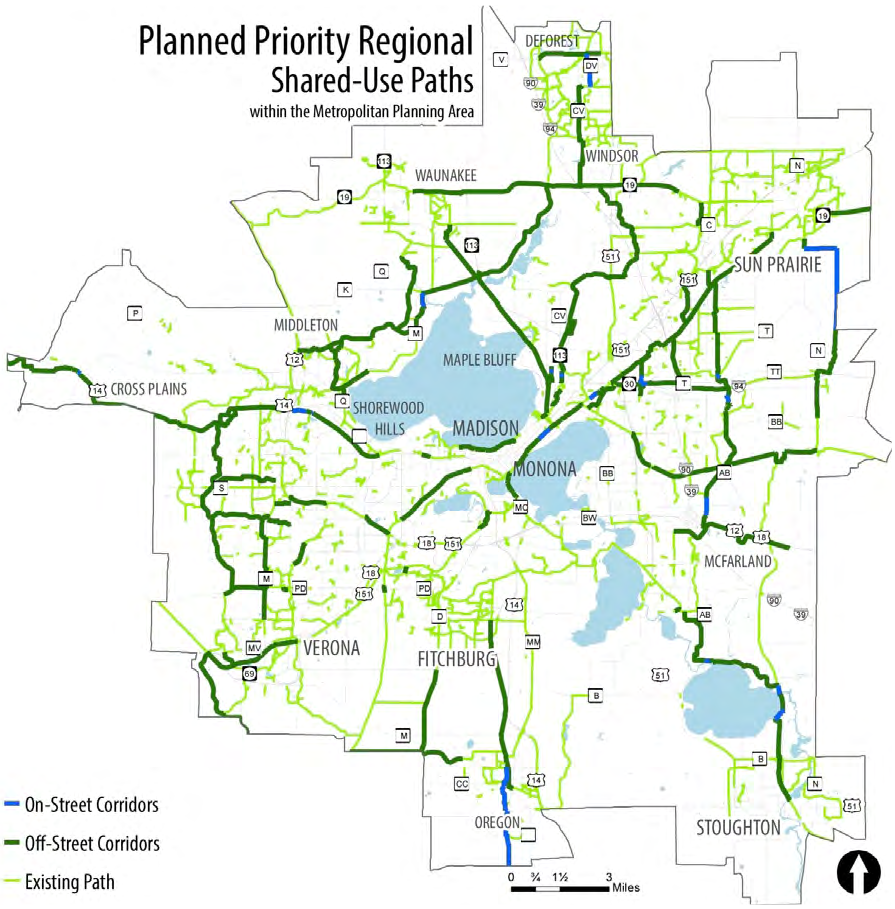


Figure 5-8: Planned Priority Regional Shared-Use Paths

Recommendations and Supporting Actions		Timeframe	Implementing Party
1	Expand the bikeway network with new shared-use paths and on-street facilities.		
A	Construct new off-street shared-use paths to complete the bikeway network envisioned in the Bicycle Transportation Plan.	Ongoing	Dane County, Local governments
B	Construct new shared-use paths in developing neighborhoods so that facilities are available as soon as new residents move in.	Ongoing	Dane County, Local governments
C	Retrofit existing corridors like railroad and utility rights-of-way with bicycle facilities as appropriate.	Ongoing	Local governments
D	Provide enhanced or premium bicycle facilities in key urban arterial corridors within right-of-way where feasible.	Ongoing	Local governments
E	Expand the use of bicycle boulevards, bicycle priority streets, and priority treatments at intersections.	Ongoing	Local governments
F	Prepare and implement local bicycle plans.	Ongoing	Local governments
G	Include paved shoulders of at least 4 feet in width on rural highways where appropriate and economically feasible.	Ongoing	WisDOT, Dane County
2	Maintain and modernize existing bicycle facilities.		
A	Repave and repair bicycle facilities with similar standards as collector streets.	Ongoing	WisDOT, Dane County, local governments
B	Include bicycle facilities on all new bridges and highway crossings.	Ongoing	WisDOT, Dane County, local governments
C	Use innovative bike facility designs that meet or exceed state and national guidelines.	Ongoing	Local governments
D	Develop and implement local policies and practices to clear snow, ice, and debris from bike facilities.	Ongoing	Dane County, Local governments

Eliminate gaps and barriers in the bicycle network.

Major facilities needed to complete the urban bikeway network are shown in Figure 5-9. The gaps and barriers analysis focused on urban areas that are fully developed and on identifying street and path corridors with existing demand for bicycling that can feasibly accommodate bicycle facilities when the opportunity arises. The analysis is intended to serve as an initial screening based on the existing and planned bikeway network.

A more detailed engineering evaluation is needed to determine how best to facilitate bicycles within the street corridors identified.

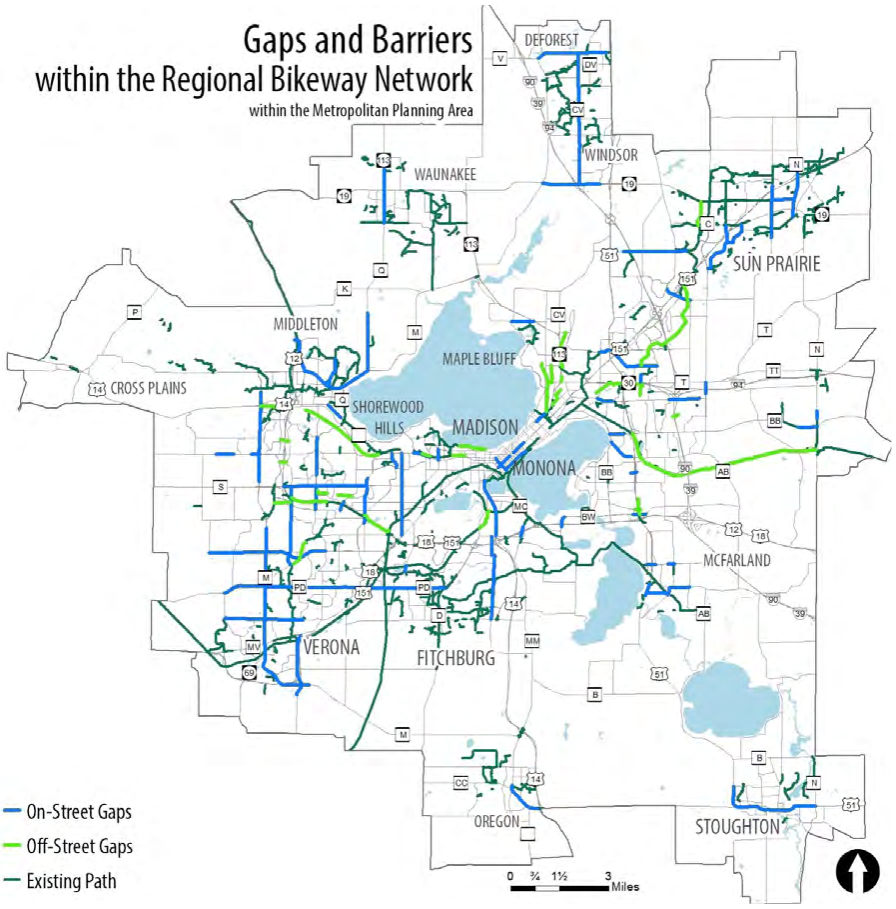


Figure 5-9: Gaps and Barriers within the Regional bikeway Network

While a detailed feasibility analysis of the identified corridors was not conducted, constrained street corridors with no available right-of-way and/or recently reconstructed streets are excluded.

The gaps and barriers are a occur in both on-street and off-street facilities. Fixing these gaps and barriers will help complete the bicycle route system envisioned in the Bicycle Transportation Plan. Figure 5-10 illustrates the planned primary regional route system.

Most of the on-street needs shown in the gaps and barrier map will likely be satisfied with bike lanes where none currently exist. Where feasible, these lanes may be buffered or protected.

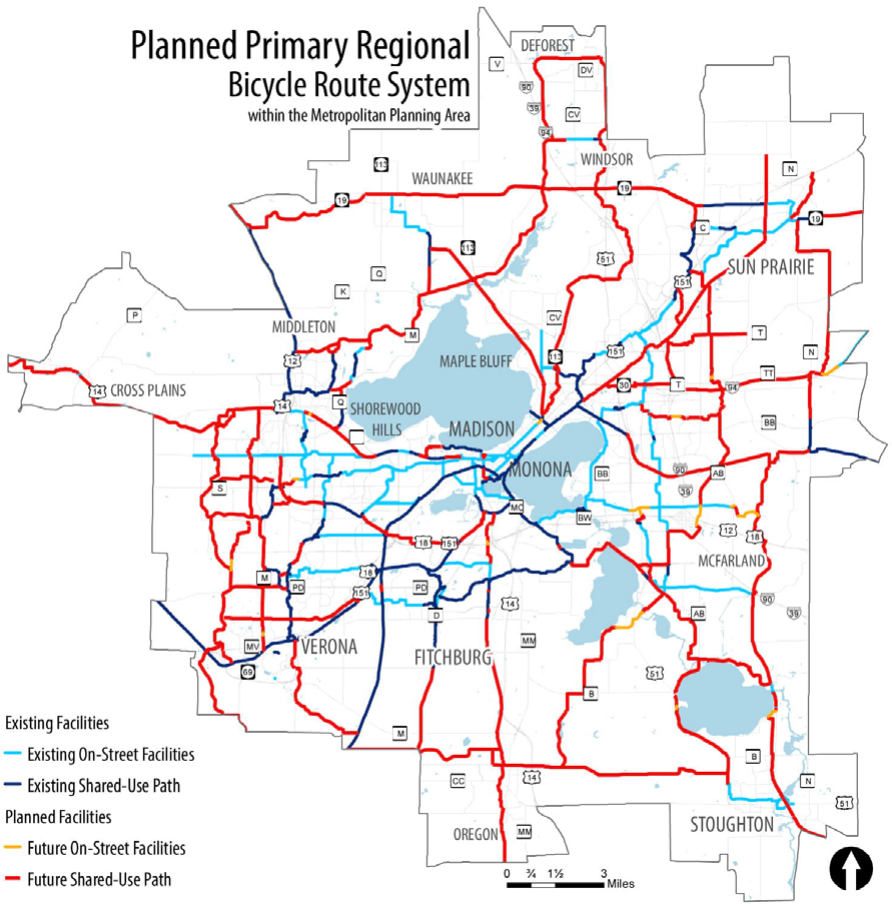


Figure 5-10: Planned Primary Regional Bicycle Route System

Recommendations and Supporting Actions		Timeframe	Implementing Party
3	**Eliminate bicycling barriers and hazards in the bikeway network.**		
A	Close regional bikeway network gaps and address barriers (see Figure 5-9).	Ongoing	Dane County, Local governments
B	Evaluate intersections with a history of safety concerns or complaints, and plan and implement improvements.	Ongoing	WisDOT, Dane County, local governments
C	Complete the local street network where barriers prevent direct travel.	Ongoing	Local governments
D	Ameliorate conflicts between bikes and buses, delivery trucks, and pedestrians.	Ongoing	Local governments

Encourage bicycling by enacting bicyclist-supportive policies and ensuring bicyclist safety. To ensure that users of all abilities are comfortable using the bicycle network, appropriate facilities must be provided, but we must also ensure that both bicyclists and motorists are provided with ample education and encouragement. Also, intersections and corridors with high bicycle crash rates need to be studied to identify effective counter measures. These types of studies can also identify common patterns for crashes, which can be used to develop targeted education campaigns. Other user needs include adequate bicycle storage opportunities, access to bike sharing services, and adequate wayfinding.

Recommendations and Supporting Actions		Timeframe	Implementing Party
4	Provide adequate bicycle parking.		
A	Require bicycle parking as a condition of new development.	Ongoing	Local governments
B	Provide public bicycle parking in business districts, on campuses, and at high-use transit stations.	Ongoing	Local governments
5	Improve bicyclist safety through a "3E" approach .		
A	Conduct studies of intersections and other areas with high crash rates or documented safety issues to identify appropriate countermeasures.	Ongoing	Local governments, MPO
B	Update 1991 City of Madison study of vehicular crashes involving pedestrians and bicyclists, expanding it to the metro area, to obtain up-to-date information on common patterns for crashes. Utilize the information in crash prevention efforts.	1-5 years	MPO, City of Madison Traffic Engineering
6	Continue bike share, education, and bicyclist supportive policies.		
A	Continue supportive policies like producing bicycle maps and accommodating bicycle-themed events.	Ongoing	MPO, Local governments, NGOs
B	Implement wayfinding system for bicyclists using the recently developed Bicycle Wayfinding Design Guidelines for Dane County.	Ongoing	Dane County, Local governments
C	Expand the bike share program, working with the provider, by expanding the coverage and increasing the density of stations.	Ongoing	BCycle, Local governments
D	Support and expand education and encouragement programs that promote safety and encourage all residents to bicycle for commuting and other trips.	Ongoing	MPO, Local governments

PEDESTRIANS

Sidewalks are the preferred accommodation for pedestrians and provide many benefits, including safety, mobility, and healthier communities. Therefore, the pedestrian needs analysis started with identifying urban arterial and collector streets where sidewalks are missing from one or both sides, but are needed to serve existing development . This provided a starting point for prioritizing the most pressing needs. These street segments were then split into "Tier 1" and "Tier 2" categories.

Tier 1 sidewalk needs typically have a higher demand for walking based on the pedestrian walk access analysis (see Chapter 3) and are on streets with higher traffic speeds and volumes. Other qualitative factors were also considered. For instance, recently reconstructed streets and streets where a sidewalk is on one side, but most of the destinations are on the other side were generally put in the Tier 2 category. Figure 5-11 illustrates the Tier 1 and Tier 2 regional pedestrian network needs.

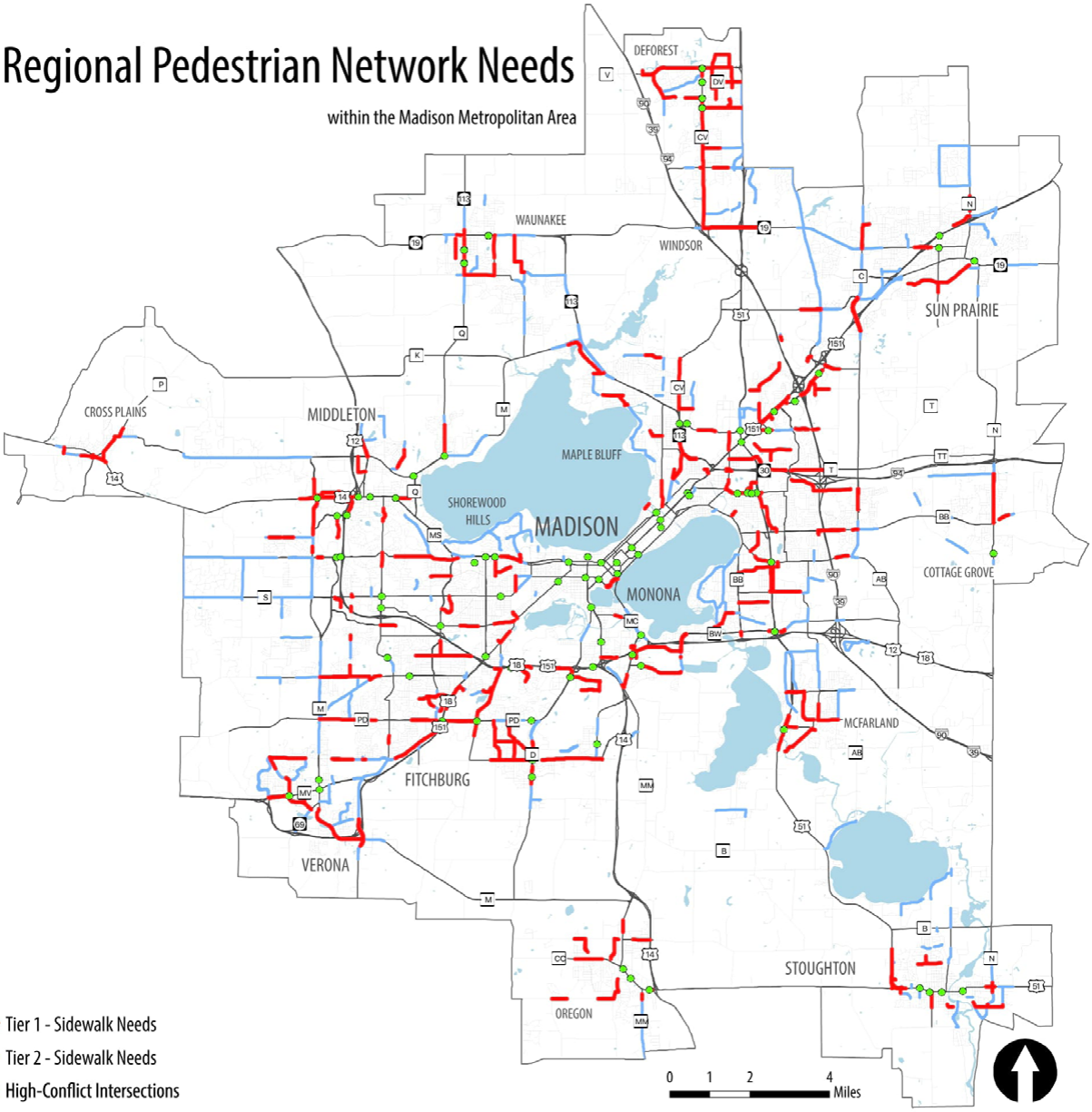


Figure 5-11: Regional Pedestrian Network Needs

Street crossing facilities such as curb ramps, crosswalks, and signals are the other major type of facility for pedestrians. Designing safe and convenient street crossings is extremely important for creating a pedestrian friendly environment. Appendix E includes a pedestrian toolbox that illustrates the different types of pedestrian facilities and treatments that can be used to encourage walking and provide for the safety of pedestrians. Of course, good facilities alone are insufficient without destinations within walking distance. Streetscape design is also an important part of creating walkable communities. Pedestrian-supportive land use is addressed above under Land Use and Transportation Integration. The following recommendations and supporting actions address the region's major pedestrian facility needs.

Construct sidewalks along all new urban streets and retrofit regional roadways with sidewalk accommodations. All urban streets that attract pedestrians normally benefit from having sidewalks.

Recommendations and Supporting Actions		Timeframe	Implementing Party
1	Provide sidewalks and appropriate pedestrian amenities in developing neighborhoods.		
A	Require sidewalks on both sides of all streets in new urban developments.	Ongoing	Local governments
B	Adopt land use ordinances to ensure new developments provide for adequate pedestrian circulation and are integrated with adjacent land uses.	Ongoing	Local governments
C	Connect bordering, developing neighborhoods with sidewalks and shared-use paths.	Ongoing	Local governments
D	Prepare and implement local pedestrian plans.	Ongoing	Local governments
2	Retrofit regional streets with modern, safe pedestrian accommodations .		
A	Prioritize the addition of missing sidewalks on arterial and collector streets with higher demand for walking (See Fig. 5-11).	Ongoing	WisDOT, Local governments
B	Identify pedestrian needs and gaps, as well as safety problems, and implement solutions.	Ongoing	WisDOT, Local governments
C	Reduce cost share required of property owners to retrofit in sidewalks in existing neighborhoods.	Ongoing	Local governments
D	Prepare and implement ADA compliance plans to retrofit non-conforming facilities to ADA standards.	Ongoing	Local governments
E	Identify and install accessible pedestrian signal systems and other ADA accessibility treatments where necessary.	Ongoing	WisDOT, Local governments
F	Provide for a more comfortable pedestrian experience with wider sidewalks and appropriate separation on high-volume regional roads with pedestrian traffic.	Ongoing	WisDOT, Local governments

Improve the safety and usability of the pedestrian network. At the beginning and end of every trip, users of all modes are pedestrians. Thus, it is important to ensure a safe and usable pedestrian network. High conflict intersections should be examined to determine their need for pedestrian crossing improvements. The sidewalks should be maintained for year-round use, similar to roadways. In areas where roadway geometry and street designs cause unsafe pedestrian conditions, traffic calming devices should be installed to ensure pedestrian safety.

Recommendations and Supporting Actions		Timeframe	Implementing Party
3	Improve safety and usability for pedestrians at intersections and crossings.		
A	Evaluate pedestrian improvements at major street crossings and implement as opportunities are available. See Fig. 5-11 identifying many of these high conflict locations.	Ongoing	Local governments, MPO
B	As intersections are designed and reconstructed, consider pedestrian safety improvements.	Ongoing	WisDOT, Local Governments
C	Use pedestrian design tools to improve crossings such as enhanced crosswalks, refuge islands, and rapid flashing beacons. See Pedestrian Facilities Toolbox in Appendix F.	Ongoing	WisDOT, Local Governments
D	Identify and prioritize new grade-separated crossings where streets and shared-use paths with substantial pedestrian traffic intersect with highways and other barriers.	Ongoing	WisDOT, Local Governments
4	Maintain sidewalks and pedestrian facilities for year-round use.		
A	Provide and enforce snow removal policies, particularly around intersections and bus stops.	Ongoing	Local Governments
B	Implement program to identify and repair broken and substandard sidewalks.	1-5 years	Local Governments
5	Design new streets and retrofit existing streets to reduce speeding.		
A	Ensure that local street standards do not require unnecessarily wide streets.	Ongoing	Local Governments
B	Retrofit existing overly wide streets to reallocate space for other uses as part of reconstruction.	Ongoing	WisDOT, Dane County, Local Governments
C	Incorporate traffic calming features into new local streets where appropriate.	Ongoing	Dane County, Local Governments
D	Implement traffic management programs to address speeding and cut-through traffic problems on existing streets.	Ongoing	Dane County, Local Governments

INTER-REGIONAL TRAVEL

In an increasingly connected world, inter-regional travel must be maintained and expanded. While intercity-bus options are currently available, buses lack a common terminus and often lack good connections to local bus routes. Further, inter-city passenger rail service is unavailable.

Construct an inter-city transit hub. The lack of a centralized inter-city bus terminal is the most immediate need for inter-regional travel by bus. A new facility needs to be centrally located with convenient access to the University of Wisconsin campus as well as downtown Madison. A modern, attractive facility would feature ticket sales and other amenities for passengers. Several of our nearby cities - Milwaukee, Saint Paul, La Crosse, Grand Rapids, and Champaign-Urbana - have terminals that are well located and designed to maximize rider access and comfort.

While a new inter-city bus terminal would initially only serve buses, consideration should be given to future rail service to ensure convenient integration with existing and future services. Inter-city bus operators should be able to reliably access the new terminal without regular interference from traffic and other delays. Further, convenient connections to local transit service should be available.

Recommendations and Supporting Actions		Timeframe	Implementing Party
1	Build an inter-city bus terminal.		
A	Construct a new high-quality inter-city bus terminal in central Madison.	5-15 years	City of Madison
B	Ensure the new facility has convenient access to downtown Madison and the UW.	5-15 years	City of Madison, UW
C	Ensure that passengers can conveniently transfer to BRT and local buses.	5-15 years	City of Madison, Metro

Support improved inter-city transit. Madison is well-served by inter-city bus service, still, several gaps remain. Demand for travel to the Twin Cities will likely support far more service than is currently provided by the several daily round trips provided by Megabus, Greyhound, and Jefferson. More frequent buses, particularly on the express routes, would make the bus a more attractive alternative to driving. Increased frequency to northeastern Wisconsin is also needed. Only one daily round trip links Madison to Fond du Lac, Oshkosh, Appleton, and Green Bay. The population served by this route would be better served by several daily round trips. Additionally, bus service to Iowa (Dubuque, Davenport, Des Moines, etc.), Omaha, St. Louis, and Kansas City are inconvenient. Improved service could consist of new, longer routes with direct service to these cities, increased frequency, and better connections.

Until passenger rail service is available in Madison, increased access to Amtrak must be provided by increasing the frequency of inter-city service and connectivity to Amtrak stations. Thruway bus service currently provides an extension of Amtrak rail service to Madison. Connections to south and east coast trains in Chicago are convenient with frequent service to Chicago Union Station, but connections to west coast trains like the Empire Builder, California Zephyr, and Southwest Chief may require out-of-direction travel or long waits.

Recommendations and Supporting Actions		Timeframe	Implementing Party
2	Support new and improved inter-city bus service.		
A	Improve service frequency to Minneapolis / St Paul and Appleton / Green Bay.	1-5 years	WisDOT, Private Providers
B	Improve connections to Amtrak services.	1-5 years	WisDOT, Private Providers
C	Provide direct service to Davenport, Des Moines, Omaha, and other cities to the west.	1-5 years	WisDOT, Private Providers

Implement inter-city high-speed passenger rail service. Prior to 2010, an expansion of the popular Amtrak Hiawatha Service was planned to downtown Madison. The service would have had seven trains per day departing Madison, arriving in Chicago with stops in Milwaukee and other cities in between. This project was awarded federal stimulus funds, however, the funds were returned prior to construction.

Planning for inter-city high-speed passenger rail service should not be abandoned. Corridor acquisition and preservation will ensure viability of the service if and when the service becomes politically viable. The project should be as close to "shovel-ready" as possible, with planning efforts finalized and local political support maintained. When rail improvements are needed along previously identified corridors, considerations should be made for the types of improvements that will be compatible with future passenger service.

Recommendations and Supporting Actions		Timeframe	Implementing Party
3	Maintain and preserve the rail network for future passenger rail service.		
A	Identify inter-city passenger rail routes to Milwaukee, Chicago, and Minneapolis / St Paul.	15+ years	WisDOT
B	Identify station locations for passenger rail service.	15+ years	Local Governments, Metro MPO, Dane County, WisDOT

SPECIALIZED TRANSIT

Specialized transit service is coordinated through a variety of services that aim to meet the transportation needs of seniors and disabled individuals. The Dane County Coordinated Public Transit – Human Services Transportation Plan, updated in 2013, provides details on existing services and service and coordination needs. The following highlights some of these needs and recommendations to address them.

Expand the coverage of accessible fixed-route, paratransit, and on-demand taxi services. The expansion of public all-day fixed-route bus service into unserved neighborhoods in peripheral parts of Madison and neighboring communities like Verona, Monona, and Sun Prairie will substantially increase mobility for people with special needs. The new routes utilize accessible buses and automatically increase the paratransit service area. For those without access or the ability to use fixed-route service, paratransit service must continue to expand. Wheelchair accessible taxi service is currently only provided by one taxi company and the cost to provide the service is high, particularly given the intense competitive pressure facing traditional taxi companies with the rapid growth of Uber and other transportation network companies. In order to maintain this service in the future, costs will need to be spread across providers.

Recommendations and Supporting Actions		Timeframe	Implementing Party
1	Expand the coverage of accessible fixed-route bus and paratransit service and address other identified service related needs.		
A	Implement the recommendations in the Transit Development Plan and address needs identified in the Dane County Coordinated Public Transit - Human Services Transportation Plan	Ongoing	Metro, MPO
B	Explore opportunities to expand paratransit and accessible shared-ride taxi service in urban areas beyond the fixed-route bus service area	5-15 years	Metro, MPO, Dane County
2	Work collaboratively with private taxi operators to ensure accessible taxi service is available and costs for the service are shared equitably.		
A	Work collaboratively with private taxi operators to ensure accessible taxi service is available and costs for the service are shared equitably	Ongoing	MPO, City of Madison, Private Taxi Operators, Non Profits

Continue and expand work-based transportation for low-income workers. Low-income workers will continue to struggle to find reliable ways to get to work and help drive the economy. The YWCA's JobRide program plays a crucial role in filling this niche when public transit options are not available or practical. However, demand for the service exceeds budgetary and physical capacity of the system, and as outlying communities grow, demand will as well.

Recommendations and Supporting Actions		Timeframe	Implementing Party
3	Continue and expand specialized work-based transportation for low-income people.		
A	Work with the non-profit organizations to ensure funding remains available for people to get to work who don't have traditional options.	Ongoing	MPO, City of Madison, non-profit organizations
B	Continue to maximize efficiency by optimizing vehicles and timetables.	Ongoing	Non-profit organizations

Leverage emerging technologies to lower specialized transit operating costs while expanding service availability. Emerging technologies, such as ridesharing services and autonomous vehicles, provide both challenges to existing service delivery methods and opportunities for the future. New technologies that offer proven benefits should be incorporated into the transportation system, and accompanied by supportive policies.

Recommendations and Supporting Actions		Timeframe	Implementing Party
4	Utilize emerging technologies to lower operating costs and expand travel options.		
A	Modify policies as needed to ensure that autonomous vehicles can adequately serve seniors and people with disabilities.	5-15 years	MPO, City of Madison, WisDOT

Continue efforts to better coordinate specialized transit service. The City of Madison and Dane County coordinate successfully, minimizing service duplication. However, with the numerous public and private agencies and programs providing service there are still major coordination needs as documented in the Dane County Coordinated Public Transit – Human Services Transportation Plan. This includes coordinating transit services as well as job training, eligibility requirements, and funding. In addition, local communities should consider transit service availability when sighting senior housing, medical facilities, and other services.

Recommendations and Supporting Actions		Timeframe	Implementing Party
5	Improve interagency coordination of the various specialized transit services and private services.		
A	Plan for the advent of Family Care in Dane County, including for IRIS (self-directed services) members to prevent cost-shifting to Metro Transit.	Ongoing	MPO, City of Madison, Metro Transit
B	Improve coordination of medical trips, including inter- and intra-community trips and from surrounding counties.	Ongoing	City of Madison, WisDOT

TRANSPORTATION DEMAND MANAGEMENT

Maximizing the use of alternative modes and reducing the number of people driving alone can improve air quality, congestion, and the quality of neighborhoods. Transportation Demand Management (TDM) strategies make alternatives to driving more appealing and increase awareness of the available options. TDM programs rely upon a robust transit, bicycle and pedestrian network, and support for ridesharing. Land use decisions and parking strategies also impact the viability of these alternatives.

Expand the regional network of park-and-ride lots to encourage carpooling, transit use, and bicycling. For commuters traveling between communities facilities and services such as park-and-ride lots and vanpools offer options for trips that are not able to be fully served by transit and bicycle infrastructure. Dane County currently has twelve park-and-ride lots but only five offer transit service. Park-and-ride usage could be expanded by increasing the number of lots with that have transit service, preferably limited-stop service, and are located on the bikeway network. To create more park-and-ride lots that serve a variety of transportation modes will require the cooperation of multiple government agencies to ensure the lots are in easily accessible locations and meet the needs of different commuters. Figure 5-12 shows existing and planned park-and-ride lots.

Expand the vanpool program. Currently, the vanpool program primarily serves commuters traveling into downtown Madison and the UW from communities outside of Madison. The State of Wisconsin Vanpool Program is limited by both the destinations it serves and by the hours it travels. In addition, only a limited number of vans are available and all vanpools must include a state employee. Another van service operated by the YWCA called the YW Transit JobRide offers service in the Madison area. The JobRide service provides rides to areas that aren't served by transit and to those that are inaccessible during non-peak transit hours, including nights, weekends, and holidays. The service provides an important complement to the public transit system, but funding it continues to be a challenge and it currently has a waitlist. Expansion of these services will increase options for travel that is hard to serve with transit, bicycling or walking.

Recommendations and Supporting Actions		Timeframe	Implementing Party
1	Expand the regional network of park-and-ride lots to encourage carpooling, transit use, and bicycling.		
A	Explore partnerships with local communities and agencies to develop park-and-ride facilities.	1-5 years	WisDOT, Dane County, Local governments
2	Expand the state vanpool program and support development of additional vanpool programs.		
A	Support expansion of WisDOA vanpool program and development of additional vanpool programs.	5-15 years	WisDOA, WisDOT, Local Governments, Non-Profits, Private Providers

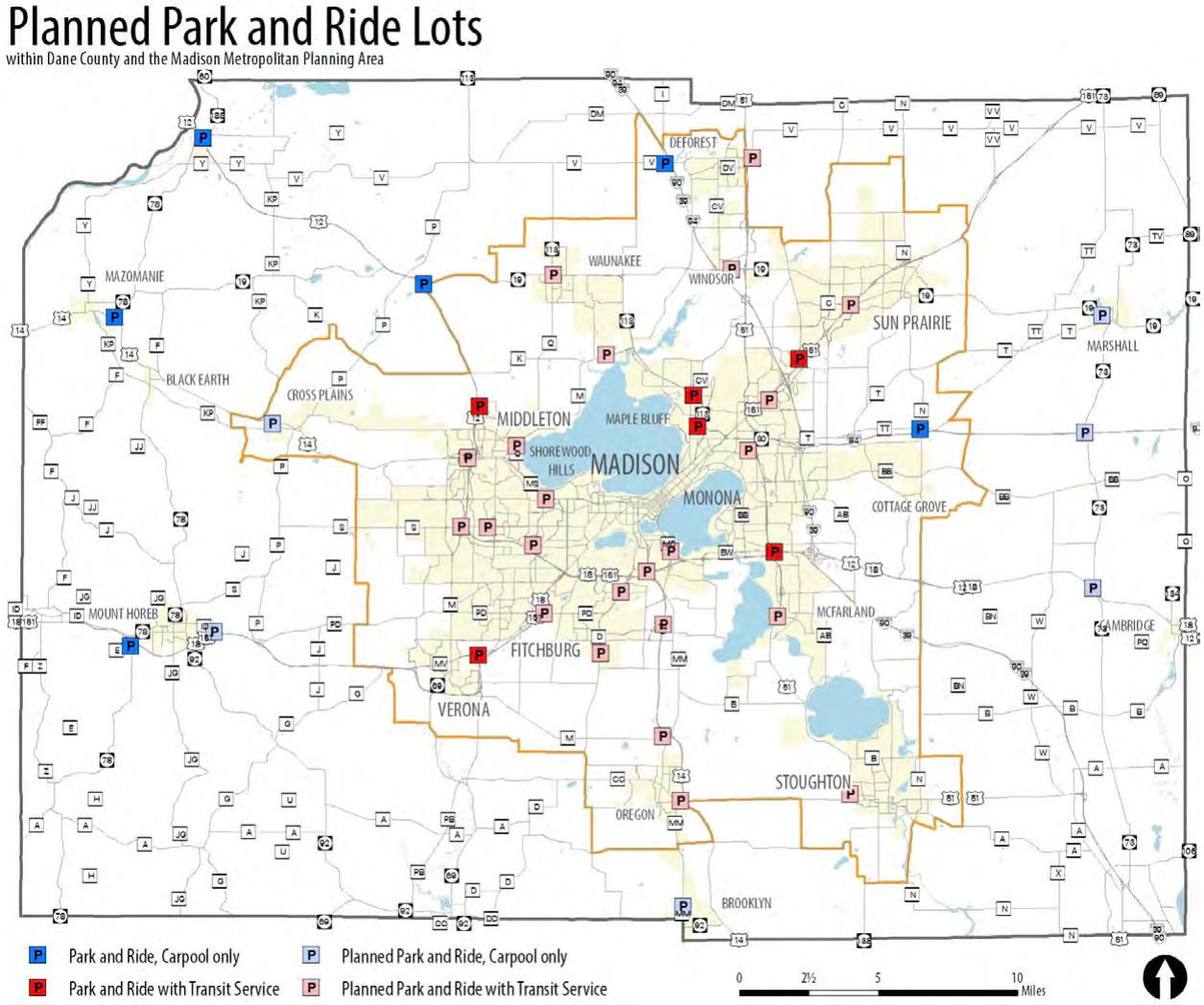


Figure 5-12: Planned Park-and-Rides

Continue to encourage and provide support to large employers, institutions, and municipalities to develop and promote strategies to reduce single-occupant motor vehicle trips. The Madison area has a well-established TDM program, Rideshare Etc., which supports businesses and other institutions to encourage reduced driving. One aspect of the program is the online Rideshare Etc. website, which provides a way for anyone to search online for options, including potential carpool partners. The Rideshare Etc. website is just one resource of the current program, which also includes a Guaranteed Ride Home program and a small marketing program. These current programs form a foundation for the expansion of TDM efforts in the region.

To foster the development of TDM initiatives in the region, local municipalities should develop clear requirements for a TDM plan as a condition of approval for large commercial developments. These requirements should include specific criteria and standards to be met, and provide support for their development and implementation. The establishment of Transportation Management Associations (TMA) in larger employment centers can help businesses meet these requirements. TMAs serve the needs of employers and employees within a business district, industrial park or other area by providing support, promotion, and advocacy for improved transportation policies and opportunities. These efforts will also support strategies such as telecommuting and alternative work schedules that can also help manage congestion.

Recommendations and Supporting Actions		Timeframe	Implementing Party
3	Continue to encourage and provide support to large employers, institutions, and municipalities to develop and promote strategies to reduce single occupant motor vehicle trips.		
A	Support establishment of Transportation Management Associations in major employment centers.	1-5 years	MPO, Local governments
B	Encourage and provide assistance to local communities interested in requiring TDM plans as a condition of approval for large commercial developments, with specific criteria and standards for such plans.	1-5 years	Local governments, MPO
C	Continue to encourage telecommuting and alternative work schedules.	Ongoing	Local governments, MPO

Provide financial incentives for people to use alternative transportation, and increase funding for marketing programs. Financial incentives are among the most effective TDM strategies. The cost and limited availability of parking in the downtown/UW areas is a significant factor in limiting single-occupancy vehicle (SOV) commuting. The advent of unlimited ride pass programs at UW and Madison College have also contributed greatly to increased transit ridership in the past 10+ years. Metro's Commute Card program continues to expand, and a number of businesses track employee commute modes to offer rewards for biking, walking,

taking transit or ridesharing. To continue progress in reducing SOV commuting, it will be important to expand employer participation in Metro's Commute Card program, parking cash-out programs, and other incentive programs. In addition, users of alternative modes will need support programs such as the Guaranteed Ride Home program and occasional parking programs to ease the transition from driving alone. In addition, encouragement programming and marketing efforts will need to be undertaken to ensure that people are aware of their options, especially individualized marketing programs such as a the Love to Ride and Smart Trips programs. These individualized marketing programs are designed to work with people to find solutions that work for their situations and to provide them with the support and resources they need to make incremental changes in their travel behavior.

Recommendations and Supporting Actions		Timeframe	Implementing Party
4	Provide financial incentives for people to use alternative transportation and increase funding for marketing programs.		
A	Continue efforts to expand employer participation in alternative transportation incentive programs such as Metro's Commute Card program, parking cash-out programs, or other financial reward programs.	Ongoing	MPO, Metro, Local Governments
B	Increase funding for support services such as Guaranteed Ride Home, occasional parking programs, and marketing of the programs.	1-5 years	MPO, Dane County, Local Governments
C	Increase funding for advertising and marketing programs, including individualized marketing programs such as Love to Ride and SmartTrips.	1-5 years	MPO, Dane County, WisDOT, Metro

Support transportation options at schools through Safe Routes to School (SRTS) programs. Auto congestion around schools affects traffic flow, air quality, and safety for bicyclists and pedestrians. Safe Routes to School programs encourage more families to walk and bike to school, and work to ensure everyone's safety near schools, particularly in student drop off/pick up areas. SRTS programs also help to increase physical activity in children and support healthy habits for the future. Since the inception of the federal SRTS program many communities in the region have undertaken SRTS projects to improve bicycling

and walking conditions at and around their schools. However, sustainable funding for these efforts is needed to ensure the continued survival and expansion of these programs. Sustainable funding, along with a regional approach to SRTS, will help establish walking and bicycling to school as a safe and efficient way for families to travel to school and help improve students' health.

Recommendations and Supporting Actions		Timeframe	Implementing Party
5	Support transportation options at schools through Safe Routes to School programs.		
A	Secure sustainable funding for a regional Safe Routes to School program, utilizing resources such as mini-grants, CIP funding, local operating budget funding, private funding, and/or federal funding.	1-5 years	MPO, Non-Profits, School Districts, Local Governments
B	Develop and implement a regional Safe Routes to School program.	1-5 years	MPO, Non-Profits, School Districts, Local Governments

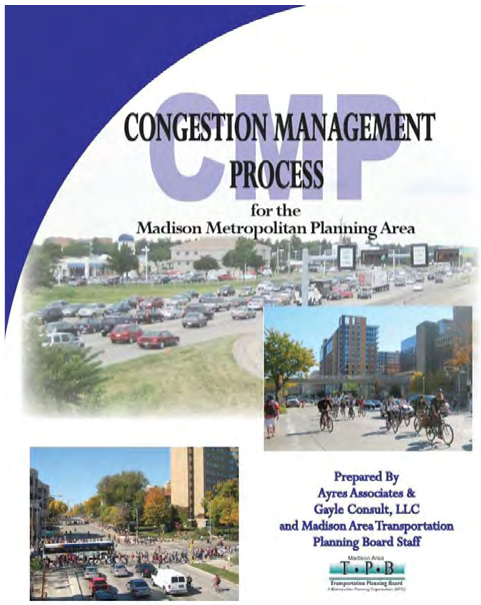
TSM, OPERATIONS, AND ITS

Congestion is caused when the demand for a transportation facility approaches or exceeds the capacity of the roadway. The result of a roadway reaching this condition is slower travel speeds, longer trip lengths, and the potential for vehicle queuing when entering or exiting the roadway. Typically, recurring congestion is common during the morning and afternoon rush hour periods on heavily traveled regional roadways. This type of congestion is generally predictable, understood, and accepted by motorists. However, non-recurring congestion caused by construction, crashes, bad weather, and other incidents can lead to unexpected delays and unanticipated travel-time variability. Complicating things, these sources of congestion can trigger secondary events, such as a weather event causing a crash or a special event near a construction zone causing extreme delay. Research has shown that these non-recurring causes contribute to close to half of all congestion. Reliability issues are often more frustrating than congestion, causing commuters to be late for work, buses to run late, and freight to miss delivery windows.

Major capacity expansion projects, such as adding additional lanes, are often not feasible or desirable because of the cost and negative impacts to the environment, residents' quality of life, and other roadway users. However, actively managing the transportation system to improve traffic operations can increase the capacity of a roadway without constructing new lanes. Transportation system management (TSM) includes strategies such as improved traffic signal operations, management of roadway incidents, traveler information, and focused roadway modifications to provide bottleneck relief. Intelligent Transportation Systems (ITS) – sensors, computers, communications systems that allow multiple agencies to work together – can aid these TSM strategies. Even for roadways that will eventually need additional travel lanes, TSM can delay the need for

capacity expansion. After expansion, TSM strategies can help to maximize the value of new capacity. In short, TSM, including ITS, is about maximizing the value of transportation infrastructure.

<u>Update and Implement the Congestion Management Process</u>.
To minimize congestion for all transportation modes and reduce unexpected delay, MATPB has adopted a comprehensive congestion management process (CMP). The CMP prescribes comprehensive transportation system management and operations strategies to ensure the most efficient use of resources and minimum environmental impact. The efficacy of this process is determined in part by an annual performance measurement and monitoring process. The first performance measure report was published in 2016.



In the future, MATPB will refine the CMP to ensure that the process is serving its intended purpose. This includes refining data collection techniques for CMP-recommended performance measures, and ensuring that CMP processes are contemporary compared to that of peer cities. While still legally valid, the process should be updated to reflect changing regional needs, trends, and technologies.

	Recommendations and Supporting Actions	Timeframe	Implementing Party
1	Implement and periodically update the adopted Congestion Management Process.		
A	Continue and improve monitoring of system performance, including post-construction project impact evaluation, utilizing the methodology outlined in the plan.	Ongoing	MPO, Dane County, Local goverments, WisDOT
B	Identify, prioritize, and implement corridor and intersection TSM projects to improve traffic and transit operations and safety on the arterial roadway system.	Ongoing	MPO, WisDOT, Dane County, Local Governments
C	Investigate the feasibility, benefits, and costs of an expanded incident detection and response program for additional state roadways (e.g., Verona Road) and selected local arterials.	1-5 years	WisDOT, Dane County, Local Goverments, MPO
D	Update the CMP to account for new federal rules, data sources, and MPO resources.	1-5 years	MPO

Improve the operation of the transportation network by improving roadway access. Access to and from a roadway is valuable to landowners on adjacent parcels – be it retail establishments, industrial uses, or residential properties. Access points can have a major impact on roadway operations. Land use adjacent to regional roadways should be planned in a way that is consistent with roadway function and geometry. Access should be examined on existing facilities and consolidated, when appropriate.

Recommendations and Supporting Actions		Timeframe	Implementing Party
2	Implement access management plans and standards for existing and planned future arterial roadways as development and street (re)construction occur.		
A	Initiate access management plans on congested corridors as development and street reconstruction occur	1-5 years	MPO
B	Develop a regional access management plan that identifies standards for future arterials roadways, best practices, and safety considerations	1-5 years	MPO

Modernize the transportation network through the use of technologies that improve the operations of existing infrastructure. The operation of the transportation system can be impacted not only by roadway design, but by technologies that modify traffic flow and provide information to influence traveler behavior. In terms of importance, neither method can be understated. To plan for and coordinate future operational improvements, MATPB adopted the first Regional Intelligent Transportation Systems Strategic Plan in early 2016. This plan contains a prioritized list of recommended projects, as well as strategies to guide plan implementation. The plan should be implemented and updated as needed.

Recommendations and Supporting Actions		Timeframe	Implementing Party
3	Modernize the multimodal transportation network using technology.		
A	Include as part of new urban roadway projects infrastructure for connected and autonomous technologies, where appropriate.	Ongoing	WisDOT, Dane County, Local governments
B	Replace obsolete traffic signal controllers with "smart" controllers when replacing traffic signals or constructing new signalized intersections.	Ongoing	WisDOT, Local governments
C	Implement adopted process to identify and integrate ITS infrastructure into planning and design of major state roadway projects.	Ongoing	WisDOT
4	Implement and periodically update the Regional Intelligent Transportation Systems Strategic Plan.		
A	Continue planning efforts to advance the recommendations listed in the ITS plan .	Ongoing	WisDOT, Dane County, Metro, Local governments
B	Continue to engage with the ITS Plan Implementation Subcommittee to facilitate cooperation and coordination among state and local agencies.	Ongoing	MPO
C	Continue efforts to provide comprehensive real-time traveler information to people and businesses.	Ongoing	WisDOT, City of Madison
D	Implement a smart card payment system that can be expanded to include a common fare media for other civic uses, as well as an open payment system that accepts fares using personal electronic devices.	1-5 years	Metro

FREIGHT, AIR, AND RAIL

Freight, air, and rail access improve the financial condition of area residents and businesses alike. Policies related to these modes should be designed to enhance the financial interests of all in the region.

Increase the local focus on freight planning. Freight interests should be incorporated into local planning efforts to ensure promotion and preservation of freight uses along freight corridors and targeted expansion of freight-related infrastructure.

Recommendations and Supporting Actions		Timeframe	Implementing Party
1	Maintain and promote new industrial uses along freight corridors.		
A	Work with stakeholders to determine significant transportation issues that negatively impact freight focused businesses within the region.	1-5 years	MPO, WisDOT
B	Work to cluster similar industrial uses to promote efficiency of the freight network.	Ongoing	Local governments
2	Maintain and expand infrastructure on the multimodal freight network, prioritizing projects that improve safety and efficiency, and minimize lifetime costs.		
A	Investigate and implement vehicle-to-infrastructure technologies to increase safety along freight corridors.	1-5 years	WisDOT, Dane County, Local governments
B	Investigate and implement vehicle-to-infrastructure technologies that reduce delay for passenger and freight vehicles in freight corridors.	1-5 years	WisDOT, Dane County, Local governments
C	Investigate ways in which new technologies, such as 3D printing, may impact the demand for future transportation facilities when planning improvements to the network.	1-5 years	WisDOT, Dane County, Local governments
D	Continue enforcement of truck weight regulations to reduce premature deterioration of roadways and bridges.	Ongoing	WisDOT
3	Increase focus on freight planning for regional and local transportation facilities.		
A	Continue to incorporate freight considerations into corridor and planning studies.	Ongoing	WisDOT, Dane County, Local governments
B	Plan for and implement recommendations from the Wisconsin State Freight Plan.	Ongoing	WisDOT, Local governments
C	Ensure local and regional freight-centric projects are listed in Wisconsin State Freight Plan to maintain eligibility for enhanced federal matching funds.	1-5 years	WisDOT, Dane County, MPO, Local governments
D	Consider first and last mile(s) implications for freight when approving site plans for freight focused facilities.	Ongoing	Local governments

Mitigate rail conflicts while maintaining the viability of rail service. Safety concerns at rail crossings should be studied and remedied with the help of private rail operators. Land use conflicts, such as rail crossings in residential areas, should be mitigated through the use of improvements that allow designation of "quiet zones." Rail corridors should be acquired when abandoned to preserve the corridors for future freight and passenger rail service, and other transportation uses. Further, governmental agencies should work with private operators to accommodate heavier loads at higher speeds.

Recommendations and Supporting Actions		Timeframe	Implementing Party
4	Maintain the availability of rail facilities for current and future uses.		
A	Preserve rail corridors for freight uses, acquiring excess land when available to ensure availability for future transportation uses.	Ongoing	WisDOT, Rail Transit Commissions
B	Replace ties, ballast, and jointed rail with modern materials to accommodate heavier loads and higher speeds.	Ongoing	WisDOT, Rail Transit Commissions, Private Operators
C	Plan for improvements to accommodate high speed, high volume passenger service on routes to Milwaukee, Chicago, and St Paul, such as positive train control, double-tracking, and electrification.	15+ years	WisDOT
5	Mitigate conflicts between rail and other uses		
A	Identify high-conflict rail crossings and mitigate conflicts, when possible.	Ongoing	WisDOT, Dane County, Local Governments
B	Continue to implement quite zones in residential neighborhoods within urbanized areas.	Ongoing	Local Governments
C	Work with rail companies to grade-separate high-use rail crossings.	Ongoing	WisDOT, Dane County, Local Governments

Ensure compatibility of land use planning near airports. The area in which an airport operates is often subject to a number of negative externalities such as increased noise, light, and air pollution. Care should be taken to ensure compatibility of land uses by accounting for existing and future airport master plans in development of local comprehensive plans. Further, the airport master plan should account for future land use plans encapsulated in local comprehensive plans.

Recommendations and Supporting Actions		Timeframe	Implementing Party
6	Ensure compatibility of uses near airports.		
A	Ensure land use plans within airport influence areas are compatible with existing and planned airport plans.	Ongoing	Local Governments
B	Ensure Airport Master Plans consider existing and future uses identified in community comprehensive plans.	Ongoing	Dane County
C	Continue to implement the Airport Master Plan.	Ongoing	Dane County
7	Improve airport facilities to enhance usability and convenience for passenger traffic.		
A	Improve connections to the airport for all modes of transportation, including increasing frequency and speed of transit connections between Dane County Airport, downtown Madison, and the UW campus.	Ongoing	WisDOT, Dane County, Metro, Local Governments
B	Consider how future transportation technologies may influence the way that passengers travel to and from airports when building new parking lots and passenger pickup/drop off facilities.	1-5 years	MPO, Dane County, Local governments

Improve airport accessibility for passenger flights and freight. Accessibility to Dane County Regional airport should be improved by all modes, specifically transit. Consideration of future technologies, such as autonomous vehicles, should be made before embarking on major parking enhancement projects. Freight-related facility accessibility should be improved as needed for local businesses.

Recommendations and Supporting Actions		Timeframe	Implementing Party
8	Improve airport facilities freight accommodations and connections		
A	Survey businesses to determine if Dane County Airport is adequately serving their needs and determine what could be done to improve service.	1-5 years	Dane County
B	Contact freight shippers operating out of Dane County Airport to determine if needs are being met with current facilities and identify improvements that must be made for future success.	1-5 years	MPO, Dane County, Local governments
C	Survey local businesses to determine if air freight needs are being met and what types of improvements would improve business viability.	1-5 years	MPO, Dane County, Local governments

PARKING

Adequate parking is necessary for the vibrancy and vitality of urban areas. It fosters economic activity in retail shopping and entertainment districts and ensures the success of business and office areas. However, over-constructing parking can lessen these advantages while discouraging users to rideshare, take transit, walk, or bike to their destinations. This modal diversion can lead to increases in congestion in already congested parts of the region. Further, emerging technologies may impact the need for parking facilities.

Use parking management strategies to reduce congestion and encourage multi-modalism. Strategically managing parking availability will ensure vibrancy of areas while encouraging multi-modalism. Such strategies may include demand-responsive pricing, where parking fees are higher when parking is most in demand. Local governments should also consider revising parking requirements to allow developers to determine the need for parking based on market demand, while avoiding shortages that may result in parking spillover in surrounding areas. Parking requirements and policies that reduce excessive parking are particularly important in downtowns and other mixed-use activity centers. In a recent update to its zoning code, the City of Madison removed nearly all parking minimums in non-residential districts, and for some residential areas only requires site plans showing where parking could be provided if needed in the future. Parking minimums had not been applied in the downtown for quite some time.

Recommendations and Supporting Actions		Timeframe	Implementing Party
1	Use parking management strategies to reduce congestion within downtown areas and major activity centers.		
A	Develop and implement a downtown Madison parking management plan.	1-5 years	City of Madison
B	Implement technologies and associated policies, such as demand responsive pricing, that increase access and convenience to parking, and reduce vehicle idling and circling to find parking.	5-15 years	Local governments
C	Encourage ridesharing by developing and implementing policies that reduce parking rates and/or provide preferential parking spots to carpools and vanpools.	1-5 years	Local governments
2	Modify parking requirements to encourage multi-modalism, using a more market-based approach while addressing potential spillover impacts.		
A	Review minimum parking requirements to ensure an appropriate balance between parking needs and continuity of the built environment.	1-5 years	Local governments
B	Allow deviation from parking minimums, particularly in dense urban areas, to accommodate innovative project designs that maximize access to alternative modes of transportation and incorporate TDM strategies.	1-5 years	Local governments

Ensure the flexibility of existing and future parking facilities to accommodate future technologies. Emerging technologies, such as ridesharing and autonomous vehicles, have the potential to reduce and/or change the demand of parking facilities. New facilities should be constructed in a way that allows their conversion to other uses, and existing facilities should be evaluated for other uses when reaching the end of their viability.

Recommendations and Supporting Actions		Timeframe	Implementing Party
3	Ensure flexibility of parking facilities to accommodate future technologies.		
A	Ensure that streets are designed with future flexibility in mind and that parking policies allow for conversion to loading zones if/when autonomous vehicle technologies are implemented.	1-5 years	Local governments
B	Ensure new parking structures are designed to allow for conversion to other uses if/when autonomous vehicle technologies are implemented.	5-15 years	Local governments