DRAFT

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Bicycle and Pedestrian Mobility Plan for Southeast Michigan

SEMCOG | *SOUTHEAST MICHIGAN COUNCIL OF GOVERNMENTS*

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Mission

SEMCOG, the Southeast Michigan Council of Governments, is the only organization in Southeast Michigan that brings together all governments to develop regional solutions for both now and in the future. SEMCOG:

- Promotes informed decision making to improve Southeast Michigan and its local governments by providing insightful data analysis and direct assistance to member governments;
- Promotes the efficient use of tax dollars for infrastructure investment and governmental effectiveness;
- Develops regional solutions that go beyond the boundaries of individual local governments; and
- Advocates on behalf of Southeast Michigan in Lansing and Washington.

Bicycle and Pedestrian Mobility Plan for Southeast Michigan

Abstract

The *Bicycle and Pedestrian Mobility Plan for Southeast Michigan* ensures that the region's nonmotorized system meets the transportation, quality of life, health, and accessibility needs of its residents and visitors, as well as the economic development priorities and goals of the region and local communities.

El *Plan de movilidad de bicicletas y peatones para el sudeste de Michigan* garantiza que el sistema no motorizado de la región satisfaga las necesidades de transporte, calidad de vida, salud y accesibilidad de sus residentes y visitantes, así como las prioridades y objetivos de desarrollo económico de la región y las comunidades locales.

تضمن خطة تنقل الدراجات الهوائية والمشاة لجنوب شرق ميشيغان أن نظام النقل غير المزود بالمحركات في المنطقة يلبي إحتياجات النقل و جودة الحياة والصحة وسهولة إمكانية الوصول لسكانها وزوارها، فضلاً عن أولويات التنمية الإقتصادية وأهداف المنطقة والمجتمعات المحلية

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Executive Summary

Bicycle and pedestrian mobility is critical to the region's transportation system. Almost every trip, including those made by automobiles and transit, is likely to begin or end with walking or biking.

The region as a whole benefits from a connected and safe bicycle and pedestrian network that supports quality of life by increasing access to core services, empowering all people with options beyond automobile travel, and enhancing connections to nature and regional assets such as town centers, downtowns, and commercial and cultural destinations. Locally, communities and residents benefit from bicycle and pedestrian mobility through broadening transportation choices. Those choices can improve health, reduce traffic congestion on roadways, and encourage activity and interaction along corridors that can spur placemaking and economic vitality.

The purpose of *the Bicycle and Pedestrian Mobility Plan for Southeast Michigan* is to establish a common vision for bicycling and walking in the region, and provide guidance on how to increase the connectivity, use, and safety of the system for all residents. This plan builds upon the 2014 *Bicycle and Pedestrian Travel Plan* by taking into account the significant progress achieved and providing an aspirational framework for connecting current and future communities and destinations with a high-comfort bicycle and pedestrian system. In addition, it analyzes shifting trends in mobility patterns and provides guidance on infrastructure design and emerging technologies that may impact bicycle and pedestrian planning.

The research and data analysis in this plan demonstrates:

- There is a growing interest in bicycle and pedestrian mobility throughout the region; the number of people walking and biking is increasing.
- There is desire and need to enhance safety and comfort for people walking and biking through infrastructure improvements.
- The bicycle and pedestrian system is a vital component for increasing access to core services and amenities for people of all ages and abilities.
- There are gaps in the regional system and challenges for connecting existing and planned infrastructure.
- A connected system helps support healthy lifestyles and communities, with recreation, tourism, and economic development opportunities.
- While responsibility for bicycle and pedestrian infrastructure is shared by many, collaboration and coordination is required to develop and sustain a regional system.

Southeast Michigan's Bicycle and Pedestrian Mobility System

By the Numbers

100%
Increase in bicycling trips since 2005

28%
Increase in walking trips since 2005

3,500
Miles of bikeways

24,000
Miles of walkways

500
Miles of regional trails

115
Communities and counties with bicycle and pedestrian plans

To continue enhancing the system and meet the needs of the region, this plan recommends the following regional policies:

- **Connect and expand the network** of walking and biking infrastructure in the region to provide a safe, comfortable, and convenient experience for people of all ages and abilities.
- **Ensure equitable access** to core services and regional destinations for pedestrians and bicyclists, including connections to other transportation modes.
- **Increase safety** for pedestrians and bicyclists with systemic approaches to roadway design, traffic operations, education, and enforcement.
- **Promote healthy lifestyles and vibrant communities** with expanded options for pedestrian and bicycle mobility, recreation, and tourism.
- **Provide education** to encourage broader participation and awareness of walking and biking issues.
- **Ensure the sustainability** of the bicycle and pedestrian network with collaborative planning and adequate funding for development and maintenance.

Structure of the Bicycle and Pedestrian Mobility Plan

This plan's seven chapters provide policy guidance, data resources, and tools for planning and implementation to support Southeast Michigan's bicycle and pedestrian mobility:

- **Chapter 1: Introduction** provides background for SEMCOG's role in bicycle and pedestrian planning. It shows connections to other SEMCOG plans that impact the bicycle and pedestrian system. It outlines the stakeholder outreach and engagement process for developing this plan.
- **Chapter 2: Regional Priorities** establishes regional policies and recommends actions that guide implementation efforts. It also outlines bicycle and pedestrian corridors that connect local networks and meet regional needs, which provide a framework for connectivity based on the data analysis in this plan.
- **Chapter 3: Understanding Current Conditions** provides context for the region's bicycle and pedestrian system with a multi-layered analysis of regional data. This chapter analyzes user input and mobility patterns, existing and planned bicycle and pedestrian infrastructure, demand for walking and biking trips, equity factors, and safety issues.
- **Chapter 4: Local Implementation** provides technical guidance and regional examples for communities looking to enhance bicycle and pedestrian mobility. It features additional information and regional highlights on local policies and practices that support walking and biking, along with emerging trends and technologies.
- **Chapter 5: Infrastructure Guidelines** provides an overview of the many infrastructure components that can enhance the bicycle and pedestrian system. It includes specifications for their application and context, and provides additional resources that may be useful for planning improvements and developing projects.
- **Chapter 6: Funding and Maintaining the System** describes how improvements can be developed and sustained. It includes considerations for funding mechanisms at the local, state, and federal level, along with best practices for different types of maintenance.
- **Chapter 7: Education, Encouragement, Enforcement, and Evaluation** provides information and examples on outreach and coordination with the public or other agencies. It also describes ways to measure progress as improvements are made over time.

Seven appendices supplement the information in the chapters described above; these appendices are available in a separate document, *Bicycle and Pedestrian Mobility Plan for Southeast Michigan - Appendix*. They are:

- **Appendix A:** County profiles providing local planning context, data analysis, and maps for each of the region's seven counties.
- **Appendix B:** A list of existing conditions and gaps in regional corridors.
- **Appendix C:** Results and analysis of a 2019 interactive online public input survey.
- **Appendix D:** Detailed crash report summarizing regional data from 2014-2018.
- **Appendix E:** Information on funding opportunities for bicycle and pedestrian projects from the USDOT.
- **Appendix F:** An overview of the methodology used for the regional equity analysis.
- **Appendix G:** An overview of the methodology used for the regional demand analysis.

Chapter 1: Introduction

SEMCOG Vision

This vision for Southeast Michigan provides the foundation for developing regional plans approved by SEMCOG's elected leadership:

> *All people in Southeast Michigan benefit from a connected, thriving region of small towns, dynamic urban centers, active waterfronts, diverse neighborhoods, premier educational institutions, and abundant agricultural, recreational and natural areas.*

To meet this vision, we must have:

- Unique places that offer various housing choices for a large and diverse population.
- An educated and trained workforce that supports a multi-sector economy and provides opportunities for all.
- Healthy, clean lakes, streams, air, and a connected system of trails, parks, and natural areas that support recreational and cultural amenities.
- Safe, efficient, and coordinated infrastructure systems that embrace advances in technology and focus on access for all.
- Effective local government and engaged citizenry.

A regional approach to bicycle and pedestrian mobility planning is also central to achieving this vision. Planning and developing infrastructure to support pedestrians and bicyclists creates safer and more convenient ways to travel. It improves quality of life in the region by increasing mobility, health, and recreation options for people of all ages and abilities. It also helps spur placemaking efforts that support both local and regional economic vitality.

Background

In 2014, SEMCOG adopted the *Bicycle and Pedestrian Travel Plan for Southeast Michigan*. The 2014 plan documented the existing and planned facilities that support bicycle and pedestrian travel, and analyzed their connectivity as a regional network. It also included strategies to enhance nonmotorized transportation in the region, promoting increased mobility, safety, recreation, placemaking opportunities, economic development, and community health.

This *Bicycle and Pedestrian Mobility Plan* builds on the 2014 plan and takes into account the significant progress achieved. In addition, it analyzes shifting trends in mobility patterns and infrastructure design, and emerging technologies that may impact bicycle and pedestrian planning.

Connection to Other Plans

This plan is supported by other regional and state plans that connect to bicycle and pedestrian mobility, and help implement the policies and actions it recommends:

***2045 Regional Transportation Plan for Southeast Michigan* (RTP),** adopted in March 2019, guides transportation investments in Southeast Michigan by working to make the system safe and more efficient, revitalizing communities, encouraging economic development, and improving the quality of the region's environmental resources through policies and actions.

Three regional bicycle and pedestrian challenges identified in the 2045 RTP are addressed in this plan:

- Identification and prioritization of regional corridors and gaps in the system.
- Preventive maintenance of the bicycle and pedestrian system.
- Continual emphasis on enhanced safety measures, including infrastructure improvements, education, and enforcement.

Access to Core Services in Southeast Michigan, adopted in January 2016, measures and benchmarks accessibility for core services that residents need to access on a regular basis – jobs, health-care facilities, supermarkets, parks, schools, libraries, and fixed-route transit. This analysis measured accessibility across four modes of travel – automobile, transit, walking, and biking. A challenge to this analysis was the lack of a pedestrian network to more accurately assess accessibility for people who walk. This plan addresses that challenge by providing the region's sidewalk network, along with updated on-road infrastructure and regional trails network.

***Green Infrastructure Vision for Southeast Michigan*,** adopted in May 2014, describes long-term goals for the green infrastructure network, along with policies to achieve an integrated regional framework. The vision highlights opportunities for roadway design to make critical contributions to improving regional water quality by reducing stormwater runoff. Since the adoption of this vision, several communities have implemented green infrastructure as part of enhancements to local bicycle and pedestrian projects. This plan continues to emphasize the importance of early planning and identifying ways to integrate stormwater management and green streets practices in transportation projects, including streetscapes, shared-use paths, and traffic calming.

Parks and Recreation Plan for Southeast Michigan, adopted in May 2019, ensures that the region's recreation system, parks, and trails meet the quality of life, health, and accessibility needs of its residents and visitors. The plan also includes a detailed accessibility analysis of all parks and trails in the region by walking, biking, driving, and public transit. This plan's Regional Bicycle and Pedestrian Corridors uses the region's trails and parks system as both connecting greenways and as destinations in themselves.

Partnering for Prosperity: Economic Development Strategy for Southeast Michigan, adopted in February 2016, focuses on 11 broad-based strategies and associated action steps related to advancing community assets, business climate, and talent and innovation. The strategy highlights the important role the region's bicycle, pedestrian, and trail networks play in developing quality places and increasing prosperity. This plan furthers the connection by ensuring bicycle and pedestrian mobility helps to promote healthy lifestyles, enhance tourism, and support placemaking.

Southeast Michigan Traffic Safety Plan, adopted in December 2015, builds on SEMCOG's long-standing goal of improving safety through a data-driven approach to roadway crash analysis. The plan features data analysis and strategies for the region's key crash emphasis areas, including pedestrian and bicycle crashes. The Safety Analysis of this plan and supporting policies and actions further these strategies and support new and emerging challenges.

Regional Master Transit Plan, adopted August 2016 by the Regional Transit Authority of Southeast Michigan (RTA) for Macomb, Oakland, Washtenaw, and Wayne Counties, offers solutions to various mobility issues in the region. The Demand Analysis and Regional Bicycle and Pedestrian Corridors of this plan utilize data and align with priorities from the Master Transit Plan.

Michigan Mobility 2045 is a 25-year plan for transforming Michigan's transportation system. The plan incorporates the state's first statewide nonmotorized plan, by compiling Michigan's eight Regional Nonmotorized Investment Plans, including SEMCOG's 2014 Bicycle and Pedestrian Travel Plan. This plan has been developed in coordination with MDOT to ensure alignment.

Public Input Process and Stakeholder Engagement

To guide development of this plan, SEMCOG established a Bicycle and Pedestrian Task Force, comprised of 70 representatives from local governments, state and federal agencies, nonprofit organizations, research and education institutions, and other organizations and stakeholders. The task force met five times over a 12-month planning process. Members of the task force established the framework for this plan, deliberating on regional priorities, policies, and actions. To complement the work of the Bicycle and Pedestrian Task Force, other existing committees and stakeholder groups were engaged, including the Southeast Michigan Active Transportation Committee and the Southeast Michigan Trails Action Team. Task force members are listed in the Acknowledgements section of this plan.

The public was also engaged, providing input through public forums at the county level. In addition to these public meetings, a public survey on bicycle and pedestrian travel was conducted. Results of the survey are summarized in User Analysis in Chapter 1; complete results are included as Appendix C.

Chapter 2: Regional Priorities

Regional Policies and Actions

The following regional policies provide overall guidance for improving bicycle and pedestrian mobility in Southeast Michigan. The actions listed below each policy provide support for coordinated implementation activities, both locally and regionally.

Connect and expand the network of walking and biking infrastructure in the region to provide a safe, comfortable, and convenient experience for people of all ages and abilities.

- Expand and enhance bicycle and pedestrian infrastructure to connect regional corridors, and in areas with demand to improve comfort levels, safety, equity, and accessibility.
- Work with the MDOT and county and local agencies to develop and apply context-sensitive planning tools to assist with implementation.
- Inventory the regional trail system and analyze current conditions to prioritize development on critical gaps for a connected regional network.
- Continue to collect, map, and disseminate data to support the bicycle and pedestrian network.
- Develop minimum design standards for bicycle and pedestrian infrastructure based on road characteristics and community context, and promote consistency across jurisdictions.

Ensure equitable access to core services and regional destinations for pedestrians and bicyclists, including connections to other transportation modes.

- Analyze sidewalk data to understand condition, accessibility, and pedestrian comfort factors.
- Develop criteria for use in prioritizing projects that encourages improved comfort levels and investment in areas identified by SEMCOG's demand and equity analyses.
- Support community-led Americans with Disabilities Act (ADA) transition plans for sidewalks, bikeways, paths, and crosswalks, and promote universal design principles for infrastructure that is accessible to people of all ages and abilities.
- Encourage provision and distribution of micro-mobility options to ensure that they are available for people of all ages, abilities, and incomes.

Increase safety for pedestrians and bicyclists with systemic approaches to roadway design, traffic operations, education, and enforcement.

- Continue to support the state's Towards Zero Deaths (TZD) vision, and further explore opportunities to develop local and regional plans to eliminate traffic fatalities and serious injuries.

- Analyze the region's nonmotorized system based on risk factors for pedestrians and bicyclists to identify focus areas for road safety audits and safety treatments.
- Support development of safe rules and standards for infrastructure related to emerging micro-mobility options.
- Encourage coordination and data sharing on crashes involving bicyclists and pedestrians between health-care providers, public-safety offices, and local communities.
- Support local communities in identifying locations and infrastructure treatments to provide safe routes to schools, parks, and other core services.
- Promote development of community traffic calming implementation plans to reduce the frequency and severity of crashes on a systemic basis.
- Work with legislators, law enforcement, local communities, and advocacy groups to identify enforcement mechanisms that can protect the safety of bicyclists and pedestrians.

Promote healthy lifestyles and vibrant communities with expanded options for pedestrian and bicycle mobility, recreation, and tourism.

- Support the planning, branding, and marketing of regional trails and touring routes.
- Support efforts that increase bicycle and pedestrian mobility and support placemaking to include achieving state and national designations or implementing signage and wayfinding guidance.
- Integrate the linkage of health and nonmotorized travel through partnerships with other organizations, such as health-care providers, recreation organizations, and area agencies on aging.
- Incorporate elements of green streets that help curb stormwater runoff and improve safety with elements that are mutually beneficial for mobility, ecology, and aesthetics.
- Work with county health departments and support public health impact assessments to promote development and enhancement of bicycle and pedestrian infrastructure.
- Assist local communities in identifying planning and zoning regulations that support bicycle and pedestrian mobility.
- Work with employers and business districts on creating incentives or amenities that help promote walking and biking as a viable commuting option.

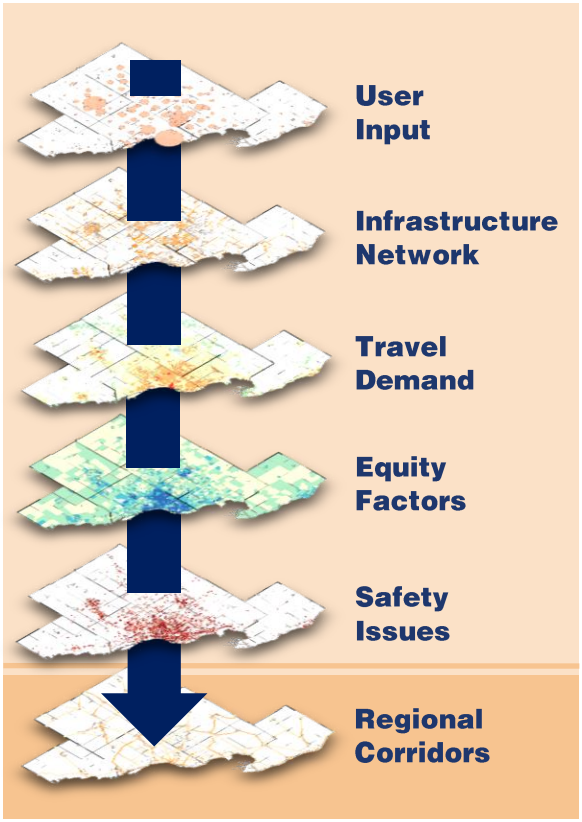
Provide education to encourage broader participation and awareness of walking and biking issues.

- Provide tools, information, and best practices on facility design, emerging trends, and related topics.
- Promote educational opportunities and events to encourage bicycling and walking.
- Promote regional safety education campaigns and align messaging across local, regional, and state agencies, and nonprofit organizations.
- Work with state and local governments and advocacy groups to educate all road users, including more information during driver's training, Safe Routes to School programs, and targeted public information campaigns.

Ensure the sustainability of the bicycle and pedestrian network with collaborative planning and adequate funding for development and maintenance.

- Analyze existing conditions to support maintenance and asset management programs for bicycle and pedestrian infrastructure.
- Collect and share data on bicyclists and pedestrians, coordinating with other entities to enhance the count database and understanding of nonmotorized travel.
- Coordinate with local, regional, and state on policy efforts related to active transportation and emerging issues such as e-bikes, micro-mobility devices, and data sharing.
- Coordinate with local, county, and state agencies to incorporate pedestrian and bicycle considerations early in the road project planning process.
- Work with local road agencies and Federal-Aid Committees to provide training and technical assistance for bicycle and pedestrian infrastructure.
- Promote flexibility in funding programs to ensure that pedestrian and bicycle infrastructure can be adequately funded.

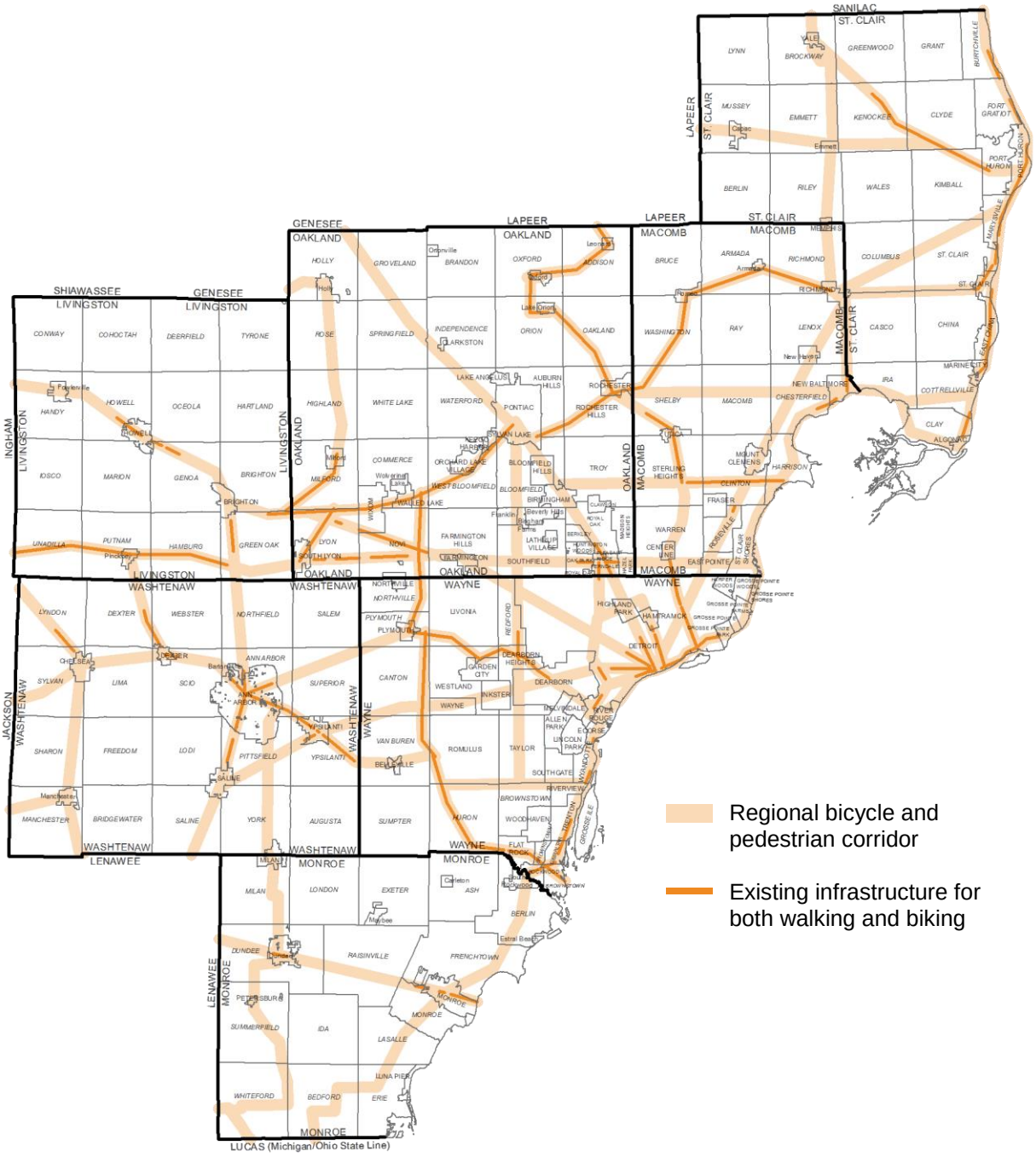
Regional Bicycle and Pedestrian Corridors



The regional policies and analysis included in this plan are the basis for establishing regional bicycle and pedestrian corridors. These corridors serve as the primary routes for longer distance trips, while also connecting local networks. At the regional scale, the bicycle and pedestrian network should seamlessly cross jurisdictional boundaries, connect residents to important destinations, and serve as an attraction that improves quality of life for both residents and visitors. The regional corridors identified in Figure 1 are intended to fill this need.

Currently, the regional corridors identified here may include a range of existing and planned infrastructure types, reflecting components of the regional trail network, designated bike routes, demand centers and equity emphasis areas, along with other aspects of the system. They can be used to facilitate cross-jurisdictional collaboration toward a common vision for bicycle and pedestrian mobility in Southeast Michigan.

Figure 1
Regional Bicycle and Pedestrian Corridors

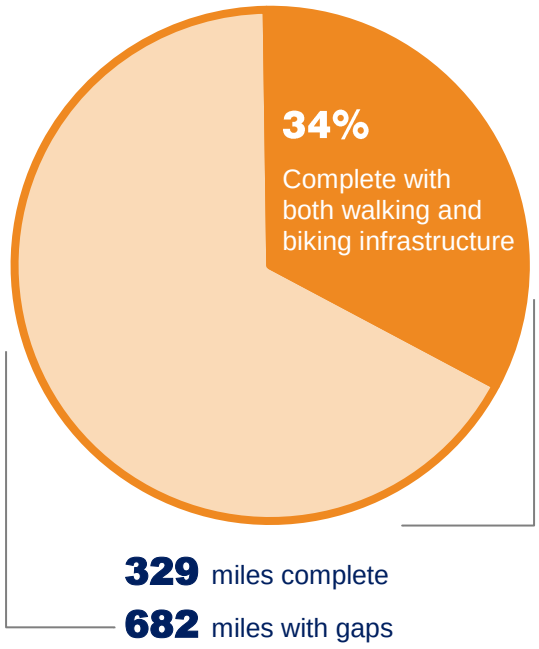


Approximately 34 percent of the regional corridor network is considered complete, with both pedestrian and bicycle infrastructure in place. While some infrastructure may exist in areas identified as gaps, further enhancements will be necessary to accommodate both walking and biking throughout the region. As a supplement to Figure 1, Appendix B includes a list of regional corridors with more information on each.

The corridors identified in this plan are not prescribed to a specific roadway, but are intended to follow the general route in a way that fits with local context. For example, while Woodward Avenue is a key corridor that connects many Southeast Michigan communities, it also experiences heavy vehicle traffic, several transit routes, and other conditions that make it less comfortable for biking. However, there are protected bike lanes in Midtown Detroit one block away on Cass Avenue that run parallel and provide a more comfortable connection along this route. With a robust network of sidewalks in the adjacent area, this is seen as a complete section of the regional corridor.

Local agencies are responsible for identifying the most appropriate route and infrastructure treatments to accommodate walking and biking safely, comfortably, and efficiently on regional corridors in their communities.

Figure 2
Regional Corridor Network Analysis



Chapter 3: Understanding Current Conditions

In recent years, Southeast Michigan has made great progress toward a more comprehensive regional bicycle and pedestrian system. As walking and biking infrastructure continues to expand and connect, so have the plans, programs, and policies that support its use. Current conditions in the region provide a strong foundation for bicycle and pedestrian mobility, however, significant gaps and barriers still exist.

To ensure that the bicycle and pedestrian system continues to grow in a way that meets both local and regional needs, this chapter analyzes current conditions and opportunities. A summary of each analysis is included in Figure 3. Together, these factors represent a layered approach to understanding the state of the regional system.

By looking at these factors together, Southeast Michigan communities can continue to develop infrastructure and programs in a way that is both collaborative and strategic. From a regional perspective, this holistic analysis ensures that bicycle and pedestrian infrastructure connects seamlessly across jurisdictional boundaries, and provides safe and convenient access to core services and destinations.

Figure 3
Current Conditions Analysis Summary

User Analysis
Compiles data about mobility patterns for bicyclists and pedestrians, and the role of their trips from a transportation perspective. This section also summarizes the results of SEMCOG's public engagement and input survey on walking and biking, and how conducting and evaluating user counts can support planning efforts.

Infrastructure Analysis
Identifies the region's existing infrastructure, including components that make up the bicycle network, pedestrian network, and regional trail network. With a primary focus on connectivity, this analysis also examines accessibility, gaps in infrastructure, and the planning or policy approaches that can enhance the network.

Demand Analysis
Identifies areas with demand for bicycle and pedestrian trips. It is based on concentrations of people and destinations, and may be used to understand which areas already support a high level of bicycle and pedestrian mobility, along with where more trips are likely to occur if infrastructure, policies, and programs were in place.

Equity Analysis
Identifies populations within the region through an equity lens based on socioeconomic factors that may impact their mobility. Walking and biking infrastructure can lead to many positive benefits for a community, and this analysis can be used to ensure that the system is accessible for people of all ages, abilities, and backgrounds.

Safety Analysis
Examines traffic crashes involving pedestrians and bicyclists over the past five years. This analysis may be used as a starting point to determine where infrastructure improvements and education would be most effective at solving traffic safety issues.

User Analysis

This section compiles data about mobility patterns for bicyclists and pedestrians, and the role of their trips from a transportation perspective. It also summarizes the results of SEMCOG's public engagement and input survey on walking and biking, and how conducting and evaluating counts can lead to improved planning.

Understanding how people currently use the transportation system is important for planning improvements and addressing challenges. This section analyzes three sets of data:

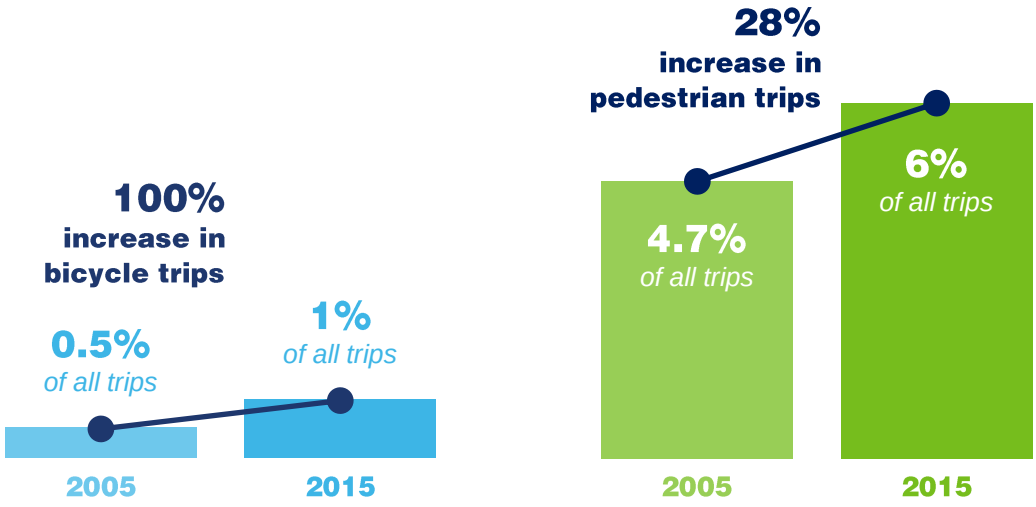
- Mobility patterns for walking and biking since 2005.
- Results of SEMCOG's Bicycle and Pedestrian Survey.
- Two complementary sources of bicycle and pedestrian counts for evaluating usage.

Together, the data provides information on how residents currently use the bicycle and pedestrian network, and the ways in which it could be improved to better meet their needs.

Bicycle and Pedestrian Mobility Patterns

As in many large metropolitan areas, driving is the most common way that people get around in Southeast Michigan. Walking and biking, however, are a part of daily mobility patterns that have grown significantly in recent years. Since 2005, walking trips in the region have increased by 28 percent, and represent six percent of all trips. In the same time period, the amount of biking trips has nearly doubled, from one-half to one percent of all trips. Combined, they currently account for approximately seven percent of all trips in the region, a 35 percent increase from 2005. During that time driving trips have decreased by 2.4 percent.

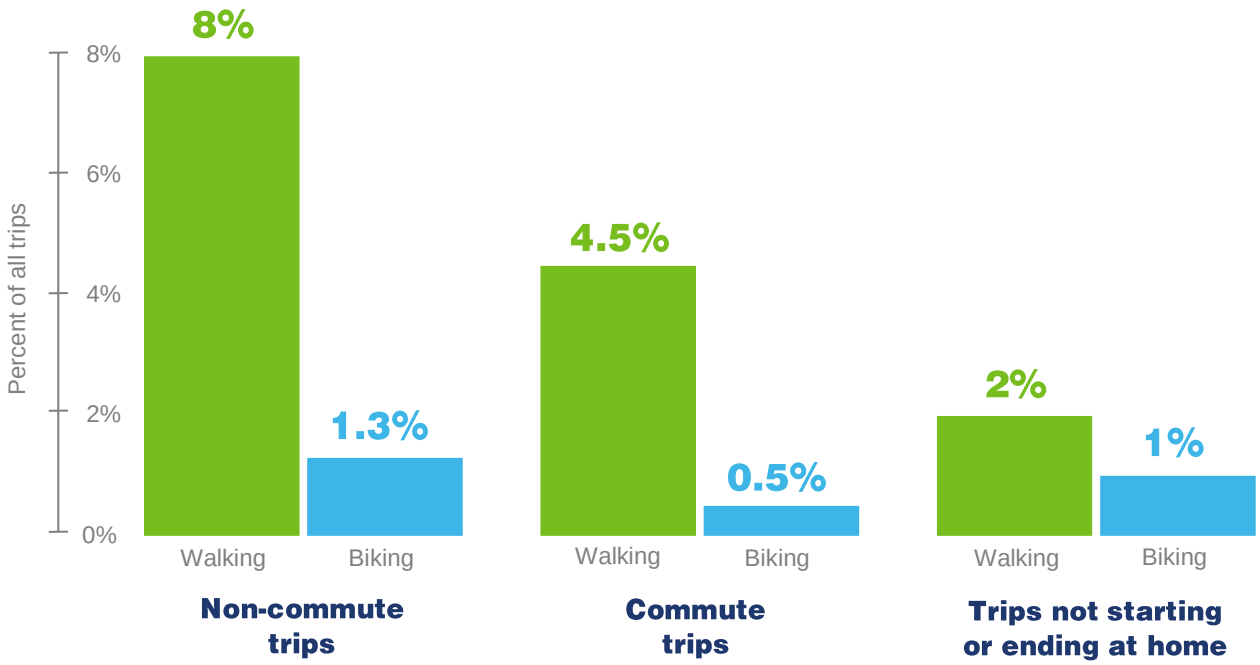
Figure 4
Bicycle and Pedestrian Mobility Patterns since 2005



Source: SEMCOG's 2005 and 2015 Household Travel Surveys

The decision to walk or bike rather than drive or use transit can vary depending on a trip's purpose. As shown in Figure 5, different mobility options represent a combined change of more than 200 percent for different types of trips. While Southeast Michigan commuters are much more likely to drive to work, the likelihood that a person will walk increases nearly four times for non-commuting trips. People making the decision to bike are less impacted by their commuting habits, but appear to be more limited by what they may need to carry, such as shopping bags, or their access to a bicycle for trips that do not start or end at home.

Figure 5
Mobility Patterns by Trip Purpose

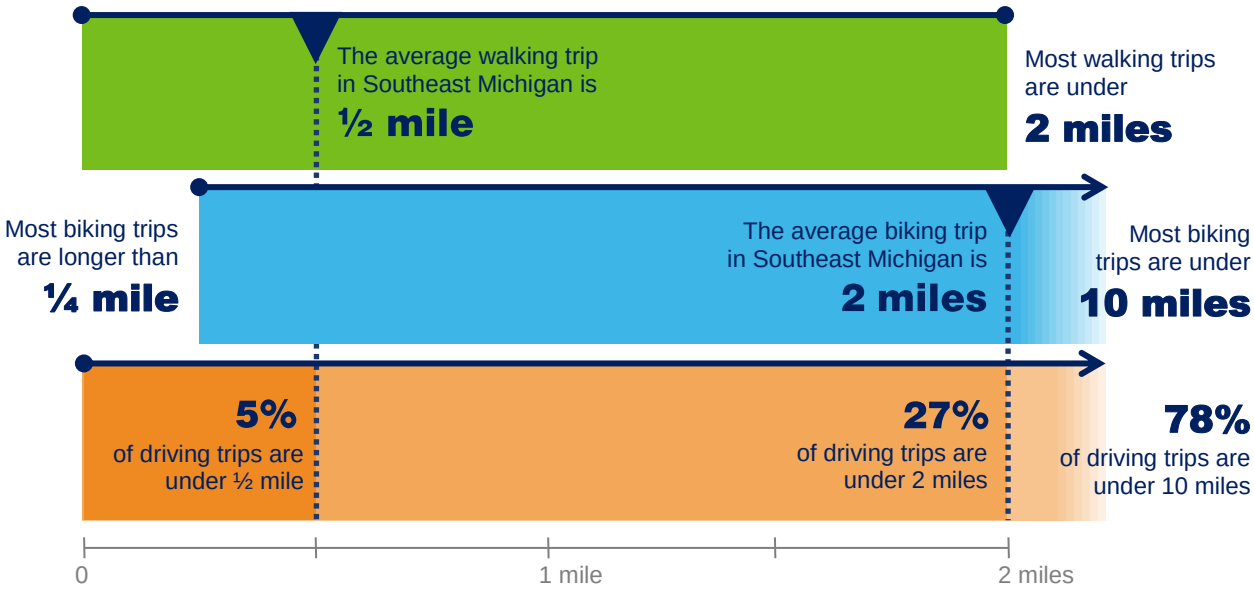


Source: SEMCOG's 2015 Household Travel Survey

These ranges in trip purposes indicate that the region's bicycle and pedestrian network meets some needs better than others. It also shows that there is potential to serve more purposes if certain resources or services were enhanced. For example, programs like Southeast Michigan's Commuter Connect, that promote and incentivize walking or biking as commuting options, could further encourage users who already walk or bike for other purposes to try an alternative way of getting to work. Expanding bikeshare systems could also make it more viable for users to bike between destinations when they are away from home. In all cases, continuing to connect and enhance bicycle and pedestrian infrastructure will increase the convenience of walking and biking and the safety of users, regardless of their trip purpose.

The distance of a trip also influences a user's decision to walk or bike (Figure 6). In Southeast Michigan, the average walking trip is approximately one-half mile; the average biking trip is approximately two miles. While many users make longer trips, particularly for recreational purposes, 98 percent of all walking and biking trips in the region are less than two miles and 10 miles, respectively. In general, the minimum distance for biking trips is approximately one-quarter mile, indicating that walking may be better suited for even shorter trips.

Figure 6
Mobility Patterns by Trip Distance



Source: SEMCOG's 2015 Household Travel Survey

By comparison, approximately five percent of all driving trips in the region are less than one-half mile, or the average distance of a walking trip. More than one-quarter of driving trips are less than two miles, or the average trip distance for biking. These figures indicate that there is significant potential to convert more driving trips to walking and biking, if safe and well-connected infrastructure is provided. Such a change could have a significant impact on congestion and a reduction in emissions. Land use and development patterns that encourage a more concentrated density of core services and destinations can also help accommodate more short trips, and increase accessibility for bicyclists and pedestrians to reach them.

Bicycle and Pedestrian Survey Results

The public survey conducted to help develop this plan supports the mobility patterns data, with 96 percent of residents indicating that they typically use an automobile for daily travel. While driving is the primary choice for most trips, 79 percent of residents walk and 54 percent bike on a daily or weekly basis.

Results show significant interest in walking and biking and a need to continue to support investment and improvements in infrastructure. This is further supported by nearly two-thirds of residents reporting that they would like to walk more often and nearly three-quarters wishing to bike more often.

For both walking and biking, the majority of residents reported that they do so for recreational purposes. Up to 26 percent reported walking and up to 31 percent reported biking for transportation purposes. This shows the continued need to provide infrastructure and facilities that meet both the region's recreational and transportation needs. Residents were encouraged to identify the types and location of places that they most often walk or bike by dropping "map markers" throughout the region. Figure 7 shows that the most popular destinations were parks and recreation, followed by shopping, dining, and other social activities. These destinations accounted for 74 percent of all the markers placed in the region.

Figure 8 shows the locations where people indicated they are currently walking or biking. While there are locations throughout the region that are walking and biking destinations, the highest concentrations are in the City of Detroit, Ann Arbor, and Southeast Oakland County. Appendix C provides detailed maps and analysis of each of the major destinations.

Highlights of the survey results include:

Walking or biking to parks and recreation destinations:

- 36 percent of residents indicated that they could, while 24 percent wished they could;
- Major regional parks identified with the highest level of interest for walking or biking were Belle Isle Park, Hines Park, Island Lake State Recreation Area, Stony Creek Metropark, Kensington Metropark, and Elizabeth Park.

Walking or biking to destinations for shopping, dining, or other social activities:

- 33 percent of residents indicated that they could, while 27 percent wished they could;

Figure 7
Types of Walking and Biking Destinations Selected

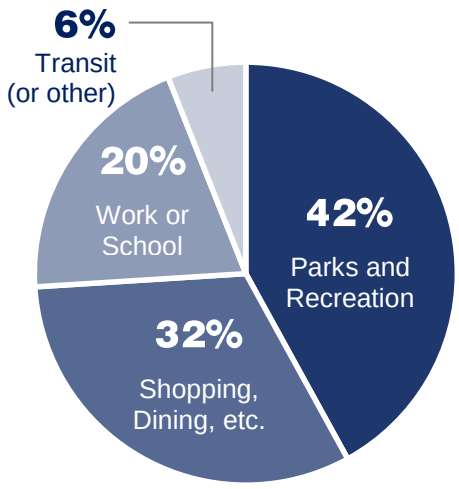
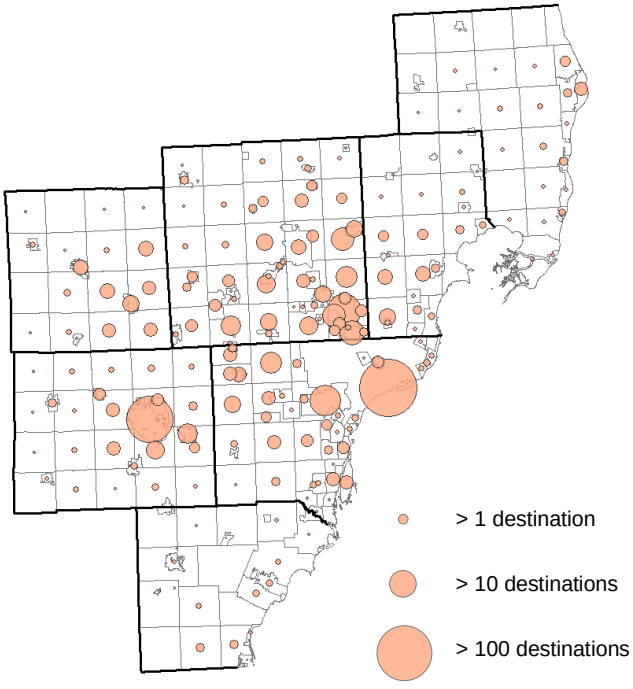


Figure 8
Location of Walking and Biking Destinations Selected



- Communities with the highest number of locations marked for walking and biking were Ann Arbor, Detroit, Ferndale, Rochester, Royal Oak, and Ypsilanti.

Walking or biking to school or work:

- 22 percent of residents indicated that they could, while 33 percent wished they could;
- The region's major job centers received the highest number of locations selected for walking or biking – Ann Arbor, Dearborn, Detroit, Rochester Hills, Royal Oak, and Southfield;
- Of the four destinations, reaching a school or work by walking or biking was reported to be the most challenging.

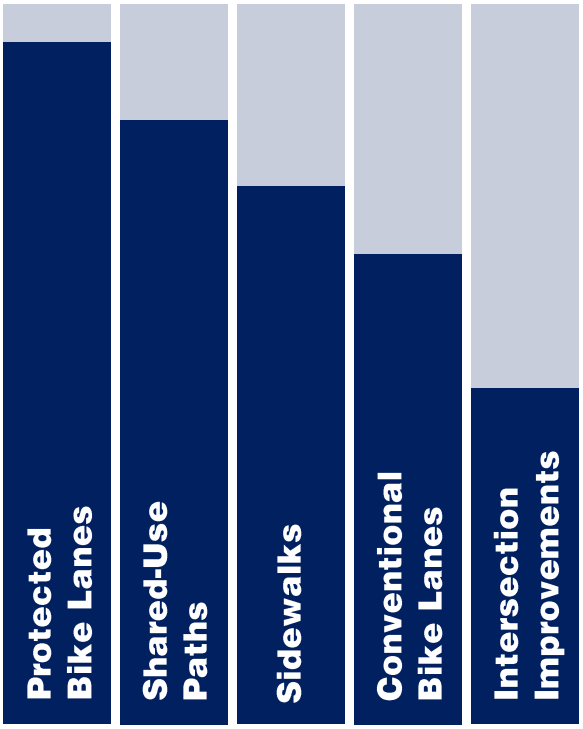
Walking or biking to transit (or other destinations):

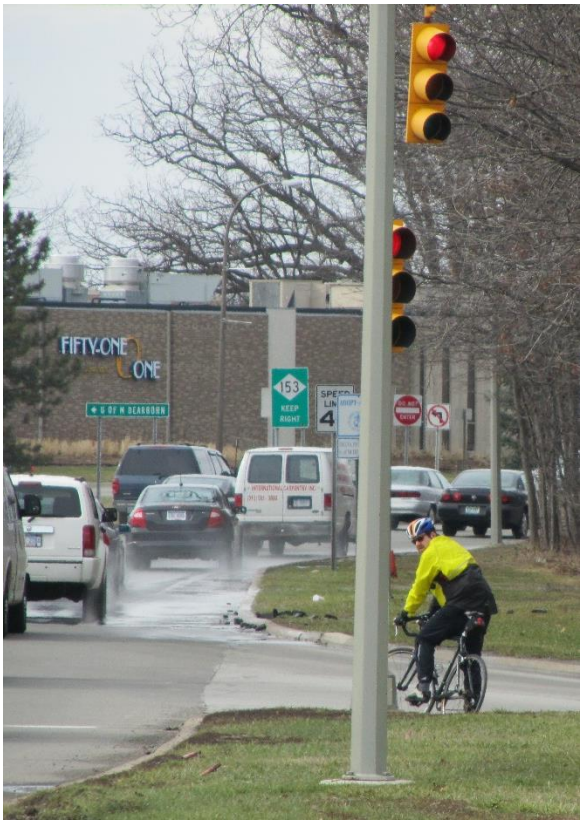
- 33 percent of residents indicated that they could, while 29 percent wished they could;
- Communities with the highest number of locations marked for walking and biking – Ann Arbor, Dearborn, Detroit, and southeast Oakland County communities.

Infrastructure Priorities

The survey also asked residents to rank investment priorities for improving and expanding the region's bicycle and pedestrian network. Residents ranked the types of infrastructure that they support most for investments (Figure 9). Additional infrastructure improvements that received the lowest priority for funding were shared-lane markings and midblock crossings.

Figure 9
Highest Priorities for Investing in Infrastructure Improvements





Challenges and Opportunities

While there is currently growing interest in walking and biking throughout the region, residents noted several impediments that limit their ability to either walk or bike. For walking, the major impediments are weather, distance or time constraints, and lack of sidewalks or paths. For biking, the greatest issue reported was a lack of infrastructure, with weather, personal safety or security, and pavement conditions also cited as challenges.

Regionally, there were several major themes for why residents could not reach desired destinations. For each location cited, the respondent could further describe the challenge as a physical barrier or gap in infrastructure, a safety issue, problems related to maintenance or condition, or other impediment.

Infrastructure Gaps and Barriers

The most commonly cited impediments were physical barriers and gaps, specifically related to a lack of bicycle and pedestrian infrastructure. In suburban and rural areas of the region, a lack of sidewalks and bicycle paths connecting to parks, schools, and regional trails were commonly cited. Across the region, gaps in shared-use paths and trails was a common impediment to walking and biking more often, as they are typically seen as the most comfortable type of infrastructure for most users.

Safety Issues

Safety issues were cited as an impediment across the region. These were mostly site-specific along the region's major road corridors. Common pedestrian safety issues across the region were a lack of safe crosswalks, and locations where existing infrastructure did not provide adequate timing for crossing, particularly in city centers and commercial areas. Poor pavement conditions were commonly noted for sidewalks and paths. Expressways were highlighted as a significant barrier to

pedestrian accessibility, with the following locations of most concern – I-75 and I-696 in Oakland County, US-23 and I-94 in Washtenaw County, and I-94 in Macomb County. For biking, common safety concerns related to sharing the road with drivers that were traveling too fast, distracted, and/or aggressive. In areas with bicycle infrastructure, bike lanes were commonly noted as being too narrow, with many users looking for more separation or protection from vehicle traffic.

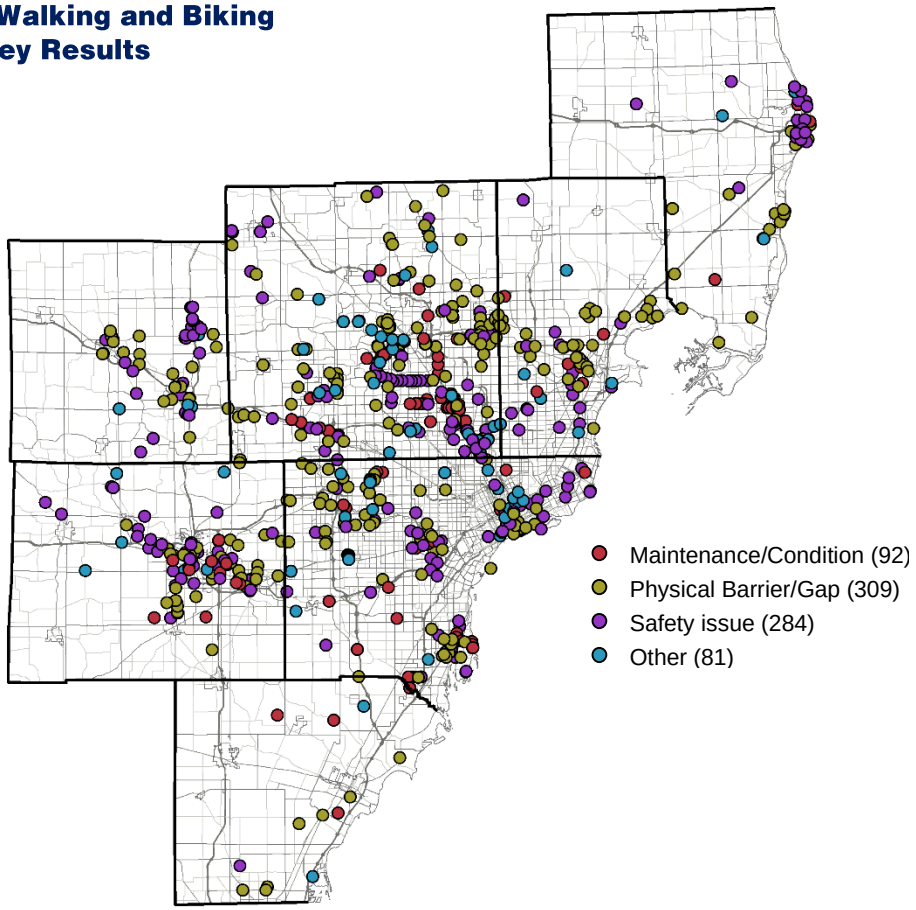
Maintenance and Condition Deficiencies

The general need for improved pavement conditions was by far the greatest need, both within the roadway and on sidewalks and trails. Road maintenance, construction, railroad crossings, flooded streets, and lack of snow removal were common impediments for both bicyclists and pedestrians. Infrastructure that does not accommodate all ages and abilities was another major impediment across the region. These design and maintenance issues limit a person's ability to access core services and connect to other travel modes. For example, while a transit stop may be in close proximity to a destination, the stop may not be accessible or safe to use for people with disabilities.

Figure 10 shows the location of all the impediments noted by survey respondents. The comments and issues cited have been included in SEMCOG's analysis of gaps for this plan and available for further analysis to interested communities and road owners. Additionally, these locations should be reviewed as construction occurs and the region's pedestrian and bicycle network continues to develop.

Figure 10

Impediments to Walking and Biking from Public Survey Results



Bicycle and Pedestrian Counts

Counting bicyclists and pedestrians is another way to evaluate user activity and mobility patterns. In addition to learning more about how many people are walking and biking, counts help to understand the difference in travel patterns and mobility options on weekdays and weekends, or with changes in the seasons. This helps confirm the accuracy of survey data, and diversify the data inputs to SEMCOG's transportation planning. As these tools are enhanced, they also support community planning efforts.

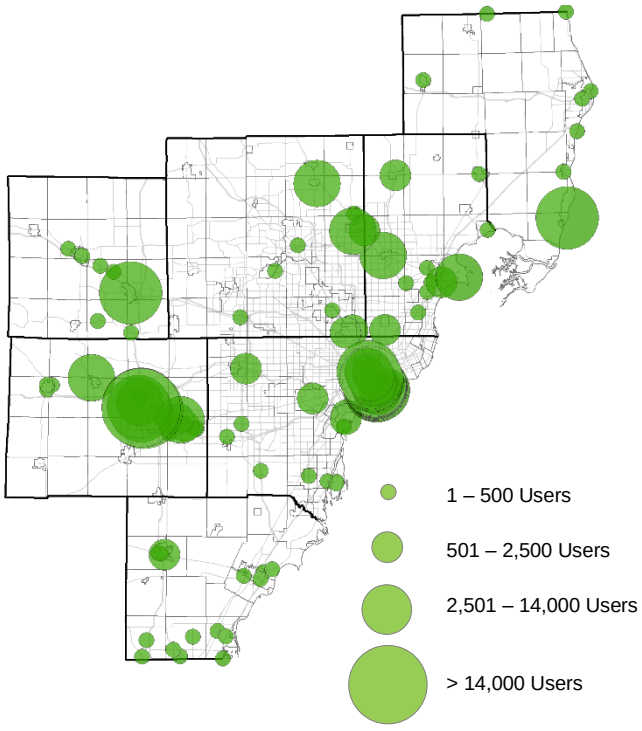
Over the past four years, SEMCOG has conducted nearly 200 counts of bicyclists and pedestrians. These have occurred in more than 50 communities across all seven counties, sampling a variety of roadways, community types, and bicycle and pedestrian infrastructure. Collectively, more than 266,000 pedestrians and 23,000 bicyclists have been counted through this program. Figure 11 shows the location of these counts with the size of each circle representing the scale of the number of users counted.

SEMCOG's bicycle and pedestrian count program is based on short duration counts, which are typically taken over the course of 16 hours on a single day, using video counting technology. Additional counts will continue to build the database and highlight regional trends. Findings from the counts conducted thus far:

- The four highest pedestrian counts in the region were in the City of Ann Arbor, with the most at the intersection of State Street and University Avenue with more than 30,000 pedestrians.
- More than 1,500 people were counted walking or biking in Lake Orion though the intersections of Atwater Street and the Paint Creek Trail.
- In the Village of Dundee, nearly 600 people walked through the intersection of Main Street and Tecumseh Street on a regular weekday.
- In the City of Brighton, more than 2,500 people were counted crossing Main Street to Mill Pond Park.
- More than 100 people were counted along Fred Moore Highway in St. Clair County, where there is currently no walking or biking infrastructure.

SEMCOG's online Bicycle and Pedestrian Count map provides information on counts conducted through this program. While they do not represent daily averages, the counts do include information for specific dates and times. The true number of people walking or biking in these locations may vary depending on time, weather, or special events.

Figure 11
SEMCOG's Bicycle and Pedestrian Count Program Findings



With advances in technology, other resources are available to supplement SEMCOG's surveying, counting, and travel-model methods. Big data sources and smart phone apps include information from cell phone GPS and location services, providing a large sample of frequently updated information. While these are often not created specifically for transportation planning, the information they provide can be useful in understanding general trends, mobility patterns, and route selection.

One such source is STRAVA, a mobile app that is primarily used to track physical activity such as walking, running, and biking. While this may be a limited sample of users, studies have shown it to be generally representative of the overall population, and helpful to understand route selection, and changes in user statistics over time. Figure 12 displays a sample STRAVA heatmap for the Island Lake State Recreation Area and Kensington Metropark. Based on STRAVA user data from 2018, Table 1 summarizes the top 10 locations in the region where pedestrian and biking trips were logged in 2018.

Figure 12
Example of STRAVA Heatmap

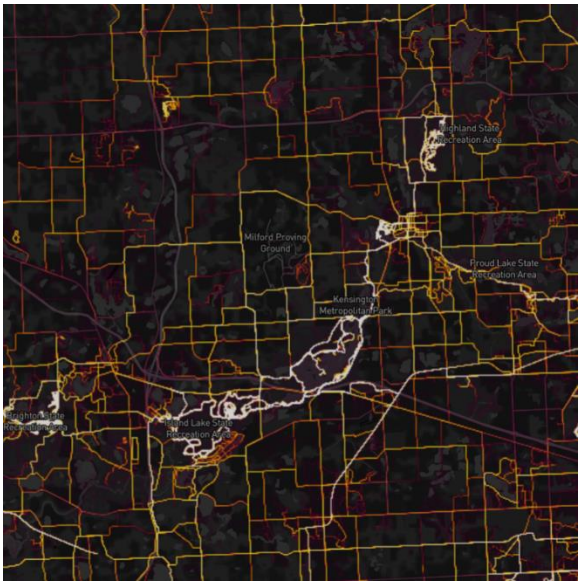


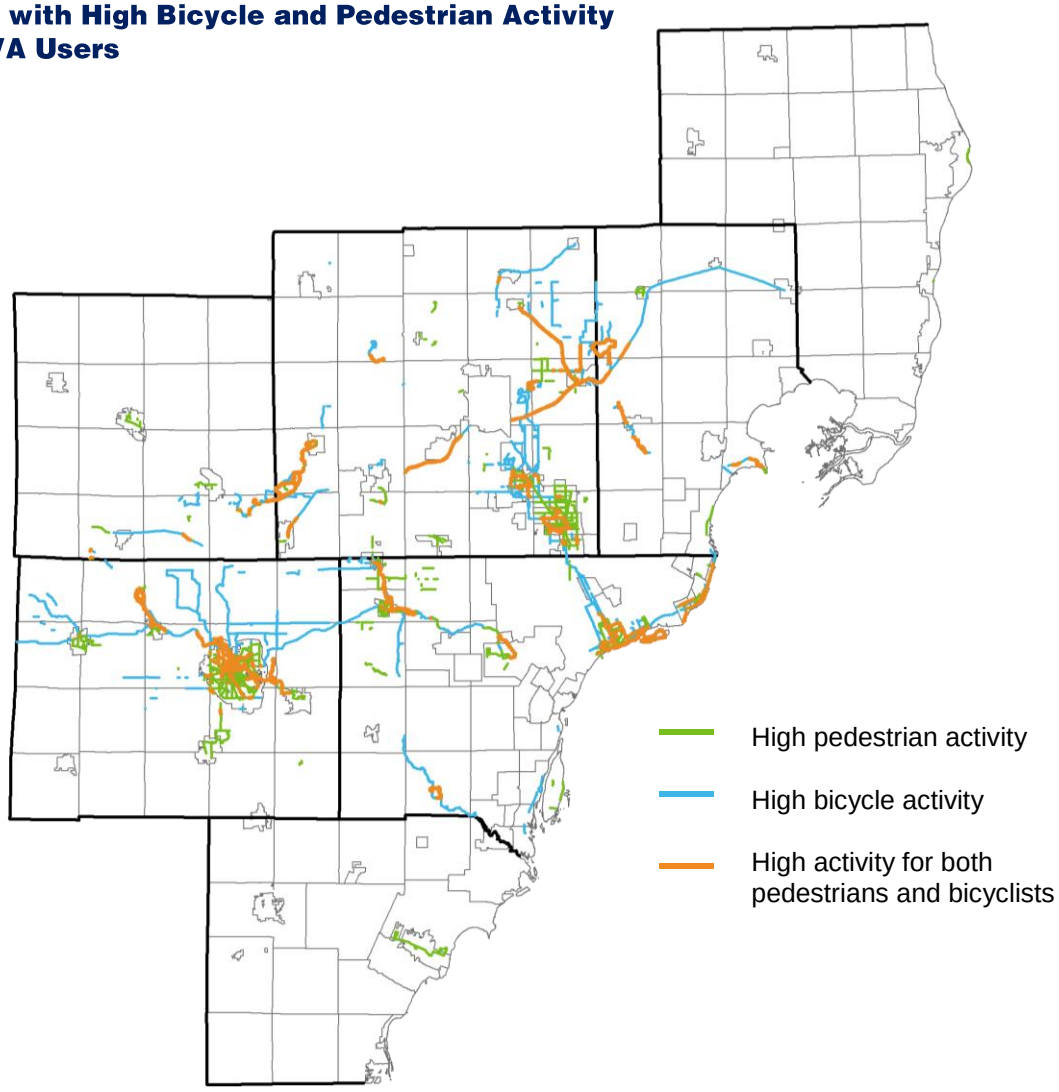
Table 1
Top Walking and Biking Locations for STRAVA Users

	Walking Trip Locations		Biking Trip Locations
1	Border to Border Trail, City of Ann Arbor	1	Island Lake State Recreation Area
2	Detroit RiverWalk, City of Detroit	2	I-275 Metro Trail, Plymouth Township
3	Long Shore Drive, City of Ann Arbor	3	Huron River Drive, Scio Township
4	Barton Drive Boardwalk, City of Ann Arbor	4	Stony Creek Metropark, Shelden Trails
5	Broadway Street, City of Ann Arbor	5	Hines Park Bikeway, City of Livonia
6	Stony Creek Metropark, Hike-Bike Trail	6	Clinton River Trail, City of Rochester
7	Gallup Park Road, City of Ann Arbor	7	Kensington Metropark, Hike-Bike Trail
8	Main Street, City of Ann Arbor	8	Stony Creek Metropark, Park Road
9	Paint Creek Trail, City of Rochester	9	Belle Isle Park, Loop Trail
10	Dequindre Cut, City of Detroit	10	Macomb Orchard Trail, Shelby Township

While further evaluation of STRAVA data is necessary to understand its implications and limitations, here are some highlights:

- 80 percent of bicycle activity and 90 percent of pedestrian activity is within SEMCOG's Bicycle and Pedestrian Demand Areas (see Demand Analysis).
- Cass Avenue, in Detroit, which had a road diet and protected bike lanes installed recently, has experienced a 264 percent increase in bicycle and pedestrian activity since 2014.
- Hamilton Avenue is the primary selected route for bicyclists between the greater downtown Detroit area and southeast Oakland County.
- Huron River Drive in Washtenaw County, a road with no formal bicycle infrastructure, has comparable usage to shared-use path segments of the Border-to-Border Trail.
- Main Street in Royal Oak has some of the highest pedestrian usage in Oakland County.
- Most users of the Macomb Orchard Trail are on the west side of the county in Shelby and Washington Townships.

Figure 13
Locations with High Bicycle and Pedestrian Activity for STRAVA Users



Infrastructure Analysis

This section identifies the region's existing infrastructure, including components that make up the bicycle network, pedestrian network, and regional trail network. With a primary focus on connectivity, this analysis examines accessibility, gaps in infrastructure, and the planning or policy approaches that can enhance the network.

Bicycle Infrastructure

Riding a bike is a flexible, affordable, and healthy way to get around that can be used for both transportation and recreation. While bicyclists may legally ride in vehicle travel lanes, or sometimes use sidewalks, their comfort and safety are often compromised in situations where infrastructure is primarily designed to accommodate other uses.

Dedicated bicycle infrastructure provides a mobility network designed specifically to meet the needs of bicyclists. Also known as bikeways, these components include shared-use paths, bike lanes, and other roadway improvements that complete the network, including shared-lane markings, wide-paved shoulders, and designated bike routes (Figure 15). For more information on these and other infrastructure components, see Chapter 5, Infrastructure Guidelines.

Over the past decade, Southeast Michigan's bikeway network has expanded rapidly. In 2010, the region's only on-road bike lanes were parts of limited, fragmented networks in just a few larger cities. By the adoption of SEMCOG's *Bicycle and Pedestrian Travel Plan* in 2014, the region's bicycle network had grown to more than 200 miles, and expanded its reach with additional types of infrastructure. Table 2 summarizes the change in Southeast Michigan's bicycle infrastructure since 2014; Figure 14 shows the current bicycle network. The region has seen growth in every type of bicycle infrastructure.

Table 2
Change in Bicycle Network

	Lane Miles		Percent Increase
	2014	*2020*	
Shared-Use Paths	1,096	1,233	13%
Bike Lanes	271	357	38%
Shared-Lane Markings	7	110	1,471%
Bike Routes	889	1,346	51%
Wide-Paved Shoulders	379	473	25%
All Bikeways	**2,642**	**3,519**	**33%**

Figure 14
Bicycle Network by Infrastructure Type

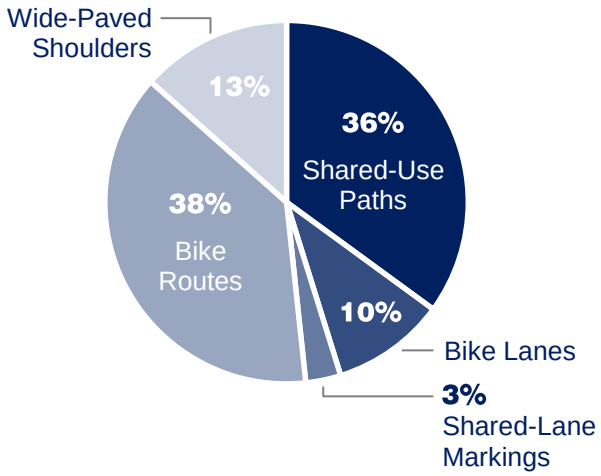
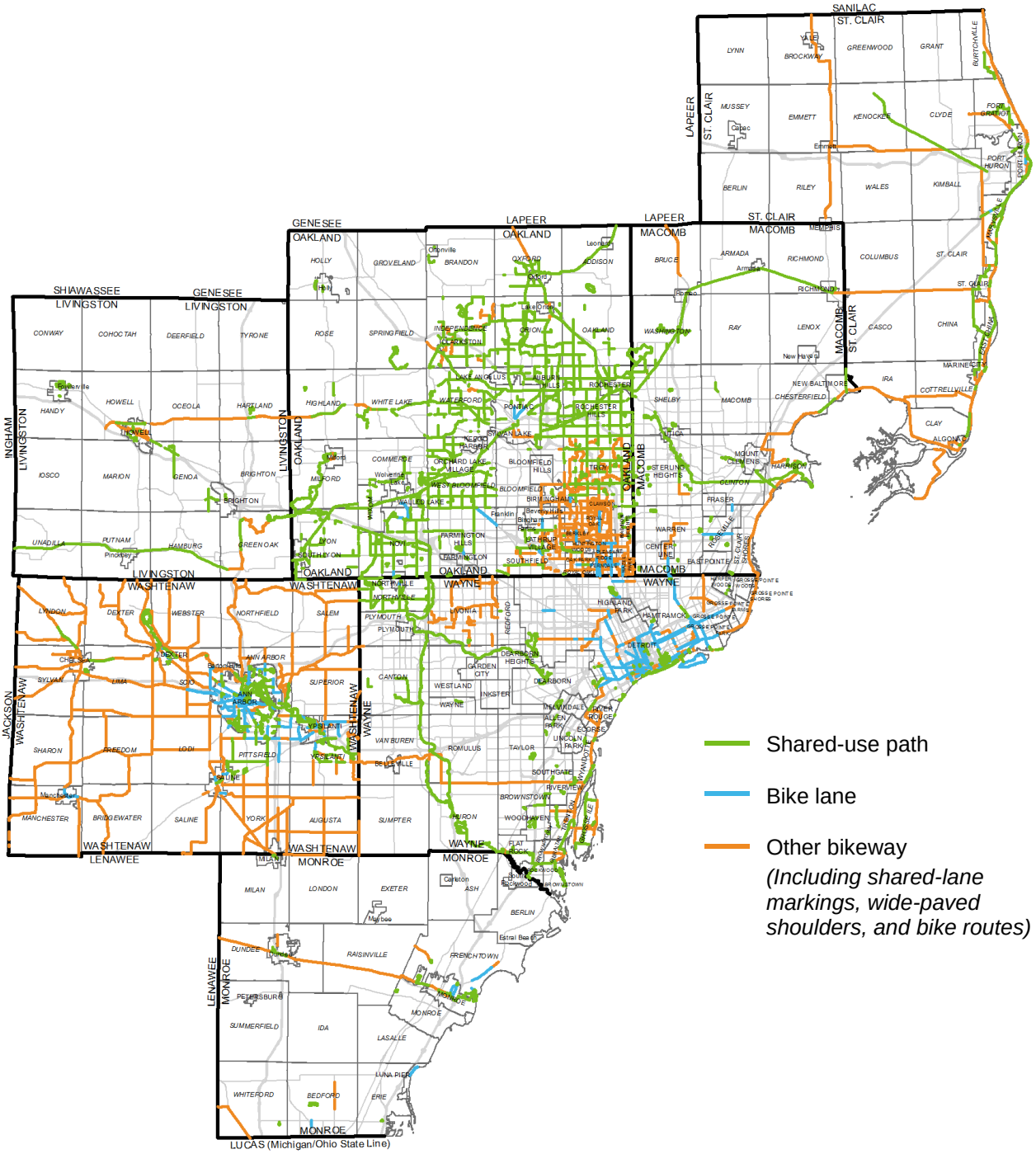


Figure 15
Bicycle Network



Access to Bicycle Infrastructure

While bicycle infrastructure is found throughout Southeast Michigan, it is not always equitably distributed, or accessible to the places where people live or want to go. For many in the region, access to bicycle infrastructure requires biking for some distance on sidewalks or roadways that do not have dedicated facilities in place. To make these connections, bicyclists may encounter conditions that are unsafe, or simply seen as inconvenient enough to deter them from biking altogether. While it is not necessary or suitable for every road to include dedicated bicycle infrastructure, ensuring reasonable access to the network is critical.

Gaps in Bicycle Infrastructure

Addressing gaps in bicycle infrastructure enhances mobility options, and leads to a more complete regional transportation network. As shown in Figure 16, approximately 52 percent of households in the region are within one-half mile of some type of bicycle infrastructure.

For households outside of this range, the analyses in this chapter can be used to understand which gaps may be a higher priority to address. For example, Figure 17 shows areas in the region that are further than one-half mile from bicycle infrastructure, but have some level of demand for bicycle transportation. Similarly, equity factors and safety issues can be considered when prioritizing gap areas.

Bicycle Access to Core Services

Expanding and connecting bicycle infrastructure can improve mobility for many Southeast Michigan residents. SEMCOG's 2016 *Access to Core Services in Southeast Michigan* report established regional benchmarks for bicycle accessibility. Table 3 shows the percentage of households that are within a 10-minute and 30-minute bike ride to core services. While these findings only represent bicycle travel times on the existing road network, regardless of whether or not bicycle infrastructure is in place, they demonstrate the value of bicycle infrastructure for enhancing access to core services, with the potential to connect with the majority of households in the region for the average trip distance.

Figure 16
Households Access to Bicycle Infrastructure

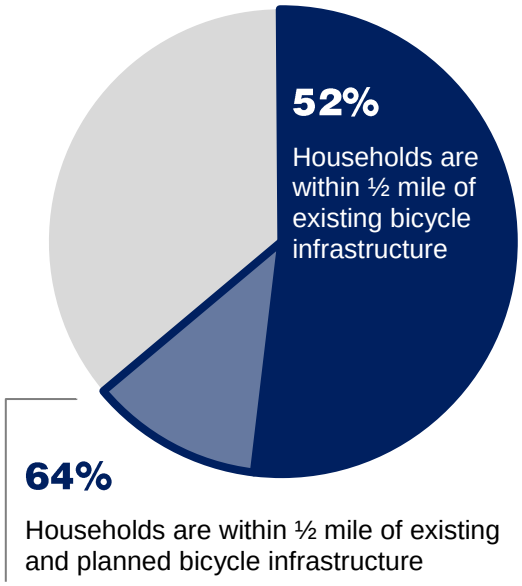
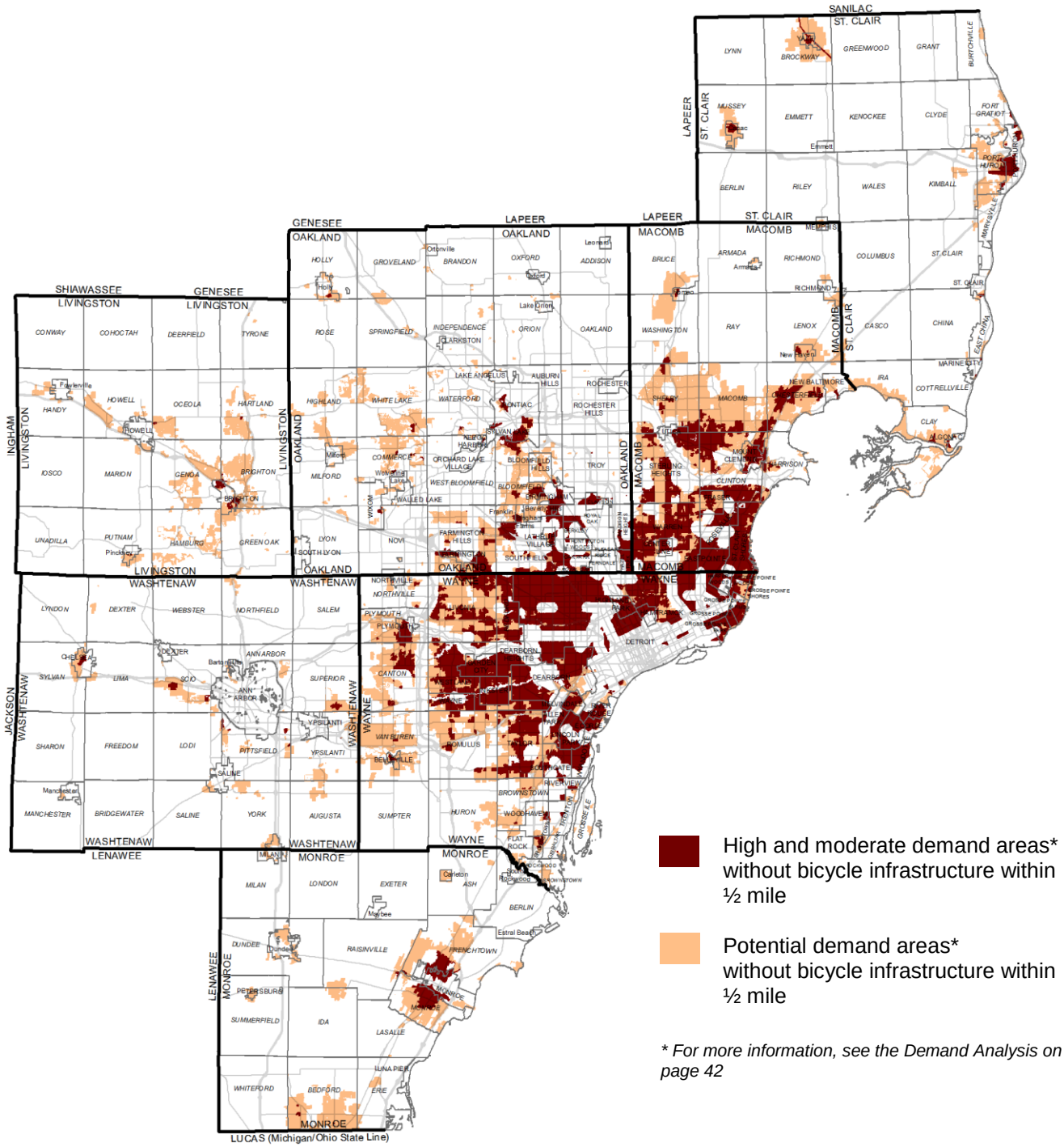


Table 3
Households within Biking Distance to Core Services

	10-minute Bike Ride	30-minute Bike Ride
Fixed-Route Transit	66%	96%
Health-Care Facilities	57%	94%
Libraries	45%	97%
Parks	89%	99%
Supermarkets	70%	96%

Figure 17
Gaps in Bicycle Infrastructure



High and moderate demand areas* without bicycle infrastructure within ½ mile

Potential demand areas* without bicycle infrastructure within ½ mile

** For more information, see the Demand Analysis on page 42*

Planning for Bicycle Infrastructure

At least 110 communities, five counties, and the Huron-Clinton Metroparks have adopted plans for bicycle infrastructure, which identify gaps in the network and strategies to fill them (Figure 18). The types of improvements planned to fill these gaps are summarized in Table 4; planned improvements are mapped in Figure 19.

Oftentimes, local plans identify a route or corridor, but may need to wait to determine the specific infrastructure treatment until the project is ready to be developed. As a result, much of the region's planned bicycle infrastructure is considered "undefined." Once developed, the planned improvements that are documented in local plans would increase access to bicycle infrastructure from 52 to 64 percent of the region's households (Figure 16).

Table 4
Planned Bicycle Infrastructure

	Miles
Shared-Use Paths	925
Protected Bike Lanes	64
Bike Lanes	440
Shared-Lane Markings	75
Designated Routes	314
Wide-Paved Shoulders	38
Undefined Improvements	2,387
All Planned Infrastructure	**4,243**

Figure 18
Local Bicycle and Pedestrian Plans

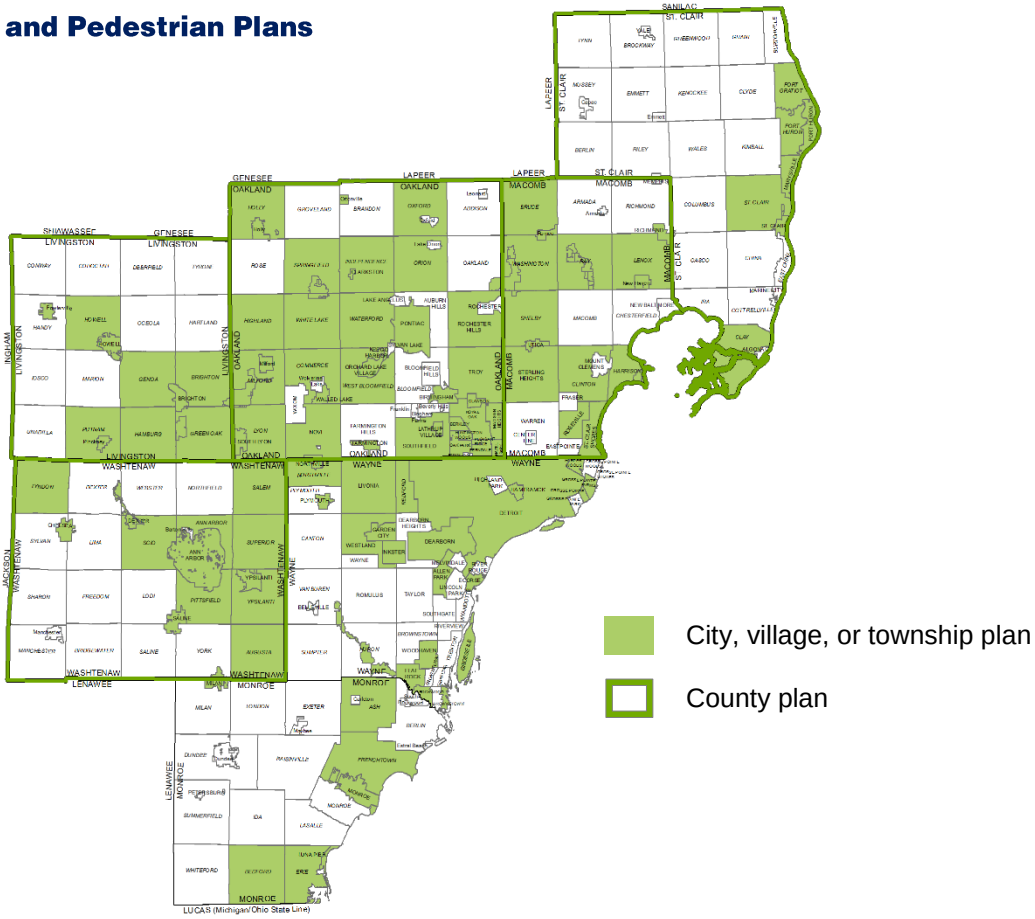
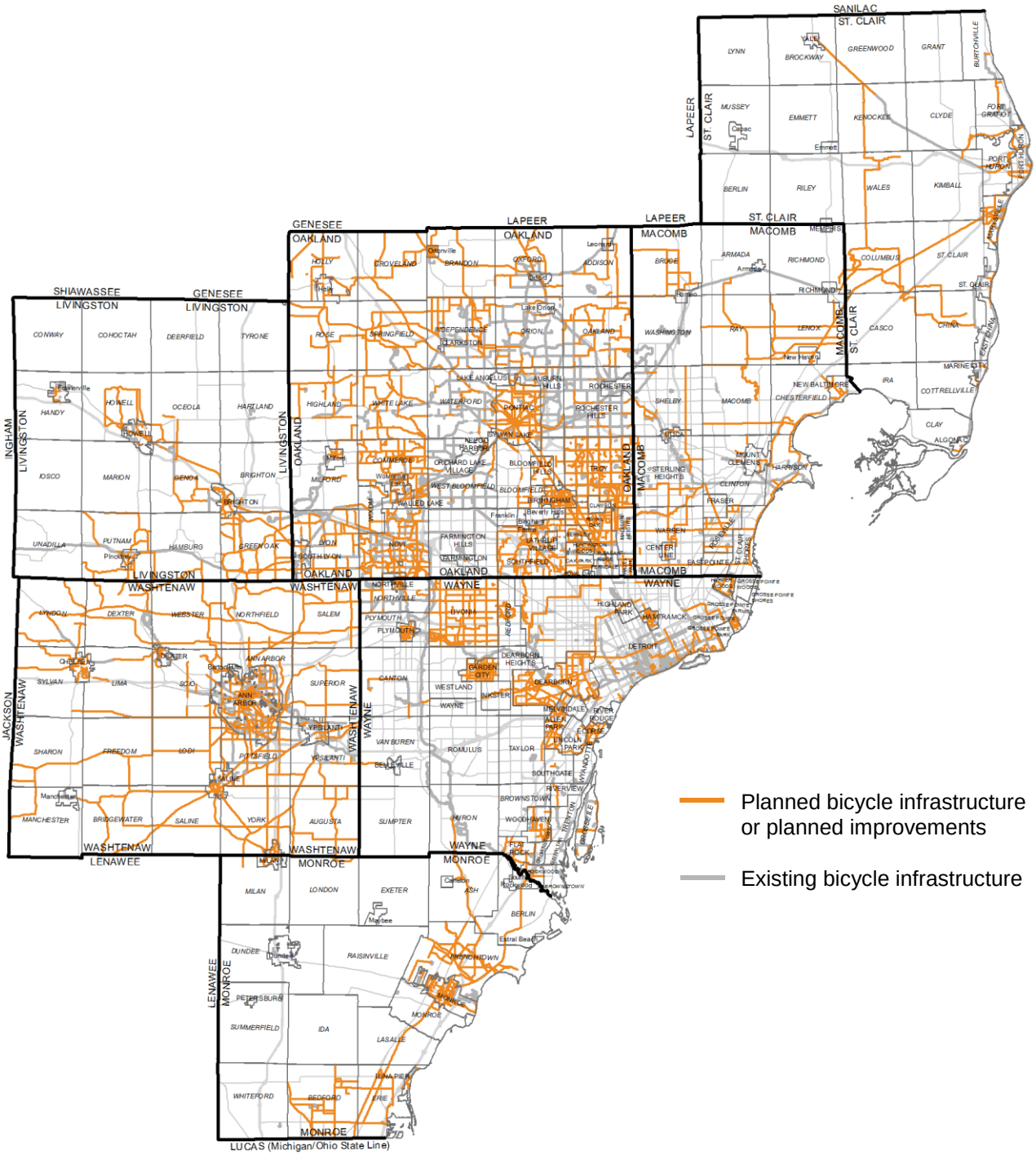
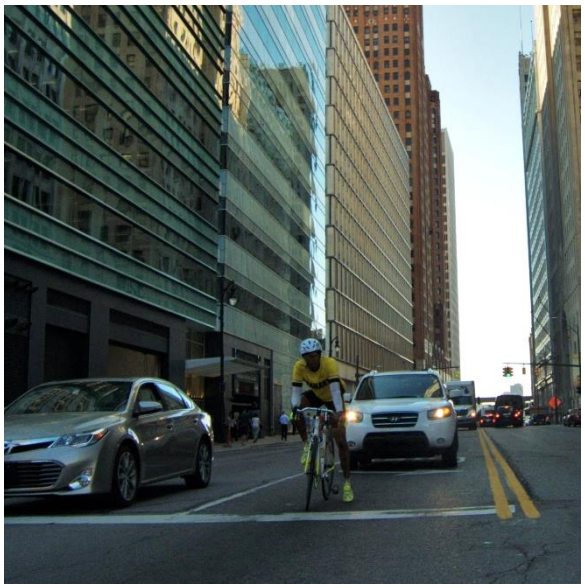


Figure 19
Planned Bicycle Infrastructure



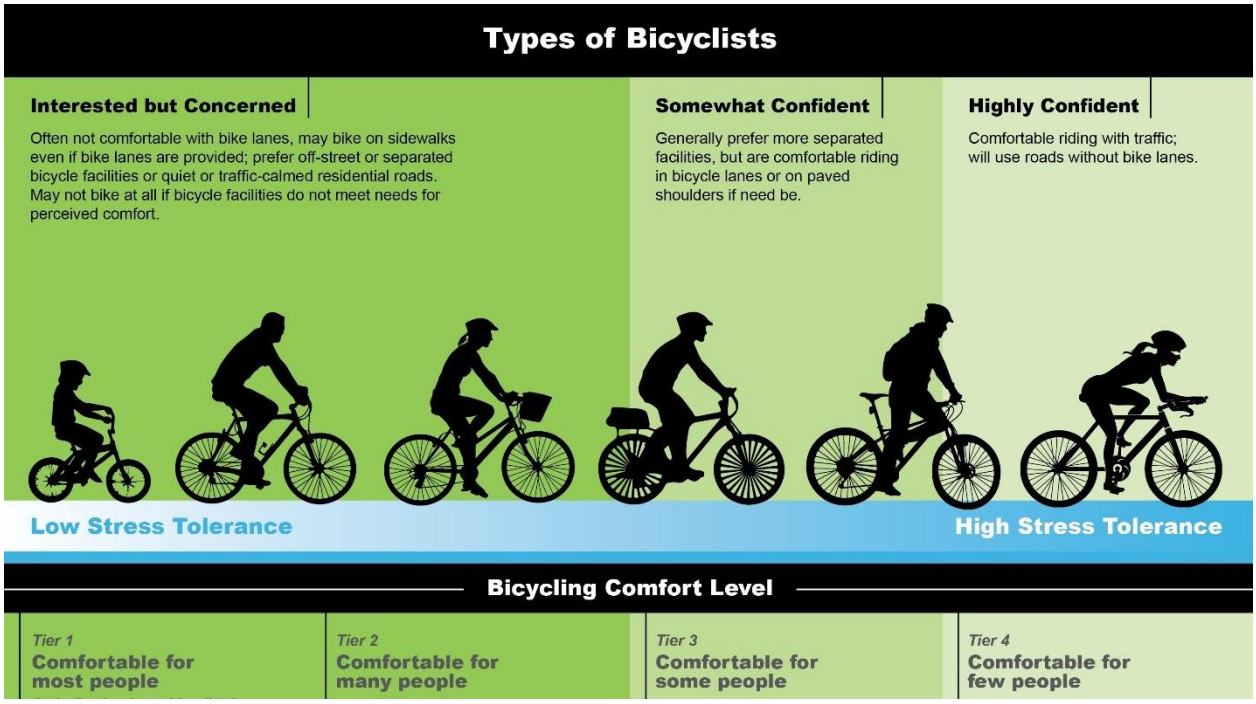
Bicycle Comfort Factors

Not all roadways are equally comfortable or amenable to biking. Factors such as traffic volume, number of lanes, road widths, on-street parking, turning lanes, and the speed at which vehicles travel play a significant role in how comfortable a road may be for bicyclists. Figure 20 shows the relationship between the three types of bicyclists and their likely comfort on different types of roadways. For example, a beginner bicyclist is much more likely to choose to ride on a roadway that provides a relatively high level of comfort (e.g., neighborhood streets with low speed limits), than they are to ride on a road with high speeds and traffic. Based on this understanding, SEMCOG's Bicycle Comfort Level analysis (Figure 20) classifies more than 28,000 miles of roadways into four tiers of comfort based on motorized traffic volumes, the number of travel lanes, posted speeds, and the presence of different bikeway features:



- **Tier 1** – Roadways and pathways that are likely **comfortable for most people**, including all of the Interested but Concerned bicyclists. These roadways are primarily neighborhood streets with low speed limits (25 mph or less) and shared-use paths and independent trails that provide separation between the roadway and are wide enough for bicyclists and pedestrians to safely share the space.
- **Tier 2** – Roadways that are likely **comfortable for many people,** including a majority of the Interested but Concerned adult bicyclists. These roadways may have either protected bike lanes, or buffered/conventional bike lanes with low motor vehicle volumes and posted speed limits. Some roadways with no bicycling facilities also fall into this category.
- **Tier 3** – Roadways that are likely **comfortable for some people**, including the Somewhat Confident bicyclists. These roadways may have buffered or conventional bike lanes along with higher volume and faster traveling vehicles. They may also have wide paved shoulders or shared-lane markings.
- **Tier 4** – Roadways that are likely **only comfortable for a few people**, usually the Highly Confident bicyclists. These roadways generally have no bicycle infrastructure, and will often involve sharing the road with faster-moving vehicles. In some cases, there is bicycle infrastructure, but it was designed primarily for the highly confident, adult touring bicyclists.

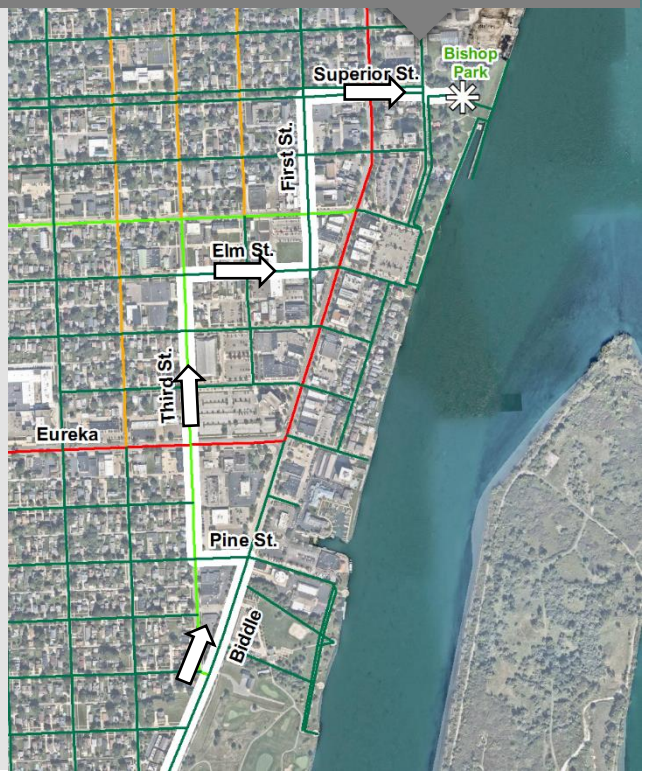
Figure 20
Types of Bicyclists by Comfort Level



Using the Bicycle Comfort Analysis for Route Planning

In the City of Wyandotte, Biddle Avenue is a major north-south corridor, and the city's core downtown. It is also unlikely comfortable for most people bicycling, as indicated in red on the map. Highly confident bicyclists may feel comfortable and choose to ride on the road there, but the majority of bicyclists are likely to choose an alternative route.

In this example, the Bicycle Comfort Analysis can assist with route planning for a bicyclist riding north along Biddle Avenue. A shared-use path provides good comfort until the rider approaches Eureka Road, where the path ends. At this point, signage may be useful in guiding a bicyclist along a more comfortable route, which is shown on the map in shades of green. One such route is along Pine Street, to Third Street, to Elm Street, to First Street, and finally to Superior Street. This route provides a more comfortable ride, and still provides access to local businesses, civic institutions, performance halls, and Bishop Park & Pier.



Pedestrian Infrastructure

Walking is a fundamental form of mobility that is essential to all other modes. Nearly every trip – including those made by car, transit, or bike – requires some amount of walking. Therefore, the function of the region's transportation system depends on a connected network of pedestrian infrastructure that provides safe places to walk. This also contributes to the economic vitality of a community and its residents. Additionally, walking is the most readily available form of exercise with the potential for positive impacts on public health and wellness.

Because walking is so flexible, the pedestrian realm can encompass both walkways and open spaces, and even range from parks to parking lots. While it is important to ensure a safe environment wherever pedestrians are present, this section focuses on dedicated pedestrian infrastructure that is specifically designed to provide access for walking – sidewalks, crosswalks, and shared-use paths. For more information on these and other pedestrian infrastructure components, see Chapter 5: Infrastructure Guidelines.

Since the adoption of the *Bicycle and Pedestrian Travel Plan* in 2014, SEMCOG has made great strides to collect more detailed and accurate information about the region's pedestrian infrastructure. At that time, benchmarks were established for shared-use paths, and areas likely to have sidewalks were estimated based on population and land-use patterns. For this plan, aerial imagery was collected and analyzed to define and understand the region's pedestrian network, including more than 24,000 miles of sidewalks (Figure 21).

Access to Pedestrian Infrastructure

Walkable access to commercial districts, schools, parks, and other destinations enhances the quality of life in a community. Pedestrian infrastructure provides critical access for people who are unable to drive, and also enhances opportunities for active lifestyles. An accessible, walkable environment also contributes to placemaking and economic development efforts.

In areas where sidewalks or walkways are unavailable, pedestrians may have no option but to walk along a roadway with little or no buffer from vehicle traffic, putting their safety at a greater risk. This can also be difficult, if not impossible, for pedestrians with visual or mobility restrictions, as the road surface and gravel shoulders are generally not designed for pedestrian use.

Figure 21
Pedestrian Infrastructure

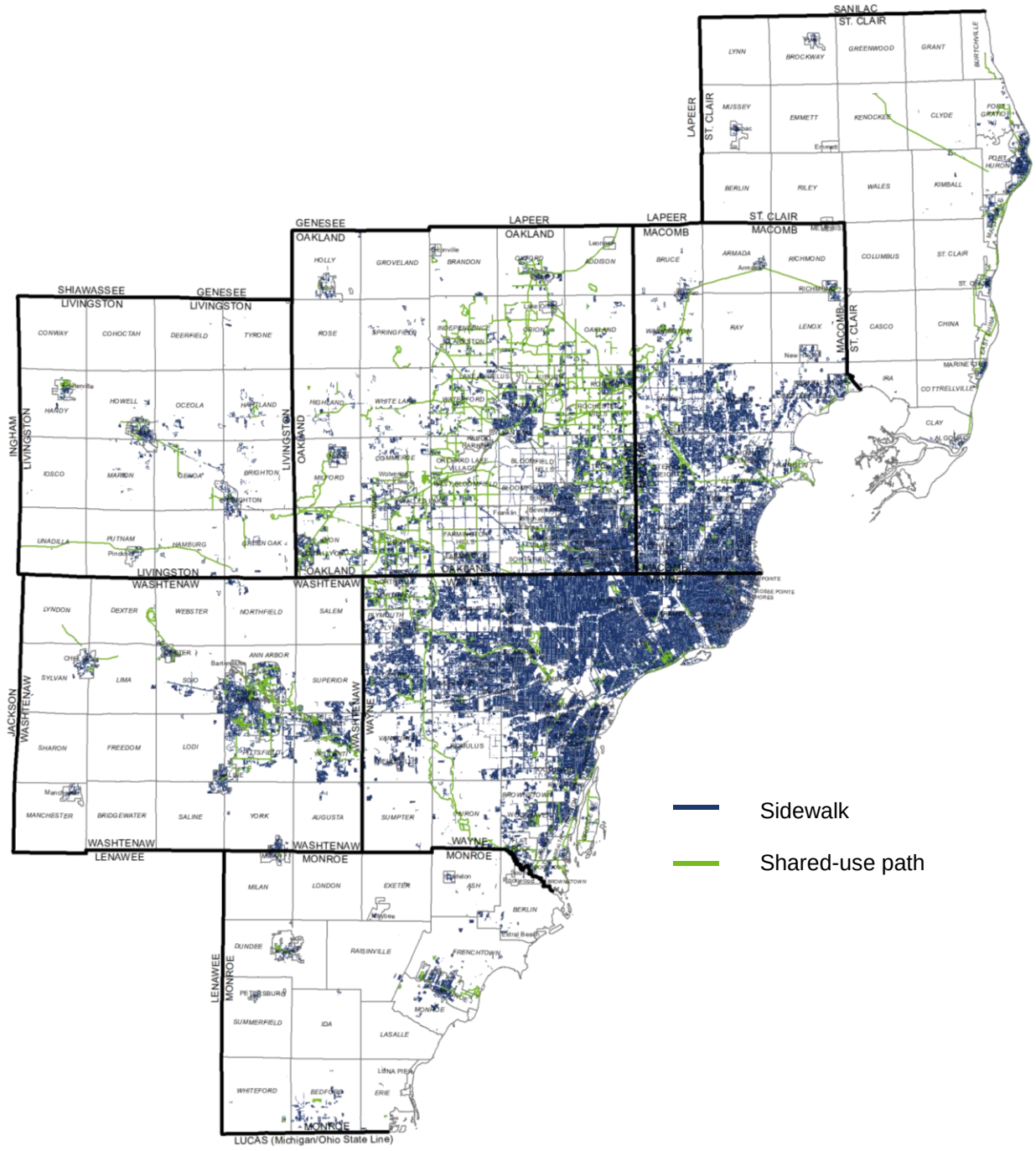


Figure 22
Summary of Crosswalk Markings

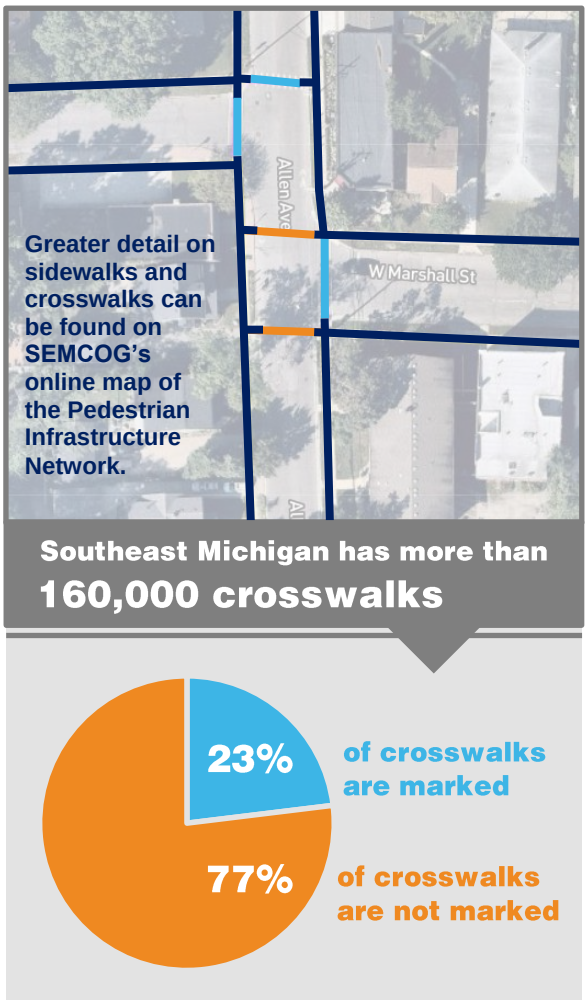


Table 5
Households within Walking Distance to Core Services

	10-minute Walk	30-minute Walk
Fixed-Route Transit	46%	64%
Health-Care Facilities	9%	51%
Libraries	5%	79%
Parks	42%	86%
Supermarkets	13%	64%

Gaps in Pedestrian Infrastructure

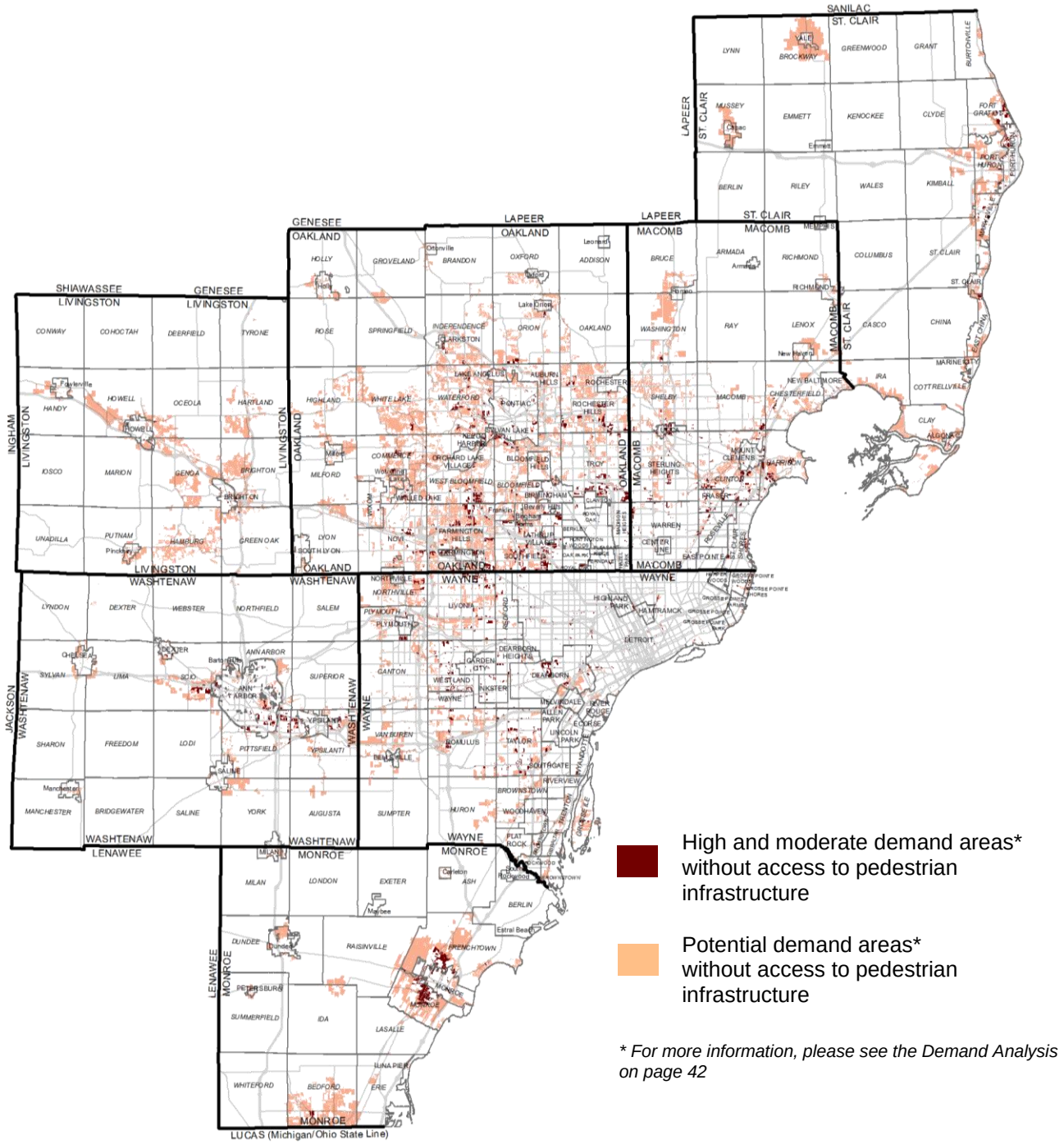
Gaps in pedestrian infrastructure are found in communities throughout Southeast Michigan. They typically exist for a reason, as in areas with lower population or fewer walkable destinations. In some cases, network components may have been developed incrementally, and the lack of connectivity limits their use. Even in areas with a well-connected sidewalk network, a lack of safe and conveniently spaced road crossings can be a significant barrier for pedestrian mobility. Regionally, gaps in pedestrian corridors often remain due to physical barriers such as crossing major roadways or waterways and narrow or insufficient right-of-way.

Due to the nature of walking, pedestrian infrastructure needs to be in close proximity to a household or destination in order to provide access. Approximately 71 percent of Southeast Michigan households have access to pedestrian infrastructure within 100 feet of their home. In addition, approximately 23 percent of the crosswalks in Southeast Michigan are marked (Figure 22). Households that have been determined to have some level of pedestrian demand, but do not have access to walking infrastructure are identified as gap areas (Figure 23). For more information, see the Demand Analysis on page 42.

Pedestrian Access to Core Services

In retrofitting streets that do not have connected or accessible pedestrian infrastructure, the highest priority should be given to locations near transit stops, schools, parks, public buildings, job centers, and other areas with high concentrations of pedestrians. SEMCOG's *Access to Core Services* report established regional benchmarks for pedestrian accessibility to several of these resources. Table 5 shows the percentage of households that are within a 10-minute and 30-minute walk to core services, regardless of whether or not a

Figure 23
Gaps in Pedestrian Infrastructure, based on Demand Areas



sidewalk or other type of pedestrian infrastructure was present. Additional analysis of travel times within the existing pedestrian network should provide a greater understanding of pedestrian accessibility.

Planning for Pedestrian Mobility

Many of the local plans shown in Figure 18 include considerations for pedestrians in addition to bicyclists. To address gaps in the pedestrian network, communities often invest in pedestrian infrastructure directly, or include requirements in their local plans and ordinances. For example, some planning efforts around sidewalk improvements occur through Capital Improvement Programs, while others are required for real estate development projects. In addition to connecting gaps and increasing access, issues related to maintenance, pedestrian behavior, and how comfortable a place is for walking should all be considered in the planning process.

Infrastructure Maintenance

The maintenance or condition of existing pedestrian infrastructure has an impact on how it is used, and how it accommodates users of all ages and abilities. Broken pavement, the absence of needed curb cuts, and unsafe intersections are all barriers to pedestrian access. These limit mobility of people with disabilities and those without access to other means of transportation. Poor infrastructure conditions can make walking less desirable. Evaluating current conditions and addressing maintenance needs will maximize the existing pedestrian networks' ability to meet community needs. For more information on Maintenance, see Chapter 6.

Pedestrian Behavior

When assessing pedestrian accessibility and gaps, it is helpful to consider typical walking distances and existing infrastructure around residential areas and destinations. The average pedestrian trip is around one half-mile, or about a 10-minute walk. Additionally, if it takes more than three minutes to reach a crosswalk (approximately 800 feet), pedestrians are generally more likely to cross along a more direct, but often less safe route. For more information, see the User Analysis on page 15.

Pedestrian Comfort Factors

Other environmental factors play a role in how comfortable a place may be for walking, such as land use and development patterns, lighting, tree canopy, as well as traffic speeds and volumes on adjacent roadways. Further analysis of these and other conditions will lead to better understanding the region's pedestrian network. Such an analysis should be used in route planning and other improvements that enhance walkability and placemaking efforts.

Regional Trails

Regional trails are a critical part of Southeast Michigan's mobility infrastructure. In addition to expanding transportation options and recreational opportunities, trails can generate economic benefits, enhance a sense of place, and help people of all ages and abilities connect to nature in a comfortable, off-road environment. With nearly 500 miles in place in Southeast Michigan, trails also provide connectivity that is integral to defining the network of regional corridors for walking and biking, as outlined in Chapter 2.

For the purposes of this plan, regional trails are a subset of walking and biking infrastructure, as defined previously in this section. In most cases, shared-use paths are physically separated from vehicle traffic. In many instances, however, they may include a connecting route where other walking or biking infrastructure links two segments of off-road trails. In all cases, they are regional in nature, providing linear connections between communities and counties. While the regional trail network outlined in Figure 25 meets this definition and serves as the primary arteries for connectivity, they often also include "spurs" that connect to local networks and destinations.

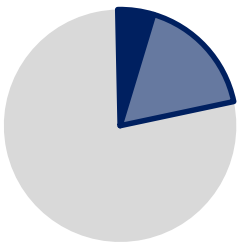
Regional trails accommodate a range of users in addition to people walking and biking, including runners, skaters, equestrians, and even low-speed electric vehicles. They typically have wayfinding signage and branding, which helps provide navigational resources and a consistent experience for trail users. They also often feature amenities that enhance the trail experience, including trailheads with parking, restrooms, or picnic areas along a route.

Access to Regional Trails

Existing trails can provide greater benefit if they are part of a larger, connected network, allowing more people to access more destinations. While 80 percent of households in Southeast Michigan are currently within a 10-minute drive to a regional trail, far less people live within walking or biking distance. Only five percent of households are within a 10-minute walk to a regional trail, and 25 percent are within a 10-minute bike ride (Figure 24).

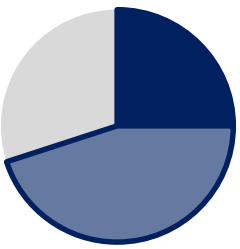
Enhancing access to trails with walking and biking infrastructure can increase the likelihood they will be used for recreation or transportation. Expanding the trail network also increases opportunities to be physically active, to socialize, and to connect with nature.

Figure 24
Household Access to Regional Trails



5% of households within a 10-minute walk

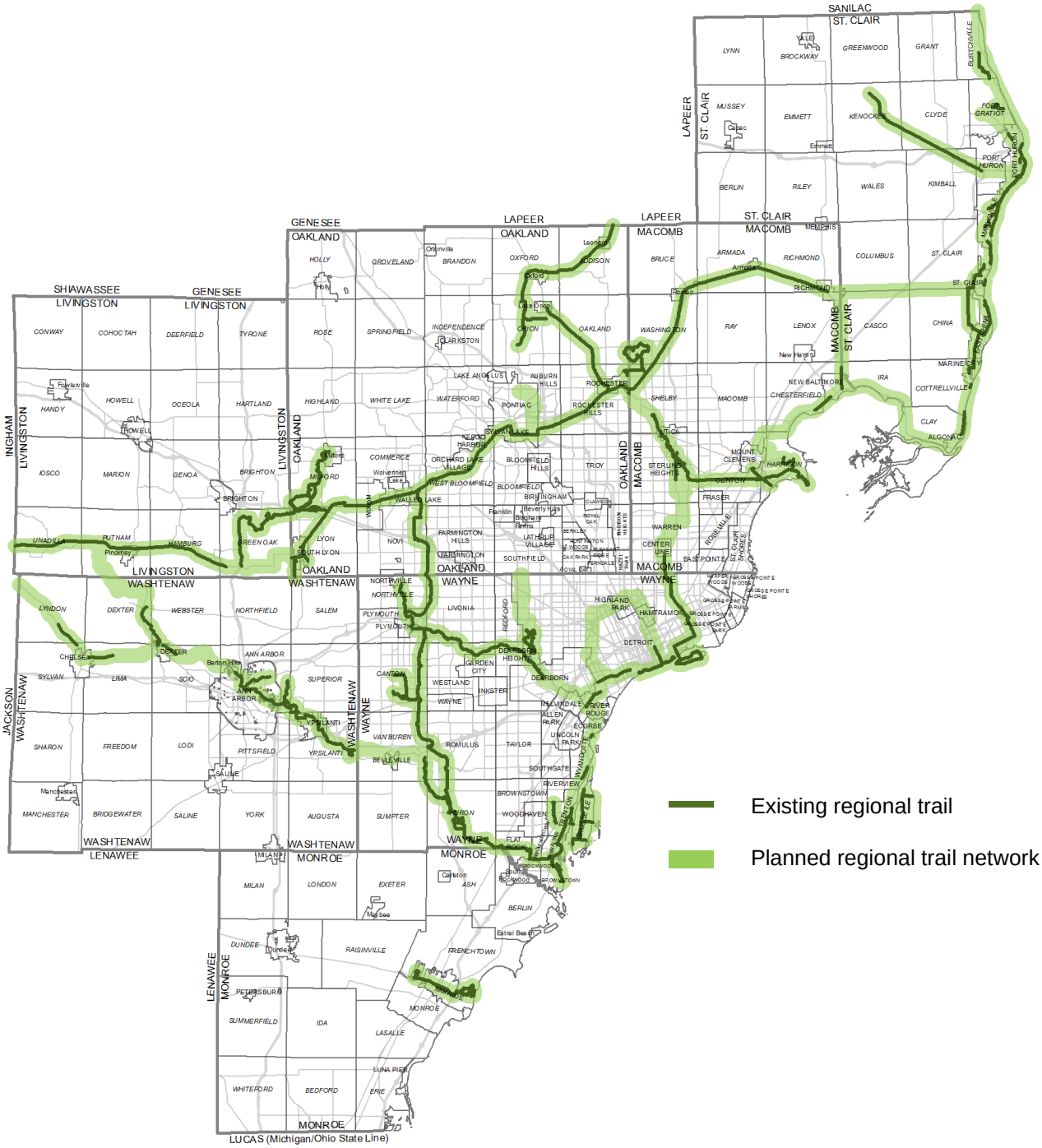
22% of households within a 30-minute walk



25% of households within a 10-minute bike ride

70% of households within a 30-minute bike ride

Figure 25
Regional Trail Network



Planning for Regional Trails

Regional trails are routinely cited as a top priority for Southeast Michigan communities, and have been a source of momentum for expanding walking and biking infrastructure. Statewide trail initiatives, such as Michigan's Iron Belle Trail and the Great Lake-to-Lake Trail, have brought increased attention and funding to the region's existing trails, and spurred local and regional initiatives to connect them. Efforts to plan collaboratively across jurisdictions have added to the network as well, with aims to increase access, mobility, and recreation opportunities.

To help guide trail development in the region, SEMCOG's Bicycle and Pedestrian Task Force worked with a group of trail stakeholders from local, regional, and state agencies to identify key challenges and opportunities to support a more connected and unified regional trail system.

Mapping and Planning

The *Bicycle and Pedestrian Mobility Plan* serves as the basis for integrating data and maps from local trail planning efforts in Southeast Michigan. The existing connections and gaps in the regional trail network are shown in Figure 25, and are often major components of the Regional Corridors mapped in Figure 1. In addition, the plan identifies information about local demand, safety concerns, and equity issues, which may be considered among other factors to help support funding opportunities and project prioritization.

To build on this resource, additional information is needed to understand current conditions and long-term maintenance needs on existing trail systems. While these trails are regional in nature, continued public engagement that is robust and accessible will remain important, to ensure they are designed and developed to meet local needs. Similarly, collaborative planning processes present the opportunity to build stakeholder relationships that may bring economic value to communities, such as elevating tourism through trail towns, cultural attractions, and the development of regional destinations.

Branding and Marketing

Many regional trails in Southeast Michigan have well-established, recognizable brands that are used to market them to the public and contribute to the user experience. Some may also be part of a wider-reaching route, such as Michigan's Iron Belle Trail, which brings additional branding and marketing initiatives.

However, it has been observed that many of the nation's most successful regional trail systems take a more coordinated approach, sharing information and resources in a unified way that yields greater collective results. This may take the form of public-facing maps and marketing efforts that are regional in scale, or in common guidelines

for wayfinding signage, design standards, or maintenance practices. For any of these approaches, however, it is paramount for a regional campaign to reflect and highlight existing standards and brands, rather than eclipse them. It may also be beneficial to collect data about the public's impressions of and experiences with the regional trail network, before and after marketing or branding efforts are implemented.

Funding

Regional trails serve both recreation and transportation purposes, which broadens the range of funding opportunities available for planning, development, and maintenance. It also means that the process of securing funding can be a challenge, with various programs and practices that do not offer a streamlined approach that works the same for every project. In order to streamline the process for seeking and improving success in receiving funding, it would be beneficial for funders to align and coordinate their opportunities, and to distribute information about trail funding and grants from a centralized source. In addition, opportunities through public-private partnerships and philanthropic organizations may be leveraged to help meet match requirements and offer more flexible funding solutions.

Capacity Building

These strategies will involve actions from stakeholders at all levels, each with their own capacity for implementation. An inventory of organizational resources and roles can highlight areas of overlap, and identify needs for additional support and technical assistance. This may include planning tools for community engagement, fiduciary agreements for grant-funded projects, or best practices for incorporating trails with economic development strategies. Capacity is a particular concern for trail maintenance, as funding is limited and responsibilities typically span community boundaries.

Demand Analysis

This section identifies areas with demand for bicycle and pedestrian trips. It is based on concentrations of people and destinations, and may be used to understand which areas already support a high level of bicycle and pedestrian mobility, along with where more trips are likely to occur if infrastructure, policies, and programs were in place.

Throughout Southeast Michigan, there is demand for new and enhanced walking and biking infrastructure. Connecting and expanding the region's bicycle and pedestrian network was consistently referenced as a top priority in stakeholder input sessions. It is important for communities to invest in these improvements strategically, with projects that meet local needs and that align with a regional vision. Factors related to population distribution, demographics, destinations, and existing mobility patterns can influence the level of demand for walking and biking. This demand analysis quantifies these and other factors, and may be used to identify locations where bicycle and pedestrian improvements could be most impactful. A detailed methodology for this analysis is included as Appendix G. The following findings highlight areas of opportunity for enhancing the network. In some cases, it illustrates gaps in the network where new connections should be prioritized. In others, it includes areas where it is currently possible to walk or bike, but where there may be opportunities for increased safety measures, promotional efforts, or supporting infrastructure, such as signage, bike parking, or benches. This analysis can also be used to target areas where walking and biking have the potential to serve a greater transportation function, supporting local planning efforts, infrastructure development, and policy-based solutions.

Levels of Demand

Demand has been assessed in three categories – areas of high demand, moderate demand, and potential demand (Figure 26). Table 6 provides context for these areas, and outlines different planning and development considerations based on the level of demand. While the categories shown here cover approximately one-quarter of Southeast Michigan's land area, together they represent 85 percent of the region's households, contain 85 percent of existing biking infrastructure, and 94 percent of pedestrian infrastructure. They also provide access to the majority of the region's core services. It is important to note that while this analysis is calibrated at the regional scale, it may be adjusted for local geographies to provide greater detail and assistance with project planning.

For areas of the region not identified with high, moderate, or potential demand, planning for and providing bicycle and pedestrian infrastructure is still valuable. While the regional bicycle and pedestrian corridors identified previously in Chapter 2 were established in part to connect demand areas, they typically pass through areas of lower demand in order to do so. In fact, many areas with lower demand correspond with gaps in the network, where bicycle and pedestrian improvements will be key to ensuring regional connectivity. As this analysis is based on connecting clusters of people and activities, areas with lower demand may also provide greater opportunities for recreation and regional trails, where connections to remote, natural settings enhance the user experience.

Figure 26
Bicycle and Pedestrian Demand Areas

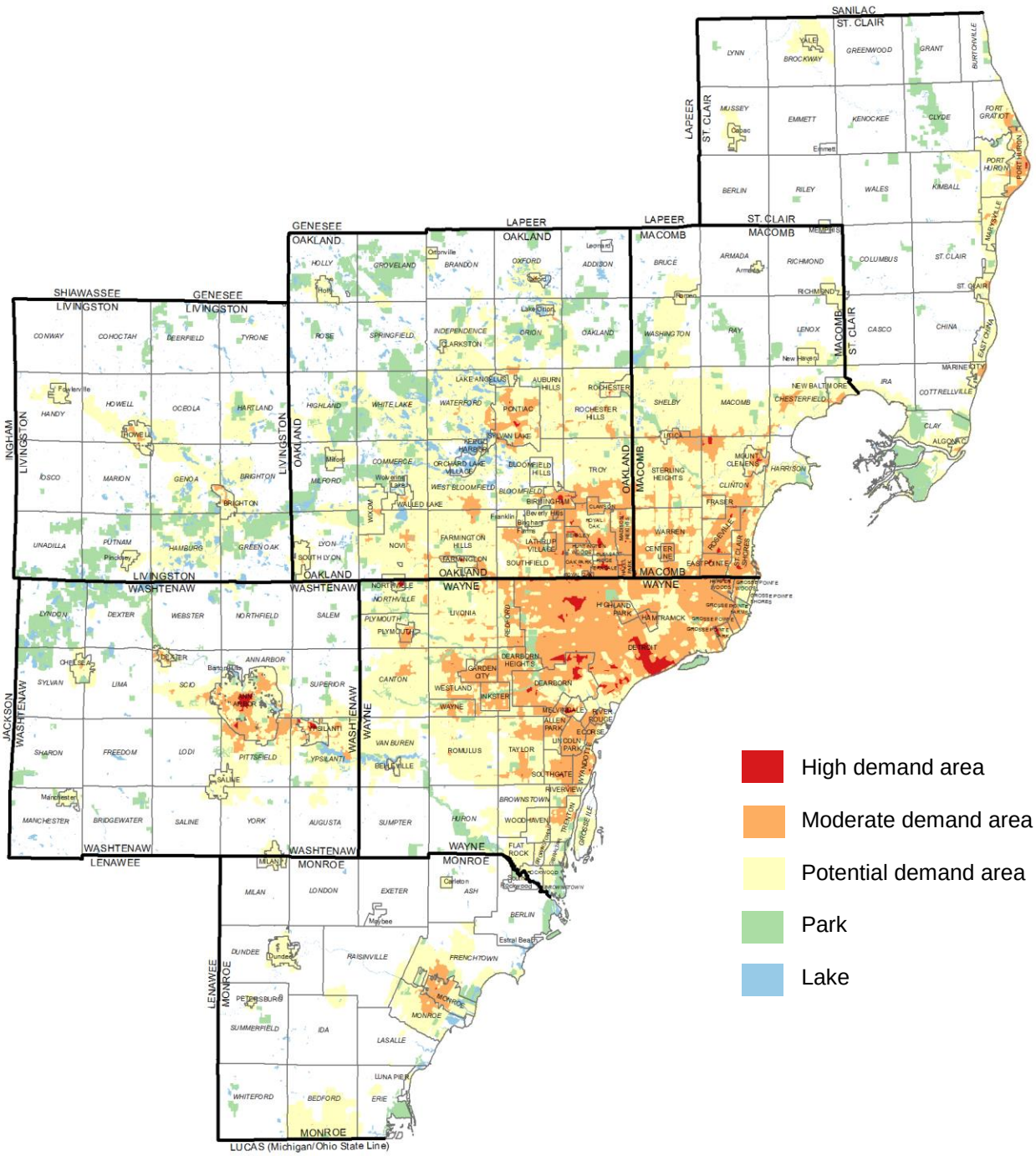


Table 6
Planning and Development Context for Demand Areas

Context	**High Demand Areas** are likely to be the most bicycle and pedestrian friendly parts of the region, or those with the most potential to support more people walking and biking. They include larger downtown commercial districts, employment centers, and most densely populated areas. With higher demand, there is also typically greater competition for space within the right-of-way. In these places, planning, programming, and policies that support walking and biking should be a central part of any transportation project.	**Moderate Demand Areas** include many of the region's smaller town centers, as well as areas adjacent to high demand areas. They are primarily residential areas, with commercial development along major roadways and intersections. These places are likely to support walking and biking, but in many cases driving is still necessary for daily trips. They often include transit services along major roads, and grid-patterned residential streets that provide many options for comfortable walking or biking routes.	**Potential Demand Areas** tend to be less densely populated with people or destinations, but have clusters of activity that may support walking and biking if adequate infrastructure exists. Road networks in these areas may be less developed, making travel times less suited for walking and biking trips, which are typically shorter in distance. These areas are also typically less connected with fixed-route transit, so bicycle and pedestrian mobility is more localized, or recreational in nature.
Implementation Considerations	• Develop on-street bikeways to better accommodate micro-mobility options while making more room on sidewalks for pedestrians and placemaking enhancements. • Prioritize walking and biking travel needs over motor vehicle needs on specific streets or corridors. • Coordinate roadway improvements with transit agencies to ensure timely transit service. • Ensure bicycle parking and other amenities are included with new real estate developments. • Use traffic calming and protected intersections to ensure safety for all roadway users. • Create programs that promote and incentivize workers and visitors to walk, bike, or take transit. • Develop an education and enforcement program that centers on urban biking and walking issues.	• Develop networks of high comfort bikeways that connect residential areas to commercial areas and transit service, including: – Shared-use paths, buffered or protected bike lanes along major arterials roadways; – Conventional bike lanes on collector roadways; – Neighborhood greenways that provide the first and last miles to biking and transit trips. • Ensure connectivity and maintenance of sidewalks, generally on both sides of the street and easy access to signalized crosswalks. • Incorporate bicycle and pedestrian accommodations at transit stops, including shelters, bicycle parking, and nearby crosswalks. • Develop education and encouragement campaigns for all roadway users, especially on the need to share the road, follow crosswalk-yielding laws, and promote nighttime visibility.	• Implement a program to fill sidewalk gaps. • Encourage new subdivisions to develop gridded street networks. • Provide shared-use paths on major roadways when possible. • Use best practices such as pedestrian lanes, shoulder bike lanes, and wide-paved shoulders to fill gaps where other facilities are not feasible. • Provide strategic investments to connect to the regional transit network. • Designate Trail Towns in communities along regional trail routes. • Create access management plans to consolidate driveways and make the roads safer for all roadway users. • Develop education and enforcement campaigns that center on suburban and rural walking and biking issues.

Demand Area Benchmarks

As actions are taken to meet demand for walking and biking throughout the region, progress can be measured based on improvements to current conditions. The following benchmarks (Tables 7, 8, and 9) compare the existing network for each level of demand with factors related to the analyses in this chapter, and the policies and actions recommended in Chapter 2. These are connecting and expanding the network, ensuring equitable access to core services and destinations, and increasing safety for bicyclists and pedestrians.

Table 7

Infrastructure Benchmarks by Demand Area

	High Demand	Moderate Demand	Potential Demand
Bicycle Infrastructure *Percentage of road network with bicycle infrastructure*	 **9%** bikeways **116** miles	 **6%** bikeways **514** miles	 **10%** bikeways **826** miles
High-Comfort Roadways *Percentage and miles of road network determined to be most comfortable for biking*	 **74%** of roads **1,031** miles	 **81%** of roads **7,392** miles	 **79%** of roads **6,986** miles
Sidewalks *Percentage and miles of roadways adjacent to a sidewalk*	 **70%** of roads **1,957** miles	 **66%** of roads **11,932** miles	 **53%** of roads **9,405** miles
Crosswalks *Percentage and number of crosswalks that are marked*	 **36%** marked **6,445** crosswalks	 **19%** marked **19,651** crosswalks	 **27%** marked **11,238** crosswalks
Regional Trails *Percentage of existing regional trail network, compared to potential build-out based on current plans.*	 **4%** of current network **5%** with gaps filled	 **36%** of current network **39%** with gaps filled	 **56%** of current network **59%** with gaps filled

Table 8
Accessibility Benchmarks by Demand Area

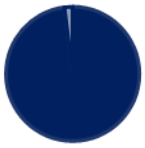
	High Demand	Moderate Demand	Potential Demand
Bicycle Infrastructure *Households within one-half mile of any bikeway*	 **67%** of households	 **60%** of households	 **76%** of households
Pedestrian Infrastructure *Households within 100 feet of sidewalks or shared-use paths*	 **99%** of households	 **95%** of households	 **72%** of households
Employment *Share of regional employment and job density*	 **11%** of regional jobs **7,568** jobs per mi²	 **41%** of regional jobs **2,613** jobs per mi²	 **38%** of regional jobs **1,098** jobs per mi²
Core Services per mi² — **Fixed-Route Transit Stops**	**71.3**	**22.7**	**1.6**
Health-Care Facilities	**1.4**	**0.4**	**0.1**
Libraries	**0.8**	**0.2**	**0.1**
Parks	**4.2**	**2.7**	**1.0**
Schools	**3.1**	**1.5**	**0.6**
Supermarkets	**2.6**	**0.9**	**0.2**

Table 9
Safety Benchmarks by Demand Area

	High Demand	Moderate Demand	Potential Demand
Crashes *Percentage of all bicycle and pedestrian crashes in the region*	 **22%** of crashes	 **58%** of crashes	 **16%** of crashes
Crash Severity *Percentage of bicycle and pedestrian crashes resulting in fatalities or serious injuries*	 **16%** of crashes	 **58%** of crashes	 **19%** of crashes

Equity Analysis

This section identifies populations within the region through an equity lens based on socioeconomic factors that may affect their mobility. Walking and biking infrastructure can lead to many positive benefits for a community, and this analysis can be used to ensure that the system is accessible for people of all ages, abilities, and backgrounds.

An equitable transportation system includes bicycle and pedestrian mobility options to connect more people to the places they need to go. There are certain populations with greater social and economic needs that may impact their mobility options. The goal of this analysis is to identify demographic factors that can show populations and neighborhoods which may rely more on walking or biking for daily transportation and, therefore, have a greater need for safe and accessible pedestrian and bicycle infrastructure.

In short, the goal of transportation equity is to facilitate access to opportunities by providing affordable and reliable transportation options based on the needs of the people they serve. The region's bicycle and pedestrian network is key to achieving this goal. For this analysis, populations were grouped into equitable emphasis areas ranging in low to high concentrations. Those areas identified as "High" are likely to include populations that are particularly reliant on the bicycle and pedestrian network, as well as first- and last-mile connections to the region's public transit system. In determining these concentrations, five socioeconomic indicators were used, as shown below. Detailed methodology for the Equity Analysis is in Appendix F.

Concentration of Equity Populations

Children Population
Population aged 17 and under, which accounts for 1,054,290 persons (22 percent of Southeast Michigan's total population).

Low-Income Households
Households in the lowest income quartile for the region. There are 465,635 (25 percent of all households) low-income households in the region.

Minority Population
Persons belonging to any of the following groups – Black; Hispanic; Asian; American Indian and Alaskan Native. The region's minority population is 1,446,089 (31 percent of the total population).

Senior Population
Population aged 65 and older, which accounts for 696,810 persons (15 percent of the region's total population).

Transit-Dependent Households
Combines zero-car households and households with fewer cars available than workers (+16 years of age). There are 143,358 (7.8 percent) households without an automobile; an additional 138,341 (7.5 percent) of households have fewer automobiles available than workers. Transit-dependent households account for 12.5 percent of the region's households.

Figure 27
Concentration of Equity Populations

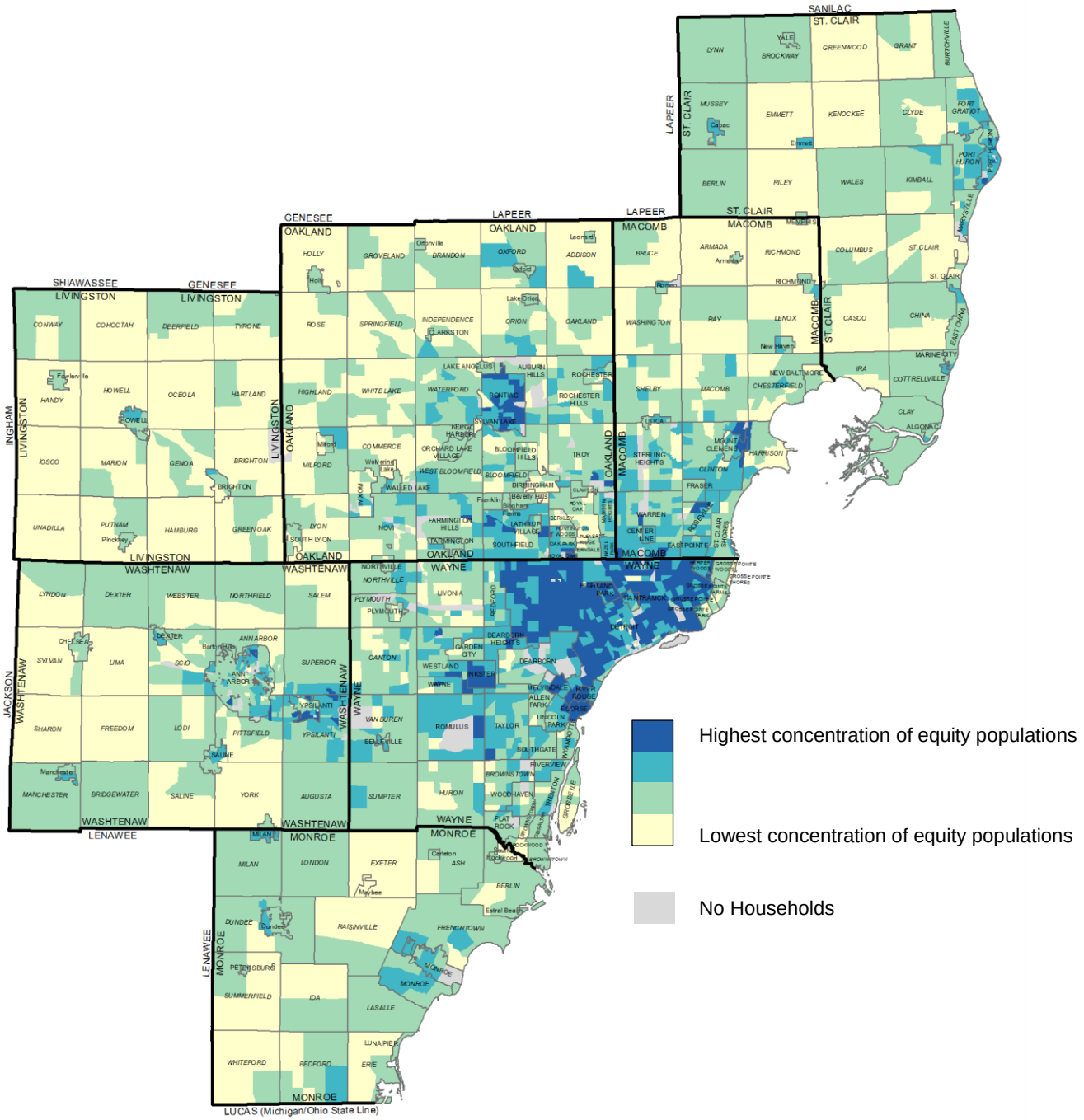


Figure 27 shows the concentration of equity populations based on the cumulative score across all five of the socioeconomic indicators. The darkest blue-shaded areas represent the highest concentration of populations who likely rely more heavily on bicycling, walking, or taking transit to meet their mobility needs. The yellow-shaded areas represent the lowest concentration of populations who likely need these transportation modes to meet their needs.

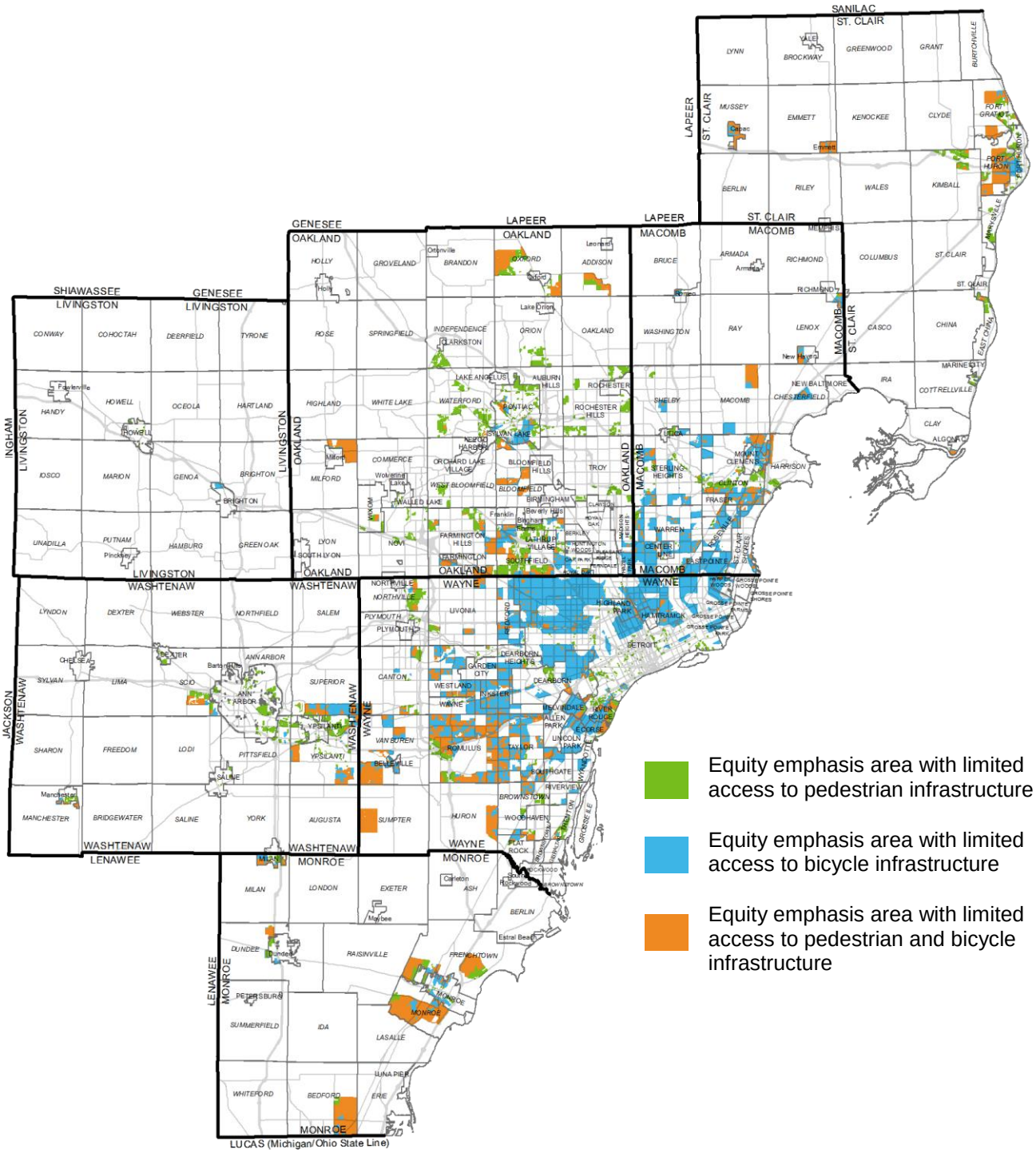
Improving the ability of people in the higher concentration areas, especially those areas shaded dark blue and lighter blue, to safely walk and bike is essential to achieving a transportation system that provides equitable access to jobs, schools, health-care services, social gatherings, and other destinations. While expanding mobility options and infrastructure to better connect people and places is important, it is not the only factor in creating more equitable access. Efforts to better align the location and proximity of core services to meet the needs and demands of residents is needed, especially for those identified by the socioeconomic indicators outlined above. Increased coordination and planning is also needed to decrease barriers to accessing both transportation options and desired destinations.

Figure 28 shows Equity Emphasis Areas in the region based upon the two highest concentrations of populations most likely to rely on biking or walking to meet their daily needs (dark and light blue shaded areas in Figure 27). Within these areas, access to existing pedestrian and bicycle infrastructure was measured to identify areas that are:

- Beyond 100 feet from the nearest sidewalk or shared-use path
- Beyond one-half mile from the nearest bicycle infrastructure
- Beyond both 100 feet from the nearest pedestrian infrastructure and one-half mile from nearest bicycle infrastructure

These emphasis areas, combined with the identified gaps in bicycle and pedestrian infrastructure shown in Figures 17 and 24, highlight opportunities to both plan for new infrastructure, and enhance and maintain existing infrastructure.

Figure 28
Equity Emphasis Areas



Safety Analysis

This section examines traffic crashes involving pedestrians and bicyclists over the past five years. It may be used as a starting point to determine where infrastructure improvements would be most effective at solving traffic safety issues.

Pedestrians and bicyclists are the most vulnerable roadway users in Southeast Michigan. Over the past five years, less than two percent of crashes in the region have involved people walking or biking, but they have accounted for nearly 30 percent of traffic fatalities. On average, more than 100 bicyclists and pedestrians are killed in crashes each year in the region. Furthermore, the Federal Highway Administration identifies the State of Michigan and City of Detroit as a Pedestrian and Bicycle Safety Focus State and City due to the high number of annual fatalities for pedestrians and bicyclists.

Crashes involving pedestrians are more common and pose a greater risk of a fatality or serious injury than those with bicyclists. Of all nonmotorized crashes between 2014 and 2018, approximately 58 percent involved pedestrians and 42 percent involved bicyclists. Of those, approximately 23 percent of pedestrian crashes resulted in fatality or serious injury, compared to eight percent of bicycle crashes. The likelihood of an injury in these crashes is much higher, however, as 84 percent of pedestrian and bicycle crashes resulted in some type of injury or fatality.

Figure 29 summarizes these regional trends since adoption of SEMCOG's *2014 Bicycle and Pedestrian Travel Plan*. While there has been a slight increase in the number of pedestrian crashes, they have resulted in fewer fatalities and serious injuries. For bicyclists, however, crashes have decreased along with fatalities and serious injuries.

Figure 29
Crash Analysis Trends, 2014-2018

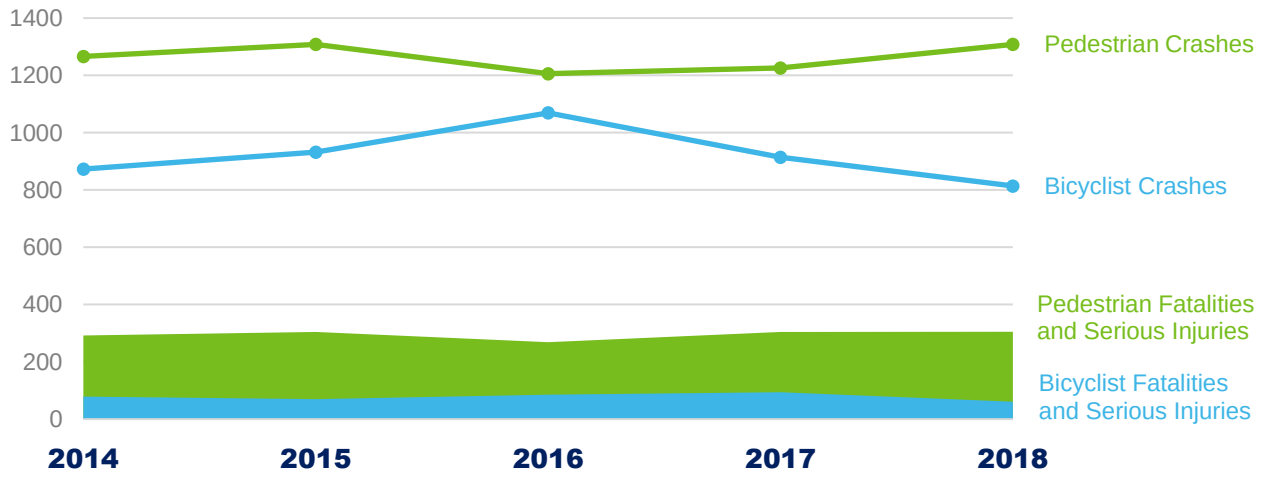


Figure 30

Location of Bicycle and Pedestrian Crashes Resulting in Fatality or Serious Injury, 2014-2018

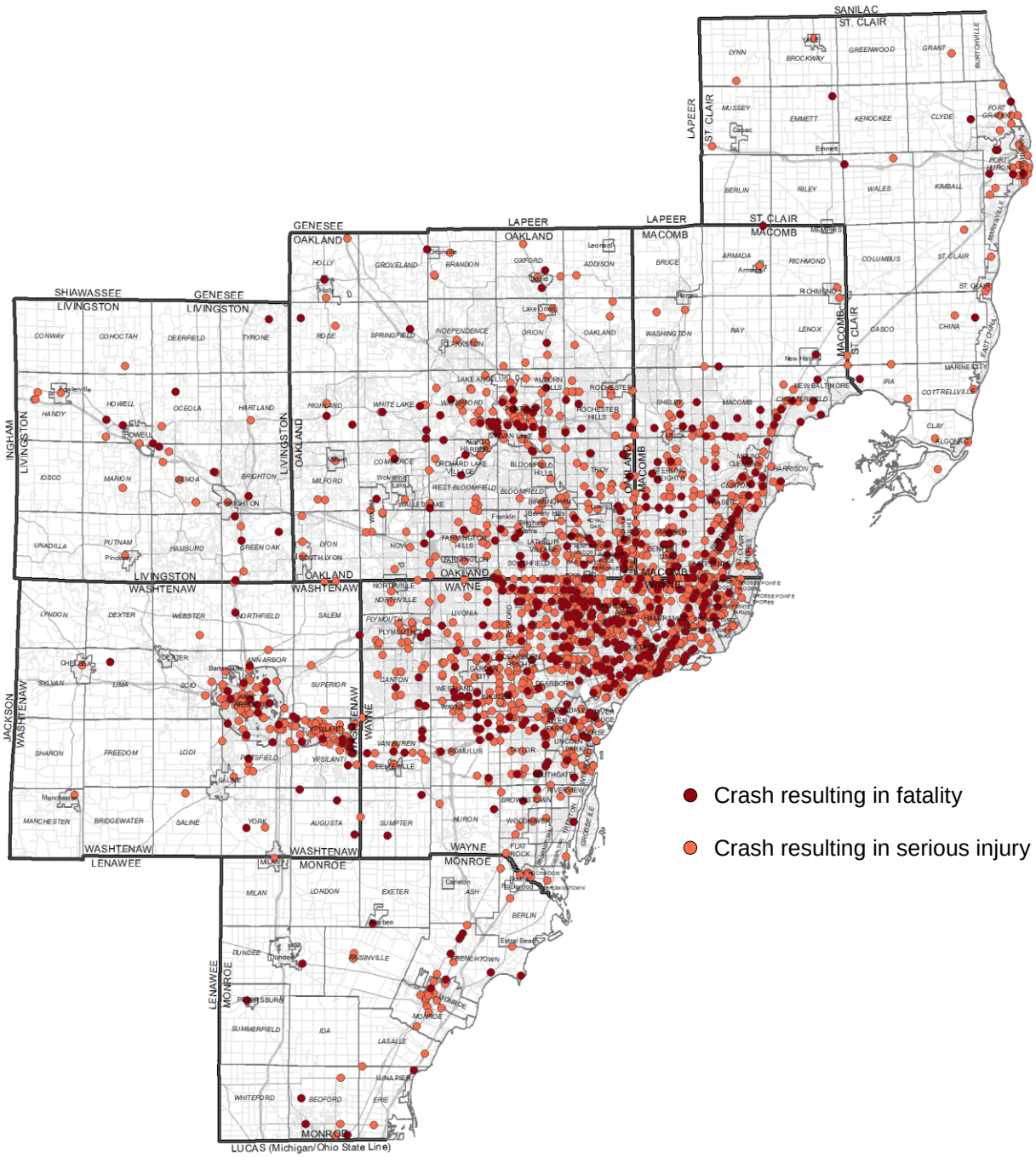
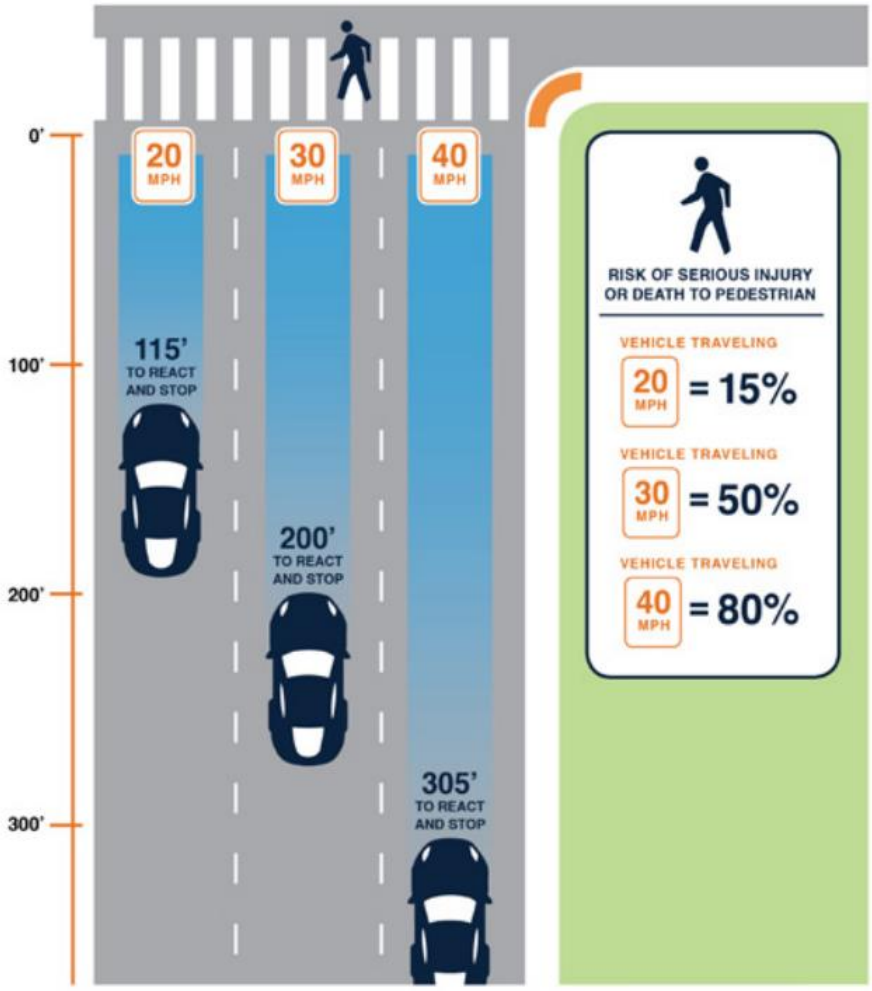


Figure 30 displays the location of all bicycle and pedestrian crashes that occurred in the region between 2014 and 2018. A comprehensive analysis of pedestrian and bicycle crashes can be challenging, as they are typically underreported to law enforcement, and traffic crash reports are only made when a vehicle is involved, excluding incidents between two bicyclists, for example. Crashes are also widely distributed across the transportation network, so trends and treatments will vary depending on local context. As a result, systemic safety programs and risk-based analysis methods are more effective in identifying where to specifically apply engineering focused pedestrian and bicycle safety improvements.

Bicycle and Pedestrian Safety Risks

Walking is generally less safe in areas where vehicles are moving at higher speeds. Approximately 62 percent of crashes resulting in pedestrian fatalities or serious injuries happen on roads with a posted speed greater than 30 miles per hour. Because of their slower travel speed, pedestrians are more sensitive to delays and detours that affect their mobility. This can also lead to risky crossing behavior, as pedestrians are often without dedicated infrastructure to ensure their safety, and may be exposed to traffic longer as they cross. Figure 31 illustrates the impact speed has on the survival rates of pedestrians, supporting the essential role for traffic-calming measures in reducing the frequency and severity of crashes.

Figure 31
Impacts of Vehicle Speed in Pedestrian Crashes



Unlike motor vehicles and bicycles, pedestrians can easily bypass curbs and other typical roadway elements that are designed to deter different road users from interacting at undefined spots. This means a pedestrian can cross a street in almost any spot, posing a greater risk of a crash where motorists might not be expecting them. Regionally, approximately 71 percent of pedestrian crashes happen outside of a crosswalk.

The likelihood of a crash between a bicyclist and a motor vehicle can vary depending on roadway and land-use context, bicyclist and driver behavior, and other conditions. Many drivers have little training on how to interact with new bicycling-related infrastructure or are unaware of bicycle-related traffic laws, like Michigan's three-foot passing law. Often, bicyclists also have little training on best safety practices or are unaware that they must comply with all traffic laws when riding in the road. Lighting is a consistent factor as more than two-thirds of fatal bicycle crashes happen in the dark.

Increasing Bicycle and Pedestrian Safety

Expanding and enhancing the region's bicycle and pedestrian infrastructure network will increase safety for all road users. It is important to provide safe walking and biking access for all people, including treatments that expand mobility options for people with disabilities. Ensuring clear and consistent design of bicycle and pedestrian infrastructure will increase safety and accessibility for people who walk and bike, while encouraging predictable behavior and alerting motorists to their presence.

In addition, it is essential to educate people who walk, bike, and drive about the risks and responsibilities associated with each travel mode. Law enforcement also plays a major role in promoting safe travel practices and increasing awareness of the rules-of-the-road for all travelers.

Regional Highlight: Walk.Bike.Drive.Safe

SEMCOG launched the *Walk.Bike.Drive. Safe* education campaign in 2018. The goal of this campaign is to reduce the number and severity of traffic crashes involving people who walk and bike, while building respect and understanding among all road users. In partnership with local governments and agencies throughout Southeast Michigan, SEMCOG is working to improve traffic safety through education with the media, at community events, and with giveaway materials.

The campaign targets key behaviors based on data and the emphasis areas in the *Southeast Michigan Traffic Safety Plan*. Key messages are staying aware and watching for pedestrians and bicyclists especially before turning, leaving at least three feet when passing bicyclists, being seen especially in dark conditions, and how to walk and cross safely when there are no sidewalks or crosswalks. Additional messaging is about understanding state traffic laws and correctly using infrastructure.

Public service billboards, radio announcements, TV spots, at-the-pump gas station video messages, and social media posts ran across the Southeast Michigan media landscape in the fall and spring. In addition, educational videos, graphics, and safety tips in English, Spanish, and Arabic were made available for downloading and posting on the *Walk.Bike.Drive. Safe* website. With support from 140 member communities and partner agencies, the campaign has had more than 80 million impressions and distributed thousands of safety materials to residents.

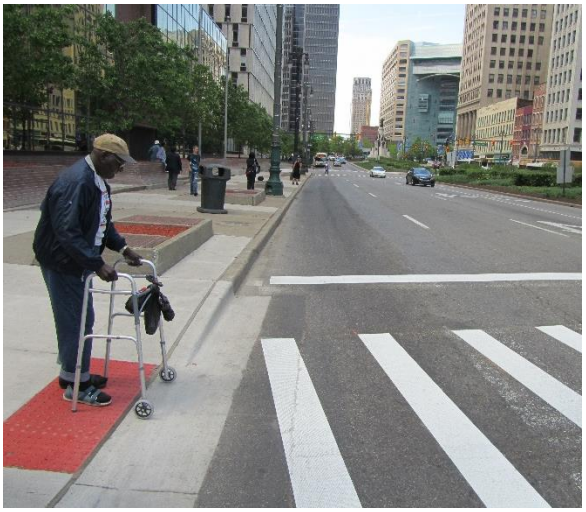
Chapter 4: Local Implementation Resources

Improving conditions for walking and biking in Southeast Michigan will occur largely through local initiatives, and benefit from regional coordination. This chapter serves as a regional guide for local communities on policies, best practices, and emerging trends for advancing bicycle and pedestrian mobility.

Developing a safe, connected transportation system for walking and biking hinges on policies, and practices that include bicycle and pedestrian mobility considerations in routine decision-making processes. Additionally, emerging trends and technologies have the potential to play an important role in bicycle and pedestrian mobility, and transform the region's transportation system. This section provides information and resources on common approaches to implementing bicycle and pedestrian improvements, and includes regional highlights from Southeast Michigan communities. The resources in this chapter are summarized by topic area below in Table 10.

Table 10
Index of Resources for Local Implementation

ADA and Universal Design



Overview

Enacted in 1990, the Americans with Disabilities Act (ADA) prohibits discrimination against people with disabilities. This means new roadways, sidewalks, and shared-use paths must be designed to accommodate the needs of people with disabilities. It also requires that existing facilities be upgraded when a planned project is implemented. Communities and road agencies are required by law to have an ADA transition plan to guide the retrofitting of bicycle and pedestrian infrastructure that does not meet the needs of people with disabilities. Failure to make improvements can result in lawsuits and fines and forfeiture of federal funds for projects.

Universal design is the concept that all elements of the built environment be accessible for people of all ages and abilities. This approach goes beyond the legal requirements of ADA to actively design spaces that are more equitable, flexible, intuitive, and accessible for anyone to use. By implementing universally accessible designs, communities are improving mobility for all, including parents with strollers, travelers with luggage, and freight deliveries.

Regional Context

- In many parts of the region, there is aging infrastructure that predates the passage of ADA, and needs enhancement. Similarly, infrastructure that is ADA compliant must be adequately maintained to ensure its accessibility.
- ADA Michigan provides technical assistance, trainings, and grant opportunities to support ADA transitions and planning.

Implementation Considerations

- ADA defines specific design standards for bicycle and pedestrian infrastructure, including elements such as sidewalk widths, pathway slopes, surface materials, elimination of obstacles, crosswalk indicators, and audible signals. It is required for all public transportation projects and maintenance activities to comply with ADA standards.
- When planning for universal design, it is important to involve community members with disabilities in the process to ensure a project will meet their needs. This level of engagement is also a requirement for some grant programs, such as the Michigan Natural Resources Trust Fund.

Additional Resources

- *Accessibility Standards*; Americans with Disabilities Act
- ADA Michigan

Bicycle and Pedestrian Counts

Overview

Bicycle and pedestrian counts are an important element of transportation planning. By measuring use over specific time periods, communities and road agencies can determine what type of transportation infrastructure is justified at a given location. Counts can also be used to measure the impact of a project, and how new infrastructure has affected the number of people walking or biking. Understanding more about these patterns can help optimize the timing of traffic signals and crosswalks, and determine if new land-use developments will require new transportation infrastructure.

Methods of collecting bicycle and pedestrian counts can vary by community, agency, road, or trail corridor, or be based on the needs of a specific project. Techniques can be as simple as manually counting road users by hand, or as complex as using artificial intelligence software to analyze video footage of traffic. Other common approaches include devices with tubes, plates, pressure pads, magnets, or infrared sensors that are used to count road users. Many agencies are also exploring big data collected from cell phone apps and GPS to supplement these efforts.

Regional Context

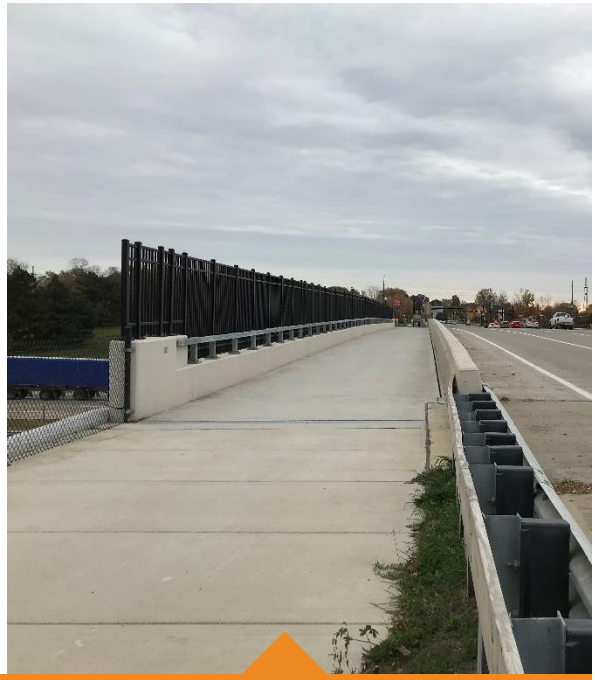
- Through SEMCOG's Bicycle and Pedestrian Count Program, nearly 200 short-duration counts have been conducted in the region. These generally represent a 16-hour period on a single day at a fixed location. As more counts are completed, the results are updated on an online map.

Implementation Considerations

- Similar to conventional traffic counts, bicycle and pedestrian counts should be taken over specific time periods, based on planning needs.
- Short-duration counts may occur over several hours to several days. They are useful to capture specific event traffic, peak-hour use, and project-specific issues. Typically, these need to be adjusted based on other data to understand long-term patterns.
- Medium-duration counts are not permanently fixed, but operate long enough to normalize the volatility in hourly or daily short-duration counts.
- Long-duration counts are usually permanent automatic traffic recorders installed at a select location across a larger geography, and used to record changes in use on a monthly, seasonally, or yearly basis.

Additional Resources

- SEMCOG Bicycle and Pedestrian Counts Map
- *Bicycle and Pedestrian Resources for Transportation Professionals*; MDOT



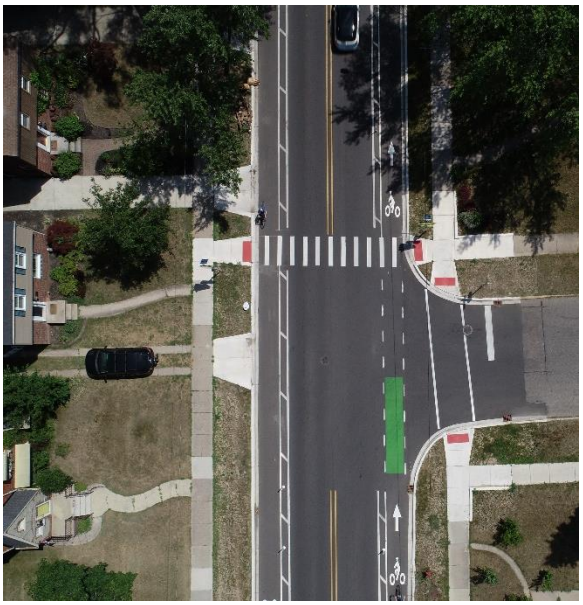
Regional Highlight: Van Buren Township

Van Buren Township is a growing community bisected by Interstate 94. Much of the commercial development is on the north side of the freeway, while regional parks, lake access, core services, and the City of Belleville are on the south side.

Belleville Road is a major north-south corridor with many core services and destinations that were not easily accessible for people walking or biking. The bridge over I-94 did not include any dedicated infrastructure, resulting in people walking along the shoulder or in the travel lanes when crossing the freeway. This included school children, people in wheelchairs, and parents with strollers. By analyzing crash data and using SEMCOG's Bicycle and Pedestrian Count Program over several different time periods, the township was able to show the need for an enhanced and safe crossing of I-94 along Belleville Road.

Through a TAP grant, the township completed a dedicated multi-use connection in 2019 that included a 14-foot-wide path, pedestrian-oriented lighting, and enhanced and marked crosswalks at on-and off-ramps.

Complete Streets



Overview

Complete streets are roadways planned, designed, and constructed to be context-sensitive and address the needs of all travelers, including people who walk, bicycle, take transit, or drive. A complete street can also include greening of the streetscape and managing stormwater runoff from roadways through green infrastructure or "green streets" approaches. Doing so creates sustainability and can improve economic vitality while protecting the environment.

Since complete streets are context-sensitive, there is no one design, or one-size-fits-all solution. The key to any "complete street" is that it aligns with the surrounding area and is safe and accessible for all users. The goal of complete streets is not that every street provides everything to everyone, but that a community's roadways provide a network of connected streets that work as a system. As such, local and state agencies can ensure that the planning, design, construction and maintenance of their streets consider the needs of all transportation system users by adopting Complete Streets policies, resolutions, or laws.

Regional Context

- At least 44 communities, including four counties, have Complete Streets policies, plans, resolutions, ordinances, or guidelines in the region. Examples that show the different contexts and ways communities plan for and address complete street principles include:
  - Road Commission for Oakland County: Complete Streets Guidelines
  - City of Ferndale Complete Streets Ordinance
  - Complete Streets Plan for Washtenaw County
  - City of Ann Arbor Complete Streets Resolution
  - City of Novi Complete Streets Resolution
  - Pittsfield Township Complete Streets Ordinance
  - City of Dearborn Complete Streets Ordinance
  - City of Sterling Heights Complete Streets Resolution
  - Harrison Township Complete Streets Design Plan
  - Complete Streets Pontiac
  - City of Brighton Complete Streets Plan

Implementation Considerations

- Complete Streets requirements can be established locally by adopting policies, resolutions, laws, plans, or design standards.

Additional Resources

- *Complete Streets Policy*; MDOT
- *Great Lakes Green Streets Guidebook*; SEMCOG
- National Complete Streets Coalition

- *Urban Street Design Guide*; National Association of City Transportation Officials
- *Complete Streets: Best Policy and Implementation Practices*; American Planning Association
- *Complete Streets, Complete Networks*; Active Transportation Alliance

Regional Highlight: City of Detroit

For the last decade, the City of Detroit's Traffic Engineering Department has been systematically looking for ways to improve infrastructure for people walking and biking, and has shifted its entire approach in planning and construction of road infrastructure. The goal is to provide better quality of life to its citizens. As a result, more people are riding the bus daily and Detroit has one of the fastest growing share of bike commuters in the nation.

Over the next three years, 16 new complete street and streetscape projects are planned to be completed. The first nine streetscapes will be completed by the end of 2020. The longest complete street project, Livernois Avenue, will include the city's first raised protected bike lanes and widened sidewalks. This project has also, in part, supported the opening of 13 new Black-owned businesses within its boundaries. The city has developed more proactive engagement with the public prior to, during, and after project development by creating multi-department education campaigns. The City of Detroit is also in the process of developing a new Transportation Master Plan that will incorporate Complete Street principles.

Connected and Automated Vehicles

Overview

As technology advances around connected and automated vehicles (CAVs), the transportation system faces both opportunities and challenges for bicycle and pedestrian mobility. Connected vehicles are those that communicate with one another, or with transportation infrastructure systems along a roadway. These can include features such as in-vehicle navigation systems, or the ability to send or receive road condition information. Automated vehicles have features that allow the vehicle to guide itself without human interaction. While CAVs refer to a range of technologies, some increasingly common examples are cruise control, parking assistance, and lane-departure warnings.

These technologies have the potential to impact the number of single-occupant vehicles on the road, and reduce the frequency and severity of crashes. They can also expand mobility options for people who are elderly or disabled, and potentially change the way street space is allocated for other modes like walking, biking, and transit. It is estimated that by 2045, between 20 and 85 percent of vehicles on the road will have some level of connected or automated features.

Regional Context

- Public Acts 332, 333,334, and 335, of 2017, provide a framework for both testing and deployment activities for manufacturers and developers of automated vehicles in Michigan.
- Home to Automation Alley, the University of Michigan, several auto manufacturers, and other industrial innovation groups, Southeast Michigan is a hub for research, development, and testing of CAV technology.

Implementation Considerations

- With CAVs, curbside space for pickup and drop-off will be more valuable than parking spaces. For communities looking to redevelop underused parking areas, opportunities exist to enhance walking and biking.
- While CAVs are expected to improve traffic safety, concerns still exist for vulnerable road users such as pedestrians and bicyclists. As technology advances, safety of all road users should remain a primary performance criterion.

Additional Resources

- *2045 Regional Transportation Plan for Southeast Michigan;* SEMCOG
- *Preparing for the Future of Transportation;* U.S. Department of Transportation
- Michigan Council on Future Mobility
- Intelligent Transportation Society of Michigan
- Planet M

Construction Zone Accommodations

Overview

Construction zones often encroach on sidewalks, crosswalks, or bicycle infrastructure, requiring bicyclists and pedestrians to make detours that are unsafe or difficult to navigate. This can also impact traffic flow for motorists, as displaced users often end up in the road.

All construction projects that impact the public right-of-way require permits that include traffic control plans. Local permitting processes should require and provide guidance for accommodating bicyclist and pedestrian travel through and around work zones.

Regional Context

- The Downtown Detroit Transportation Study includes a Construction Management Policy recommendation that details existing challenges, implementation partners, and short-term actions.

Implementation Considerations

- Accommodations for pedestrians in work zones must comply with the American with Disabilities Act.
- Walkways and bikeways should be kept clear of debris which could present a falling or tripping hazard. There are many considerations that should be given including advance warning/signage, adequate lighting, physical separation between construction and travelers, temporary facilities where appropriate, and warnings about surface irregularities, etc.
- Need commitment to staff permitting and on-site inspection efforts.
- Maintain and inspect pavement markings and signs.

Additional Resources

- *Accommodating Pedestrians*; National Work Zone Safety Information Clearinghouse
- *Manual on Uniform Traffic Control Devices, Part 6: Temporary Traffic Control*; FHWA
- *Work Zone Safety and Mobility Manual*; MDOT

Curbside Management

Overview

As mobility options diversify and travel patterns change, the value of curbside space and demand for accommodation has also changed significantly. Pedestrians and bicyclists now face increased competition for space at the curb, contending with on-street parking, bus stops, loading zones, and rideshare services. The increase in dockless micro-mobility services, such as e-scooters and bikeshare, present additional challenges for space allocation. As the place where these different transportation modes interact, curbs can be managed strategically to ensure that they meet the needs of all users safely and efficiently.

Curbside and curb-lane accommodations for bicyclists may include dedicated space for bike lanes, bike racks, and bikeshare stations. Curbside extensions and parklets further enhance pedestrian safety and comfort. Additionally, dedicated transit lanes and pick-up or drop-off zones for ridesharing services can supplement biking and walking trips by extending the reach of the network for longer trips.

Regional Context

- Some Southeast Michigan communities have dedicated space for ridesharing pick-up or drop-off zones. For example, the City of Ferndale created an online interactive map displaying five designated ridesharing locations (such as Uber and Lyft), as well as the routes that do not allow for pick-up or drop-off.
- The Downtown Detroit Transportation Study includes strategies on how to plan for curbside conflicts and manage different curbside demands.
- Wayne State University created a Lyft pick-up and drop-off zone near a park at the corner of Woodward and Warren Avenues.

Implementation Considerations

- Typically, curbside regulations focus on accommodating a traditional set of uses, primarily short-term parking, loading zones for commercial vehicles, and valet zones. As other uses become increasingly common, there is a greater need for more comprehensive regulations to balance competing demands.
- Designing for the future of curbside sidewalks may include new ways to charge for curb usage, such as technology that adjusts prices based on demand.
- To minimize conflicts for walking and biking, alleys and off-street loading areas can be designated for truck deliveries, separating the use from curbside traffic lanes.

Additional Resources

- *Blueprint for Autonomous Urbanism – Curbside Management*; National Association of City Transportation Officials
- *Curbside Management Practitioners Guide*; Institute of Transportation Engineers
- *Downtown Detroit Transportation Study*; City of Detroit

E-Bikes

Overview

Electric bicycles, known as e-bikes, have pedals that operate like a traditional bicycle, but include an electric motor to increase speed and assist users. As defined by Michigan state law, e-bikes have a maximum motor power of 750 watts.

E-bikes can extend the distance that users feel comfortable riding, and make it easier for people with disabilities to ride a bike. They can also be a great resource and benefit for commuters who may not want to exert as much energy as cycling typically requires, and they can help older cyclists feel comfortable riding a bike for longer distances.

Regional Context

- Public Acts 138, 139, and 140 amended state laws to regulate the operation of e-bikes in Michigan. These regulations establish three classes of e-bikes and where their use is legally permitted unless local laws state otherwise. For example, Class I e-bikes are permitted on paved trails, but local authorities may prohibit or regulate their use. Alternatively, Class II and III e-bikes are prohibited on trails, but local authorities may choose to permit and regulate their use.

Implementation Considerations

- As e-bikes become more common on the road, they may influence the design of future bicycle infrastructure. It may become more appropriate to design infrastructure based on the average speed of users, rather than focus on the needs of specific devices that may evolve or emerge over time.
- Local communities may adopt local laws to regulate, prohibit, or authorize the various classes of e-bikes for their shared-use paths and trails.
- Enforcement of e-bike regulations may prove difficult, and should be considered when establishing local laws.

Additional Resources

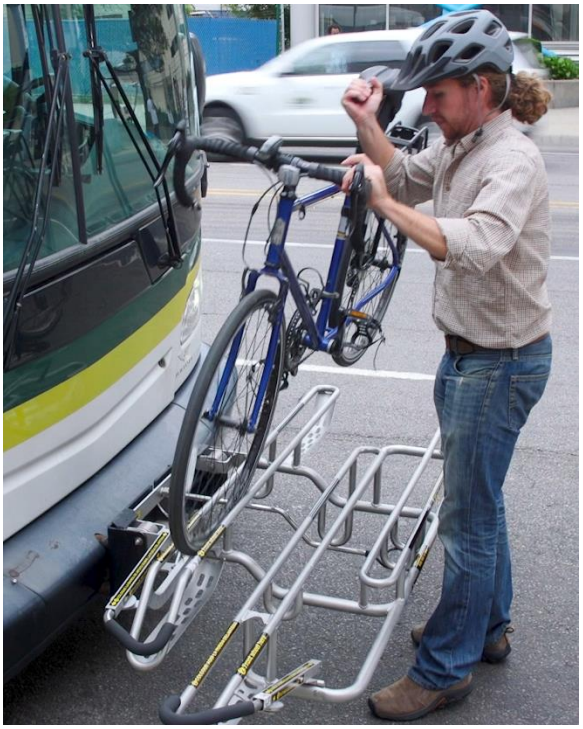
- State of Michigan HB 4781, 4782 and 4783

Regional Highlight: The Paint Creek Trail Commission's E-Bike Policy

Following adoption of Michigan's e-bike laws, the Paint Creek Trail Commission adopted its own policy regarding e-bikes on the trail in April 2018. Based on input at a public hearing on the topic, the majority of e-bike users in the area were older adults or senior citizens who enjoy biking outdoors for exercise, but also appreciated the extra power to cover longer distance trips.

The commission voted to allow Class I and Class II e-bikes on the trail for general use. Class I e-bikes provide motorized assistance only when pedaling, and ceasing function at 20 miles per hour. Class II e-bikes include a motor that propels the bike whether the user is pedaling or not, and has a maximum speed of 20 miles per hour. Class III e-bikes, which function similarly but reach speeds up to 28 miles per hour, are not permitted under the policy.

First- and Last-Mile Connections



Overview

First- and last-mile connections help fill the gap between a person's primary travel mode, and their origin or destination. While it commonly refers to walking or biking trips that supplement public transportation, even vehicle trips often require drivers to walk to and from a parking area and destinations.

Safe and convenient first- and last-mile connection solutions may include walking, biking, micro-mobility services, ride-hailing services, or park-and-rides for carpooling. These systems must work together to function as a complete network. For example, unsafe or uncomfortable conditions for walking and biking may deter transit use, or prevent it altogether.

In addition, wayfinding information is critical for users to navigate the multi-modal system. Successful wayfinding programs present information clearly and simply to accommodate visitors and newcomers who are unlikely familiar with the area.

Regional Context

- Several public transit services in the region accommodate bikes, including Blue Water Area Transit in St. Clair County, DDOT, SMART, and The Ride in Washtenaw County.
- Bicycles are currently allowed on all Amtrak trains in Michigan, including the Wolverine Line with stops in Pontiac, Troy, Royal Oak, Detroit, Dearborn, and Ann Arbor.
- Ann Arbor and the University of Michigan coordinate to provide bike lockers that are covered and secured for a nominal fee.
- The Ride used a grant from the Washtenaw Area Transportation Study (WATS) to identify opportunities for sidewalk and ADA improvements to enhance walking and biking accessibility and connections. Through a Mobility Challenge grant, The Ride has also piloted autonomous wheelchair support systems, intended to allow people using mobility devices more independence when boarding buses.
- The Dart App allows riders of DDOT, SMART, and the QLine streetcar to purchase one pass to increase the ease of boarding and transferring between providers.

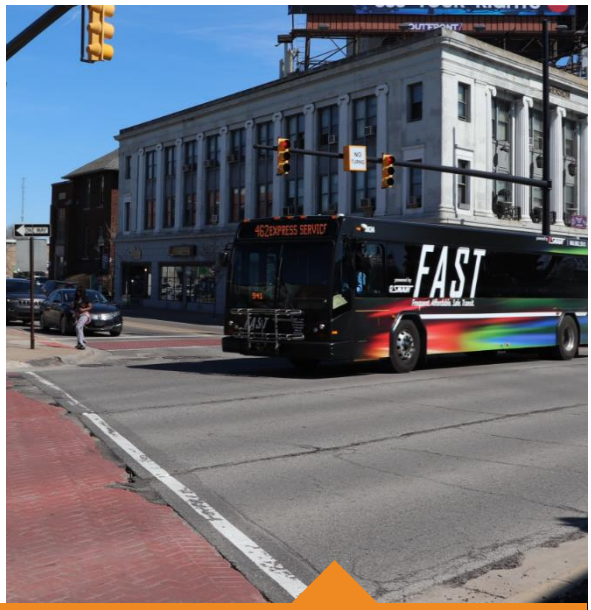
Implementation Considerations

- Transitional areas such as transit stops and parking lots benefit from wayfinding signage, secure bike parking, and designated parking areas for micro-mobility services such as bikeshare and e-scooters.
- The Federal Transit Administration recommends that infrastructure improvements around transit stations should be considered within a half-mile for pedestrians and within three miles for bicyclists.

- The Federal Transit Administration recommends that infrastructure improvements around transit stations should be considered within a half-mile for pedestrians and within three miles for bicyclists.

Additional Resources

- Manual on *Pedestrian and Bicycle Connections to Transit;* Federal Transit Administration
- *Multi-Modal Development and Delivery Work Plan;* MDOT



Regional Highlight: SMART enhances its service

SMART is making great strides in improving first- and last-mile access to the system. One featured improvement is real-time arrival notifications via the Ride SMART Bus App, which allows an individual with a smartphone to acquire information about when a bus is arriving to better assist with trip planning. For those without smartphones, SMART has been installing real-time arrival screens at designated FAST stops along Gratiot, Michigan, and Woodward Avenues. These FAST stops also contain new shelters and activated light beacons to alert a bus when someone is waiting at the stop.

SMART's entire fleet of buses is equipped with a bike rack that holds two standard bikes, allowing individuals to ride their bike to bus stops and take the bike with them to finish their trip. At key stops around the region, SMART has been working on installing bike racks to provide a safe backup option for riders if the rack on their bus is full. SMART is also committed to improving access for persons with disabilities by installing ADA walkways at bus stops around the region. The focus has been to repair, replace, or add ADA-compliant walkways at higher-use stops.

Land Use and Zoning

Overview

Land-use policies and zoning ordinances have a significant influence on how people get around. While transportation plans and policies are often aimed at connecting walking and biking infrastructure, zoning ordinances and land-use policies can help create a supportive area with a built environment that makes walking and biking more practical and comfortable.

To enhance bicycle and pedestrian travel, local land use, zoning, and subdivision regulations can require bicycle parking and sidewalks, as well as address automobile parking requirements, street design standards, access management, allowable land-use densities, and subdivision design.

Regional Context

- Many communities throughout the region have ordinances, standards, or requirements related to bicycle and pedestrian planning and implementation. These range from sidewalks and bicycle facilities ordinances, bicycle parking ordinances, bicycle or pedestrian friendly street design standards (e.g. sidewalks, paths, bikeways, crossing treatments, maximizing street grid), and form-based codes and special or overlay zoning.
- Examples in the region include:
  - City of Birmingham Overly Districts Sidewalks and Bicycle Facilities Ordinances
  - City of Berkley Bicycle Parking Ordinance
  - City of Ann Arbor Required Bicycle Parking Ordinance
  - City of Ferndale Bicycle Facilities Ordinance
  - City of Taylor Bicycle Facilities Ordinance
  - City of Detroit Sidewalks Ordinance
  - Brownstown Township Sidewalk Ordinance
  - City of Dearborn Heights Sidewalk Ordinance
  - Lyon Township Sidewalk Ordinance
  - City of Howell Form Based Code

Implementation Considerations

- Zoning ordinances can also address the needs of pedestrians and bicyclists through regulations on subdivision layouts, lot coverage, parking requirements, and including bicycle and pedestrian infrastructure in site development.

- The most conducive land use for bicycle and pedestrian activity is one with a higher-density mix of housing, offices, and retail.
- Shared-use-path connections between cul-de-sacs and adjacent streets can improve access for bicycles and pedestrians while maintaining automobile traffic patterns.
- The site-plan review process provides the opportunity to ensure that bicycle and pedestrian facilities are designed in compliance with national standards and ADA.
- Parking areas, entrances and exits to buildings, and connections to transit routes should ensure safe pedestrian access and clear identification of crossings.

Additional Resources

- *Active Transportation and Real Estate*; Urban Land Institute
- *Policy Guide on Surface Transportation*; American Planning Association
- *Using Land-Use Regulations to Encourage Non-Motorized Travel*; Federal Highway Administration

Micro-Mobility Services

Overview

Micro-mobility services provide individual transportation with small, light vehicles such as shared bicycles, electric scooters, e-bikes, or other emerging technologies. In many cases, fleets of micro-mobility devices are deployed for shared use, and may be implemented by local governments, nonprofits, or private companies.

Bikeshare systems may include a fixed network of docking stations, or simply be a collection of dockless bicycles dispersed throughout an area that connect users directly to their destination. Some bikeshare systems include e-bikes and traditional bicycles. Electric scooter sharing systems are typically dockless with electric engines that can travel up to 15 mph.

As a mobility service, these provide alternatives to traditional modes of travel, particularly for shorter trips. In Southeast Michigan, 42 percent of daily trips are under three miles. With advances in technology, and new programs and policies, micro-mobility options could make many of these short trips more convenient and faster.

Regional Context

- Currently, 14 communities in Southeast Michigan have piloted or fully implemented bikeshare systems. The largest is MoGo, covering Detroit and five Southeast Oakland County communities.
- In 2018, the region's first fleets of dockless e-scooters were launched in Detroit and Ann Arbor. Currently, all scooter services in the region are operated by private businesses, such as Bird, Lime, and Spin.

Implementation Considerations

- Micro-mobility services are most successful in areas where high amounts of short trips typically occur. Population factors, the existing mobility networks, and proximity to core services play key roles in success. For more information, see the Demand Analysis on page 42.
- Using scooters on sidewalks is legal under electric scooter laws in Michigan. However, riders must yield the right-of-way to pedestrians and give an audible signal before passing. State law also gives local governments the ability to further regulate the operation of electric skateboards based on the health, safety, and welfare of its citizens.
- Both docked and dockless services present challenges for the streetscape. Dock stations may be competing for space with sidewalks, bike racks, outdoor seating areas, street trees, or on-street parking. Dockless systems often lead to disorder or obstacles in the pedestrian zone. Designating specific parking or docking areas may help reduce conflicts with other uses.

- To reduce conflicts and increase safety, communities can regulate and enforce the locations and speed at which e-scooters can be operated.
- While micro-mobility services pair well with transit, they are particularly useful in areas with lighter service, as they extend the reach of the network for first- and last-mile connections.
- To ensure that dockless mobility and bikeshare in general is equitable and inclusive, local programs can include requirements for vehicle distribution, cash payment options, and accessible or adaptive vehicles.
- Education is particularly important for users of micro-mobility services, as they provide devices to users that may be less experienced.

Additional Resources

- *Guidelines for the Regulation and Management of Shared Active Transportation;* National Association of City Transportation Officials
- Michigan e-scooter laws: MCL 257.13f; MCL 257.33; MCL 658; MCL 660; MCL 662.

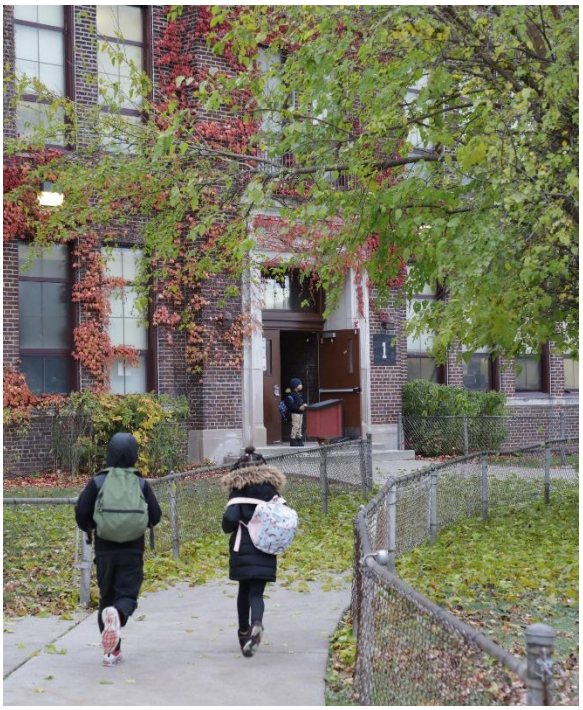
Regional Highlight: MoGo

In 2017, MoGo launched in the City of Detroit, as a nonprofit affiliate of the Downtown Detroit Partnership. With 480 bikes at 44 stations across 10 Detroit neighborhoods, MoGo is the region's largest bikeshare system.

MoGo bikes are built to withstand riding in an urban environment and are designed for comfort for a wide range of riders. In 2018, MoGo introduced 13 different types of adaptive cycles, including handcycles, recumbent bikes, tricycles, and tandem bikes, to provide additional options for riders of all abilities. Through MoGo Boost, the fleet now includes e-bikes that travel up to 15 miles per hour, with battery power that lasts for approximately 40 miles.

MoGo also accepts cash payments and offers a special pricing structure for those who qualify for state benefits programs to provide an option for riders of all incomes. Currently, MoGo is expanding its service into Southeast Oakland County. Once implemented, the system will have 75 stations and more than 620 bikes.

Safe Routes to School



Overview

Over the past several decades, the number of children walking or biking to school has dropped significantly. Safe Routes to School (SRTS) programs allocate funding to infrastructure and non-infrastructure efforts (such as educational and encouragement programs) to make it safe, convenient, and fun for children, including those with disabilities, to walk or bike to school. These programs encourage an active, healthy lifestyle, while improving safety, traffic conditions, and air quality around schools.

SRTS is a planning process where local stakeholders work together to identify barriers and develop plans to improve safe walking and biking around schools. Since 2003, the Michigan SRTS program has served more than 248 schools across the state, awarding more than $31 million in infrastructure funding and $1.4 million for education and encouragement programs.

Regional Context

The Michigan Fitness Foundation administers mini-grants for SRTS projects. Annually, the program awards up to $10,000 per school or $100,000 per district.

- MDOT administers major SRTS grants, which award up to $200,000 per school for infrastructure and $8,000 for programming. To be eligible, applicants are required to complete the SRTS planning process. This includes registering a school, assembling a SRTS team, surveying students and parents, conducting walking and biking audits, and developing an action plan.

Implementation Considerations

- All K-8 schools are eligible for SRTS grants, and all proposed projects must meet ADA requirements.
- Eligible infrastructure projects include sidewalks, traffic calming and speed reduction, intersection crossing improvements, on- and off-street bicycle facilities, off-street pedestrian facilities.
- Eligible programming projects are awareness campaigns, community outreach, traffic education and enforcement measures, and student training.

Additional Resources

- Safe Routes to School Handbook
- Safe Routes Michigan
- National Center for SRTS

Regional Highlight: Chelsea, Dexter, and Manchester

In Washtenaw County, the communities of Chelsea, Dexter, and Manchester are partnering with the five Healthy Towns Project (5H), the Michigan Fitness Foundation, Michigan State University, and Wayne State University to produce Safe Routes to School action plans for each school district. These plans resulted in identifying coordinators for each district, weekly walking school buses, and TAP grants for each community for infrastructure improvements and programming. These are examples of ongoing programming:

- Enforcement – Portable radar signs that change locations within each school district. Washtenaw County Sheriffs and Chelsea Police Departments maintain these signs.
- Education – Bike rodeos are conducted in all three communities.
- Evaluation – Every five years, participation levels are monitored as part of a regional survey called Behavior Risk Factor Surveillance Systems.
- Encouragement – Walk to School weekly programs, dedicated Facebook pages, coordinated Walking School Bus routes, and purchase of encouragement items.

Streetscaping

Overview

Streetscaping improves the look and feel of a street with trees and landscaping, decorative lighting and pavers, public art, and street furniture such as benches and bike racks. Gateway treatments and wayfinding signage can further enhance bicycle and pedestrian mobility by designating destinations and directing traffic.

These functional and aesthetic improvements enhance the sense of place, safety, and walkability of a street, contributing to a more vibrant corridor or district. While design approaches may vary by street type and local context, streetscaping can be used to support economic development efforts and enhance nearby businesses, or meet environmental goals by incorporating green stormwater infrastructure and increased tree canopy.

Regional Context

- The City of Ann Arbor DDA provides a Street Design Manual to guide construction and maintenance of downtown streets.
- The City of Detroit's Streetscape Program is investing $80 million in bond funding to improve streetscapes and commercial corridors across the city.
- Recognizing the importance of Washtenaw Avenue to their economic base, Pittsfield and Ypsilanti Townships worked together to develop the Re-Imagine Washtenaw Design Guidelines, which facilitates the phased development of a livable, walkable, and workable corridor.

Implementation Considerations

- Streetscape improvements are often focused on established traditional downtowns or historic districts, but may be beneficial in any areas with high pedestrian activity or demand.
- Streetscaping can accomplish multiple goals, such as traffic calming, pedestrian safety, and water quality improvements, while employing creative solutions that reflect a community's history and enhance its identity.

Additional Resources

- *Great Lakes Green Streets Guidebook;* SEMCOG
- *Streetscape Guidance for Downtown Historic Districts;* MDOT and SHPO
- *Designing Walkable Thoroughfares, A Context Sensitive Approach;* ITE

Regional Highlight: Rochester Hills' Auburn Road Streetscape

In 2017, the City of Rochester Hills adopted the Auburn Road Corridor Plan. A major focus of this plan was to enhance the public realm for the city's Brooklands neighborhood to be an inviting place for people to gather, walk, bike, and shop. By early 2020, this half-mile, two-lane road was reconstructed and reimagined using multiple streetscaping, placemaking, and environmental enhancements to not only improve transportation accessibility for all users, but also as a destination for residents to visit and stay. Here are some of the implemented streetscape successes:

- Wide sidewalks that include street furniture, pedestrian-scale lighting, bike racks, street trees and landscaping, phone-charging stations, and space for outdoor dining.
- On-street parking, defined safe midblock and intersection pedestrian crossings, and several street and driveway closures to encourage safer walking and biking.
- A narrow median and two compact roundabouts to calm traffic and enhance the corridor as an attractive place for vehicles and pedestrians.
- Green infrastructure and low-impact design to include roadside rain gardens and bioretention cells for managing stormwater runoff.

Future enhancements along this corridor include gateway and art installations and a splash pad, and other green and gathering spaces.

Traffic Calming

Overview

Traffic calming uses street design features and measures to reduce motor vehicle speeds to improve safety and enhance neighborhoods. The aim of traffic calming is to encourage safer, more responsible travel along roadways for all users – motorists, pedestrians, and cyclists.

There are many strategies and techniques for traffic calming – vertical deflections (speed humps, speed tables, and raised intersections); horizontal deflections (chicanes, curb extensions, and traffic circles); roadway narrowing to reduce speed and enhance the street environment for people who walk or bike; and reallocating space within the roadway for medians, pedestrian crossing islands, bicycle lanes, or on-street parking.

Regional Context

- City of Auburn Hills has implemented a Traffic Calming Program that uses a three-phased approach – identification of the problem; education and enforcement; and engineering and implementation.
- City of Ferndale developed a Neighborhood Traffic Calming Program with several demonstration streets.
- Washtenaw County has implemented a Neighborhood Traffic Management Program (NTMP) which creates a partnership between residents, the road commission, and law enforcement to provide long-term solutions to residential traffic and speed issues.
- City of Detroit has implemented a Traffic Calming Program that enables residents to request speed humps on their residential streets.
- Many communities have begun to evaluate roadway configurations for narrowing or eliminating travel lanes, often referred to as “road diets.” The goal of a road diet is to reallocate at least one vehicle lane for other uses, such as for parking, sidewalks, bicycle lanes, transit use, turn lanes, curb extensions, parklets, or pedestrian refuge islands.

Implementation Considerations

- Traffic-calming policies should include planned bicycle and pedestrian facilities as prioritization criteria.
- Developing criteria for candidate streets and treatment identification can help prioritize local funding.

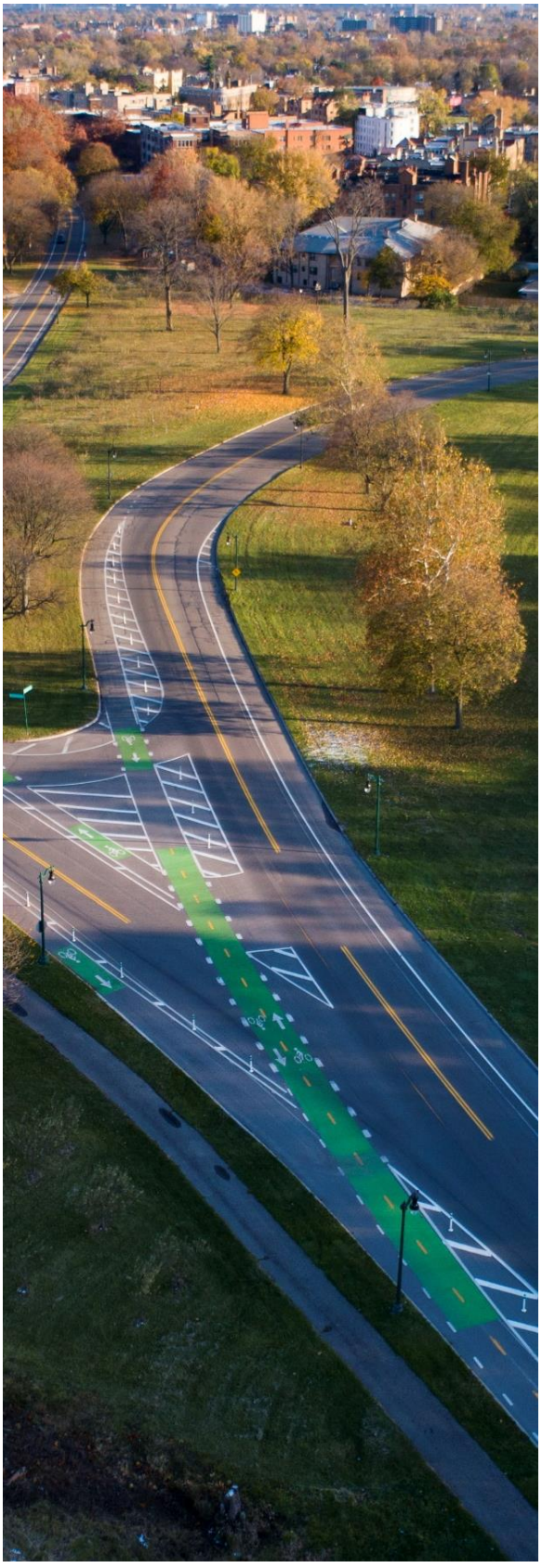
Additional Resources

- *Traffic Calming ePrimer;* Federal Highway Administration
- *Traffic Calming to Slow Vehicle Speeds;* U.S. Department of Transportation
- *Traffic Calming Measures;* Institute of Transportation Engineers
- *Urban Bikeway Design Guide – Speed and Volume Management;* National Association of City Transportation Officials

Regional Highlight: Ann Arbor Traffic Calming Guidebook

In 2019, the City of Ann Arbor developed a Traffic Calming Guidebook that provides a step-by-step process for residents to engage with the city to perform technical analysis of traffic concerns on local streets and explore options for effective solutions.

The guidebook also features detailed qualification criteria, and a traffic-calming device toolkit with detailed descriptions and considerations, including costs of the many different treatments.



Chapter 5: Infrastructure Guidelines

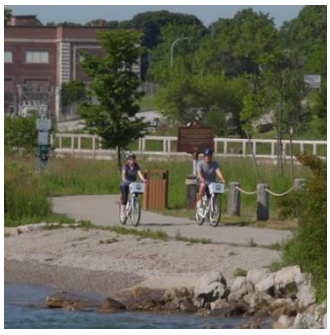
This section provides guidance on selecting, designing, and implementing bicycle and pedestrian infrastructure and amenities that support the network. Communities can use the information provided to select appropriate infrastructure solutions, and communicate about plans and projects.

The information in this chapter, summarized in Table 11, presents both long-standing and new bicycle and pedestrian infrastructure components cited in guidebooks developed by agencies such as the American Association of State Highway and Transportation Officials (AASHTO), the National Association for City Transportation Officials (NACTO), the Federal Highway Administration (FHWA), and the Michigan Department of Transportation (MDOT). While specific recommendations may vary by agency or change over time, a common theme is flexibility – there is no one-size-fits-all solution for developing walkways, bikeways, or roadways, and different treatments may be more appropriate or cost effective depending on local context, traffic volumes, and community goals.

In addition, some treatments are newer and may be considered experimental, or only have interim approval from FHWA or the Michigan Manual for Uniform Traffic Control Devices (MMUTCD). As such, communities should check with MDOT or their county road agencies before planning for these elements especially for projects using federal funding.

Table 11
Index of Bicycle and Pedestrian Infrastructure Components

Bicycle Infrastructure



Shared-Use Paths

Shared-use paths, also known as side paths, trails, or greenways, are paved, off-road facilities for bicyclists and pedestrians that are physically separated from motor vehicle traffic. They provide the most comfortable experience for most bicyclists, while also accommodating pedestrian use.

Shared-use paths that are built within a road's right-of-way are often referred to as side paths. These provide connections between neighborhoods, parks, shopping districts, and other local destinations. In some cases, side paths can function more like sidewalks with several driveways and intersections that interrupt bicycle travel.

Shared-use paths can also be independent of the roadway network, winding their way through parks, along rivers and flood plains, or within rail corridors and utility easements. These are often referred to as trails. With a limited number of intersections and driveway crossings, they allow for relatively unimpeded free-flow travel, acting almost like freeways for bicycles.

To avoid conflicts between users, shared-use paths are wider than typical sidewalks with a minimum width of eight feet, and often feature specialized intersection treatments. Current federal design guidelines require shared-use paths to provide at least two feet on either side as clear buffer zones. In areas with higher volumes of bicyclists and pedestrians, such as riverwalks and downtown areas, they may be 14 feet or wider.

Pavement surfaces should be selected based on the anticipated volumes and needs of various users. For example, while crushed stone may be accommodating for some bicyclists, it is less conducive to pedestrian use or for people in wheelchairs. Similarly, asphalt and concrete surfaces have different installation costs and maintenance needs over time.

Typical design speed for shared-use paths is 12-30 miles per hour, which impacts turning radii and sight distances for path users and vehicles on adjacent roadways. Bi-directional bicycle traffic and frequent driveways and intersections can create unexpected conflicts between users. These can be mitigated by reducing motor vehicle turning speeds, consolidating driveways, and ensuring clear sight lines between side path users and motorists. Conflicts between bicyclists and pedestrians may occur on shared-use paths if adequate width is not provided.

Protected Bike Lanes

Protected bike lanes, also known as separated bike lanes or cycle tracks, are on-street or street-adjacent bike lanes that are physically separated from travel lanes and walkways with vertical elements. They can be one-way or bi-directional. They are intended to provide the same level of comfort as shared-use paths and are similar to side paths but are exclusively for bicycle travel. They are also useful where sidewalks currently exist but where no dedicated space is provided for bicyclists.

A variety of materials can provide physical separation – planters, flexible plastic posts, concrete medians, curbs, and parked motor vehicles. Different types of cyclists, such as those using adaptive equipment, should be considered when determining the width of the bike lane, the height of the vertical elements, and the equipment needed to maintain it. At intersections, separated bike lanes should be designed using signal phasing or intersection geometry to mitigate conflicts between bicyclists and motorists.

There are advantages and disadvantages to both one-way and two-way facilities. While one-way bike lanes are generally safer and easier to implement because they can be developed in phases, they require more space using both sides of a roadway, and may require more education to discourage wrong-way travel. Two-way facilities may be easier to maintain as space is consolidated on one side of the roadway, and can more easily accommodate passing or two-abreast riding. However, they require more traffic-control devices, and present different challenges at intersections and where they connect to other one-way facilities.

Buffered Bike Lanes

Buffered bike lanes provide dedicated space on a road for bicyclists, and include a painted buffer area to the left of the bike lane, providing additional separation between bicyclists and vehicle traffic. This also helps bicyclists navigate around open doors of parked cars.

Where buffers are used, bike lanes can be narrower because the shy distance function is assumed by the buffer. For example, a three-foot buffer and four-foot bike lane next to a curb can be considered a seven-foot bike lane. It is recommended that side-buffered lanes next to on-street parking have a five-foot minimum width to encourage bicyclists to ride outside of the door zone. Buffers should be at least 18 inches wide; in areas where bicyclist volumes are high, bicyclist speed differentials are significant, or where side-by-side riding is desired, the desired bicycle travel area width is seven feet.

Conventional Bike Lanes

Conventional bike lanes dedicate exclusive on-street space to bicycling through signs and pavement markings. Painted buffers can be added to improve the comfort of bicyclists by increasing the distance from travel lanes or on-street parking.

Bike lanes should be signed and marked to discourage motorist use for travel, passing, or parking. Bike-lane markings should extend to intersections to communicate where motorists and bicyclists should be expected to travel and queue. Bike-lane buffers can be narrowed or removed at constrained locations to provide space for turn lanes or intermittent with on-street parking, where appropriate.

On one-way streets, left-side bike lanes are recommended, as they separate transit stops from bicycle travel, and provide greater mutual visibility for cyclists and drivers. In locations with on-street parking, there are less conflicts with opening vehicle doors, since the vast majority of car trips are single-occupant with the driver-side doors opening more often than passenger-side doors.

While conventional bike lanes are pairs of one-way facilities that run in the same direction as adjacent vehicle-traffic lanes, problems arise when trying to provide two-way connectivity on a one-way street. In these cases, contra-flow bike lanes can be installed on the left side of the motor-vehicle lane, allowing bicyclists to travel in the opposite direction of motor-vehicle traffic on a one-way street. A buffer of at least three feet provides adequate separation, especially in the moderate-speed, high-volume conditions that characterize some streets where these may be applied.

Shared-Lane Markings

Shared-lane markings (often called sharrows) are pavement markings within a vehicle traffic lane that alert both drivers and bicyclists where it is safest to ride a bike, which is directly over the markings. This helps the bicyclist avoid curbside conflicts like the doors of parked cars, and lets drivers know there is an expectation that they will be sharing this lane with people on bikes. Sharrows should be placed after every intersection and frequently enough to remind motorists to expect bicyclists in the street.

Sharrows are useful in completing the bicycle network and filling gaps, but are likely less comfortable for many users as compared with shared-use paths and bike lanes. This treatment is only applicable where motor-vehicle speeds are low enough to share the road safely.

Advisory Bike Lanes

Advisory bike lanes are similar to sharrows in their flexibility, but provide a greater level of comfort and protection. They are intended for low-speed, low-volume residential roadways, and feature dashed lines that delineate a shoulder for bicyclists to use when a road is too narrow to accommodate designated infrastructure in addition to two-way vehicle traffic. They allow bicyclists to travel on the sides of the road in the advisory bike lanes, while two-way vehicle traffic is maintained in one center travel lane. When two motorists approach each other from opposite directions, they use the shoulders to pass, yielding to any bicyclists traveling in either direction. Advisory bike lanes are considered "experimental" by FHWA and have yet to be widely implemented in Michigan.

Wide-Paved Shoulders

Wide-paved shoulders are paved portions of a roadway outside of the travel lanes and, while they are not designed for biking, bicyclists often use them where other bikeways are not available. The comfort of bicycling in paved shoulders varies based on shoulder width, traffic volumes, and traffic speeds. In addition, MDOT recognizes shoulder bike lanes as those that are wide enough to accommodate stopped vehicles, but also meets relevant criteria for bike lanes and therefore includes appropriate signage.

Paved shoulders are most appropriate in rural or some suburban environments where traffic speeds and volumes are generally lower. Typically, they should be at least four-feet wide to provide adequate space for bicyclists. Rumble strips on paved shoulders should include occasional breaks to accommodate bicyclist access. When paved shoulders are not marked as bicycle facilities, bike route signs can remind motorists to watch for bicyclists.

Bike Routes

Bike routes are a designation given to a collection of bicycle-friendly roadways and pathways that offer a unique advantage for biking. They typically use roads that have lower-traffic volume, or fewer stops and intersections. Often, they are intended to guide long-distance connections, and are key to the region's bicycle and pedestrian corridors, as identified in Chapter 2. Bike routes typically have signage and, while they do not always have designated infrastructure, they may include a combination of other bikeways and paths. As such, they cost the least to implement, and are flexible enough to change alignments as needed, or be enhanced with more comfortable infrastructure over time.

Neighborhood Greenways

Neighborhood greenways, also known as shared streets or bicycle boulevards, are on-road routes that are optimized for bicycle travel. More often than not, these routes are designated on residential streets with existing sidewalks that help the corridor function more like a greenway. Signs, pavement markings, and traffic-calming features are used to manage motor-vehicle speeds and volumes to provide a comfortable shared environment between bicyclists and motorists. In many situations, neighborhood greenways can be developed quickly with minimal capital investment compared to share-use paths or protected bike lanes.

Neighborhood greenways function best on streets with very low traffic volumes and where motor vehicle speeds are supposed to be close to bicycle-travel speeds (10-25 mph). SEMCOG's Bicycling Comfort Level Analysis, summarized on Page 31, can be helpful in identifying these routes. Priorities should be given to routes that connect other low-stress bikeways, such as shared-use paths and protected bike lanes.

Neighborhood greenways can also use traffic calming techniques to keep motor vehicles traveling at or below the posted speed. Since an advantage of neighborhood greenways is that they primarily experience lower volumes of traffic, medians or traffic circles can be used to discourage cut-through traffic.

Green Bike Lane Markings

Green bike lane markings are a supplemental treatment used as part of bike-lane projects — protected, buffered, or conventional. Green markings can be made with paint or thermoplastic, but they require a specific color blend for consistent applications. Nationally, some communities are installing green markings for the entire length of a bike lane. In Michigan, they are used primarily at intersections to denote areas of conflict between bicyclist and motor vehicles. Often, the markings are dashed to indicate to drivers that they are allowed to enter this space, similar to other dashed-lane markings.

Bike Boxes

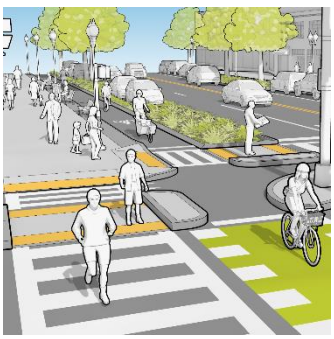
Bike boxes use paint and pavement markings to help people biking make left turns or get a head start on vehicle traffic. They delineate space at signalized intersections that allow bicyclists to position themselves in front of motorists when facing a red signal. Bike boxes are intended to help left-turn movements and facilitate movements where a bike lane does not continue through the intersection. Bike boxes preclude motorists from turning right on red, which should be communicated through signage.

Two-Stage Turn Boxes

Many bicyclists do not feel comfortable putting themselves before cars in a traditional bike box, especially to make a direct left turn. Two-stage turn boxes are more comfortable for bicyclists turning left at intersections by breaking the movement into two steps. Bicyclists travel through the intersection on a green signal, wait in the turn box and cross when presented with a green signal in the perpendicular direction. Two-stage turn boxes also preclude motorists from turning right on red, which should be communicated through signage.

Bicycle Signals

Used most often with protected bike lanes, bicycle signals are traffic signals that provide exclusive phases for bicyclist movements in order to reduce conflicts between motorists and bicyclists at intersections. They can also help protect against pedestrian and bicyclist conflicts. In addition, bicycle signals can be timed and coordinated so bicyclists stop less often.



Protected Intersections

Similar to protected bike lanes, protected intersections separate motorist, bicyclist, and pedestrian movements at intersections through signal operations, physical separation, signage, and pavement markings. They improve safety and comfort by reducing the frequency and severity of motorist right-turn conflicts with bicyclists and pedestrians using corner islands to reduce right-turning speeds and improve sight lines. Protected intersections also provide separate crossing space for bicyclists and pedestrians, in addition to queuing space for bicyclists.

Pedestrian Infrastructure

Shared-Use Paths

As previously discussed in the context of bicycle infrastructure, paths that exceed eight feet in width are typically considered accommodating for both pedestrians and bicyclists. While shared-use paths are generally considered to be the most comfortable type of infrastructure for walking or biking, they can often lead to conflicts between users, in which slower-moving pedestrians are often more vulnerable. To mitigate potential safety issues, signage or pavement markings can be used to indicate pedestrian and bicycle zones or travel directions, which is particularly important on heavily used routes.

Sidewalks

Sidewalks are paved pathways for pedestrian travel. They are the foundation for any pedestrian mobility network, and are sometimes supplemented by shared-use paths. In most cases, sidewalks should be installed on both sides of the street and include a buffer that provides separation from adjacent traffic. This provides added safety and comfort, and can provide space for street trees, plantings, lighting, and street furniture. Sidewalks can also provide access that is independent of a roadway, providing a more connected network between cul-de-sacs or through parking lots.

The Americans with Disabilities Act (ADA) requires sidewalks to provide a minimum width of three feet with unobstructed access. Most sidewalks in the region are a minimum width of five feet, which allows two people to pass comfortably or to walk side-by-side. Higher-pedestrian volumes may warrant wider walkways. For any sidewalk width, the paved surface must be relatively level from side-to-side, and running slopes should generally be less than five-percent grade, unless the adjacent roadway is steeper.

Crosswalks

Crosswalks, marked and unmarked, legally exist at all intersections, unless explicitly prohibited. Accessible curb ramps provide a transition between sidewalks and crosswalks. They are required at all crosswalks on public streets and at transit stops. Detectable intersection warnings, or truncated domes, are a standardized surface feature that alerts pedestrians to a transition between sidewalks and roadways, and required by ADA at all crosswalks.

Marked Crosswalks

Marked crosswalks use pavement markings to delineate a pedestrian crossing area. They increase the safety and comfort of people crossing the street on foot, and alert drivers to potential pedestrian activity. At mid-block locations, pavement markings establish a legal marked crosswalk.

Crosswalks may be marked with transverse lines, which run parallel to pedestrian travel and outline a pedestrian walkway, or continental markings, which run perpendicular to pedestrian travel and enhance visibility. They may also include decorative treatments that define a district and support placemaking, or be physically raised to signal to motorists that they are crossing into spaces intended for other users.

Crosswalk widths should be six feet or the width of the connected curb ramps, whichever is greater. Higher pedestrian volumes may warrant crosswalk widths of eight feet or wider. On multi-lane, high-volume, high-speed roads, crosswalk markings should not be installed without additional treatments such as signage, signals, curb extensions, or pedestrian safety islands.

Pedestrian Safety Islands

A pedestrian safety or refuge island provides space in the roadway for pedestrians to wait for traffic to pass, and reduces the time it takes to safely cross at an intersection. They are generally applied at locations where speeds and volumes make crossings difficult, or where three or more lanes of traffic make pedestrians feel exposed or unsafe in the intersection.

Pedestrian safety islands should be at least six feet wide to accommodate the length of a bicycle or a person pushing a stroller, but have a preferred width of 8-10 feet. They can also be used to connect offset crosswalks to encourage crossing pedestrians to look at oncoming traffic before crossing, and are often enhanced using plantings or street trees.

Curb Extensions

Curb extensions (also known as bulb-outs, neckdowns, or chokers) narrow streets to shorten crossing distances, improve sight lines, manage on-street parking, slow traffic speeds, and reduce effective turning radius. They work best when paired with on-street parking, and can be built to physically enforce parking restrictions near crosswalks and improve visibility. To manage drainage, curb extensions can be used for green infrastructure and bioretention.

Pedestrian Signals

Pedestrian signals enhance crosswalks by displaying a white pedestrian symbol, an orange flashing hand, and a steady orange hand to communicate walk, clearance, and don't-walk phases. Countdown timers showing the time remaining in the clearance phase are required when installing any new pedestrian signal.

Pedestrian signals can be activated by default for every traffic signal cycle or by pedestrians with crosswalk push buttons, which must be accessible by pedestrians with disabilities. Lights and sound cues can be used to confirm pedestrian signal activation for pedestrians with visual and auditory disabilities. Pedestrian phases should be adjusted to ensure adequate time for all users to cross, especially near schools and hospitals.

Leading pedestrian intervals can be used to initiate the pedestrian walk phase three-to-seven seconds before the concurrent motor vehicle phase begins, allowing pedestrians to cross first. This phasing increases pedestrian visibility and reduces conflicts with turning motorists, improving safety and comfort for travelers within the intersection. Leading pedestrian intervals should be considered at intersections with significant pedestrian traffic and turning vehicles. They should be implemented consistently along a corridor to manage pedestrian and motorist expectations. Prohibiting right turn on red can further increase their effectiveness.

Pedestrian Hybrid Beacons

Pedestrian hybrid beacons, also known as High-Intensity Activated Crosswalk Beacons (HAWK beacons), are user-activated traffic signals that require motorists to stop at crosswalks. Pedestrian hybrid beacon operation includes no signal indication until activated, a flashing yellow phase after activation, a solid red phase that is long enough to accommodate crossing pedestrians, and a flashing red phase that permits motorists to proceed after yielding for pedestrians and bicyclists.

Pedestrian hybrid beacons are recommended along multi-lane and high-volume streets. Stop bar markings should be installed in advance of the crosswalk to maintain adequate sight lines.

Rectangular Rapid Flash Beacons

Rectangular rapid flash beacons are user-actuated flashing pedestrian crossing signs that draw motorist attention to pedestrians waiting to cross. Generally, these should only be installed at mid-block crossings or roundabouts, because the flashing beacons may not be visible to motorists turning from side-streets into the crosswalk. Advanced yield markings should be installed to maintain clear sight lines between crossing pedestrians and motorists.

Crosswalk Signs

Crosswalk signs draw motorists' attention to the presence of mid-block crosswalks and crossing pedestrians and bicyclists. They can be placed at mid-block crossings, in a median, combined with stop or yield line markings, and between travel lanes in the crosswalk. Advanced crosswalk signs require installing stop-line markings or yield-line markings.

Stop-Line and Yield-Line Markings

Stop-line markings are wide, white bars in the vehicle travel lane that indicate where motorists should stop in advance of intersections. At intersections, stop bars should be placed no less than four feet and no more than 30 feet from a crosswalk.

Similarly, yield-line markings, also known as "sharks' teeth," are white, triangular markings that indicate where vehicles should yield to crosswalk users. At unsignalized mid-block crosswalks, yield markings should be placed no less than 20 feet and no more than 50 feet from the crosswalk. Yield markings must be accompanied by appropriate signage.

Supporting Infrastructure

Lighting

Lighting can help with nighttime visibility and improve safer travel for pedestrians and bicyclists. Lighting also makes pavement conditions visible to help avoid potential hazards. To avoid creating a silhouetting effect, lighting at crosswalks should be placed to illuminate crossing pedestrians from the side instead of overhead.

Lighting on shared-use paths and heavily traveled bicycle facilities can increase bicyclist comfort and safety, especially during winter months and through underpasses. Installing lighting along regional shared-use paths should begin and end at logical locations to avoid creating intermittently dark sections. Adequately lighted streets can also help motorists see bicyclists in on-street facilities.

Wayfinding

Wayfinding signs, markings, and maps direct travelers to important destinations. In addition to destination names, wayfinding signage should indicate the travel distance or approximate time to reach the destinations they promote. Destinations can include parks, neighborhoods, business districts, schools, shared-use paths and transit stations.

While wayfinding elements are useful for most bicycle and pedestrian infrastructure, they are critically important for regional trails, neighborhood greenways, and bike routes, which all may include connections with different infrastructure types.

Just as numbered state highways might have different names in different jurisdictions, regional trails can have multiple designations to maintain local wayfinding systems. As such, communities should work together so wayfinding is clear and useful, aesthetically pleasing, and preserves both local and regional identities.

Bicycle Parking

There are many different types of bike parking that fit into different contexts – examples include simple bike racks, outdoor bike lockers, and secure bike parking rooms within parking structures. The key to selecting the right type of parking is based on local demand for short, medium, and long-term parking and what space is available within the public right-of-way. The Association for Pedestrian and Bicycle Professionals has published a bike parking guide that can help assess local demand.

Bicycle Repair Stations

Oftentimes, bicycling-related issues arise when users are far away from their homes, motor vehicles, or a local bike shop. Bicycle repair stations have all the tools necessary to perform basic bike repairs and maintenance, from changing a flat tire to adjusting brakes and derailleurs. When located at trail heads, in parks, or other destinations in the network, communities can make biking more convenient and encourage its use.

Green Infrastructure

Green infrastructure can be added to both bicycle and pedestrian projects to accommodate multiple goals of improving water quality and promote better bicycle and pedestrian mobility. Improvements include porous pavement for bikeways and walkways, rain gardens, bioswales within vegetated planting strips, bump-outs, and other traffic-calming devices. In addition, trees can provide a sense of separation and safety, while also enhancing aesthetics and pedestrian comfort. Use *SEMCOG's Green Streets Guidebook* for more information on incorporating green infrastructure into street design.

Access to Transit

One of the benefits of bicycling and walking facilities is providing safe and comfortable access to transit stations and stops. A number of elements may be implemented to provide access. Sidewalks and bikeways provide a basic level of access, but site-specific features such as curb ramps and connections from the street or path network to the station are equally important.

Station wayfinding and amenities such as benches, shelters, trash receptacles, bike parking, and real-time bus arrival information can improve the overall transit experience. Local agencies and transit providers should work together to ensure stations and stops are easily accessible for pedestrians and bicyclists.

Trailheads and Rest Areas

Trailheads and rest areas are primarily features of the regional trail network, but aspects of both should be considered for longer distance local shared-use paths. They typically are located at access and terminus points of trails and may include parking lots, restrooms, picnic and seating facilities, drinking fountains, emergency phone service, and other recreational amenities. If a trail or path has segments of significant incline or grade, rest areas can provide relief.

Interpretive Facilities and Public Art

Connecting trails and pathways to the local environment and community can enhance walking or biking experiences and provide greater understanding of history or uniqueness of the surroundings. Interpretive facilities typically include signage with ample graphics to engage users of all ages and often integrate cultural, historic, or natural resources of the area. Public art can include interpretive activities, but also can also simply add an esthetic to the pathway, enhance community identity, or provide a public place for gathering and meeting.

Chapter 6: Funding and Maintaining the System

This section helps develop strategies for implementing and sustaining the bicycle and pedestrian system. It includes considerations for funding mechanisms at the local, state, and federal level, along with best practices for different types of maintenance.

Funding

Having sufficient funds for developing and maintaining bicycle and pedestrian infrastructure and related programs is critical to achieving a network of mobility options in Southeast Michigan. Unfortunately, funding is often limited. The funding that is available is often highly competitive and reliant on additional resources. Communities that successfully develop and expand their walking and biking systems often need to be creative in leveraging funds from a variety of sources and aligning projects with other, often larger, infrastructure projects.

Another challenge is that while funding sources exist, they can be difficult to navigate. The following sections summarize the funding sources available for bicycle and pedestrian projects. It needs to be noted that often projects will need multiple funding sources due to both limited funds and local matching requirements. Additionally, the size and complexity (e.g., acquisition needs, right-of-way issues, environmental impacts, etc.) of the project will likely determine and impact funding and financing options. Table 12 provides a general guide for various funding options based on projects of varying sizes and available budgets. This table is broken down by estimated budgets/costs and timeframe for project construction. Here are examples of projects for each category:

- **Small Budget – Short-Term:** Placemaking and temporary treatments such as painted bike lanes and shared-lane markings, wayfinding signage, and pop-up pedestrian areas and parklets.
- **Small Budget – Long-Term:** Sidewalk maintenance, and ADA enhancement projects; shared-use paths and trail enhancements such as maintenance, signage, and trailhead amenities.
- **Large Budget – Short-Term:** Sidewalk gap filling and replacement in demand areas and near core services; mid-block and intersection pedestrian safety enhancements such as HAWK signals and countdown devices; protected and separated bike lanes.

- **Large Budget – Long-Term:** Regional trail and shared-use path gap-filling projects; streetscapes including pedestrian lighting; multi-use bridges and boardwalks crossing roadways, rivers, wetlands, etc.

Table 12
Sources of Funding Options

Small Budget – Short Term	Small Budget – Long-Term	Large Budget – Short-Term	Large Budget – Long-Term
• Neighborhood Associations • Nonprofit grants • Local Health Departments • Office of Highway Safety • Main Street and Downtown Development Authority programs • Crowdsourcing (e.g., Patronicity grants) • Local General Funds • Foundation grants • Individual donors	• Federal Transportation Funds (e.g., TAP, SRTS, CMAQ, etc.) • Capital Improvement budget funds • State and Local Programs – Community Development Block Grants; Natural Resources Trust Fund; Recreation Passport; Land & Water Conservation Fund	• Foundation grants • Individual donors • Public-private partnerships • Infrastructure bonds	• Federal Transportation Funds (e.g., TAP, SRTS, CMAQ, etc.) • Foundation grants

Federal and State Funding Sources

Numerous funding opportunities administered at the federal and state levels support bicycle and pedestrian improvements and programs. These programs are generally intended for capital improvements, safety and education programs, and projects that relate to the surface transportation system. Federal funding programs typically require a local match of 20 percent and are often highly competitive.

Federal Highway Administration (FHWA) and MDOT administer programs to fund and implement infrastructure that support bicycle and pedestrian transportation, and to develop safety projects at high-crash locations. A complete list of funding opportunities available through the USDOT is in Appendix E. In addition, the National Parks Service (NPS) and Michigan Department of Natural Resources (DNR) administer funds to improve outdoor recreation opportunities, including walking and biking. Here are a few of the most applicable programs for bicycle and pedestrian projects:

- **Highway Safety Improvement Program (HSIP):** Administered by FHWA and MDOT, HSIP is a core federal-aid program with the purpose of achieving a significant reduction in traffic fatalities and serious injuries on all public roads. This program can be used for road diets, pedestrian and bicycle crossing improvements, traffic calming, and other treatments that improve safety for vehicles, pedestrians, and bicyclists.
- **Land and Water Conservation Fund (LWCF):** Administered by NPS and DNR, LWCF provides grants to states and local governments for acquiring and developing public

outdoor recreation areas and facilities. These may include walking or biking trails, or improved connections through parks.

- **Michigan Office of Highway Safety Planning Grants:** Administered by the National Highway Traffic Safety Administration and Michigan State Police Office of Highway Safety Planning, these grants are awarded for pedestrian and bicycle safety programs. This funding aims to increase safety awareness and skills among pedestrians, bicyclists, and motorists sharing the roadway. Items eligible for funding are public awareness materials, bicycle skills courses, and training for professionals involved with all aspects of pedestrian and bicycle safety.
- **Surface Transportation Block Grant Program (STBG):** Administered by FHWA and MDOT, STBG is a flexible funding program that may be used by states and localities for projects to preserve and improve the conditions and performance on any public road, including bicycle and pedestrian infrastructure.
- **Transportation Alternatives Program (TAP):** Administered by FHWA and MDOT, TAP funds are split between the state and various larger urban areas based on population. MDOT administers an estimated $17.6 million in TAP funding each year, which includes funds for Safe Routes to School programs and projects. The SEMCOG region has received approximately $5 million annually, distributing funds on a competitive basis. TAP funds can be used to expand transportation choices and enhance the transportation experience through implementing a number of improvements – pedestrian and bicycle infrastructure and safety paths, environmental mitigation through green infrastructure, and projects to improve walking and biking to school.
- **Safe Routes to School (SRTS) Major Grants:** MDOT administers major grants for SRTS with funding through TAP. This grant program focuses on helping communities build sidewalks, crosswalks, and any other infrastructure improvements that may be needed to make it possible for students to walk, bike, and roll safely to school. They are supplemented by Safe Routes to School Mini Grants, which are administered by the Michigan Fitness Foundation and more focused on education and encouragement.

State of Michigan Funding Sources

State-level funding for walking and biking projects is available from various sources, including MDOT, DNR, the Michigan State Police. Here are some of these programs:

- **Michigan's Act-51 Funds:** MDOT, county road agencies, cities, and villages all receive state funding from state gas taxes and registration fees that can be used for a variety of roadway projects including bikeways, sidewalks, and crosswalks.
- **Michigan Natural Resources Trust Fund (MNRTF):** Provides grants to local governments and other agencies to secure and develop lands for recreational purposes. Trail projects within and connecting to parks, especially trails that enhance and improve statewide and regional trail networks (e.g., Michigan's Iron Belle Trail and Great Lake to Lake Trail), are priority projects under MNRTF.
- **Recreation Passport Grants:** Provides funding to local governments for developing public recreation facilities, such as developing new facilities and renovating old facilities.

Local Funding Sources

Local revenues, millages, and infrastructure bonds are the primary local public funding sources for pedestrian and bicycle projects. Additionally, some communities use tax-increment financing (TIF) – value capture of the increment tax increase collected and used for improvements within

the district. Through local zoning ordinances, communities can encourage and require sidewalk and pathway construction when new development and redevelopment occurs.

Transportation is only successful if users can safely access it by walking or biking. Local governments can set aside portions of general transportation revenue, public school bonds, county health department funding, parking fees, and traffic violation revenue for upgrades to walking and biking facilities.

Private and Philanthropic Funding Sources

Many private funding sources are available for pedestrian and bicycle projects, from small grants for marketing activities to multi-year foundation grants. Small-scale projects and improvements that require land acquisition are often funded primarily from private sources.

- **Safe Routes to School Mini Grants:** In coordination with MDOT, the Michigan Fitness Foundation administers a safe-routes to school mini-grant program that provides funding to schools to develop transportation programs that encourage students in grades K-8 to walk and bike to school. Examples of these programs are walking school buses, bike mechanics clubs, or bike train programs; other programs that encourage more students to walk and bike to school on a regular basis could also be eligible.
- **Parks and Trails Initiative:** Ralph C. Wilson Jr. Foundation's (RCWJF) parks and trails initiative is focused on making connections and eliminating gaps in the regional trails system and supporting local economic vitality.
- **Legacy Funds for Design and Access:** This partnership between RCWJF and the Community Foundation for Southeast Michigan's Greenway's Initiative support projects that serve to increase walkability and bikeability of local communities and/or increase outdoor recreational activities.

Statewide and nationally, funding opportunities for smaller projects and support for planning and encouraging walking and biking activities are available:

- **People for Bikes Community Grants:** Primarily focused on supporting bicycle infrastructure projects and targeted advocacy initiatives that make it easier and safer for people of all ages and abilities to ride. These funds are generally smaller in size and scope and support infrastructure projects such as bike paths, lanes and trails, and end-of-trip facilities such as bike racks, bike parking, bike repair stations, and bike storage.
- **DALMAC Fund:** Funds a variety of bicycling activities in Michigan, ranging from safety and education programs to bicycle trail development.
- **League of Michigan Bicyclists Micro-Grants:** Provides financial assistance to support the implementation of creative projects that promote bicycling and safety on Michigan roadways.

Funding Through Public-Private Partnerships

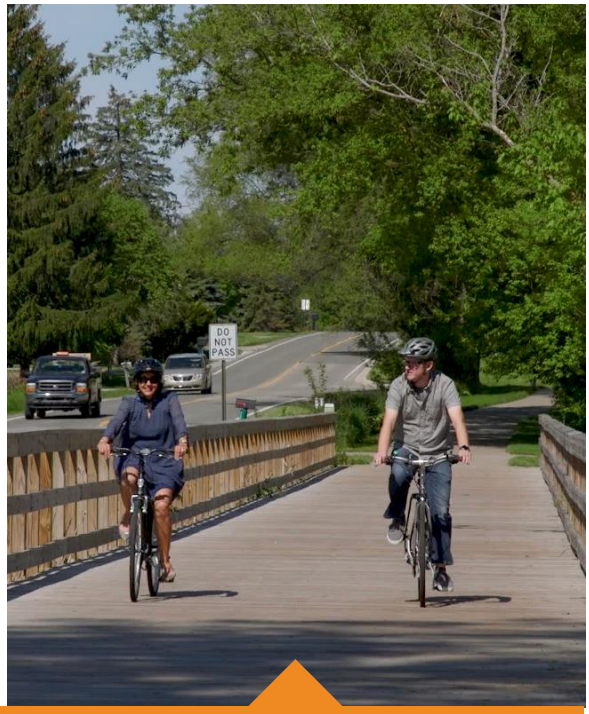
Public-private partnerships are contractual agreements that can leverage funds from both sectors for infrastructure projects and facilities. Where municipal budgets fall short, private revenue can fill the gaps. During project development, seeking opportunities to partner and coordinate with adjacent land owners and stakeholders such as utility owners is a way to leverage available resources and time projects for greatest impact. With an increased emphasis on the health benefits of walking and bicycling, public and private health organizations can be resources for funding and partnerships, and promote the benefits of a project.

Innovative Funding Sources

Increasingly, nonprofit organizations, municipalities, and individual advocates are using crowdfunding for innovative pedestrian and bicycle projects. Crowdfunding uses a large audience for fundraising, typically with the help of Internet donation websites such as kickstarter.com.

The Michigan Economic Development Corporation's (MEDC) Public Spaces Community Places program is a public placemaking initiative using Patrinicity's crowdgranting campaign. Through this program, local residents can use crowdfunding to be part of developing strategic projects, such as those supporting walking and biking in their communities and be backed with a matching grant from MEDC.

Regardless of funding source, continued investment in expanding, maintaining, and closing gaps in walkway and bikeway networks is needed to create complete, connected, convenient, and safe infrastructure for people to walk and bike. Operations and maintenance, including striping, sweeping, snow removal, bridge maintenance, and repaving all should be factored into local budgets. Special attention should also be paid to the potential for requiring specialized maintenance equipment for certain types of trails and bicycle facilities that may be too narrow or delicate for standard maintenance vehicles. Facility design should avoid the requirement of non-standard maintenance vehicles whenever possible to lower the long-term maintenance burden on local jurisdictions.



Regional Highlight: Pittsfield Township Greenways Development

After using SEMCOG technical assistance as part of its Community Master Plan Update, Pittsfield Township has planned and developed nearly 10 miles of shared-use paths and sidewalk projects between 2010 and 2019. These projects fill critical gaps in the township's network and provide direct links to transit access, the county's Border-to-Border Trail, and connect residents to township hall and four parks.

In order to achieve this success, the township needed to be both strategic and collaborative in identifying and securing funding. Through the combination of a township park millage, Washtenaw County Parks and Recreation Commission funds, MDOT Economic Development Category A funding, Transportation Alternatives Program funds, and Washtenaw County's Urban CDBG funds, Pittsfield Township has allocated nearly $6 million for bicycle and pedestrian pathways. Additionally, through a SEMCOG Green Infrastructure grant, in 2020 the township is implementing bio-swales and tree planting along Textile Road adjacent to the Pittsfield Preserve, Marsh View Meadows Park, and Platt Textile Greenway.

Maintenance and Repair

Maintaining pedestrian and bicycle infrastructure is necessary to ensure that it remains safe and usable. Existing facilities such as sidewalks, crosswalks, bike lanes, and trails should be evaluated to determine whether the existing maintenance plan is working, and to make improvements to the plan if necessary. Routine maintenance activities such as street sweeping, surface inspections, and landscaping can help keep existing infrastructure intact and prevent small problems from escalating over time. Seasonal maintenance, such as snow and ice removal, helps preserve both the pavement surface and the system's transportation function by maintaining clear access for pedestrians and bicyclists.

Other maintenance activities require greater investment and should be planned strategically. Capital Preventative Maintenance (CPM) such as crack sealing, seal coating, or renewing pavement markings may occur annually or every few years through a phased approach. Larger infrastructure maintenance projects, such as road reconstruction or bridge repair, are also sometimes necessary to maintain or enhance bicycle and pedestrian mobility networks.

Increasingly, grants that fund development of bicycle and pedestrian infrastructure, such as the Transportation Alternatives Program (TAP), require applicants to identify a plan and budget for long-term maintenance for their project to be eligible. Many communities have implemented proactive sidewalk maintenance and repair programs, including:

- Canton Township's Sidewalk Repair Program
- Ann Arbor's Sidewalk and Ramp Repair Program
- Sterling Heights' Sidewalk Repair and Replacement Program
- Royal Oak's Shovel It Forward program is an innovative and fun approach to both educate and partner with residential and commercial property owners to remove snow from sidewalks

Implementation Considerations

- Funding plans for any project should consider the entire lifecycle of its needs, including ongoing maintenance costs.
- Coordination between public works, parks and recreation, public utilities, and other local departments and divisions can clarify maintenance responsibilities and expectations while improving efficiency.

- Establishing a clear routine assessment by neighborhood for repair and maintenance has proved to be successful in many communities. The goal is to assess the entire community every five years, with a subset of neighborhoods assessed each year so that maintenance and repair is ongoing and no neighborhood is inspected or assessed less than every five years.
- A typical asset management approach to maintaining bicycle and pedestrian infrastructure would be to invest 10 percent of the infrastructural component's value in maintenance/repair each year.
- Similar to the way that road pavement condition is monitored through the PASER system, evaluating and rating bicycle and pedestrian infrastructure can identify maintenance needs and establish quantifiable priorities to ensure that the system stays in good condition.
- Depending on the type of buffer and overall dimensions, some independent paths and protected bikeways may require specialized maintenance equipment for sweeping and snow maintenance. Where there is on-road infrastructure, care should be given to evaluate snow storage needs, ideally with snow stored within the buffer, behind the road curb, or a combination of the two.

Regional Highlight: St. Clair County Trail Conditions Analysis

As part of their countywide trial planning efforts, the St. Clair County Metropolitan Planning Commission completed an analysis of existing conditions throughout their trail network in spring of 2019.

Working in partnership with the St. Clair County Transportation Study, they developed a rating system based on the PASER model, but adjusted the scoring to reflect trail infrastructure issues. They used mobile devices equipped with cameras and a field collection app with GPS, which not only allowed them to understand more about pavement condition, but also more information about wayfinding signage, drainage issues, and other supporting elements like benches or trailheads along a route. The results of this analysis provide a thorough baseline to begin a prioritized trail maintenance program.

Chapter 7: Education, Encouragement, Enforcement, and Evaluation

Creating a bicycle- and pedestrian-friendly community takes more than just new trails, bike lanes and sidewalks. It takes a holistic approach that promotes safe use of bicycle and pedestrian facilities through education, encouragement, enforcement, and evaluation.

This chapter outlines opportunities to educate bicyclists and pedestrians about the rules of the road and encourage more bicycle and pedestrian travel. It includes how to engage and inform drivers and law enforcement about the safest ways to share the road. It also addresses the evaluation of the system and its use.

Education

Educating all road-users – people who walk, bike, and drive – on the laws and best practices in traveling is a vital component to creating a more walkable and bikeable Southeast Michigan. Efforts to increase education for walking and biking include both programming and campaigns that focus on issues such as the use of pedestrian signals, or how to educate children to safely cross the street without an adult. Education may also cover traffic rules for cyclists to deter them from riding against traffic or in unsafe places, and information for motorists about the rights of cyclists and pedestrians.

In educating the public, it is important to develop programs that address both the different groups of road users and their different behavior patterns. For example, public and stakeholder audiences that should be targeted for educational programs and campaigns include parents and teachers; transportation officials, decision makers, and law enforcement officers; as well as road users of various age groups, such as school children, college-age pedestrians and cyclists, and older adults. Nationally and regionally, there are several resources and programs available to

encourage bicycle and pedestrian travel and increase education on using and supporting walking on biking.

Active Transportation Education

Providing travel training through education and opportunity for individuals with disabilities is a major component for expanding access and increasing usage of the region's bicycle and pedestrian facilities.

- **PEAC's Active Transportation Program –** A curriculum based, community centered program that trains individuals with disabilities how to travel in their community. This training teaches independence and provides students opportunities to access their community, develops personal agency, and educates about alternative modes of transportation, including how to use and travel by SMART bus.

Bicycle and Pedestrian Safety Campaigns

Bicycle and pedestrian safety campaigns show people how and why to walk and/or bike. Typical programs focus on reducing conflicts with motor vehicles, and provide information on best practices in crossing and sharing the road, as well as local laws.

- **Pedestrian Safer Journey Campaign** – Developed by FHWA, this campaign helps educators, parents, and others who care about pedestrian safety to get the conversation started with children and youth.
- **Ride On Royal Oak –** This public education campaign targets bicyclists and motorists on how best to get around Royal Oak safely and responsibly. It uses PSAs, with a city police officer talking through the importance of bicycle and motorist safety on roadways. The PSAs are shown in movie theaters and on public television.

Bicycle Skills and Riding Education Programs

Bicycle skills and riding education programs teach bicycle skills and provide an opportunity for participants to practice and develop skills to help them ride safely and avoid common crashes. These courses and events often include bike maintenance, traffic safety advice, and laws related to riding on public roads.

- **Livonia Bike Walk: Bike Rodeo –** Using the Livonia YMCA parking lot, the city puts on a bicycle rodeo that includes a series of challenges to help young bicyclists improve their skills. In addition to guidance on skills and best practices such as bike registration and inspection, helmet fitting, exiting driveways, and safe intersection crossing, the Bike Rodeo also provides those

who complete the “course” with giveaways such as bike helmets, water bottles, lights, and t-shirts.

Pedestrian and Bicycle Information Center

Pedestrian and Bicycle Information Center (PBIC) is supported by the Federal Highway Administration (FHWA) and the National Highway Traffic Safety Administration (NHTSA). It focuses on improving the quality of life in communities by promoting safe bicycling and walking as a viable means of transportation and physical fitness. PBIC has an online catalog of bicycle and pedestrian education programs, guides, fact sheets, and lesson plans available for organizations and local governments in promoting traffic safety.

Road Safety Programs and Campaigns

Road safety programs and campaigns encourage road users to abide by local and state laws, be courteous to other road users, and promote sensible behaviors and actions.

- **Walk.Bike.Drive Safe –** This traffic safety education campaign for Southeast Michigan was designed to reach as many road users as possible through sharing safety messages via tip cards, public service announcements on radio and TV, and at-the-pump screens at gas stations; billboards and bus posters; community outreach via local governments, schools, and libraries; and coverage in the media.

Safe Routes to School Trainings (SRTS)

Safe Routes to School Trainings are local and regional trainings designed to better understand the SRTS planning process, youth engagement and leadership, asset mapping, and leveraging partnerships.

- **Safe Routes to School Michigan –** Offers multiple trainings and webinars geared towards school champions, principals, transportation officials, planners, and road authorities to gain hands-on training and learn from best practices and success stories.

Encouragement

In addition to educating all road users on best practices for safety, it is important to promote walking and biking through encouragement programs and events that make them more visible and expose new users to biking and walking as a form of mobility.

Bike to Work Day

Bike to Work Day is an annual event that is held in May throughout the country with the purpose of promoting and encouraging bicycling to work as an option for commuting.

- **Detroit Bike to Work Day –** Provides multiple convoys of cyclists to meet up and travel together to Downtown Detroit. The annual event has multiple sponsors and provides those that ride with snacks, refreshments, and giveaways.

Commuter Challenge

Commuter Challenge programs are often annual events that focus on a day, week, month, or longer, encouraging individuals, teams, and workplaces to compete in taking an alternative commute to work. The main goal or "challenge" is for single-passenger drivers to try a new mode of travel to work, such as walking, biking, public transit, carpooling, or telecommuting.

- **Southeast Michigan Commuter Challenge –** Using Commuter Connect, a free alternative commute matching program, the Commuter Challenge is an annual event that encourages single-passenger drivers to try a new mode of travel to work. During May 2019, Southeast Michigan participants reduced carbon dioxide emissions by more than 1,234 pounds.

Open Streets

Open Streets initiatives temporarily close streets to automobiles so people may use them for various activities like walking, jogging, bicycling, skating, dancing, and other social activities. These events are great at bringing the community together and promoting transportation options, placemaking, and public health.

- **Open Streets Detroit –** A free, safe, and inclusive event that brings Detroiters together in the streets by providing opportunities for fitness, recreation, and community building along city streets. The inaugural route was in Southwest Detroit, covering three-and-a-half miles along Michigan Avenue and West Vernor Highway.

Special Events and Festivals

Special events and festivals that raise the visibility of walking and biking are growing in popularity and can range from a handful of participants to thousands. These events are great opportunities for community building and promoting the assets within a community or region. At the local level, block parties, art strolls, walking tours, and neighborhood pride tours are great ways to promote and raise appreciation for pedestrian-scaled environments.

- **Tour De Ville –** Annual family-oriented bike ride that begins and ends in Historic Northville. The routes and lengths vary from a 10-mile family ride to a 54-mile route for the more seasoned rider. Over the last five years, this event attracted more than 2,000 riders and raised more than $90,000 for local charities.

Temporary Pop-Up Demonstrations

Temporary pop-up demonstrations are a great way to show and test the potential success of a project. Temporary installations can be quick and affordable to install and remove, often over the course of a weekend, week, or month. These may include temporary protected bike lanes, painted sidewalks, parklets, pedestrian plazas in vacant spaces, and traffic-calming techniques.

- **AARP's Pop-Up Demonstration Tool Kit –**This toolkit, as part of AARP's Livable Communities Program, provides a step-by-step guide to developing and implementing a pop-up demonstration project that illustrates how a proposal or desired bicycle and/or pedestrian enhancement can be organized, supported, and achieved.

Walk-to-School Day

Walk-to-School Day is a way to encourage students to walk or bike to school. In 2019, 5,129 schools across the country participated in a walk-to-school or bike-to-school event, including 304 schools and more than 88,000 students in Michigan. Walking and bicycling to school enables children to incorporate the regular physical activity they need each day while also forming healthy habits that can last a lifetime.

- **Chelsea Walk-to-School Wednesdays –** This weekly event in the City of Chelsea is facilitated by the Five Healthy Towns coalition, and leads walking groups to two of the city's elementary schools. Parents are encouraged to join if they are interested; the event takes place every Wednesday that school is in session.

Enforcement

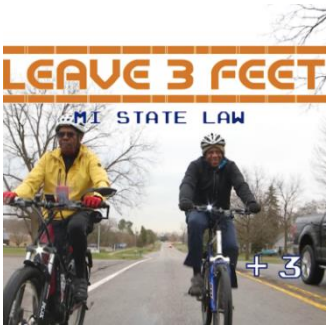
Enforcement strategies primarily focus on how the law enforcement system treats and enforces traffic laws to improve the walking and biking environment and helps ensure the safety of all road users. The examples summarized in this section are aimed at reducing common traffic mistakes that occur along roadways and encouraging everyone to follow the rules of the road.

Enforcement of Traffic Laws

Enforcement of traffic violations can vary from issuing warning citations to ticketing for traffic offenses such as riding against traffic, disregarding traffic signals, etc. In addition to enforcing traffic laws for those who walk and bike, it is important to also make those who drive aware of the latest laws and infrastructure.

Law Enforcement Partnerships

Partnering with police and traffic safety on enforcement is a useful strategy to deter unsafe behaviors of drivers, pedestrians, and bicyclists, and encourage all road users to obey traffic laws and share the road safety. Often enforcement can be included in community training and events (e.g., bicycle rodeos, walking tours); or through law enforcement promoting good user behaviors, such as providing awards or coupons to local stores or shops when good road behavior is observed (e.g., a child wearing a bike helmet, walking a bicycle across a busy intersection, or using hand signals when turning).



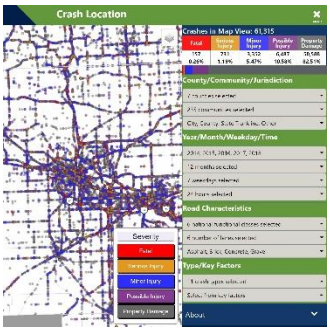
Law Enforcement Training Sessions

Training sessions for law enforcement officers are very important as infrastructure and regulations change over time. They allow communities and the state to support the professional development of its law enforcement officers regarding enforcement of bicycle and pedestrian laws. Newer laws, like the three-feet passing law enacted in 2018, is one example of balancing educating motorists and enforcing the law.

- **League of Michigan Bicyclists' Training Series –** These trainings are geared toward law enforcement and consist of two components: classroom sessions focused on community bicycle safety, and a hands-on afternoon session designed to guide participants on hosting events such as bicycle rodeos.

Evaluation

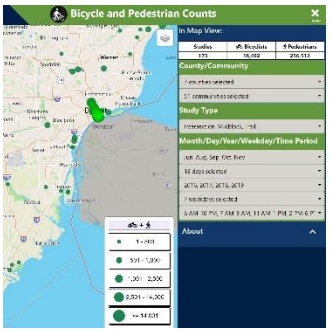
Regardless of the type of bicycle or pedestrian project, there is always a need for evaluating it on a regular basis to gauge its quality and user-friendliness. This may include obtaining feedback from users of bicycle and pedestrian facilities, counting the number of people using new treatments, or making improvements in response to the feedback and data received through surveys or other input.



Annual Crash Data Evaluation

Annual crash data evaluation provides insights on the safety of bicycle and pedestrian facilities and can help identify problem areas. Identifying areas that are exceeding the expected number of pedestrian or bicycle crashes is a way of strategically using crash data to prioritize improvements.

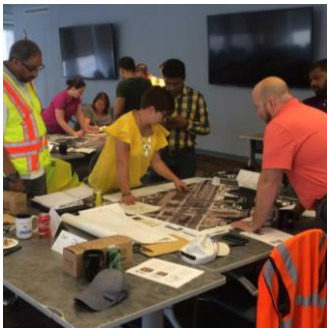
- **SEMCOG's High-Priority Safety Locations Map –** This online tool prioritizes roadways that have a disproportionate number of crashes to assist local agencies in addressing traffic safety needs. The data includes several search features, including crashes involving bikes and pedestrians.



Bicycle and Pedestrian Counts

Bicycle and pedestrian counts in targeted areas can help quantify increases in use for a particular project, or provide support for future improvements. These can be both high- and low-tech, ranging from local groups and volunteers physically counting people with pen and clipboard (or tablet) to permanent electronic counters at high-use locations.

- **SEMCOG's Bicycle and Pedestrian Count Program –** To assist local communities with bicycle and pedestrian planning, SEMCOG developed a bicycle and pedestrian count program, measuring the number of people across the region in urban, suburban, and rural areas using all types of facilities and infrastructure. In 2019, this program included an online map of nearly 200 studies across all seven counties.
- **City of Ann Arbor's Nonmotorized Progress Report –** Since 2006, the city has collected 185 nonmotorized counts on more than 150 corridor segments primarily using observers placed along corridors and at intersections to better understand and document usage.



Public Participation Surveys

Public participation surveys help to understand users and how the bicycle and pedestrian infrastructure is used. Activities like online surveys, community meetings, and block parties are good opportunities to understand and respond to the perspectives and experiences of the community. SEMCOG's *Public Participation Plan* provides resources and examples of ways to engage the public and evaluate results of public participation.

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