Michigan Department of Transportation
Michigan 2045 Mobility
A transportation plan for a connected future #MM45

# MM2045
# Active Transportation Plan: A Bold Vision


Final - Nov. 5, 2021

# Contents

# Figures

# Tables

CHAPTER 1

# Introduction

## Active Transportation Plan for Michigan

The Michigan Department of Transportation (MDOT) has developed an integrated, performance-based 25-year plan for transforming Michigan's transportation system, known as the 2045 State Long-Range Transportation Plan, or Michigan Mobility 2045 (MM2045). While developing MM2045, MDOT identified active transportation as a vital factor in Michigan's vision for a 21st century transportation system that improve Michiganders' safety, addresses climate change, and enhances infrastructure conditions, mobility options and system reliability to drive statewide economic investments.

This active transportation plan's development has relied heavily on the efforts of the larger MM2045, which relied on extensive stakeholder engagement, public-input surveys, and other efforts throughout MM2045's planning process to solicit feedback and guidance from the public and stakeholders. Throughout the strategy development process, the project team referred to the results of the MM2045 public engagement activities, including surveys conducted using MetroQuest, telephone town hall meetings, Americans with Disabilities Act (ADA) surveys, virtual mode-specific stakeholder meetings, MDOT social media outreach, and the MM2045 website. The public's priorities and interests in the future of Michigan's transportation system were incorporated and addressed in the strategy development and revision process.

## What is Active Transportation?

For the purposes of this plan, "active transportation" is defined as human-powered transportation that engages people in physical activity while they travel. There are two primary classes of active transportation: walking and bicycling. The following are common characteristics of these modes of travel:

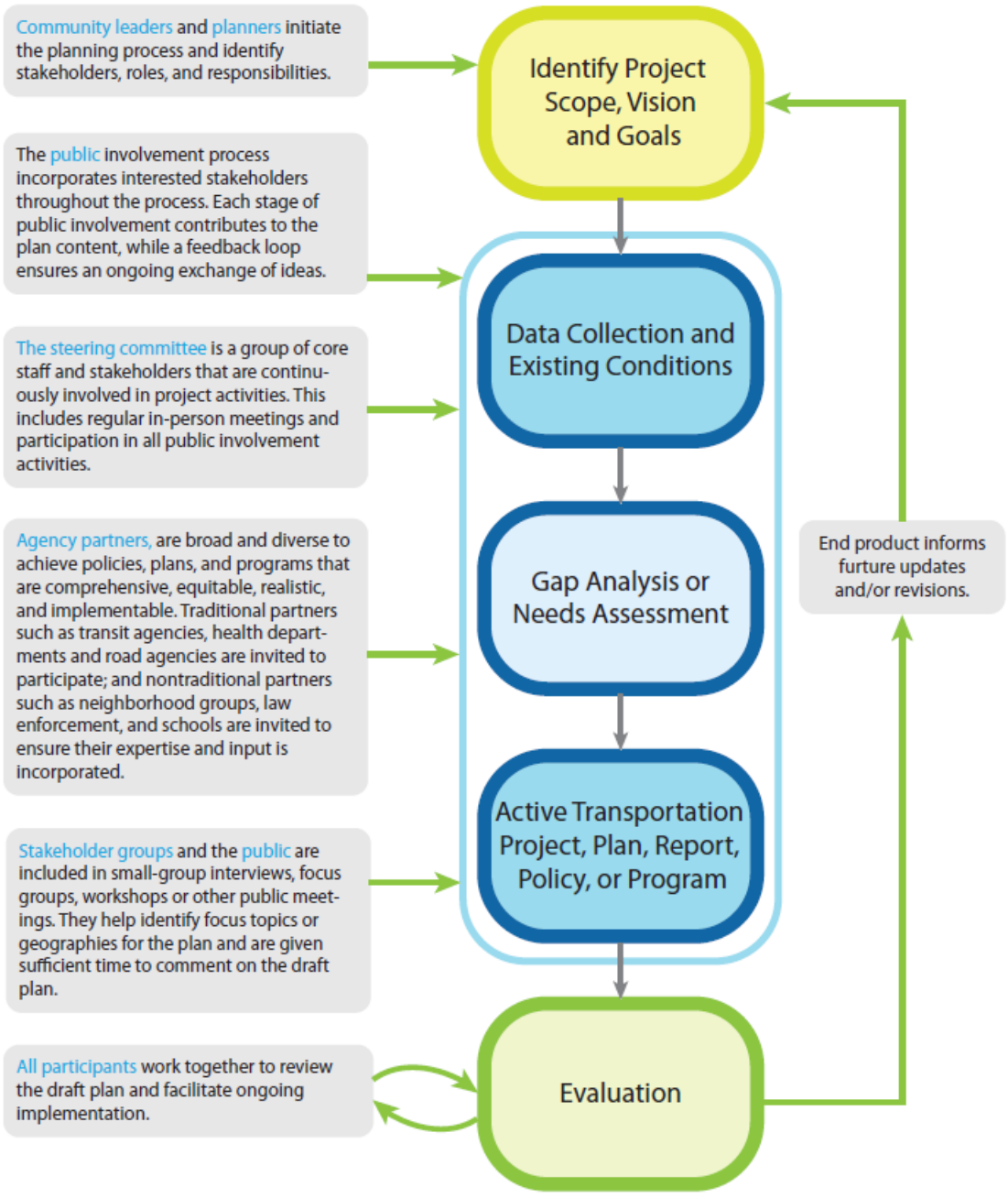
- Human scale.
- Vulnerable road users.
- Primarily nonmotorized.
- Perform better via their own infrastructure networks.

Michigan's transportation agencies and partners must work together to prioritize their transportation needs and investments across all travel modes and spend transportation dollars wisely. Ensuring safety and mobility, with an increasing focus on multimodal integration, requires conscious policy decisions and investment priorities that should be guided by an understanding of the needs and goals, and available resources. MDOT developed this active transportation plan as a standalone document to be integrated into and support MM2045's vision of the transportation future in Michigan across all modes, recognizing active transportation as a vital form of transportation.

# Who is Involved?

Many collaborators are involved in the active transportation project development process. This process is highlighted in Figure 1, showing the stakeholders and typical steps of the process.

***Figure 1.* Active Transportation Plan Process**



CHAPTER 2

# 2045 Vision, Guiding Principles, Goals and Objectives

## MM2045 Vision

In 2045, the vision for Michigan's mobility network is safe, efficient, future-driven, and adaptable. This interconnected multimodal system is people-focused, equitable, reliable, convenient for all users, and enriches Michigan's economic and societal vitality. Through collaboration and innovation, Michigan will deliver a well-maintained and sustainably funded network where strategic investments are made in mobility options that improve quality of life, support public health, slow climate change, and promote resiliency.

## MM2045 Guiding Principles

Guiding Principles reflect the vision, mission, and values, and align with an agency's capabilities. As part of the MM2045 development process, the following four Guiding Principles were developed based on the 19 values included in the MM2045 vision and input from the MDOT Leadership, Sponsors, Core Team, and Stakeholders:

- **Preservation:** Preserve, operate, enhance, and right-size the existing multimodal network as efficiently and effectively as possible, build and manage it to withstand and recover rapidly from disruptions, and maintain a network that provides for predictable access, movement, and interconnectivity.
- **Modal Choice:** Build, maintain, and operate a multimodal mobility network for all users that is safer, adapts to new demographic, economic, and technological conditions, equitably distributes costs and benefits, responds to the public's demand for more modal choices, and strengthens economic opportunity with high-quality access to jobs, to commerce, and between economic centers in and out of Michigan.
- **Future-Oriented:** Protect mobility investments by pursuing and planning for emerging trends, embracing technology, seeking flexible and diversified funding and financing tools to strengthen cross-jurisdiction and multidisciplinary partnerships, and pursue innovation in every aspect of transportation.
- **Sustainable Communities:** Foster livable, healthy, and connected communities with convenient, multimodal access to jobs, services, social support, and activities by facilitating the safe and convenient movement of all people regardless of age, income, or ability, providing strong intermodal connections, and engaging in health-promoting projects and policies that support clean air.

## Goals and Objectives

The following MM2045 Goals and Objectives were developed based on input from MDOT leadership, sponsors, MDOT's core team, external stakeholders, public input, national goals, and federal planning factors. While these Goals were developed for the larger MM2045 planning effort, they translate smoothly over to the active transportation plan as they are broad, multimodal, and represent many aspects of creating a transportation system for the 21st century.

Each Goal is accompanied by a summary/hybrid of the full plan objectives, which are specific measurable statements that support achievement of the broader goals.

- **Quality of Life:** *Enhance quality of life for all communities and users of the transportation network.* The priority objectives intend to enhance quality of life for all communities and users of the transportation network.
  - *Priority objectives* include creating opportunities for safe physical activity, equitable transportation choice, and community engagement while pursuing community supportive transportation outcomes.
- **Mobility:** *Enhance mobility choices for all users of the transportation network through efficient and effective operations and reliable multimodal opportunities.* The priority objectives intend to enhance mobility choices for all users of the transportation network through efficient and effective operations, and reliable multimodal opportunities.
  - *Priority objectives* include improving access, connectivity, equity, and options between modes.
- **Safety and Security:** *Enhance the safety and ensure the security of the transportation network for all users and workers.* The priority objectives intend to enhance the safety and ensure the security of the transportation network for all users and workers.
  - *The priority objective* is to reduce the number of lives lost and injuries sustained on Michigan's transportation network by striving for zero.
- **Network Condition:** *Through investment strategies and innovation, preserve and improve the condition of Michigan's transportation network so that all modes are reliable, resilient, and adaptable.* Through investment strategies and innovation, the priority objectives intended to preserve and improve the condition of Michigan's transportation network so that all modes are reliable, resilient, and adaptable.
  - *Priority objectives* intend to preserve and improve the condition of Michigan's transportation network so that all modes are reliable, resilient, and adaptable.
- **Economy and Stewardship:** Improve the movement of people and goods to attract and sustain diverse economic opportunities while investing resources responsibly. The priority objectives intend to improve the movement of people and goods to attract and sustain diverse economic opportunities while investing resources responsibly.
  - *Priority objectives* include pursuing transportation improvements to expand access to economic opportunities, jobs, core services, activity centers, tourist destinations, and land uses.
  - *Priority objectives* include achieving a state of good repair of transportation assets while cost-effectively maintaining, operating, and upgrading assets to maximize the useful life.
- **Partnership:** *Strengthen, expand, and promote collaboration with all users through effective public and private partnerships.* The priority objectives intend to strengthen, expand, and promote collaboration with all users through effective public and private partnerships that reflect Michigan's diversity, equity, and inclusion principles.
  - *Priority objectives* include data collection for use in performance measures to inform decision-making and to show progress, strengthening coordination of transportation facilities and services between agencies and municipalities, and strengthening community engagement to ensure decision-making processes and public outreach are representative, responsive, transparent, and accountable.

CHAPTER 3

# 2045 Strategies

## MM2045 Strategies

Many of the strategies are designed to support achieving more than one MM2045 goal or objective. However, every element of each Goal or Objective from the larger MM2045 Plan may not have corresponding active transportation strategies. Furthermore, while many of the MM2045 strategies are multimodal and translate well to advancing active transportation in Michigan, a virtual active transportation strategy identification town hall workshop held in April 2020 (with nearly 90 stakeholder participants from across Michigan) identified some additional active transportation-specific strategies. The workshop allowed stakeholders to review and provide feedback on potential strategies to achieve the draft objectives.

During the development of MM2045, MDOT conducted in-person and virtual meetings with statewide stakeholders to develop the Vision, Guiding Principles, Goals, and Objectives, which together form the MM2045 strategic direction. Input from stakeholders along with peer state best practices were refined, expanded, and validated through meetings with internal MDOT staff and external partners. The adopted MM2045 Strategies are the result of this process.

The MM2045 Strategies are grouped under eight themes: Prioritizing Safety, Managing Resources Responsibly, Providing Accessibility and Mobility for All, Supporting Michigan's Health, Building Resilience, Working Together, Technology, and Economic Vitality. The themes and strategies are developed from multiple Goals and Objectives and are led by all four MM2045 Guiding Principles.

- **Quality of Life:** Active transportation strategies that improve quality of life focus on providing opportunities for physical activity via walking and biking for people of all abilities, races, and ethnicities in urban, suburban, and rural areas. These strategies include developing new initiatives to support walking and biking for non-work trips, Safe Routes to School (SRTS) programs, strengthening outreach, and encouraging active transportation commuting options.
- **Mobility:** Key strategies for active transportation mobility include providing a complete and reliable pedestrian and bicycling network that is accessible for users of all ages and abilities to destinations and other transportation modes. This is accomplished by reducing barriers created by major highway and other transportation facilities in cities and metro areas, implementing Complete Streets policies, supporting connection to transit with first- and last-mile connections, mitigating travel delays, and leveraging technology to maximize safety and operational efficiency of new and existing systems.
- **Safety and Security:** People who walk and bike are among the most vulnerable roadway users and the most disproportionally represented in roadway fatalities and serious injuries. Implementing low-cost safety treatments, expanding active transportation networks and connectivity, improving safety culture (including educational efforts for drivers and active transportation users), and implementing Zero-Focused Safety programs that offer strategies and tactics for reducing traffic fatalities to zero are among the top strategies to reducing these types of crashes and providing safer conditions for walking and biking.
- **Network Condition:** Investment strategies, innovation, and preservation are necessary to achieve and to maintain a state of good repair of all transportation assets, including facilities for walking and biking. Key active transportation strategies involve establishing methods and approaches for assessing bicycle and pedestrian network needs, identifying gaps, and targeting and funding improvements to eliminate gaps and improve connectivity and safety.

- **Economy and Stewardship:** Strategies that maximize economic competitiveness by increasing opportunities for walking and bicycling improve the ability for people to access jobs, businesses, and other destinations. In addition, strategies to conduct analyses that help quantify the economic impacts of biking and walking can be used to support tourism and attract new visitors. Other strategies include encouraging communities and metropolitan planning organizations (MPOs) to develop policies and support for first- and last-mile connection projects that are eligible and competitive for the federal Transportation Alternatives Program, Highway Safety Improvement Program, and Congestion Mitigation and Air Quality Improvement Program funds and that require schools and/or school districts to count all costs associated with school siting, which includes the impacts on utilities, public services, infrastructure, and tax base.
- **Partnership:** Strategies that facilitate collaboration with federal, state, regional, local, and private partners to support walking and bicycling are necessary to expand or enhance active transportation opportunities. These strategies include:
  - Conducting regular reviews of policies and guidance related to data collection and ensuring pedestrian and bicycle-related data is being collected, used, and disseminated.
  - Establishing multimodal roadway inventories and pedestrian and bicycle safety training and education for designers, planners, and drivers.
  - Eliminating gaps and barriers in the bicycle and pedestrian network in conjunction with all transportation projects as appropriate.
  - Coordination of planning efforts to ensure cohesion between networks across jurisdictions.
  - Initiating performance measures such as pedestrian and bicycle trip frequencies and percentages of pedestrian and bicycle mode shares to inform decision-making and show progress toward local, regional, state, and national goals.

The following MM2045 strategies can relate to, influence, and be adapted to create positive outcomes supporting the active transportation strategies identified in this plan.

### Prioritizing Safety

- Promote safe behaviors.
- Prioritize infrastructure and facilities' improvements with proven safety benefits.
- Support and implement state-of-the-art safety technology solutions.
- Collaborate with transportation partners and emergency medical and trauma services.

### Managing Resources Responsibly

- Advance transportation asset management to optimize transportation investments.
- Streamline and improve data, data management systems, and processes.
- Right-size Michigan's transportation network and systems.

### Providing Accessibility and Mobility for All

- Improve the reliability of the transportation network and systems.
- Enhance the mobility of Michigan's residents and non-residents.
- Define, measure, and improve equitable access.
- Develop projects that equitably meet community mobility needs.

### Supporting Michigan's Health

- Participate in and contribute to initiatives to improve air quality and reduce emissions.
- Encourage healthy lifestyles.

### Building Resilience

- Identify and address risks to Michigan's transportation network.

### Working Together

- Expand public sector partnerships and collaboration.
- Improve and expand relationships with private and nonprofit partners.
- Ensure decision-makers and stakeholder groups reflect Michigan's character and integrity.

### Technology

- Regularly evaluate new transportation technology and adopt those which best support Michigan's goals.

Further discussion on these strategies as they relate to active transportation, and additional Active transportation-specific strategies are presented in the following sections of this plan.

# Active Transportation Strategies

The active transportation plan identifies strategies and implementable actions intended to improve the transportation network while supporting safety and multimodal connectivity within and between communities and throughout Michigan, which in turn will increase the number of people walking and bicycling. MDOT developed the strategies through extensive research, coordination, and communication with stakeholders. To develop the MM2045 strategies, MDOT and consultant teams referenced the MM2045 strategic direction and reviewed existing strategic and planning documents from MDOT and other Michigan transportation and planning agencies, best practices and research, and strategies from peer states.

Many draft strategies were designed to support achieving more than one MM2045 Goal or Objective from the larger MM2045 Plan. All elements of every Goal or Objective might not have corresponding active transportation strategies. Furthermore, while many of those strategies are multimodal and translate well to advancing active transportation in Michigan, a virtual active transportation strategy identification town hall workshop held in April 2020 (with nearly 90 stakeholder participants from across Michigan) identified some additional active transportation-specific strategies. The workshop allowed MDOT staff and stakeholders to review and provide feedback on potential strategies to achieve the draft objectives.

The following strategies are a mix of active transportation-relevant strategies from MM2045 along with active transportation-specific strategies developed as a result of the virtual town hall and strategy-related research in coordination with how best to achieve the plan's Goals and Objectives. Active transportation strategies must be implemented to accomplish the overarching Goals and Objectives set by MM2045.

The list of strategies in Table 1 are extensive and this reflects the vast number of opportunities the state, local agencies, partners, and advocates across the state can pursue to improve conditions for pedestrians and bicyclists. With such a broad array of strategies available, it is expected that agencies and organizations of all sizes can find efforts they can pursue to enhance conditions for pedestrians and bicyclists.

Each strategy in the below table is noted as contributing to advancing one or more policy area, such as: Quality of Life, Mobility, Safety and Security, Economy and Stewardship, and Partnership. Each strategy is then assigned a time frame for consideration. The time frames used for this plan are:

- Ongoing – Strategies that are either currently underway, or strategies that once initiated, would continue over time.
- Near-Term – Strategies that would be initiated in one to seven years.
- Mid-Term – Strategies that would be initiated in eight to 14 years.
- Long-Term – Strategies that would be initiated in 15 to 25 years.

These time frames are just estimations and guides that agencies and partners can pursue on a schedule and time frame that best meets their needs and desired outcomes.

Table 1 provides the active transportation strategies that road agencies should consider addressing, related to the plans' goals. Additional strategies for future consideration over time can be found in Appendix A.

***Table 1.* Active Transportation Strategies**

| Strategy | Goals | | | | | | Time Frame |
|---|---|---|---|---|---|---|---|
| | Quality of Life | Mobility | Safety and Security | Network Condition | Economy and Stewardship | Partnership | |
| Mainstream active transportation by bringing it on par with motorized transportation and focus on a culture shift to support active transportation and positively impact first- and last-mile connections. | X | **X** | X | | | X | Ongoing |
| Implement low-cost engineering treatments to increase pedestrian safety and facilitate pedestrian access and mobility along and across roadways. | X | X | **X** | | X | | Ongoing |
| Expand connected bicycle and pedestrian networks in cities, metro areas, and rural areas to increase access and improve safety, while prioritizing connectivity of the network to provide more options for local travel. | X | X | **X** | | X | | Ongoing |
| Regularly review and update policies and guidance to recognize the needs of pedestrians and bicyclists to ensure accommodations are considered at all stages of project development. | | X | **X** | | X | | Ongoing |
| Expand bicycling and walking infrastructure to support tourism and attract new visitors. | X | | X | | **X** | X | Ongoing |
| Establish or update multimodal inventories along roadways and ensure that project planning and design processes address local Complete Streets needs. | X | X | | | X | **X** | Ongoing |
| Eliminate gaps and barriers in the bicycle and pedestrian network in conjunction with larger transportation improvement projects. | X | X | X | | X | **X** | Ongoing |

| Strategy | Goals | | | | | | Time Frame |
|---|---|---|---|---|---|---|---|
| | Quality of Life | Mobility | Safety and Security | Network Condition | Economy and Stewardship | Partnership | |
| Strengthen communications channels between MDOT and the Michigan Department of Natural Resources and their efforts in state route and trail planning, recreation planning, state park siting, and recreation grant-funding efforts | X | X | | | X | **X** | Ongoing |
| Strengthen communications channels between MDOT and the Michigan Department of Health and Human Services to leverage the strengths of each agency to promote active transportation and healthy lifestyles. | X | X | | | X | **X** | Ongoing |
| Engage stakeholders with Complete Streets and Context-Sensitive Solutions approaches to project planning and delivery. | **X** | X | | | X | X | Ongoing |
| Regularly update and communicate information on new and existing safety laws and technologies to decision-makers, design professionals, and law enforcement. | | | **X** | | | X | Ongoing |
| Aid local communities to investigate crashes and identify and deploy proven safety countermeasures (such as countdown timers, road diets and pedestrian refuge islands). | X | X | **X** | | | X | Ongoing |
| Provide training on how to systematically perform road safety audits where routine consideration is given for active transportation facilities that can be built independently and/or in conjunction with roadway projects. | X | X | **X** | | X | X | Ongoing |
| Expand/enhance outreach efforts to new and existing safety partners across all modes and disciplines (e.g., public health), including materials and communications to be used by all. | | | X | | X | **X** | Ongoing |
| Support short-term to long-term efforts to change the public and practitioner safety culture. | X | | **X** | | | X | Ongoing |

| Strategy | Goals | | | | | | Time Frame |
|---|---|---|---|---|---|---|---|
| | Quality of Life | Mobility | Safety and Security | Network Condition | Economy and Stewardship | Partnership | |
| Encourage use of SRTS tools and programs that have been created to encourage children and caregivers to choose active transportation options. | X | | **X** | | X | X | Ongoing |
| Use best practices to characterize SRTS facility use and context to help ensure appropriate design treatments are integrated into project development and maintenance processes. | **X** | X | X | | X | X | Ongoing |
| Involve transit providers in the project development process from scoping through design engineering. | X | | | | X | **X** | Ongoing |
| Support planning and design decisions that promote the attractiveness and ease of biking and walking for residents of all ages and abilities. | **X** | X | | X | X | X | Ongoing |
| Provide guidance to include active transportation projects in the state, regional and MPO transportation plans to ensure they are included when setting project budgets. | | X | | | X | **X** | Ongoing |
| Continue to monitor rapidly developing information technology specifically related to intelligent infrastructure and intelligent vehicles and monitor their effectiveness in improving safety and operations. | X | **X** | | | X | | Ongoing |
| Monitor emerging artificial intelligence technologies and their effects on transportation and active transportation modes of travel. | | **X** | X | | X | | Ongoing |
| Implement more crosswalks in urban areas to set expectations for pedestrians. | | **X** | X | | X | X | Ongoing |
| Continue the ongoing coordination of active transportation standards, design, and implementation between MDOT central and regional offices, MPOs, RPAs, counties, and municipalities. | | | | | X | **X** | Ongoing |

| Strategy | Goals | | | | | | Time Frame |
|---|---|---|---|---|---|---|---|
| | Quality of Life | Mobility | Safety and Security | Network Condition | Economy and Stewardship | Partnership | |
| Expand opportunities for peer-to-peer networking for municipalities through MDOT support of the Vision Zero efforts and provide technical assistance to improve quality and ease of local action plan implementation. | | | **X** | | X | X | Near-Term |
| Identify and address inequities that people with disabilities, minority groups, and low-income residents face regarding transportation related fatalities. | **X** | X | X | | | X | Near-Term |
| Revise engineering standards to allow broad flexibility in lane widths in urban areas and consider narrower, curb-to-curb street designs to enhance comfort among people walking and bicycling. | **X** | | X | | X | | Near-Term |
| Compile and disseminate funding and project information to improve transparency and performance. | | | | | X | **X** | Near-Term |
| Provide support for planning and design decisions to promote the attractiveness and ease of biking and walking. | **X** | | | | | X | Near-Term |
| Develop Complete Streets training for MDOT staff and consultants as well as interested local and regional staff. | X | | | | | **X** | Near-/ Mid-Term |
| Improve access to data and best practice examples to evaluate alternatives, conduct outreach, and adopt effective policies and plans. | X | | X | X | X | **X** | Mid-Term |
| Establish methods and approaches for assessing bicycle and pedestrian network needs, identifying gaps, and targeting improvements. | X | X | X | **X** | X | X | Mid-Term |
| Conduct regular reviews of policies and guidance related to data collection and ensure pedestrian- and bicycle-related data is being collected, used, and disseminated. | | X | X | X | X | **X** | Mid-Term |

| Strategy | Goals | | | | | | Time Frame |
|---|---|---|---|---|---|---|---|
| | Quality of Life | Mobility | Safety and Security | Network Condition | Economy and Stewardship | Partnership | |
| Improve training and education for all roadway users and design professionals in emphasizing bicycle and pedestrian safety. | X | X | X | | | **X** | Mid-Term |
| Engage in mainstreaming Road to Zero and Vision Zero design and policy principles to ensure internal rapid adoption of a Safe System approach and development of a broader traffic safety culture across Michigan. | | | X | | | **X** | Mid-Term |
| Increase Road to Zero efforts striving to ensure that marginalized and vulnerable communities' safety issues are addressed. | X | | X | | | **X** | Mid-Term |
| Establish a toolbox of facility types, including guidance as to which is appropriate for various situations. | | | | | X | **X** | Mid-Term |
| Establish measures for tracking non-interstate highway projects and report on centerline miles with Complete Streets elements. | | | | | X | **X** | Mid-Term |
| Support the broad adoption of Complete Streets design guidance, which will ensure that the road network leading to and around schools are designed for users of all ages and abilities, especially students. | X | **X** | X | | X | | Mid-Term |
| Conduct analyses to help quantify the economic impacts of biking and walking. | X | | | | **X** | X | Mid-/ Long-Term |
| Conduct a systemwide analysis of Michigan's active transportation network to identify safety priority corridors through design audits and crash reports. | X | | **X** | | X | X | Long-Term |
| Develop data and metrics to help quantify the health benefits of active transportation. | X | | | | X | **X** | Long-Term |

Notes: **X** – Primary Goal

ADA - American Disability Act
MDOT - Michigan Department of Transportation
MPO - Metropolitan Planning Organization
RPA - Regional Planning Association

CHAPTER 4

# Existing Conditions

## Infrastructure and Environment

### Michigan's Active Transportation Facilities

Michigan's active transportation network is made up of various types of facilities, some of which accommodate both pedestrians and bicyclists, while others are limited to one mode or the other. Choice of where to deploy each type is based upon geometric constraints, budget constraints, speed, volumes, land uses, crash history and risk, network considerations, and user demand. Currently, with more than 600 road agencies and thousands of townships and parks departments all involved in building out the network, having these various entities track and report their inventory has not been possible. Therefore, there is not a means to estimate the inventory that exists for these facilities by type, as a policy does not exist requiring asset management and inventory of multimodal facilities at statewide, regional, or local levels. Recommendations and guidelines for implementation of an inventory plan for local agencies can be found in Section 5 of this plan.

The active transportation plan is intended to address a need for a comprehensive resource for multimodal planning in Michigan. Table 2 presents the types of facilities that serve pedestrians, bicyclists, and motorists either in a dedicated or shared environment. Also shown is the general prevalence of the facility type in Michigan. Further detail describing each facility is provided in the following subsections.

***Table 2.* Mode Types Permitted per Facility**

| Facility Type | Pedestrians | Bicyclists | Parked Vechicles | Moving Vehicles |
|---|---|---|---|---|
| Sidewalks[C] | ✓ | | | |
| Pedestrian Streets[C] | ✓ | | | |
| Pedestrian Lanes[N] | ✓ | | | |
| Shared-use Paths/Sidepath[C] | ✓ | ✓ | | |
| Trails[C] | ✓ | ✓ | | |
| Shoulders[C] | ✓ | ✓ | ✓ | |
| Striped Bike Lanes[C] | | ✓ | | |
| Sharrows[C] | | ✓ | | ✓ |
| Wide Outside Lane/Curb Lane[C] | | ✓ | ✓ | ✓ |
| Shared Roadways[C] | | ✓ | ✓ | ✓ |
| Separated Bike Lanes[O] | | ✓ | | |
| Bike Routes[C] | ✓ | ✓ | ✓ | ✓ |
| Bike Blvd/Neighborhood Greenway[O] | ✓ | ✓ | ✓ | ✓ |
| Advisory Bike Lanes/Advisory Shoulders[O] | ✓ | ✓ | | ✓ |
| Shared Streets[O] | ✓ | ✓ | ✓ | ✓ |
| Yield Streets[N] | ✓ | ✓ | ✓ | ✓ |

[C] Commonly found in Michigan [O] Occasionally found in Michigan [N] Not likely to be found in Michigan

Source: Wade Trim

### *Sidewalks*

Sidewalks are the basis of any local active transportation system, primarily serving people on foot. However, not ubiquitous, in urban and inner-ring suburban areas of Michigan, many properties and subdivision areas are connected to a sidewalk and/or network of sidewalks. These sidewalks are typically located adjacent to the road network and generally range between 48 to 60 inches wide. Connectivity of the system by filling in sidewalk gaps is important in both suburban and rural areas, especially where need is evident with desire lines. Gaps in the sidewalks are commonplace for many reasons in the suburban and rural network. One common issue is that as new developments build on a site, they are only required to build sidewalk on their parcel of land, slowly filling in gaps in some areas, but not necessarily completing a contiguous network. In addition, a significant number of older areas, typically urban areas, experience failing sidewalks with cracks and heaving pavement, which can be particularly difficult and uncomfortable for those with disabilities that affect mobility. In some rural areas where there are existing sidewalks, they may only be 36 inches wide, while in some urban areas, streetscape sidewalks can be 10 feet wide, or more.

***Figure 2.* Sidewalk – Durand, Michigan**

Source: Wade Trim

### *Pedestrian Streets*

Pedestrian streets restrict travel to pedestrians only. They are typically used in commercial corridors to allow shopping, resting, dining, or performing. Candidate streets experience high pedestrian volume and low vehicular traffic, and often become destinations resulting in economic benefit.

### *Pedestrian Lanes*

Pedestrian lanes are often interim facilities marked within the road right of way that create designated spaces for pedestrian use. These lanes are often used to connect important destinations within a community where no other pedestrian facility exists. They may be deployed on one or both sides of the roadway. “Ped Only” pavement markings should be spaced along the entire length with a double white line separating the traffic from the pedestrian lane.

### *Shared-Use Paths/Sidepaths*

Shared-use paths accommodate pedestrians, bicyclists, and other wheeled users. Shared-use paths are often the safest, most inclusive, and most desirable active transportation segment type; however, they are often the most expensive to build, require a significant amount of space that may entail right of way costs, and may require more maintenance than most other segment types. According to the MDOT Sidepath Intersection and Crossing Treatment Guide, the shared-use path or sidepath is appropriate for installation next to roadways with volumes of 6,000 vehicles per day and greater, and with speeds 30 mph and greater. Based on the number of prospective users and the constraints found within a specific area, it may not be appropriate to utilize this active transportation type. Most often the surface is paved asphalt, although concrete or crushed limestone surfaces are not uncommon. While some paths are 8 feet wide, most transportation agencies build paths to be at least 10 feet wide to accommodate two-way traffic, with 2-foot clearance zones on each side of the path. Shared-use path bridges and boardwalks should be at least 14 feet wide. As the number of expected users per hour increases, so does the necessary path width. Since paths can carry higher levels of nonmotorized traffic separate from motorized traffic, a shared-use path is often the optimal solution; however, they are generally expensive to build and maintain.

Two sub-types of shared-use paths exist from an operations and location perspective, but they are both very similar from a user perspective:

- *Independent Paths:* These facilities follow their own alignment separated from roadways through parks, beside waterbodies, along utility easements, or on former rail beds (rails to trails). They generally have few road or driveway crossings.
- *Sidepaths:* These facilities are located within the road right of way but are located outside of the roadway itself. Where intersection and driveway densities are low, they function similarly to an independent shared-use path, but where densities are high, they function more like a wide sidewalk, from a bicycling perspective.

***Figure 3.* Independent Path – Charlevoix, Michigan**


Source: Wade Trim

***Figure 4.* Independent Path – Detroit, Michigan**

Source: Wade Trim

***Figure 5.* Sidepath – Goodrich, Michigan**

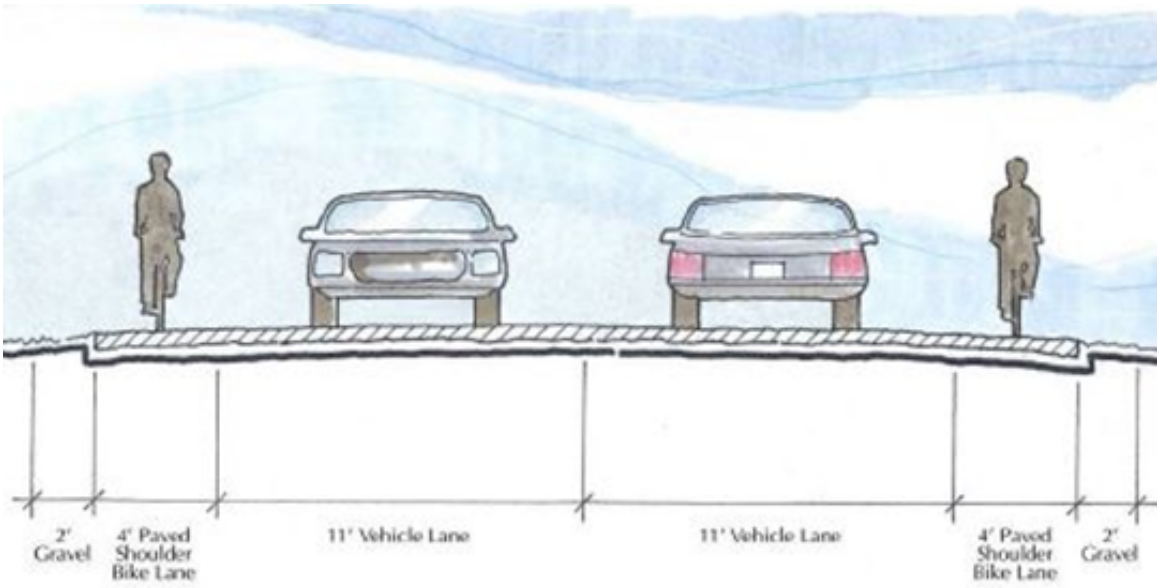

Source: Wade Trim

### *Widened Shoulders*

Widened shoulders may be the preferred option for non-urban situations where driveway and intersection densities are low, a shared-use path is not possible or warranted due to potentially lower active transportation traffic volumes, and there are no connections to other regional shared-use path networks. For shoulders to function as a facility to walking or bicycling, a significant portion of the shoulder must be free from rumble/mumble strips to ensure the safety of all users. The recommended clear paved shoulder width differs in size based upon vehicle traffic speed:

- 35 mph or slower – 5-foot preferred, 4-foot minimum.
- 40 mph to 50 mph – 6-foot preferred, 5-foot minimum.
- Faster than 50 mph – 8-foot preferred, 7-foot minimum.

***Figure 6.* Widened Shoulder**




Source: Oakland County Trails Master Plan

### *Striped Bike Lanes*

Bike lanes are on-street facilities that use pavement marking stencils, stripes, and signs (optional) to create dedicated lanes for bicyclists. Design may include additional buffer striping between bicyclists and traffic, or bicyclists and parked cars, providing a car door separation zone. Bike lanes can be considered arterial and collector streets where there is sufficient roadway width and vehicle travel speeds are slower than 45 mph. For speeds 35 mph and faster, a striped buffer between the bike lane and vehicle lane should be considered in the design to provide greater comfort and safety. Bike lanes should have at least 4 feet of rideable surface width and should be wider in certain instances, such as where there are curbs, on-street parking, and higher volumes of motorized traffic. Bike lanes may also be wider to accommodate more bicycle traffic, especially non-traditional bicycle types such as adult tricycles, bicycle trailers, and recumbent cycles.

***Figure 7.* Striped Bike Lane – East Lansing, Michigan**

Source: Wade Trim

### *Marked Shared Roads*

Marked shared roads uses pavement markings to provide positional guidance to bike riders as to where they should ride within the roadway, and to alert motorists that bicyclists should be anticipated in the roadway. The markings are commonly referred to as "sharrows." The markings assist riders in staying clear of the "car door zone" where bicyclists may be struck by car doors opened by drivers and passengers parked along the route. Sharrow markings can be used where other separate bicycling facilities are not possible given roadway context or in areas that are too narrow for bike lanes. With the latter, they are generally used solely to close small gaps in bicycling connectivity and where speeds are 35 mph or slower. Sharrows are also used on roads with high incidences of wrong-way riding and/or high parking turnover. The markings, placed every 200 feet and within 100 feet of every intersection, are often used in conjunction with "Share the Road" or "Bicycle May Use Full Lane" signs.

***Figure 8.* Marked Shared Road (Sharrows) Marking**

Source: National Association of City Transportation Officials Urban Bikeway Design Guide

***Figure 9.* Marked Shared Road (Sharrows) Marking – Detroit, Michigan**

Source: Wade Trim

### *Wide Outside Lane/Curb Lane*

Curb lanes are a form of shared roadways where the outside travel lane is at least 14 feet wide, allowing bicyclists and motorists to travel side-by-side within the same travel lane. Fifteen-foot lane widths are not recommended because two cars may attempt to travel side-by-side within the wider lane. More often, it may be better to use a different shared roadway treatment such as a sharrow or advisory bike lane.

***Figure 10.* Wide Outside Curb Lane – Grosse Pointe Shores, Michigan**

Source: Wade Trim

### *Shared Roadways*

A shared roadway may not be an officially designated and marked bicycle route but is open to both bicycle and motor vehicle travel. In Michigan, all roads, except limited access highways or as otherwise signed, are shared roadways. Most neighborhood streets function as shared roadways that permit both motorists and bicyclists to utilize the same right of way. Speeds and the level of traffic for all modes is often low, allowing for safe and comfortable use by both. Some shared roadways may get designated as formal bike routes while others may not.

***Figure 11. Shared Roadway – Grosse Ile, Michigan***

Source: Wade Trim

### *Separated Bike Lanes*

Separated bike lanes, also known as cycle tracks or protected bike lanes, provide exclusive paths for bicyclists separate from motor vehicle travel lanes, parking lanes, and sidewalks. Parked cars, bollards, planter boxes, and curbs may be used to provide horizontal, physical separation from moving cars and trucks. Separated bike lanes may also be vertically separated, either raised above the roadbed or to full sidewalk height. Where parking is allowed, the parking lane is placed between the bike lane and traffic. There are several subtypes of separated bike lanes:

- One-way separated bike lanes should measure 5 feet wide with 2 feet of buffered spacing (seven feet combined).
- Two-way separated bike lanes should measure 6 feet wide each with a desired 3-foot buffer.

In constrained locations, two-way separated bike lanes may be reduced to 8 feet in width and one-way separated bike lanes can be reduced to 4 feet in width.

***Figure 12. Separated Bike Lane – Detroit, Michigan***


Source: Wade Trim

### *Bike Routes*

Bike routes are designations given to a select subset of shared-use paths, streets with bicycle facilities, and/or shared roadways to guide bicyclists to important destinations. When shared roadways are chosen, it is likely because no other bicycling facilities are needed given roadway context, or where no other suitable roadway or pathway exists. Route designation is given to select bikeways and shared roadways based on factors such as connectivity, directness for intended destinations, and bicycling safety and comfort (motorist traffic speed and volume, parking, traffic control devices, surface quality, etc.). Signs are used to assist with wayfinding and to remind motorists that bicycles may be encountered. Routes can be modified as new and more favorable bikeways and shared roadways are developed.

***Figure 13. Bike Route – Ann Arbor, Michigan***

Source: Wade Trim

### *Bicycle Boulevards/Neighborhood Greenway*

This is a designation given to some shared roadways where a series of contiguous street segments have been modified to accommodate bicycle through-travel while limiting motor vehicle through-traffic. Traffic calming devices such as chicanes, mini traffic circles, and divider islands are often used to slow down motor vehicle traffic. Traffic diverters can be installed within intersections that allow bicyclists to continue straight along the neighborhood greenway but require motorists to turn onto the cross-street. Bicycle boulevards can serve as major cross-town connectors accommodating high bicycle traffic volumes. Routes are often chosen to provide the most direct bicycle through-routes while encouraging or requiring vehicles to travel on parallel, more auto-centric arterial roadways.

### *Advisory Bike Lanes/Advisory Shoulders*

Like sharrows, this treatment is intended to harmonize bicycle and motorized traffic on shared roadways, encouraging motorists to drive within the center of the road and only shifting into the advisory shoulders/bike lanes when there is oncoming traffic and it is safe to merge right. These roads do not have a centerline and the shoulders/bike lanes are designated by dashed lines where a solid edge line/bike lane line normally is placed. People walking and biking generally stay within the advisory shoulders/bike lanes. While this is an experimental treatment, some Michigan cities including Grand Rapids are deploying them.

***Figure 14.*** **Advisory Bike Lanes/Advisory Shoulders**


Source: FHWA-HEP-17-024 Small Town and Rural Design Guide

### *Shared Streets*

Shared streets are retrofits of urban residential and commercial streets where the street roadway width is 20 feet or more. They are designed without striped lanes that designate separate spaces for individual modes. Motorists, pedestrians, and bicyclists are given equal priority and opportunity. Sidewalks and the roadway are at the same grade. The curbs in the traditional sidewalk areas are removed and bollards and street trees are used to define where vehicles should not be permitted. For wider shared-space streets, staggered blocks of chicaned landscaping and alternating angled parking may be used to slow vehicle speeds. Active transportation users are encouraged to utilize the entire road right of way. Shared streets require special ADA considerations.

***Figure 15.* Shared Street – Traverse City, Michigan**

Source: Wade Trim

### *Yield Streets*

Yield streets are designed to serve pedestrians, bicyclists, and motor vehicles within the same right of way, often in suburban residential areas. The streets are two-way, with paving often less than 15 feet wide and no lane markings. Vehicular parking is allowed along the roadside in areas of contrasting material or paving color. These parking areas allow for queuing for the passing of oncoming vehicles. Trees may be planted within the roadside parking areas to improve the aesthetics and reduce vehicular speeds.

## Types of Active Transportation Facility Amenities and Safety Treatments

To ensure that the needs of active transportation facility users are met, a variety of amenities can be deployed to enhance their experience and reduce crash risks. Some are necessary to limit negative impacts (lighting), while others improve the user's overall satisfaction with the facility (bicycle racks and convenient public restrooms). Active transportation facility amenities should be incorporated into the active transportation network design at the outset and should not be considered as "add-ons" or eliminated during budget refinement. The provision of these facilities is important to enhance safety and comfort for all active transportation users.

Active transportation facility amenities should be installed in locations throughout the nonmotorized network. Where each item should be installed depends upon the amenity, network, and nodes and spokes in the system. For example, bike racks should be placed near businesses, schools, and downtown areas, but not along a shared-use path in the middle of a residential neighborhood. Benches are appropriate to install in almost any location along the transportation network. These supporting items enhance user experience, safety, and satisfaction.

Below are examples of the amenities and safety features that should be considered during the design and development of active transportation routes.

### *Signs*

Two types of signs should be deployed along all active and motorized transportation:

- Safety Signs: Signs for both motorists and active transportation users that make them aware of potential conflicts. Safety signs include pavement markings, in-road signs, and signs located along transportation corridors, some of which may include flashing elements.
- Wayfinding Signs: Specialized signs that are designed to assist travelers in finding their way to destinations. These signs may simply be directional in nature or may be more elaborately designed structures that include kiosks with standardized community branding elements.

***Figure 16.* Wayfinding Signs**

Source: Wade Trim

### *Bicycle Intersection Safety Treatments*

Several safety elements can be implemented to reduce the conflicts between motorists and bicyclists:

- Protected Intersections: These intersections should be deployed wherever busy active transportation routes cross busy motorized routes. Safety features may include:
  - Corner refuge islands,
  - Forward stop bars for cyclists and a setback crossing area,
  - Tight vehicular turning radii and narrow lanes to slow vehicular speeds,
  - Pavement markings to indicate bicycle priority, and
  - Separated bike signal phasing.
- Bike Lanes/Bike Boxes: These position bicycles ahead of vehicles to minimize right-turn conflicts with vehicles and improve bicyclist visibility.
- Bicycle Signals/Phasing: This form of protection is for dedicated bicycle movements through the intersection to eliminate conflicts with vehicles.
- Two-Stage Turn Boxes: These provide bicyclists a safe way to make left turns at multi-lane signalized intersections from the bike lane or separated bike lane.

### *Pedestrian Intersection Safety Treatments*

The following are some of the safety elements that can be implemented to reduce the conflicts between motorists and pedestrians. These differing interventions should be deployed based upon the network context, geometric constraints, number of users, crash history and risk, and the volume and speed of motorized traffic. Pedestrian safety treatments include:

- Pavement markings.
- Signalized crosswalks, such as High intensity Activated crossWalKs (HAWK) and Rectangular Rapid Flash Beacons (RRFB).
- Countdown timers.
- Pedestrian call buttons, including those with audible warnings.
- Pedestrian-friendly signal phasing, such as Leading Pedestrian Intervals (LPIs), which give pedestrians a three to seven second head-start prior to vehicles to establish their presence in the crosswalk before vehicles turn left or right on green, or turn right on red.
- Embedded pavement flashing beacons.
- Refuge islands.
- Bulb-out curbing.

### *Pedestrian-Scale Lighting*

Pedestrian-scale lighting is designed to illuminate the area of active transportation. Depending upon its location, it may provide added safety or aesthetics to an area. Pedestrian lighting should be considered along all busy routes and in urbanized areas where personal safety may be a concern (perceived or actual).

### *Bike Racks*

Riders require the ability to lock their bikes at their destinations to prevent theft. Bike racks should be visibly located in convenient locations near entrances to all major locations. Protection from the elements is desirable.

***Figure 17.* Bike Racks – East Lansing, Michigan**


Source: Wade Trim

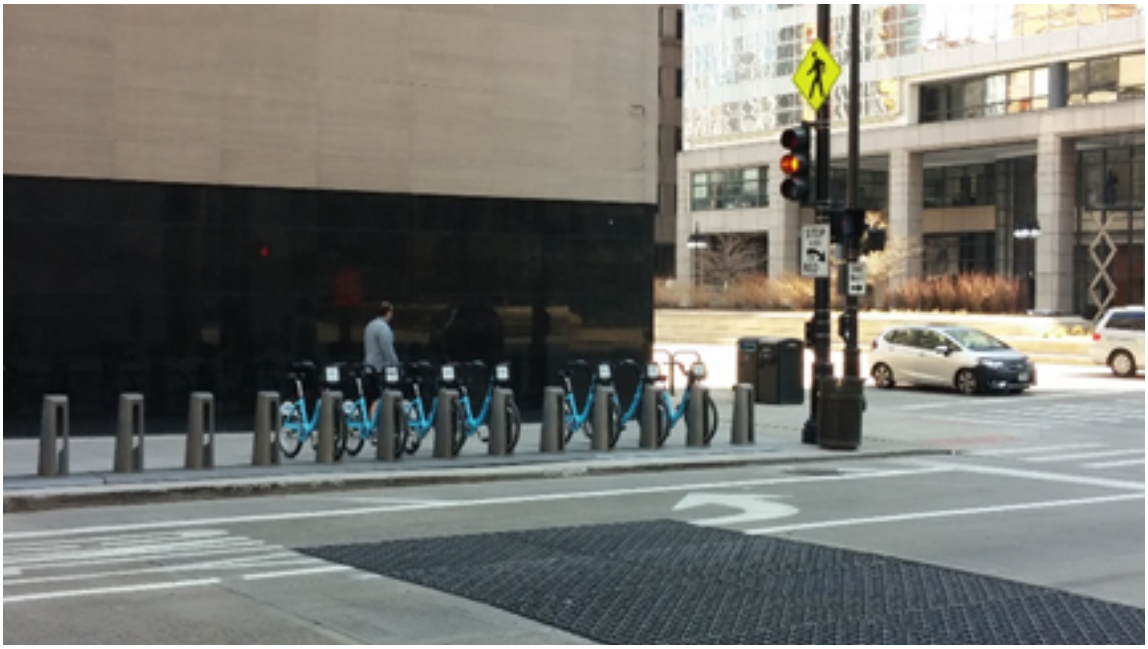
### *Bike Repair Stations*

These stations include standardized tools, clamps to hold the bike in place during repair, and air pumps to fill tires. They should be located at major active transportation transition points, trailheads, or along busy routes.

### *Bike-Sharing Stations*

These centralized stations are located throughout a community where riders can pick up and drop off short-term bicycle and electric bicycle (e-bike) rentals.

***Figure 18.*** **Bike Share Station**



Source: Wade Trim

### *Bike Storage*

Bike storage is necessary for long-term storage of bicycles, either at destinations or at points related to first/last-mile connections to public transit. This may include locked rooms or lockers to reduce vandalism. With the wider deployment of more expensive e-bikes, these storage facilities and charging stations at major destinations and transit stops will grow in importance.

### *Street and Path Trees*

To ensure comfort of users during hot months, shade is an important tool that will increase path use and decrease discomfort while providing visual softening of the environment. Trees should be installed along all busy active transportation routes.

***Figure 19.* Street Trees – Durand, Michigan**

Source: Wade Trim

### *Street Furniture*

These urban design features include benches, trash receptacles, and drinking fountains, and add comfort for active transportation users. Street furniture should be provided at all major transition points in urban and suburban locations and at vehicular parking areas.

***Figure 20.* Street Furniture – Bench**

Source: Wade Trim

***Figure 21. Street Furniture – Trash Receptacle***

Source: Wade Trim

### *Restrooms*

Restrooms are a vital component of comfort for active transportation users. The type of facility is based on location and number of potential users. Downtown areas, major transportation hubs, and trailhead parking areas should offer public restrooms.

### *Vehicle Parking*

Vehicle parking should be located at all trailheads. Convenience and availability of parking spaces are vital. Directions to parking should be clear and long-term parking should be available.

### *Bus Shelters*

Bus shelters are a key amenity for public transit users, adding comfort and protection from the elements.

# Current Network

Michigan's current active transportation network is comprised of many layers of entities and organizations providing both the planning and implementation of active transportation facilities. This has been, in part, due to the varying granularity needed for an active transportation system, and the "Home Rule" form of local governance in Michigan. Like the motorized roadway system, the active transportation network is necessary to connect the multitude of destinations together, ensuring that the network is convenient and optimizes the number of persons served. Major destinations and regional centers would be the focus of the statewide network while job centers, local parks, playgrounds, elementary schools, and neighborhood commercial districts would be more appropriately planned for and considered at the local level.

## Statewide Routes

There are 11 major statewide routes in Michigan, including the U.S. Bicycle Route System (USBR), the Iron Belle Trail (including a section of the North Country National Scenic Trail), the Great Lake-to-Lake Routes, and the Underground Railroad Bicycle Route, as shown in Figure 22. These statewide routes consist of shared-use trails and on-road designations that may currently cross or have the potential to cross more than one region across the state. These routes connect different regions and assets across Michigan, from sandstone cliffs and beaches to farmlands, small towns, and major cities. These routes have been developed by different organizations and by different processes. A shared-use trails directory and maps of the trail system across the state (for trails 3.5 miles and longer) can be found on the Michigan Trails and Greenways Alliance (MTGA) website and on the 12-map set of MDOT Road and Trail Bicycle Guides (Michigan.gov/MDOT-Biking).

Both the USBR and Michigan's Iron Belle Trail efforts have varying degrees of MDOT and other state agency involvement in their designations. To formally designate a USBR, it must be:

1. Part of the existing national corridor plan,
2. All the entities along the route must approve of the designation, and
3. MDOT must formally submit the application to the American Association of State Highway and Transportation Officials (AASHTO) Special Committee on Route Numbering.

The initial designation of the Iron Belle Trail was an effort of the Governor's Office and the Michigan Department of Natural Resources (MDNR), but MDOT worked with state, regional, and local agencies to help implement gap-filling projects.

The Great Lake-to-Lake Routes system was developed by the Michigan Trails and Greenways Alliance with support from the Kresge Foundation. Local communities apply for MDOT's various federal pass-through grant programs, such as the Transportation Alternatives Program, to bring the projects to fruition.

The Underground Railroad Bicycle Route was created through a joint effort between the Center for Minority Health at the University of Pittsburgh and the Adventure Cycling Association, establishing a Detroit Alternate Route that detours off the main route through southeast Michigan.

Due to Michigan's unique position on an international border, many statewide projects also extend connections to Canada. Both the USBR and Michigan's Iron Belle Trail link (or are planned to link) to Canada's Great Trail via bridges located in Detroit and Sault Ste. Marie. The Underground Railroad was designed for ferry access to Canada via Marine City. Routes that extend across regions offer various amenities and communities for hikers, bicyclists, and other travelers to visit. Facility types and amenities are described in the previous section of this plan.

At the statewide level, four efforts have developed networks that cross large portions of the state as listed in Table 3. These statewide efforts have been completed by government agencies at all levels, metropolitan planning organizations (MPOs), and nonprofits alike, often in collaboration with local supporters. Regional efforts have been spearheaded by MDOT, MDNR, MPOs, and nonprofit advocacy organizations, while local efforts are often led by recreational planning entities or local planning departments.

As the active transportation network continues to expand, it is important to identify gaps and determine opportunities for growth. Gaps can create deterrents for users who may have otherwise continued along a route. Removing gaps by building new route infrastructure helps to connect communities and encourages bicyclists and pedestrians to travel to new areas, and increases safety, comfort, access, and overall mobility. A review of existing gaps and planned efforts to close them for statewide route systems are included in the subsequent sections.

***Table 3.* Michigan Statewide Route Systems**

| System | Route | Mode | Length – Once Completed | Percent Completion |
|---|---|---|---|---|
| U.S. Bicycle Route System | USBR-10 | Bicycle | 193 miles | 100% |
| | USBR-20 | Bicycle | 310 miles | 100% |
| | USBR-35 | Bicycle | 505 miles | 100% |
| Michigan's Iron Belle Trail | Hiking Route | Hiking | 1,265 miles | 76% |
| | Biking Route | Bicycle | 810 miles | 64% |
| Great Lake-to-Lake Trails | #1 – South Haven to Port Huron | Hiking and Bicycle | 275 miles | 68% |
| | #2 – Muskegon to Bay City | Hiking and Bicycle | 210 miles* | 80%* |
| | #3 – Charlevoix to Alpena | Hiking and Bicycle | 140 miles | 100% |
| | #4 – Manistique to Marquette | Hiking and Bicycle | 90 miles* | 55%* |
| | #5 – Escanaba to Porcupine Mountains | Hiking and Bicycle | 195 miles* | 60%* |

| System | Route | Mode | Length – Once Completed | Percent Completion |
|---|---|---|---|---|
| Underground Railroad Bicycle Route | Detroit Alternate | Bicycle | 180 miles (approximately) | 100% |

Notes: *Estimated

***Figure 22.* Michigan's Statewide Active Transportation Route Systems**

### *U.S. Bicycle Route System*

The USBR is a national network of bicycle routes throughout the United States, with 14,000 miles established in 27 states and in Washington, D.C. AASHTO, along with the Adventure Cycling Association, have developed a national corridor plan that displays current designated USBRs and proposed undeveloped corridors. Routes proposed on the corridor plan are conceptual and represented by 50-mile zones where a route may be developed. Routes are determined by first being nominated by state DOTs, followed by the approval of AASHTO. Routes must be on the corridor plan before being considered for designation. When a bicycle route is approved to be part of the USBR system, it signifies support from all jurisdictions along the route.

Within Michigan, there are three AASHTO-designated routes:

- USBR-10 traverses the southern region of the Upper Peninsula, connecting St. Ignace to Iron Mountain. The 193-mile route utilizes the wide paved shoulders along US-2.
- USBR-20 is in the Lower Peninsula and connects east-west between Marine City and Ludington. The route primarily runs along paved roads, many with paved shoulders. A few portions of the route on rail-trails and other pathways.
- USBR-35 traverses the western border of the Lower Peninsula, connecting New Buffalo on the border of Indiana to Sault Ste. Marie. The route primarily runs along paved roads, many with paved shoulders. A few portions of the route run on rail-trails and other pathways.

There are four USBRs that are under development by other states that will connect to Michigan:

- USBR-25 is planned to enter the state at the Ohio/Michigan border. Per the corridor plan, USBR-25 will head north with potential endpoints in Detroit or Marine City.
- USBR-30 is planned to enter the state from Ohio and will travel through Lansing to Muskegon.
- USBR-36 is planned to connect Michigan and Indiana and connect Detroit to Chicago through the southern tier of Michigan counties.
- USBR-8 is planned to enter the state at the Wisconsin/Michigan border near Ironwood and travel south to connect with USBR-10.

The USBR aims to connect various states and regions across the United States; therefore, nearly every route has a significant connection. USBR-20 connects to two privately owned ferries. On the eastern end of the corridor, a ferry connects Marine City to Sombra, Ontario (as of the writing of this plan, the Marine City/Sombra ferry is not operating due to causeway damage in January 2018. An alternate ferry crossing is located 7.5 miles to the south at Algonac, Michigan). On the western end of the corridor, a ferry connects Ludington to Manitowoc, Wisconsin. USBR-35 connects from Indiana through Michigan and ends in Sault Ste. Marie, Michigan, with an option to cross the international border to Sault Ste. Marie, Ontario. There are multiple opportunities for bicyclists to connect to additional trails within Michigan. USBR-10 is one section of the Iron Belle Trail and USBR-35 intersects with the three Great-Lake-to-Lake Trails in the Lower Peninsula. USBR-8 is the northernmost route, which currently runs between Fairbanks and the Canada/United States border within Alaska.

*Figure 23.* **U.S. Bicycle Routes in Michigan**

### *Michigan's Iron Belle Trail*

Michigan's Iron Belle Trail is comprised of two separate routes: one for hikers and one for bicyclists. Both trails extend between Belle Isle in Detroit and the City of Ironwood in the western portion of the Upper Peninsula. According to MDNR, as of February 2020, 71 percent of the Iron Belle Trail is complete.

The hiking trail is the western trail section in the Lower Peninsula and the northern trail section in the Upper Peninsula, where it traverses along Lake Superior. It follows the North Country National Scenic Trail between Calhoun and Gogebic counties. The hiking trail is 1,265 miles long and 76 percent of the trail is complete, with the remaining sections to be developed.

The bicycle route is the more eastern route in the Lower Peninsula and the southern trail section in the Upper Peninsula, where it follows US-2, which overlaps USBR-10 (until USBR-10 leaves US-2 and crosses into Wisconsin at Iron Mountain). Existing sections of the route utilize trails that have previously been developed by communities and at the county and state level. The bicycle route is 810 miles long and 64 percent complete, with the remaining sections to be developed.

From Calhoun County, the hiking trail heads north, following the North Country National Scenic Trail, which traverses seven states and connects eastern New York to central North Dakota. As part of a national hiking trail network, the Iron Belle Trail provides a great opportunity to draw visitors to Michigan. There are also many trail connections to the Iron Belle Trail that hikers can connect to, including the Pere Marquette State Trail in the central region of the Lower Peninsula for bicyclists, and the Betsie Valley Trail which provides hikers a route to connect to Lake Michigan in the Lower Peninsula.

*Figure 24.* **Michigan's Iron Belle Trail**

### *Great Lake-to-Lake Routes*

The Michigan Trails and Greenways Alliance has led the effort towards developing five Great Lake-to-Lake Trails spread across the Upper and Lower peninsulas. The five routes include:

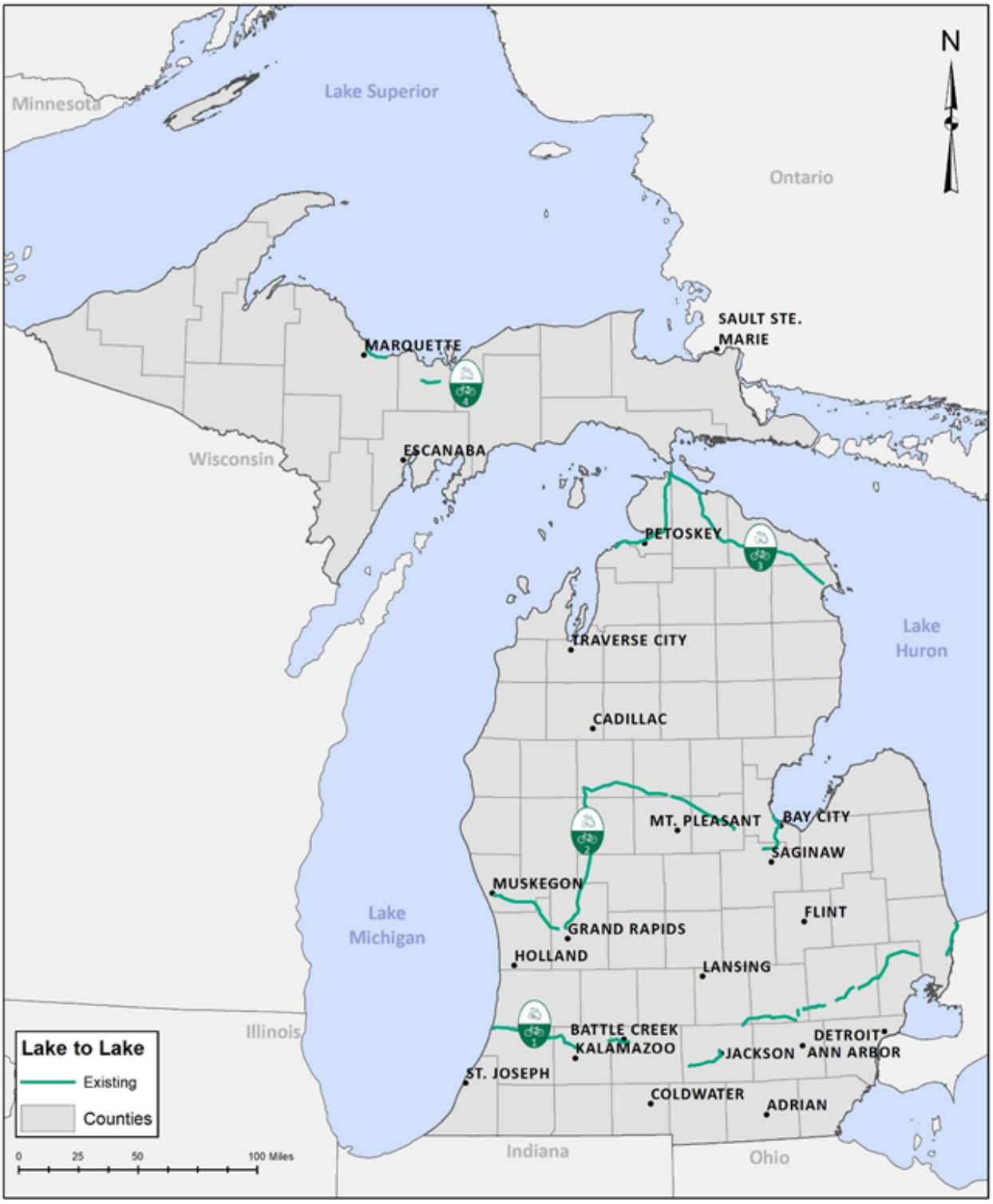
- South Haven to Port Huron,
- Muskegon to Bay City,
- Charlevoix to Alpena,
- Manistique to Marquette, and
- Escanaba to the Porcupine Mountains.

The trails are intended to be shared-use, available to both bicyclists and walkers, and separated from roadways. Route selection was informed by the location of existing trails; current gaps include temporary routes until more permanent off-road projects are available due to funding or improved land use opportunities. The Great Lake-to-Lake Trails project is envisioned to promote Michigan's tourism and nonmotorized transportation assets. The project includes a marketing/branding strategy to unify different trails and communities that are part of the larger trail, such as branding and signage to create a cohesive system.

Route #1, between South Haven and Port Huron, is strategically positioned in proximity to two Amtrak lines running from Chicago to southeast Michigan. These connections allow for bike/train transportation opportunities to multiple major cities in Michigan. The Great Lake-to-Lake Trail #1's ribbon-cutting and inaugural group ride took place in September 2019.

Within Michigan, the Great Lake-to-Lake Trails will connect with several existing trails, including connecting to the Iron Belle Trail at various points and smaller regional trails, such as the Fred Meijer White Pine Trail State Park in Osceola County and the Van Buren Trail State Park in Van Buren County.

*Figure 25.* **Great Lake-to-Lake Trails**

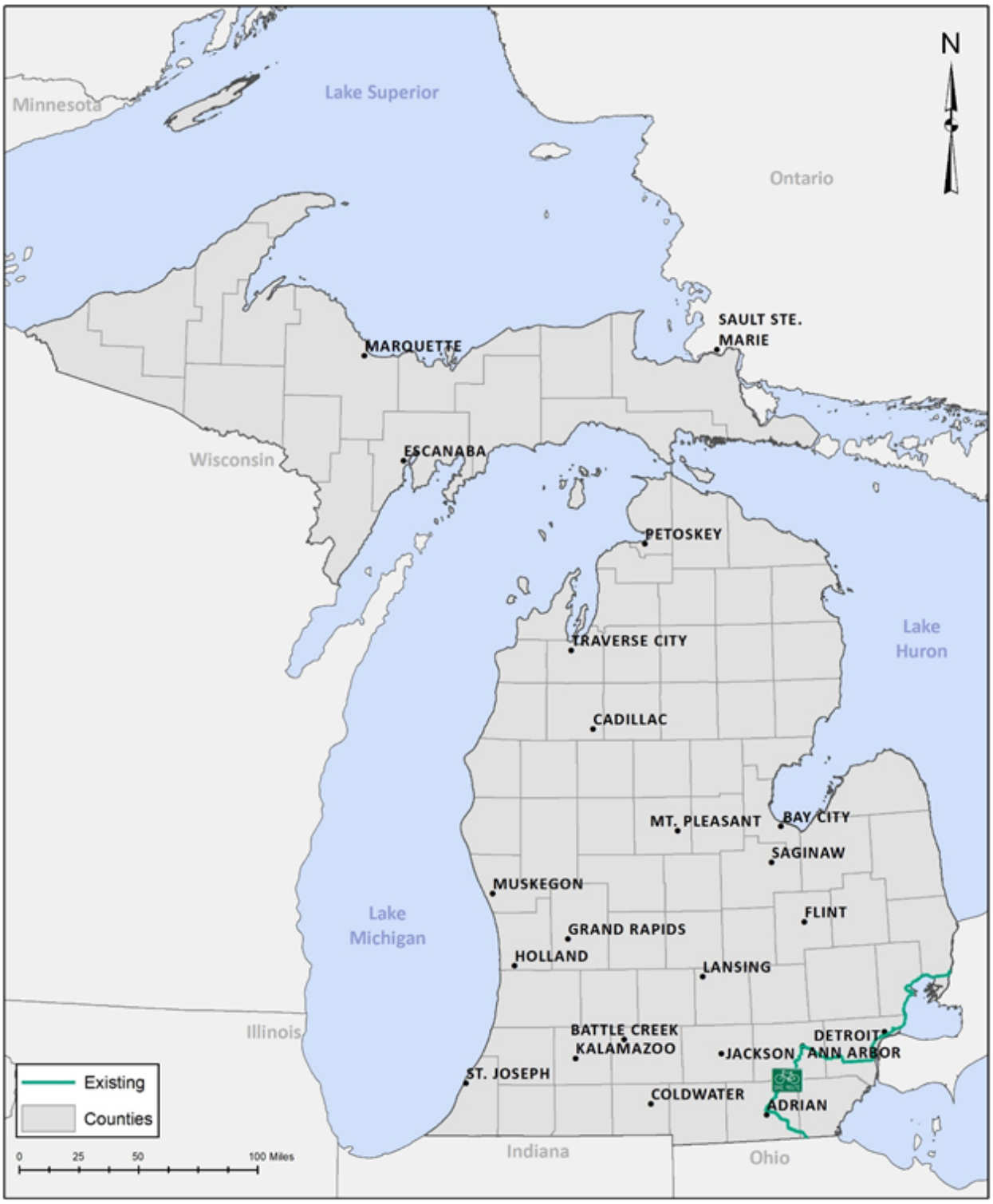


### *Underground Railroad Bicycle Route*

The Underground Railroad Bicycle Route was established to mirror and memorialize the route of the Underground Railroad (UGRR) in the United States. The UGRR was a secret network that was utilized by escaped former African American slaves to flee from the antebellum South through the free states to Canada. The primary route extends from Mobile, Alabama, to Owen Sound, Ontario, and covers 2,007 miles across eight states and two countries. There is a 505-mile alternate route that extends through the state of Michigan. Known as the UGRR Detroit Alternate, it departs from the main route in Oberlin, Ohio, and connects cyclists to Toledo and Detroit and eventually reaches Ontario north of Lake St. Clair. The route includes sections of on-road shoulders as well as shared-use pathways, including the Kiwanis Trail between Adrian and Tecumseh.

The UGRR Bicycle Route was designed to create connections across multiple states. To the south, the route connects to Ohio and continues to Alabama. To the north, there is a privately operated ferry that connects Marine City, Michigan, to Sombra, Ontario, crossing an international border (as of the writing of this plan, the Marine City/Sombra ferry is not operating due to the causeway being damaged in January 2018, but an alternate ferry crossing is located 7.5 miles to the south at Algonac, Michigan). The route continues to Owen Sound, Ontario, a town founded by freedom seekers in 1841, with freed slaves beginning to settle in the area in the early 1830s. Within Michigan, bicyclists have many opportunities to connect to the UGRR Bicycle Route, including the Iron Belle Trail in Detroit and the Border-to-Border Trail in Washtenaw County.

*Figure 26.* **Underground Railroad Bicycle Route – Detroit Alternate**



## Intermediate Regional Routes

The statewide routes provide the backbone for long-distance bicycle travel and tourism. Many of these statewide routes are made up of, or provide connectivity to, shorter intermediate regional and local routes that provide important connections within communities and individual regions of the state. The intermediate regional routes may include:

- Routes that are already segments of the existing or proposed statewide routes.
- Routes that are spurs of the existing or proposed statewide routes.
- Multi-community or multi-county routes that may become integrated into the statewide routes, either as segments or spurs.

When these cross-county, or multi-county pathways, are developed and connected to more local trails and pathway systems, opportunities for expanded active transportation, recreation and tourism are multiplied. These intermediate regional route networks play an important role in the state's expanding system of infrastructure for people walking and bicycling. Often, an intermediate regional route begins as a local trail or pathway and grows into an intermediate regional route over time, providing greater opportunity for active transportation. As intermediate route networks are expanded and connected with one another, they become part of the statewide system.

One example of a developing statewide route that is made up of multiple, already-developed intermediate regional routes is the 210-mile Great Lake-to-Lake Route #2 Trail from Muskegon to Bay City. When complete (20 percent remains undeveloped), Route #2 will be a result of connecting multiple intermediate routes that include the Muskatawa Trail (26 miles), the Fred Meijer White Pine Trail State Park (94 miles), sections of the Pere Marquette Rail-Trail and Pere Marquette State Trail (30 and 56 miles, respectively), the Bay County Riverwalk Trail System (21 miles), the Kent Trails (15 miles), and the Muskegon Lake Shore Trail (12 miles).

Across the state there are numerous intermediate regional routes that are not currently part of a potential statewide route, but which could over time become connections or part of new statewide routes. These long intermediate regional routes include:

- I-275 Metro Trail,
- Wadhams to Avoca Trail,
- Betsie Valley Trail, Bill Nicholls Trails,
- Jack Stevens Hancock Calumet Trail,
- Houghton Waterfront and Houghton-Chassell Trails,
- Clinton-Ionia-Shiawassee Trail, and
- Sleeping Bear Dunes Heritage Trail.

Many of these intermediate regional routes were developed over time and began as local routes or short segments. Recognizing this evolution and having a vision of statewide connectivity is how local and regional partners, along with state agencies and nonprofits, have been so successful in developing the world-class network of rail-trails and pathways across the state.

## Local Networks

Michigan's regional active transportation networks have been planned by a variety of organizations including MDOT regions, MPOs, and nonprofit entities. A majority of the government-led regional efforts occurred in the 2000s and early 2010s. Some of the regional efforts led by nonprofit entities started earlier, including TART and the Downriver Linked Greenways Initiative in 1998, and Top of Michigan Trails Council in 1995.

Local active transportation efforts led by municipalities and local nonprofits also date from the 1990s and 2000s. Examples include the Connor Creek Greenway Master Plan, prepared by the Detroit Eastside Community Collaborative in 2003, while Ann Arbor adopted its first nonmotorized plan in 1992.

Walking is the most universal way of getting around. In fact, almost every trip begins and ends with some amount of walking. This includes transit, carpooling, bicycle, and vehicular trips. Commutes are sometimes made by foot, especially when destinations are close and pedestrian infrastructure is accessible. Walking is often the mode of choice for visiting neighborhood establishments. These may include trips to cafes or restaurants or walking to school or the library. Walking as a form of exercise or recreation is also common. In many of these cases, walking as mode of transportation may be a choice, but many other people may be dependent on walking. According to the 2015 Michigan Household Travel Survey, just more than 5 percent of households in Michigan do not have a vehicle. In urban areas, like Detroit, this percentage is much higher, approaching one-quarter of all households. Whether walking as a mode of transportation is a choice or not, pedestrian networks are a priority in our communities. The 2015 survey found that while driving accounts for most travel trips at 88.2 percent (including 42.3 percent driving alone and 45.9 percent shared rides), walking is the second-highest form of travel, accounting for 6.1 percent of all trips. The fact that walking is the mode second-highest to driving reinforces the importance of accommodating pedestrian safety and mobility. In addition, people are more likely to choose to walk if the accompanying infrastructure is comfortable, convenient, and enjoyable.

Biking is a favorite pastime and an important means of active transportation in Michigan. Many people use their bicycle to travel to work, to appointments, for leisure, or for other errands. As biking infrastructure is made available and barriers are removed, more individuals view biking as a feasible means of transportation. Biking as a form of recreation or exercise is also popular. There are many trails throughout Michigan for cyclists to use. From mountain biking trails to the Iron Belle trail, which traverses the entire state, and many regional and community trails, there are many amenities for cyclists to enjoy. While many people may choose to travel by bike instead of by car, there are many people who do not have access to a car. In these situations, biking can be their only reliable means of getting around. According to the 2015 Michigan Household Travel Survey, biking accounts for 0.9 percent of all trips, but it should be noted that this number doesn't represent all individuals who rely on the bicycle for transportation.

Michigan experiences all four seasons throughout the year and winter weather can inhibit people who rely on walking or bicycling to get around. Winter elements can affect a person's ability, and often a person's desire, to walk and bike. Slippery conditions caused by ice accumulation also contribute to safety concerns. A comfortable walking environment in winter requires a commitment to maintaining walking surfaces for pedestrians. A viable biking and walking environment in winter requires a commitment to maintain surfaces and keep sidewalks, bike lanes and shared-use paths clear of snow and ice.

Tourism patterns in Michigan also affect the need for pedestrian infrastructure and is closely tied to bicycle use in the state. State parks and areas along the Great Lakes draw millions of visitors every year, especially in the summer months. Many people travel to Michigan for its shared-use paths, races, and biking events. Michiganders will travel outside of their community to explore different biking routes and new communities close to paths. Increased biking infrastructure and safety measures will continue to draw tourists and residents to recreational biking opportunities within their communities and throughout the state.

Mackinac Island, where personal motor vehicles are not permitted, is a haven to cyclists. The appeal of the resort island is often attributed to its distinct culture around nonmotorized transportation. The circumference of the Island is an 8-mile nonmotorized highway that is enjoyed by cyclists and pedestrians, but there are also many inland trails that are available for cyclists to explore.

The Southeast Michigan Council of Governments (SEMCOG) represents seven counties in southeast Michigan. Although pedestrian and bicycle facility network inventories are not consistently collected or maintained throughout the state, SEMCOG maintains an up-to-date and publicly accessible inventory for this data for its entire southeast Michigan area. SEMCOG collected sidewalk data for all seven counties in 2019 using aerial photography. Data was initially derived using an automated AI digitization process and then manually checked to ensure accuracy. SEMCOG also built data based on the Michigan Geographic Framework Road network and identified roadways with existing or planned bicycle facilities. Trails were added to account for pathways not located within the road right of way. While specific to the southeast Michigan area, the SEMCOG region includes urban, suburban, and rural districts. The data collected by SEMCOG is used in this report for imagery and analysis to help illustrate the pedestrian characteristics found in different types of communities across the state.

The types of networks that are found in urban, suburban, and rural areas are further discussed in the following subsections.

### *Local Pedestrian Network*

Many Michigan communities are embracing and providing spaces that cater to pedestrians. Downtown areas throughout the state make pedestrians the priority with wide sidewalks, signalized crossings, and streetscape amenities. Walkways along rivers and water features are increasingly popular features in major cities. Grand Rapids features a river walk along the Grand River, and Flint is home to an extensive River Trail along the Flint River. The Detroit Riverwalk is a 3.5-mile route along the Detroit River that connects parks, pavilions, and open spaces. Smaller cities along the Great Lakes often feature boardwalks along harbors, or pedestrian-accessible piers that connect marinas to amenities such as shops and restaurants.

Mackinac Island is Michigan's most well-known pedestrian asset. Other pedestrian assets found throughout the state include Michigan's college campuses. Many campuses provide areas that are exclusive to bicyclists and pedestrians, which offer enjoyable walking environments for students and visitors alike. Increasingly, new safety measures are being implemented across the state to benefit pedestrians. Shared streets are a new transportation feature where pedestrians, cyclists, and vehicles utilize the same street space to increase safety and create a sense of place. Bagley Street in Detroit's Mexicantown neighborhood is a newly converted shared street, and Kalamazoo has a shared streets ordinance to better serve pedestrian needs.

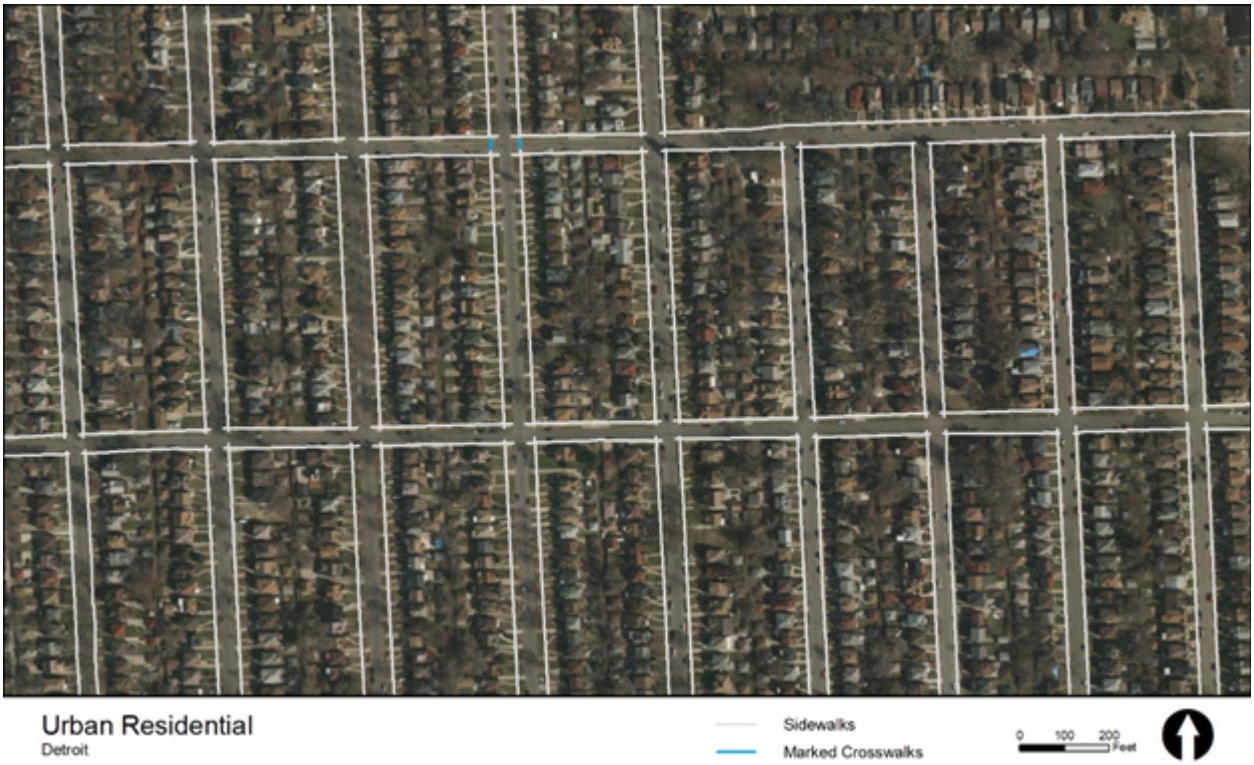
Michigan has a diverse set of land uses and a range of communities with different needs. Urban cities, suburban communities and rural towns all have a need for, and benefit from, pedestrian networks. An effective urban/rural distinction throughout the state is made using the adjusted census urban boundary (ACUB). Areas within an ACUB include an urban cluster where the minimum population is 5,000, or is an urbanized area as designated by the U.S. census. Areas outside of the ACUB can be considered rural. To further delineate the ACUB area between urban and suburban, the census-convenient definition was used for delineation. Urban areas are comprised of city boundaries that are the principal city listed in the census' metropolitan statistical areas.

#### Urban Network

The 14 Michigan cities that are listed as the principal city in a census metropolitan statistical area include: Ann Arbor, Battle Creek, Bay City, Detroit, Flint, Grand Rapids, Jackson, Kalamazoo, Lansing, Midland, Monroe, Muskegon, Niles, and Saginaw. These cities are in the southern portion of Michigan's Lower Peninsula and are representative of urban areas found throughout Michigan in many of its traditionally urbanized cities, towns, and villages. Together, the cities cover 469 square miles (0.8 percent) of Michigan's total land area. In 2010, 16 percent of the state's population lived in these urban areas, which is a significant amount given the small amount of land cover represented.

In urban areas, continuous sidewalks should be provided on both sides of the street and, if possible, separated from the street by a buffer or grass strip. Accessibility and adherence to ADA guidelines is required for new construction and retrofit projects across the network with crosswalks at intersections that have been designed with pedestrians in mind. In urban areas, highways and railroads can be barriers for walkable connections, and communities should be vigilant and creative in making areas accessible to pedestrians where barriers are present.

***Figure 27.* Urban Residential Pedestrian Networks**




Residential neighborhoods within urban communities tend to follow a rectangular grid pattern. Sidewalk systems are relatively complete, but residential areas tend to have few marked crosswalks. Marked crosswalks are typically present closer to schools and major arterial roads. The sidewalk network has many connection points and walkers can utilize multiple route opportunities. Research has shown that, on average, smaller blocks are better for pedestrians.

***Figure 28.* Urban Commercial Pedestrian Networks**

Urban commercial areas are often built on a grid system, similar to residential areas. Often a mix of uses, such as residential, commercial, and office uses, are found within these districts. Sidewalk systems tend to be complete in urban commercial districts, and marked crosswalks are more prevalent. While networks may be near completeness, there may be more need for safety measures and accessible infrastructure as these spaces are often frequented by vehicles and pedestrians.

There are 3,177 miles of arterial, collector, and local roads in the urban SEMCOG region, and there are 5,770 miles of sidewalks. For every mile of road in the urban region, there are 1.8 miles of sidewalks. A road with continuous sidewalks on both sides of the street would have a ratio of 1-to-2. While urban areas vary throughout Michigan, the SEMCOG region is largely representative.

### Suburban Network

Areas within the ACUB, but not within urban-designated cities, comprise the suburban area in Michigan. Suburban areas are found throughout the state but are mostly concentrated in the southern portion of Michigan's Lower Peninsula. In total, suburban areas in Michigan cover 4,907 square miles, or 8.4 percent of Michigan's total land area. In 2010, 60 percent of the state's population lived in suburban areas. Together, urban, and suburban areas deserve significant attention in building pedestrian networks, as they serve the greatest proportion of the state's population.

Suburban areas are like urban areas in their connectivity needs but may cover larger geographies. In neighborhoods and busier corridors, continuous sidewalks should be provided on both sides of the street and provide safe opportunities for crossing major roads. A municipality with a suburban area typically follows a land use pattern of tract subdivisions with mostly residential uses, connected by arterial roads that are designed for travel by car. Arterial roads can be prone to safety and environment issues for pedestrians and should be a focus as many community services are located along these types of roadways.

***Figure 29.*** **Suburban Residential Pedestrian Network**


Suburban residential neighborhoods often have more curvilinear streets and fewer intersections than the grid patterns of urban areas. This type of network often encourages lower traffic speeds and safer walking environments. These types of pedestrian networks are often used for recreational walking purposes but are often isolated from commercial centers. Routes tend to have fewer connection points, limiting certain route opportunities. Sidewalk connections are not always uniform, and there may be gaps depending on different subdivision developments. There tend to be few marked crosswalks in suburban neighborhoods except near schools or major arterial roads.

***Figure 30.* Suburban Commercial Pedestrian Network**


Commercial suburban areas are usually composed of commercial strip corridors that include retail uses and office parks. Designed for motor vehicle convenience, commercial developments typically include large parking lots. Road designs often include boulevards with medians, or five-lane roads with a center turn lane. Fast-moving traffic combined with multiple driveways can deter pedestrians from walking in these areas. Sidewalk connectivity in suburban commercial areas is also prone to gaps and sidewalks are often built only as development occurs.

***Figure 31.* Suburban Industrial Pedestrian Network**

While all community types include industrial uses, suburban areas commonly have concentrated corridors for industry businesses or factories. Industrial areas are frequented by commuters who travel to these businesses for work. Road design varies but is often designed for two-way traffic with little to no shoulder. Sidewalk networks tend to be incomplete or nonexistent in industrial areas. However, pedestrian networks should be given consideration as workers without access to a car need appropriate travel infrastructure.

In the suburban SEMCOG region there are 15,382 miles of arterial, collector, and local roads, with 19,094 miles of sidewalks. For every mile of road in the suburban district, there are 1.2 miles of sidewalks. This ratio suggests that many places are accessible to pedestrians but there are areas where gaps exist. While suburban areas across Michigan have diverse development patterns, the SEMCOG region is largely representative of this type of area.

### Rural Network

Areas outside of the ACUB are considered rural areas in Michigan and amounts to 90.8 percent of Michigan's total land area. Rural areas are largely located in the Upper Peninsula and the northern portion of the Lower Peninsula. In 2010, 24 percent of Michigan's population resided in rural areas. Rural pedestrian networks face a unique challenge as communities with lower population density cover larger areas, making sidewalk construction expensive on a per capita basis. These larger areas should still aim to connect pedestrians with safe walking infrastructure.

In rural contexts, pedestrian mobility may look different than in urban or suburban areas. Where pedestrian volumes are lower, paved shoulders should be provided along major roads with adequate width to maintain safety between motorists and pedestrians. Traffic speeds vary in rural areas, but often allow for higher speeds where there is less foot traffic. However, many of Michigan's state parks and campgrounds are located amidst rural areas and experience increased pedestrian activity at various times of the year. In these areas connecting to and surrounding state parks, campgrounds, and recreational settings where rural roadways with higher traffic speeds exist, more efforts to provide separated facilities for pedestrians or wider shoulders with rumble/mumble strips should be encouraged.

The makeup of Michigan's local government system, including counties, townships, cities, and villages, entails a largely decentralized political system. While the large number of municipal jurisdictions affects policies across the state, rural areas can often experience these divisions in a substantial way. There are typically a variety of guidelines regarding pedestrian networks, and uniform policies do not exist between adjacent municipalities. This can result in an inconsistent pedestrian network. For instance, one community may require sidewalks on both or one side of a road, while the adjacent community may decide that shoulders are sufficient.

***Figure 32.* Rural Residential Pedestrian Network**

Rural residential areas are primarily composed of large residential lots where houses are set back from the road. Sidewalks are not often found in these areas, and paved shoulders – where available – are often used to serve pedestrians. In some cases, combined bicycle/pedestrian signs are installed to alert drivers to the possible presence of these types of users.

***Figure 33.* Rural Residential Pedestrian Network**


The configuration of rural commercial areas is typically arranged around the intersection of two major roads. Commercial areas may offer a variety of services, and include local retail, convenience stores, restaurants, and gas stations. Sidewalks are often available in these areas, but tend to have gaps, or require pedestrians to cross to the opposite side of the road.

There are 5,038 miles of arterial, collector, and local roads in the rural SEMCOG region and there are 241 miles of sidewalks. For every mile of road in the rural SEMCOG region, there is less than 0.1 miles of sidewalks. As data for widened shoulders is not currently available at a regional level, this could not be accounted for in an analysis of pedestrian amenities. Rural areas in Michigan have varying levels of accommodation for pedestrians, but observations in the SEMCOG region show that very few areas are serviced by sidewalks.

### *Local Bicycle Network*

New local infrastructure is being built across the state to benefit and protect cyclists. In Marquette, bike lanes connect cyclists to the city shared-use path and to local establishments. Ann Arbor boasts more than 900 bike parking spaces available downtown, along with 87 miles of bike lanes, including the new William Street Bikeway separated bike lane. Detroit is implementing new biking infrastructure, including sidewalk-level separated bike lanes through the Livernois Avenue of Fashion corridor on the city's northwest side, and protected bike lanes on major corridors.

Michigan has a diverse set of land uses and a range of communities with different needs. Urban cities, suburban communities and rural towns all have a need for, and benefit from, bicycle networks. As discussed in Local Pedestrian Network, an effective urban/rural distinction throughout the state is made using the ACUB. Areas within an ACUB include an urban cluster where the minimum population is 5,000 or is an urbanized area as designated by the U.S. census. Areas outside of the ACUB can be considered rural. To further delineate the ACUB area between urban and suburban, the census-convenient definition was used for delineation. Urban areas are comprised of city boundaries that are the principal city listed in the census' metropolitan statistical areas.

### Urban Network

The 14 Michigan cities that are listed as the principal city in a census metropolitan statistical area include: Ann Arbor, Battle Creek, Bay City, Detroit, Flint, Grand Rapids, Jackson, Kalamazoo, Lansing, Midland, Monroe, Muskegon, Niles, and Saginaw. These cities are in the southern portion of Michigan's Lower Peninsula and are representative of urban areas found throughout Michigan in many of its traditionally urbanized cities, towns, and villages. Together, the cities cover 469 square miles, or 0.8 percent of Michigan's total land area. In 2010, 16 percent of the state's population lived in these urban areas, which is a significant amount given the small amount of land cover represented.

Bicycle infrastructure in urban areas can look very different based on the surrounding amenities. On busy streets that experience a lot of traffic, separated bike lanes are one way to help keep all modes of transportation safe. Separation from vehicle traffic, delineation with striped or green paint, directional markings, and bollards can all increase safety and aid bicyclists to feel more confident.

Residential neighborhoods within urban communities tend to follow a rectangular grid pattern. Sidewalk systems are relatively complete, and while cyclists can use the sidewalk, riding bicycles on sidewalks is generally discouraged for people over the age of 16. If using the sidewalk, they must yield and give the right of way to pedestrians. Many residential streets in urban areas are calm enough for cyclists to feel comfortable using them. For this reason, infrastructure specific to cyclists is rarely built in smaller neighborhoods.

***Figure 34.*** **Urban Commercial Bicycle Network**


Urban commercial areas are often built on a grid system, like residential areas. A mix of uses, such as residential, commercial, and office, are often found within these districts. Sidewalks tend to be complete in urban commercial districts, and there are usually higher volumes of pedestrians present. Due to increased traffic levels in urban commercial areas, these are areas that can often most benefit from added bicycle infrastructure.

The urban SEMCOG region has 71 miles of shared-use paths, accounting for 7 percent of all the shared-use paths in the region. With 237 total miles, 66 percent of the region's bike lanes are located within the urban SEMCOG region. There are 77 miles of other bikeways, including paved shoulders and marked shared lanes in these areas. Finally, there are 131 miles of planned bicycle infrastructure projects in the urban SEMCOG region. With 3,177 miles of arterial, collector, and local roads in these cities, and 516 miles of existing or planned bicycle infrastructure, the ratio of road to bicycle infrastructure

mileage is approximately 6-to-1. For every mile of road in the urban region, there are 0.2 miles of bicycle infrastructure. While urban areas vary throughout Michigan, the SEMCOG region is largely representative and demonstrates that there is a trend toward incorporating bicycle infrastructure in the urban environment. The data supports a proportionally larger investment in bike lanes in urban areas.

### Suburban Network

Areas within the ACUB, but not within urban-designated cities, comprise the suburban area in Michigan. Suburban areas are found throughout the state but are mostly concentrated in the southern portion of Michigan's Lower Peninsula. In total, suburban areas in Michigan cover 4,907 square miles, or 8.4 percent of Michigan's total land area. In 2010, 60 percent of the state's population lived in suburban areas. Together, urban and suburban areas deserve significant attention in building bicycle networks, as they serve the greatest proportion of the state's population.

Suburban areas are similar in connectivity needs to urban areas but are generally less dense and may cover larger geographies. Where roads experience a high enough level of traffic that bicyclists would be discouraged from riding in shared traffic, additional bicycle infrastructure should be considered and implemented when appropriate. A municipality with a suburban character typically follows a land use pattern of tract subdivisions with mostly residential uses, connected by arterial roads that are designed for travel by car. Arterial roads without appropriate bicycle facilities can be prone to safety issues for bicyclists and should be a focus, as critical network connections and many community services are located along these types of roadways.

***Figure 35.* Suburban Residential Bicycle Network**


Suburban residential neighborhood road networks often feature more curvilinear streets and fewer intersections than the grid patterns of urban areas. This type of network often encourages lower traffic speeds and may make cyclists feel more at ease riding in the street. People may utilize suburban residential streets for visiting neighbors, recreation, or traveling to public institutions like schools and libraries. However, these areas are often isolated from commercial centers.

***Figure 36.* Suburban Commercial Bicycle Network**


Commercial suburban areas are usually composed of commercial strip corridors that include retail uses and office parks. Designed for motor vehicle convenience, commercial developments typically include large parking lots. Road design includes boulevards with medians, or five-lane roads with a center turn lane. Fast-moving traffic combined with multiple driveways can deter bicyclists from using these areas. Some communities have paired shared-use paths within or adjacent to suburban commercial districts.

***Figure 37.* Suburban Industrial Bicycle Network**

While all community types include industrial uses, suburban areas commonly have concentrated corridors for industry businesses or factories. Industrial areas are frequented by commuters who travel to these businesses for work. Road design varies but is often designed for two-way traffic with little to no shoulder. Bicycle infrastructure should be given consideration as workers without access to a car need appropriate travel infrastructure.

Many industrial parks have large setbacks, and some communities are taking advantage of these areas to construct shared-use paths.

The suburban SEMCOG region has 908 miles of shared-use paths, accounting for 87 percent of all the shared-use paths in the region. With 108 total miles, 30 percent of the region's bike lanes are located within the suburban SEMCOG region. There are 358 miles of other bikeways, including paved shoulders and marked shared lanes in these areas. Finally, there are 661 miles of planned bicycle infrastructure projects in the suburban SEMCOG region. With 19,094 miles of arterial, collector, and local roads in these communities, and 2,035 miles of existing or planned bicycle infrastructure, the ratio of road to bicycle infrastructure mileage is approximately 9-to-1. For every mile of road in the suburban region, there are 0.1 miles of bicycle infrastructure. While suburban areas vary throughout Michigan, the SEMCOG region is largely representative and demonstrates that there is a trend toward incorporating bicycle infrastructure in the suburban environment. While all types of bicycle infrastructure are found in suburban areas, the data supports a focus on shared-use paths.

### Rural Network

Areas outside of the ACUB are considered rural areas in Michigan and amount to 90.8 percent of Michigan's total land area. Rural areas are largely located in the Upper Peninsula and the northern portion of the Lower Peninsula. In 2010, the remaining 24 percent of Michigan's population resided in rural areas. Rural bicycle networks face a unique challenge as areas with lower population density cover larger areas. These larger areas should still aim to connect cyclists with safe biking infrastructure.

In rural contexts, bicycling may look different than in urban or suburban areas. Paved shoulders should be provided along major roads with adequate width to maintain safety between modes of transportation. While rural roads require a higher stress tolerance for bicyclists due to a higher interaction with traffic, rural areas often benefit from trails and shared-use paths that traverse communities.

***Figure 38.*** **Rural Residential Network**

Rural residential areas are primarily composed of large residential lots where houses are set back from the road. Unlike urban and suburban neighborhoods, where the streets can be relatively calm with lower speed limits, homes in rural areas are often situated on connector roads with higher speed limits. Paved shoulders, where available, are often the best option for cyclists, although cyclists in these areas usually have a higher stress tolerance. In some cases, combined bicycle/pedestrian signs are installed to signal vehicles the possible presence of these types of users. Some rural area may pursue the creation of a shared-use path network along certain roadways, offering connections to statewide/regional trail and pathway systems. These are essentially service spines to local pathway networks fed by shoulders where pathways aren't feasible.

***Figure 39.* Rural Residential Bicycle Network**


The configuration of rural commercial areas is typically arranged around the intersection of two major roads. Commercial areas may offer a variety of services, and include local retail, convenience stores, restaurants, and gas stations. Sidewalks may be available in these areas, but like rural residential areas, if cyclists want to use the road, they will likely need to have a high stress tolerance.

The rural SEMCOG region has 60 miles of shared-use paths, accounting for 6 percent of all the shared-use paths in the region. With 13 total miles, 4 percent of the region's bike lanes are located within the rural SEMCOG region. There are 141 miles of other bikeways, including paved shoulders and shared lane markings in these areas. Finally, there are 249 miles of planned bicycle infrastructure projects in the rural SEMCOG region. This mileage accounts for 25 percent of the region's bicycle infrastructure in this category. With 5,038 miles of arterial, collector, and local roads in these communities, and 249 miles of existing or planned bicycle infrastructure, the ratio of road to bicycle infrastructure mileage is approximately 20-to-1. For every mile of road in the rural region, there are less than 0.1 miles of bicycle infrastructure. While rural areas vary throughout Michigan, the SEMCOG region is largely representative of rural districts. Bicycle infrastructure in rural areas looks different than it does in urban areas and larger cities, and in many cases paved shoulders and shared-use paths are the most appropriate way to accommodate cyclists.

# Physical Gaps and Barriers/Network Gap Analysis

## Michigan Active Transportation Network Gap Characterization

Michigan's statewide active transportation network is made up of facilities of many different types and scales. Some parts of the network extend the length of the state, while others are community-based routes that may include shared-use paths, bike lanes, sidewalks, or boardwalks. As the active transportation network continues to expand, it is important to identify gaps and determine opportunities for growth. These gaps may be due to a few factors, including changes in jurisdiction, which may be exacerbated by governmental agencies not communicating with one another. Gaps can create deterrents for users who may have otherwise continued along a route. Removing gaps by building new infrastructure helps to connect communities, encourages bicyclists and pedestrians to travel to new areas, and increases safety, comfort, access, and overall mobility. The cause of gaps varies across the network. In some cases, routes reach a commercial area where existing development prevents the route from continuing. In other areas where routes are located on public land, the transition to privately owned land can create a gap. Highways, railways, and other large infrastructure can also create obstacles to route advancement. The less challenging portions of many routes have been developed and gaps tend to include segments with greater complexity of development issues and associated increases in costs. The most expensive segments, such as those with greatest environmental and right of way acquisition obstacles, constitute a significant percentage of existing gaps in many areas. Common causes of gaps that may be complex to solve are rivers, highways, and railroads. All of these can be exacerbated by coordination issues to include, but not be limited to, local preferences, funding restraints, zoning, and local politics.

The gaps of the active transportation network are examined in the context of statewide routes. As independent regional and numerous local active transportation plans already exist, this plan seeks to tie them all together primarily via statewide routes, to create one comprehensive statewide network across the state of Michigan and draw attention to the need to address gaps and barriers. Some local or regional network gaps may be so difficult and expensive to surmount that local development is unlikely. A statewide funding approach is needed to address these gaps, be it that the gaps are on the local, regional, or statewide route levels.

## U.S. Bicycle Route System

The existing USBR in Michigan is described in Current Network. In addition to the three existing U.S. Bicycle Routes, Adventure Cycling Association (ACA) has identified four additional corridors or routes that could connect through Michigan: three east-west routes and one north-south route. These proposed corridors or routes are identified as 50-mile-wide bands where a route could be located.

- East-West Routes
  - USBR-8 is in the Upper Peninsula, connecting Michigan's western terminus of USBR-10 to Iron Mountain with Ironwood to the west.
  - ACA has proposed the USBR-30 route to be between the Michigan/Ohio state line, south of Detroit on the east and Muskegon on the west. The route passes through Lansing and Grand Rapids, with a potential connection to Milwaukee, Wisconsin, via a privately operated ferry.
  - USBR-36 travels through the southern portion of Michigan between Detroit on the east, with New Buffalo on the west.
- North-South Routes
  - In the Lower Peninsula, USBR-25 is proposed to follow the eastern edge of the state. The northern terminus is at the Mackinac Bridge, where it intersects with USBR-35. The route travels along the Lake Huron shoreline, passing through Alpena, Bay City, and Detroit, with the southern terminus at the Michigan/Ohio state line near Toledo.

Figure 40 displays the existing and conceptual sections of the USBR system in Michigan.

*Figure 40.* **U.S. Bicycle Routes – Michigan Existing and Proposed**


Source: State of Michigan and Wade Trim, 2020

### *Existing System and Gap Characterization*

The USBR is established through designation by state DOTs and generally follow existing road systems. USBR-10, 20, and 35 are complete within Michigan, and the majority are on-road. Small sections of each route follow shared-use paths or other bicycling facilities. Due to the nature of these facilities being on-road, there are no gaps in the designated routes. There are, however, opportunities for route realignments to utilize newly built bicycle facilities or desirable locations; although, realignments should not significantly increase mileage for the sole purpose of facility utilization.

While the national corridor plan establishes a 50-mile-wide area where routes can potentially be developed, MDOT is responsible for official USBR designation in Michigan. New routes or realignments to existing routes must be coordinated with MDOT prior to AASHTO sanctioning the route. Local agencies play a critical role as a partner in the process and in championing a specific route or project. A summary of the USBR designation process is as follows:

1. Local stakeholders, with input and oversight by MDOT, determine possible route alignments that satisfy AASHTO and MDOT criteria, including:
   - The route is within the 50-mile priority corridor.
   - The route end points connect to an international border, another designated or proposed USBR, and/or another state.
   - The route satisfies the needs of the intended users.
   - The route is a paved. Roads may, or may not, have paved shoulders, or bicycle facilities.
   - The route is supported by all local road agencies.
   - The route is reasonably direct.
2. MDOT and other local agencies vet the proposed route for access to services, destinations, and the safety and comfort of the bicyclist.
3. Should the route be deemed safe and feasible, local partners create the following items for additional review:
   - A map of the route, at a large enough scale to assist with wayfinding.
   - Turn-by-turn directions from both ends of the route.
   - A comprehensive list of all local road agencies impacted by the route, and the date they officially supported the route by an official-approved resolution.
4. MDOT reviews and ground truths the final route before submitting final documents to AASHTO for approval.

Current barriers to route implementation (this is applicable to all routes, including the Iron Belle and Great Lake-to-Lake Trails) include:

- Identifying local champions to lead the specific route alignments with ongoing communications to MDOT.
- Communications to communities that may lack information on the economic benefits of active transportation routes and tourism to support or commit resources to the route-planning efforts.
- Local concerns that there is a lack of alternative transportation facilities to support the route, or that existing facilities will need to be enhanced or upgraded to certain standards to be considered useable for bicycling.
- Lack of funding for local active transportation projects along the designated route.

### *Route Opportunities*

Four routes proposed by AASHTO have the potential to extend through Michigan: USBR-8, USBR-25, USBR-30, and USBR-36. These routes have the potential to connect to Ohio, Indiana, Wisconsin, and Ontario, Canada.

## Michigan's Iron Belle Trail

Michigan's Iron Belle Trail is comprised of two separate routes: one for hikers and one for bicyclists. The completeness of the trail fluctuates, and as of 2020, the hiking route was 1,265 miles long, with 76 percent of the route complete. The bicycle route was 810 miles long, with 64 percent of the trail complete. Figure 41 displays the existing and proposed sections of Michigan's Iron Belle Trail. Interactive maps, partner toolkits, brochures and frequently asked questions can be found on the Michigan's Iron Belle Trail website: https://michigantrails.org/trails/featured-trails/iron-belle-trail/.

***Figure 41.* Iron Belle Trail – Existing and Proposed**


Source: State of Michigan and Wade Trim, 2020

### *Existing System and Gap Characterization*

Michigan's Iron Belle Trail (IBT) is an MDNR-led collaborative initiative to provide a route that traverses the entire state of Michigan by hiking or bicycling via existing trail networks and new connections.

The hiking route aims to have dedicated facilities for hikers, ranging from sidewalks and shared-use paths to primitive off-road foot paths. The biking route aims to provide long-distance bicyclists with, at minimum, the same level of accommodations found along USBRs. Where possible, it aims to have dedicated infrastructure such as bike lanes or shared-use paths. Both routes will include wayfinding signage.

Gaps occur in the routes for a variety of reasons; most often due to coordination needs, especially regarding design standards, funding (often the most expensive sections are the remaining gaps), and route alignment. Like the USBR initiative, much of the planning and funding is left to the locals. MDNR provides a general area where the IBT route can be developed but leaves many of the decisions up to local agencies. Often, gaps in the route are created by not opting for the most direct routes and using unnecessarily circuitous routes, which are often ignored by trail users. Frequently, communities desire facilities that will cater to the largest number of bicyclists and pedestrians (i.e., shared-use paths), or they want a pedestrian facility on a biking route (e.g., a sidewalk) or bike facilities on a hiking route (e.g., a bike lane). Furthermore, communities may not choose the most direct or cost-effective solution, creating a meandering route that may better serve local community needs rather than long-distance travelers.

While both MDOT and MDNR have competitive grant funding available, these funding sources are limited and require local matching funds. Due to the scale and scope of the IBT, grant sources alone are not sufficient to cover the entire cost of completing a project of statewide scope and scale. Additionally, each funding program and agency has different missions and program responsibilities, which can create challenges with combining funding sources from a different agency. In some cases, agencies have differences in competitiveness criteria, with respect to what constitutes a gap or what is an acceptable treatment. For example:

- In areas with primitive off-road paths, bridges may not be considered competitive for funding because long-distance hikers can wade through the waters.
- Where shared-use paths are proposed, one agency will accept narrower shared-use paths and bridges, while the other requires these structures be wider.
- Some agencies will accept a wide, paved shoulder or bike lanes, while the other will not.
- Some agencies will not accept an unpaved or primitive path as an eligible or competitive walking/biking facility.

Since most of the easy-to-fill gaps have already been completed, those remaining are often the more challenging, time-consuming, and costly projects, resulting in many local pockets of disconnected facilities. Below are examples that exhibit the challenges.

#### Significant Gaps Along the Hiking Route

- Manistee National Forest: In the section of the trail south of the Manistee National Forest in Newaygo and Kent counties, the path often alternates between community or park paths to on-road portions of the route.
- Lower Huron Metro Park and the City of Belleville: In western Wayne County, a walking path is available to hikers in the Metro Park, and the downtown section of the city of Belleville includes sidewalks. A current gap exists between these two land uses where a gravel shoulder connects the park to the downtown area.

#### Significant Gaps in the Biking Route

- A 32-mile stretch between Crystal Falls and Iron Mountain in Dickinson and Iron counties lacks the wide paved shoulder that accommodates bicyclists on other on-road route segments.
- The Iosco Exploration Trail in the townships of Au Sable, Oscoda, and Plainfield in Iosco County is expected to be 44 miles long and include on-road and off-road facilities. Many of the next phase off-road sections will be 10-foot-wide paved shared-use paths along the roads' right of way or publicly owned land.

Natural features like rivers and man-made features, such as railroads or highway systems, also create major barriers. This occurs in the city of Saginaw where the Saginaw Riverwalk encounters I-675 and the Saginaw River. This area is currently in the planning stages, but the intent is to cross both obstacles and travel north to connect with the Zilwaukee Pathway.

### *Route Opportunities*

Michigan's IBT exists in a variety of stages, from planning and acquisition, to engineering and development. Even where portions of the trail are in the planning stage, the general framework is in place. Gaps have been identified by MDNR and incorporated in the overall plan. For this reason, it is helpful to examine the trail in a detailed context to better understand where opportunities exist; mileage completed and in planning by MDOT regions is provided in Table 4.

***Table 4.*** **Iron Belle Mileage by MDOT Region**

| Bay Region | Miles | Percent |
|---|---|---|
| **Portion of Total Hiking Trail** | **0.0** | **0.0%** |
| Trail Completeness | N/A | N/A |
| Trail in Planning Stage | N/A | N/A |
| **Portion of Total Biking** | **165.2** | **20.4%** |
| Trail Completeness | 75.5 | 45.7% |
| Trail in Planning Stage | 89.7 | 54.3% |

| Grand Region | Miles | Percent |
|---|---|---|
| **Portion of Total Hiking Trail** | **233.5** | **18.5%** |
| Trail Completeness | 147.4 | 63.1% |
| Trail in Planning Stage | 86.1 | 36.9% |
| **Portion of Total Biking** | **0.0** | **0.0%** |
| Trail Completeness | N/A | N/A |
| Trail in Planning Stage | N/A | N/A |

| Metro Region | Miles | Percent |
|---|---|---|
| **Portion of Total Hiking Trail** | **71.0** | **5.6%** |
| Trail Completeness | 53.8 | 75.8% |
| Trail in Planning Stage | 17.2 | 24.2% |
| **Portion of Total Biking** | **71.8** | **8.9%** |
| Trail Completeness | 37.4 | 52.1% |
| Trail in Planning Stage | 34.4 | 47.9% |

| North Region | Miles | Percent |
|---|---|---|
| **Portion of Total Hiking Trail** | **269.2** | **21.3%** |
| Trail Completeness | 210.1 | 78.0% |
| Trail in Planning Stage | 59.1 | 22.0% |
| **Portion of Total Biking** | **234.4** | **28.9%** |
| Trail Completeness | 100.2 | 42.7% |
| Trail in Planning Stage | 134.2 | 57.3% |

| Southwest Region | Miles | Percent |
|---|---|---|
| **Portion of Total Hiking Trail** | **67.8** | **5.4%** |
| Trail Completeness | 33.5 | 49.4% |
| Trail in Planning Stage | 34.3 | 50.6% |
| **Portion of Total Biking** | **0.0** | **0.0%** |
| Trail Completeness | N/A | N/A |
| Trail in Planning Stage | N/A | N/A |

| Superior Region | Miles | Percent |
|---|---|---|
| **Portion of Total Hiking Trail** | **538.2** | **42.5%** |
| Trail Completeness | 459.6 | 85.4% |
| Trail in Planning Stage | 78.6 | 14.6% |
| **Portion of Total Biking** | **338.6** | **41.8%** |
| Trail Completeness | 302.2 | 89.2% |
| Trail in Planning Stage | 36.4 | 10.8% |

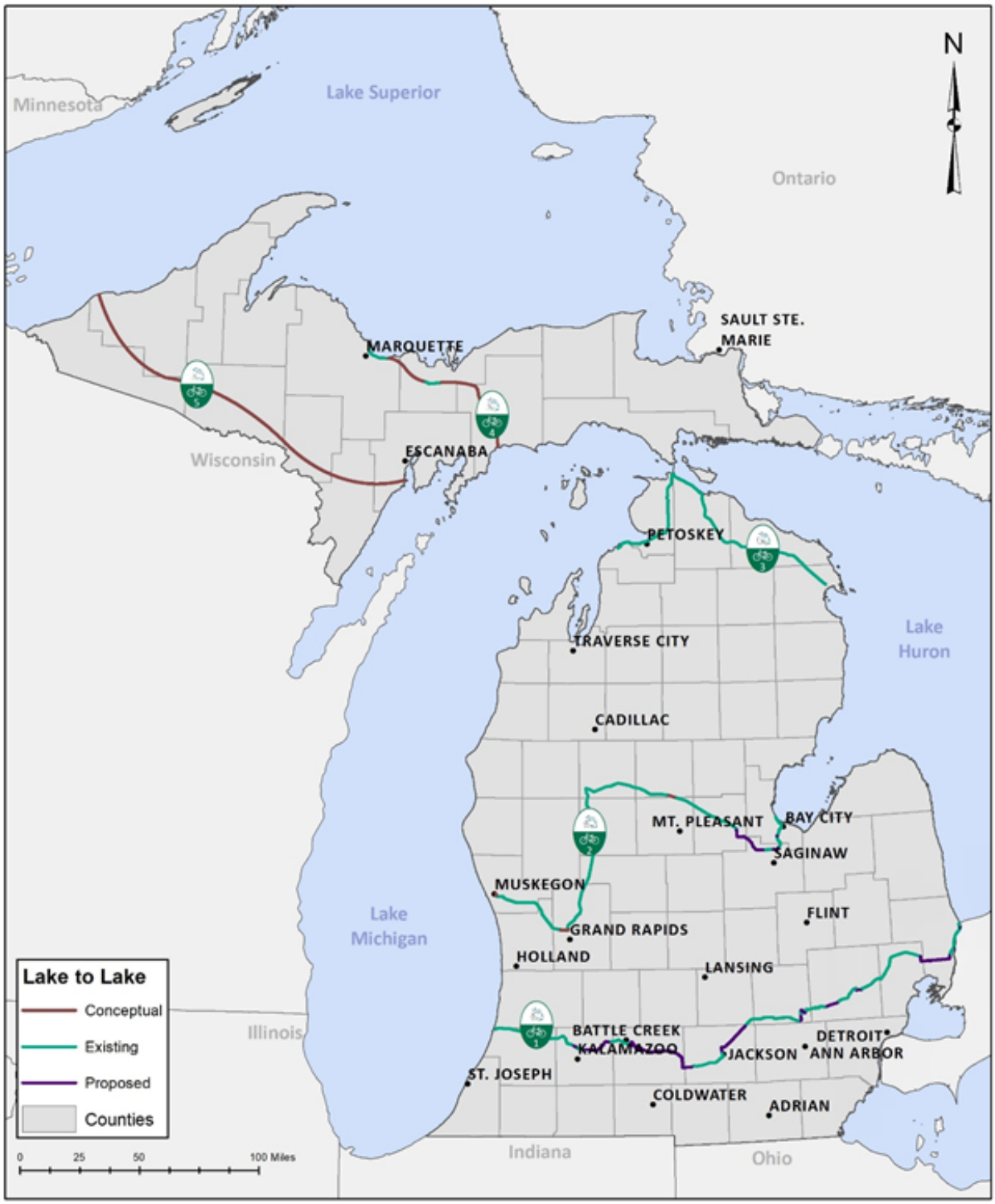
| University Region | Miles | Percent |
|---|---|---|
| **Portion of Total Hiking Trail** | **85.0** | **6.7%** |
| Trail Completeness | 52.1 | 61.3% |
| Trail in Planning Stage | 32.9 | 38.7% |
| **Portion of Total Biking** | **0.0** | **0.0%** |
| Trail Completeness | N/A | N/A |
| Trail in Planning Stage | N/A | N/A |

Source: Department of Natural Resources – September 2020

*Great Lake-to-Lake Trails*

There are five Great Lake-to-Lake Trails in various stages of development in Michigan, as described in Current Network. The trails are intended to be shared-use, available to both bicyclists and pedestrians, and separated from roadways as much as possible. Figure 42 displays the existing, proposed, and conceptual sections of the Great Lake-to-Lake Trails.

***Figure 42. Great Lake-to-Lake Trails – Existing, Proposed, and Conceptual***




Source: State of Michigan, Michigan Trails and Greenways Alliance and Wade Trim 2020

### *Existing System and Gap Characterization*

The five Great Lake-to-Lake routes vary in their status and stage of development. Route #3, between Alpena to Charlevoix, at a total length of 140 miles, is 100 percent complete as it is composed of the existing North Eastern State Trail and North Western State Trail. Most of the trail is 10-12 feet wide with crushed limestone or asphalt paving. The trail passes through rural landscapes, forested wetlands, farmland, and a number of former lumber towns.

Route #2, between Muskegon to Bay City, measuring approximately 210 miles, is 87 percent complete and follows existing sections of the Musketawa State Trail, the Fred Meijer Pioneer Trail, the Fred Meijer White Pine Trail, the Pere Marquette State Trail, the Pere Marquette Rail Trail, and the Bay County Riverwalk Trail. One major obstacle for a continuous Route #2 is the lack of a connection between the Fred Meijer Pioneer Trail and the Fred Meijer White Pine Trail in Grand Rapids. To connect these two trails, the route would need to traverse the I-96/US-131 interchange, as well as the Grand River. Another gap exists in the city of Clare's downtown, between the Pere Marquette State Trail and the Pere Marquette Rail Trail. In its current state, walkers or bicyclists must travel along roadsides, with some options for sidewalks between the two shared-use trails. The largest gap is 17 miles long and exists between where the Pere Marquette Rail Trail ends in Midland and where it connects with the Kochville Pathway, west of Saginaw.

Between South Haven and Port Huron, Route #1 is 62 percent complete. The route follows many existing trails in the state's southern region, including the Kal-Haven Trail, Falling Waters Trail, and the Mike Levine Lakelands Trail. Following the initial planning phases, Route #1 became the initial focus of the Michigan Trails and Greenways Alliance (MTGA). The work included field analysis, feasibility studies and dialogue with local officials to determine the ideal route. The current emphasis is on completing Route #1 by building supportive infrastructure in areas where there are gaps and installing wayfinding signs on existing sections.

There are 14 gaps identified across the 275-mile route. Six of these gaps are less than a mile in length. Many of these smaller gaps are part of planned intermediate regional routes and include sections of routes with missing pieces within the system. Four gaps less than 10 miles long are in close proximity to each other in Livingston and Oakland counties. These gaps include a temporary route for the Clinton River Trail, the soon to be completed Michigan Airline Railway Trail, and two gaps that will connect the Fieldcrest Path in Green Oak Township south of Brighton: both the Mike Lavine Lakelands Trail and the Island Lake State Park Trails. Three of the gaps are all approximately 15 miles long and cross Kalamazoo, Jackson, Macomb, and St. Clair counties. The largest gap is 36 miles long and exists between the Battle Creek Linear Park and the Falling Waters Trail in Jackson County.

Both routes #4 and #5 are largely conceptual in nature, with #4 approximately 90 miles long and #5 195 miles long. While the rough course of each trail is known, the specific pathways are mostly undetermined by the MTGA. Route #4 will utilize the existing Iron Ore Heritage Trail and the Coalwood Trail. The remaining 60 miles to connect Marquette and Manistique have yet to be determined. Route #5 will connect Escanaba to the Porcupine Mountains and is estimated to cover 160 miles. While the route is expected to travel near US-2 and the biking route of the IBT, the intent is to create an off-road option that can service both people walking and biking.

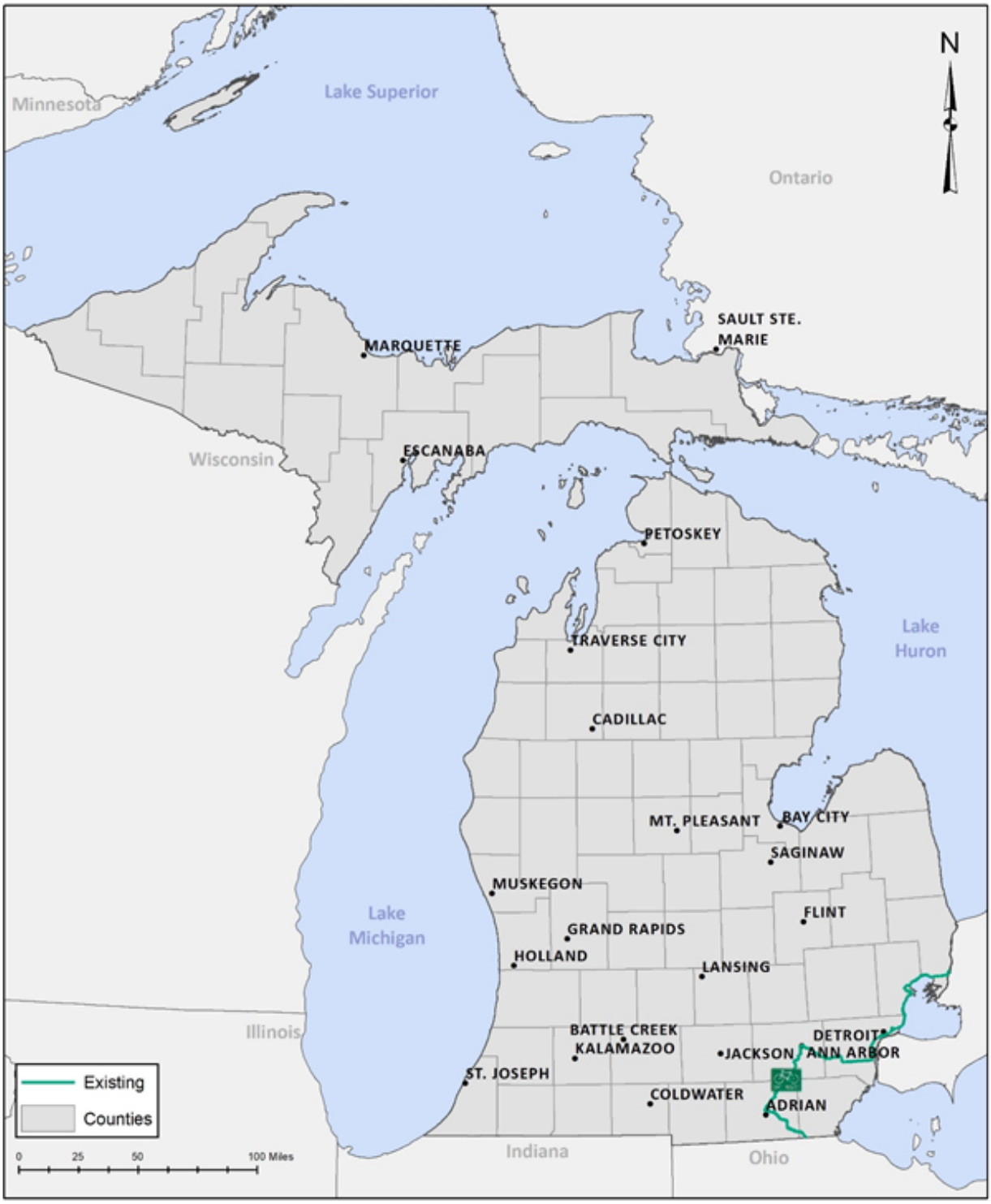
### *Route Opportunities*

Where the MTGA has identified gaps along the Great Lake-to-Lake Trails, they have often identified future trails as well as a long-term trail vision. The selected future trails often follow existing roadways and provide a direct connection to existing sections of the trail. The long-term trail vision is typically a more scenic off-road option that traverses natural areas or borders bodies of water. For Great Lake-to-Lake Route #1 in St. Clair County, the future trail to connect the Macomb Orchard Trail to the bridge to Bay Trail will likely follow an east-west two-lane highway. However, the long-term vision identifies a power easement for trail development that also utilizes park connections. To connect the Lakelands Trail to the Huron Valley Trail, an interim on-road option along 9 Mile Road will likely be developed. In Calhoun County, several roads and bike paths are expected to connect the Battle Creek Linear Trail to the Falling Waters Trail. As opportunities present themselves, and land is available, the ultimate goal is for the route to follow the Kalamazoo River.

## Underground Railroad Bicycle Route

The UGRR Bicycle Route was established by the Adventure Cycling Association and local bicycle advocates to mirror and memorialize the route of the UGRR in the United States. While the primary route connects Mobile, Alabama, to Owen Sound, Ontario, the UGRR Detroit Alternate passes through Michigan. Figure 43 illustrates Michigan's UGRR Bicycle Route.

***Figure 43.* Underground Railroad Bicycle Route – Detroit Alternate**




Source: Adventure Cycling Association

### *Existing System and Gap Characterization*

The UGRR Bicycle Route Detroit Alternate (UGRR-DA) is complete within Michigan with no existing gaps. The Michigan portion of the UGRR-DA is approximately 180 miles, out of the total 565-mile Detroit Alternate that split from the main route at Everett, Ohio, and rejoins the route at its terminus at Owen Sound, Ontario. It utilizes a mixture of nonmotorized trails as well as bike lanes and on-road shoulders. While the route has been determined in its entirety, sections of the route are anticipated to receive nonmotorized upgrades in the future, as parts of local active transportation efforts.

Like much of the USBR network, most of the UGRR-DA route is on-road cycling with the riders sharing the road with motorists. This system is not meant for the casual or novice bicyclist. Sections of the route include a 12-mile stretch along Pennsylvania Road along the southern border of Romulus, Taylor, Southgate, and Wyandotte. This two-lane section is generally rural with a posted speed limit ranging from 40 to 45 mph, with narrow or no shoulders, and would generally only be comfortable for highly confident bicyclists with a high tolerance for traffic stress. Jefferson Avenue through the Grosse Pointe communities and St. Clair Shores also has the potential to be prohibitive to casual or novice bicyclists. Most of this route requires sharing the road with motorists.

### *Route Opportunities*

Along the Michigan portion of the UGRR, many of the route opportunities are infrastructure improvements for bicyclists. The section that runs through Macomb County has been identified as a priority link in the Mobilize Macomb initiative. Macomb County's Shoreline Trail is intended to connect St. Clair Shores to New Baltimore and envisions a wide safety path or shared-use path as part of the connector. This path would align with the current UGRR Bicycle Route. As part of the City of Saline Non-Motorized Plan, the recommended bicycle facilities along streets that coincide with the UGRR Bicycle Route. These facilities may consist of shared roadways, bike lanes, or shared-use pathways. The UGRR Bicycle Route is an important asset that allows bicyclists to connect and engage with an essential part of the nation's history. By integrating supportive infrastructure for bicyclists, more users will feel confident enjoying the route.

## Developing Local Projects

There is a need to resolve gaps in local and regional networks in addition to the statewide routes. A complete nonmotorized network supports active transportation, improves health, and increases recreation, tourism, and economic development opportunities. Partnerships and collaboration are required to develop and sustain regional and local systems.

Physical barriers and gaps in the active transportation network are common impediments to walking and biking within, and between, local municipalities. According to SEMCOG data, approximately 71 percent of southeast Michigan households have access to pedestrian infrastructure within 100 feet of their home. This percentage is likely to be similar in other urban areas of the state with the percentage higher in urbanized areas developed prior to 1950, dropping in suburban areas, and falling further in rural areas. To increase this access, local agencies must determine the most suitable facilities and treatments to accommodate and promote active transportation in their communities. Often, there is a need for continuous sidewalk and shared-use paths to connect to various land uses and areas in the communities.

Local agencies can begin the process of expanding and/or enhancing current active transportation infrastructure to increase connectivity and close gaps in regional corridors by:

- Convening the inventorying and mapping of existing active transportation facilities such as sidewalks; shared-use paths; side paths; buffered, separated, and striped bike lanes; marked shared lanes (sharrows); designated bike routes; wide paved shoulders; and trails.
- Assisting with the analyzing of current conditions and creating a prioritized active transportation infrastructure plan to identify and address the critical gaps in the local, regional, and statewide networks. Gaps may include not only a portion missing from the infrastructure, but could also involve a physical barrier or impediment, safety concerns, maintenance issues, or other needs identified by the local agencies and users. (Information on funding can be found in Section 7 of this plan.)
- Working with supporting partners such as MDOT, county road agencies, bike advocacy groups, transit providers, design professionals, etc., to develop and apply context-sensitive solutions where applicable that improve safety, equity, and accessibility for all users and modes.

- Assisting with the dissemination of design standards for bicycle and pedestrian infrastructure based on road characteristics and community context which promotes consistency across jurisdictions. This includes new and retrofit projects to promote compliance with ADA inclusion for sidewalks, and crosswalks.
- Encouraging the availability of micromobility services for various ages, abilities, and income levels to address the first and last mile of transit service and reduce other non-infrastructural barriers for people walking and biking (e.g., time, security, etc.).

### *Route Opportunities*

Local agencies are encouraged to develop projects at the local level by seeking opportunities for establishing local routes and for filling in gaps in the network. As local agencies are responsible for identifying these routes, they are encouraged to start planning by establishing or expanding upon Complete Streets policies and other policies in their communities that promote addressing gaps. For example, local streets may have sidewalks lacking connection and accessibility and in developing local projects, priority may be given to connections to high demand areas such as schools, transit, and core service areas. In addition, there may be opportunities to build new bridges or add onto existing ones in urban, suburban, or rural areas to accommodate pedestrians and bicyclists safely and efficiently on local roadways.

## Active Transportation Planning

Active transportation planning can be directly incorporated into local and regional planning efforts, including, but not limited to, transportation and mobility planning documents, recreation plans submitted to MDNR, and municipal planning documents (i.e., master plans, land use plans, downtown development authority plans, corridor improvement authority plans, neighborhood revitalization plans, economic development plans, park plans, etc.). Opportunities to bolster active transportation infrastructure and programs can be considered as a standard part of the transportation assessment and recommendations included in these documents. Furthermore, local and regional agencies can incorporate investments in active transportation facilities into their capital plans.

The State of Michigan's long-range transportation plan, MM2045, includes universal standards for performance measures, equity, and accessibility that can be used by both regional bodies and local governments to assess, prioritize, and develop transportation improvements projects. To further the goals of active transportation, active transportation projects can be included in municipal transportation improvement plans (TIPs), regional TIPs prepared by MPOs, and incorporated into the Statewide Transportation Improvement Program (STIP). The Michigan Active Transportation Plan and MM2045 provide planning standards and templates that regions and local governments can follow as they develop active transportation plans. As these smaller governmental organizations are largely responsible for local implementation, providing the framework for active transportation via standards, metrics, and performance indicators help to make all regions work together to create a true multimodal transportation network. The Policies, Programs and Practices section of the active transportation plan explores challenges and options to address barriers and gaps that currently exist within Michigan's active transportation network.

### *Route Opportunities*

Active transportation planning by local agencies with the support of partners is vital for establishing a complete and active transportation network to ensure that the system expands to meet both local and regional needs. Improved active transportation network outcomes may be achieved through a variety of municipal ordinance revisions, including altering municipal engineering standards to allow for enough space for active transportation facilities to be added within the right of way, improving access management, or providing for/requiring new active transportation systems be built along with road construction. Zoning ordinance design standards may also mandate locations for building pedestrian access, building orientation, adjacent transit stop amenities, interconnection of the site's walking network with offsite active transportation routes, provision of sidewalks, bicycle facilities, and bicycle parking. Other ordinances may include requiring bicycle developers to build sidewalks or paths, or bike parking as a percentage of surface parking, etc.

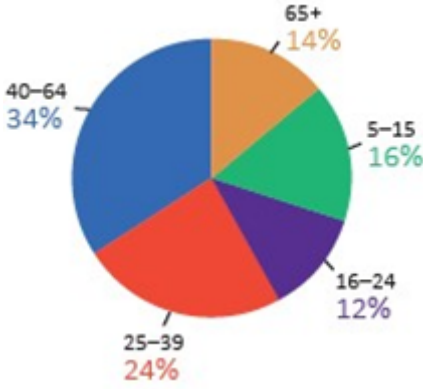
# Current Walking and Biking Overview

Over the last 15 years, there has been a dramatic shift in how people travel, with changes in both how we get around and where we go. Examining these trends is important to assessing how well we are meeting existing demand and planning for future active transportation investments and improvements.

## National Active Transportation Trends

The 2017 National Household Travel Survey (NHTS) is the most recent comprehensive examination of our national transportation habits. The 2017 NHTS found that 17 percent of Americans reported taking a walk or bike ride. The survey also reported that people between the ages of 40 and 64 are the most active, with 34 percent reporting a daily walk or bike trip. Twenty-four percent of people ages 25 to 39 reported daily riding or walking activity. Younger children between the ages of 5 and 15 reported daily walking or biking habits at a rate of 16 percent. Seniors and young adults ages 16 to 24 were the age groups least likely to report daily riding or walking habits, reporting 14 percent and 12 percent, respectively.[1] When examined for participation by gender, similar proportions of women and men reported walking or biking at least once a day.

***Figure 44.* Age of Persons Reporting Active Transportation Travel**




Source: 2017 National Household Travel Survey

The study also looked at where these trips were occurring. As expected, the proportion of active transportation trips was higher in urban and suburban areas than in rural communities or small towns, often due to the more intensive land uses, higher population densities, and presence of more active transportation facilities found in these more urbanized areas. Conversely, 23 percent of suburban respondents reported no active transportation use, compared to 16 percent of urban respondents.[2]

Active transportation activity peaks on different days and at different times than other travel modes as represented in Figure 45. The activity curve differs whether the trip is recreational/weekend or utilitarian/weekday.

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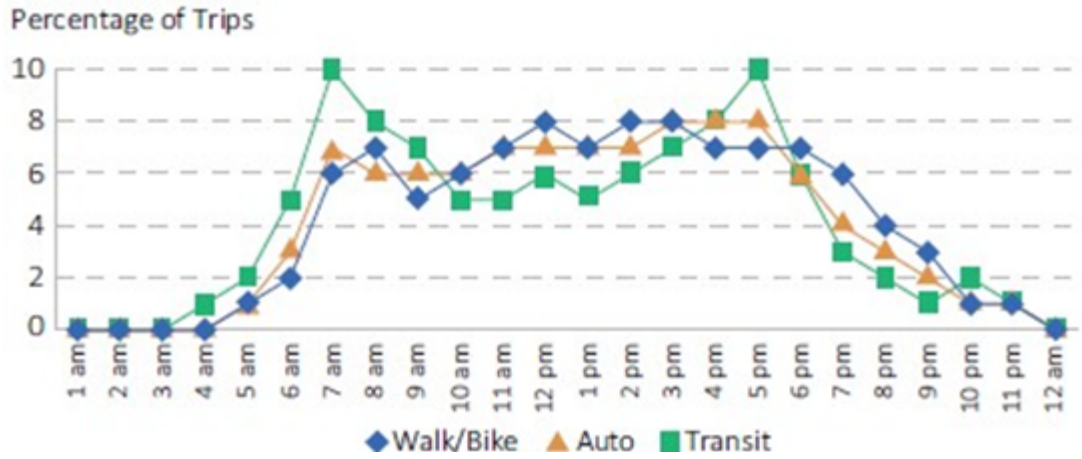
1 Federal Highway Administration, *2017 National Household Travel Survey*, U.S. Department of Transportation, Washington, D.C., 2017. Available online: http://nht.oml.gov.

2 Ibid.

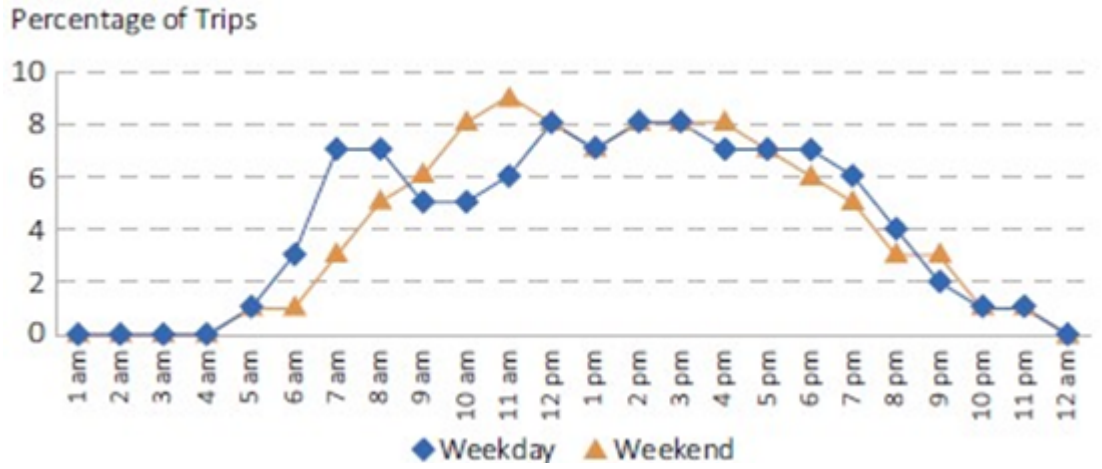
***Figure 45.* Travel Mode by Time of Day**




Source: 2017 National Household Travel Survey

Seventy-five percent of active transportation trips occur during the week, as opposed to the weekend.

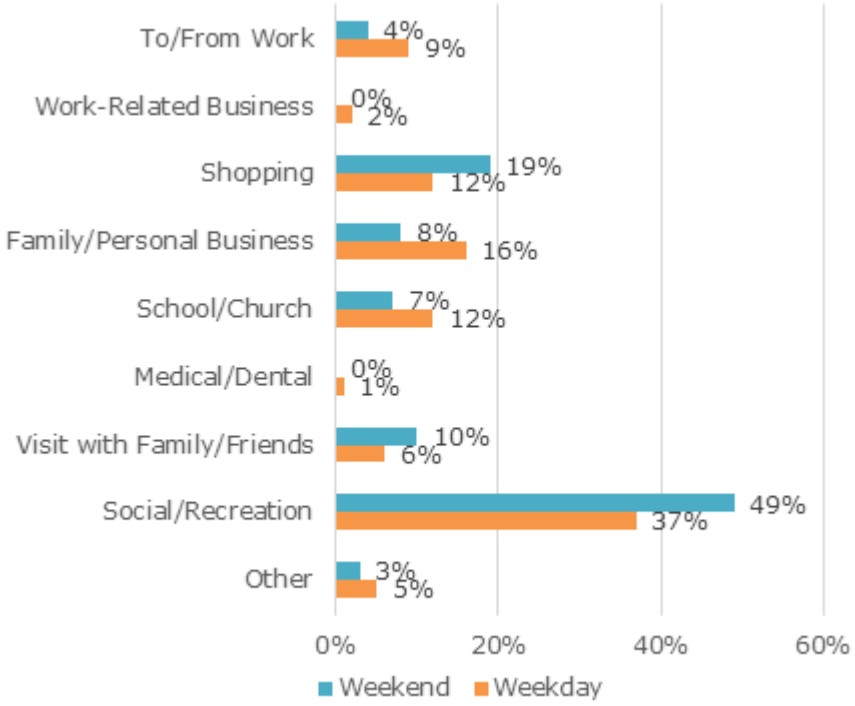
***Figure 46.* Active Transportation Trips by Time of Day and Day of Week**




Source: 2017 National Household Travel Survey

Weekday trips include social or recreational trips (37 percent), family or personal business (16 percent), school or religious services (12 percent) and shopping (12 percent). Nine percent of weekday trips are taken with the purpose of commuting to and from work. When looking at weekend trips, 49 percent are taken for social or recreational trips and 19 percent are taken for shopping. Visits with family account for 10 percent of weekend active transportation trips.

***Figure 47.* Percentage of Active Transportation Trips by Trip Purpose and Day of Week**




Source: 2017 National Household Travel Survey

As density increases, so does the percentage of active transportation trips for uses other than recreation and family visits. Urban areas have the highest proportion of active transportation use for shopping, commuting, and work-related travel.[3]

### *Geography and Commuting*

Land use and density are key determinants of active transportation mode share. As the data previously analyzed shows, active transportation trips increase in denser areas. The median commute distance for walking was one-half of a mile and just under 2 miles by bike.[4] Due to greater proximity of origins and destinations, urban populations account for the highest share of the 3.2 percent of the U.S. population walks to work and only 1.3 percent utilize bicycling as their primary commuting mode.

Understanding these trips – both the purpose and the length – is critical to developing a plan for increasing the number of active transportation trips. In general, higher proportions of younger persons, males, those with college degrees or greater, and those from higher income households walk and bike to work. Per findings published by the Carnegie Mellon University in 2019:

- Sixty percent of workers who commute by walking are under the age of 35.
- Sixty percent of bike commuters are between 25 and 45 years old.
- A large proportion (27.2 percent) of walking commuters live in households making less than $25,000 annually, which can be correlated with the high costs of car ownership.
- Both the lowest and highest income households represent larger proportions of the bike commuter population compared to the general NHTS population.
- Walking times to and from transit stations and wait times have become worse for low-income populations while high income populations have experienced improved transit travel and wait times.

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3 Federal Highway Administration, 2017 *National Household Travel Survey*, U.S. Department of Transportation, Washington, D.C.. Available online: http://nhts.ornl.gov.

4 Grahn, Rick, Stan Caldwell and Chris Hendrickson, *Recommended Policies for the 21st Century Trends in US Mobility*, Wilton E. Scott Institute for Energy Innovation Carnegie Mellon University, Traffic 21, and Mobility 21. Carnegie Mellon University, 2019.

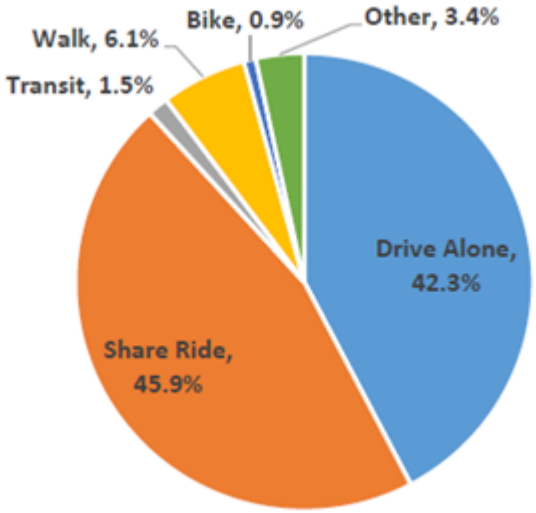
- Greater than 40 percent of bike commuters have graduate degrees.
- The male-to-female bike commuter ratio is almost 3-to-1.
- Black workers are underrepresented among bike commuters. The Black population makes up approximately 13 percent of the NHTS general population; however, only 3.8 percent of the reported bike commuter population is Black.[5]

Minority and low-income populations are not well-represented in these current active transportation user populations and may benefit from improvements in active transportation facilities. Transportation equity is further discussed in Section 4.6.

## Michigan Active Transportation Trends

The 2015 Michigan Travel Counts Household Travel Survey (MTC III) reported that walking accounted for 6.1 percent of all weekday trips in Michigan, while biking accounted for less than 1 percent (0.9 percent) of all weekday trips, as shown in Figure 48. All three Michigan Travel Counts Household Surveys found that the walk and bike to work shares remained nearly the same at 4.5 percent in the earlier two studies (MI Travel Counts 2004-05 and MTC II in 2009) and found 4.6 percent share in 2015. The study found that approximately 20 percent of walking and 25 percent of biking trips occurred for exercise and recreation.

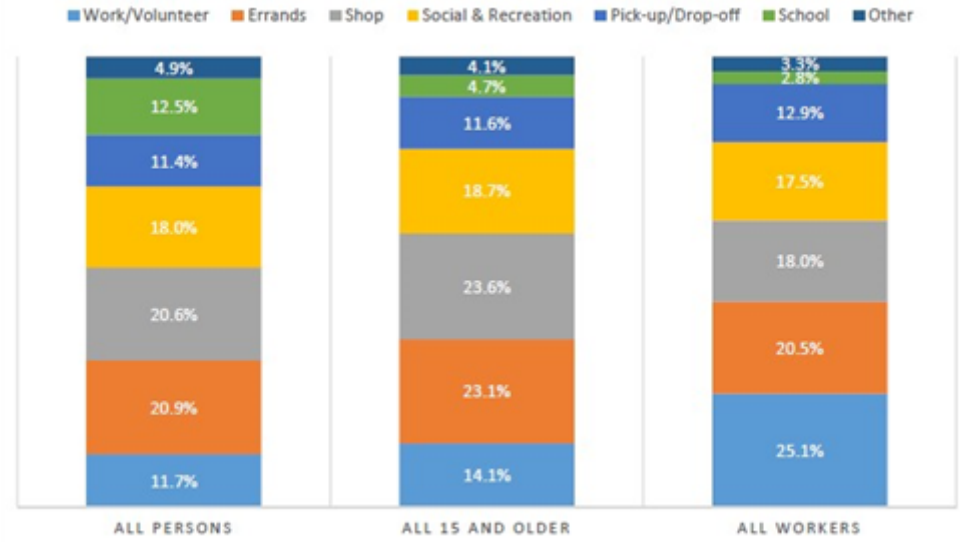
***Figure 48.* Means of Travel by All People for All Trip Purposes – Weekday**




Source: 2015 Michigan Travel Counts Household Survey

5 Ibid.

***Figure 49.* Distribution of Weekday Trips by Purpose – By Three Groups**

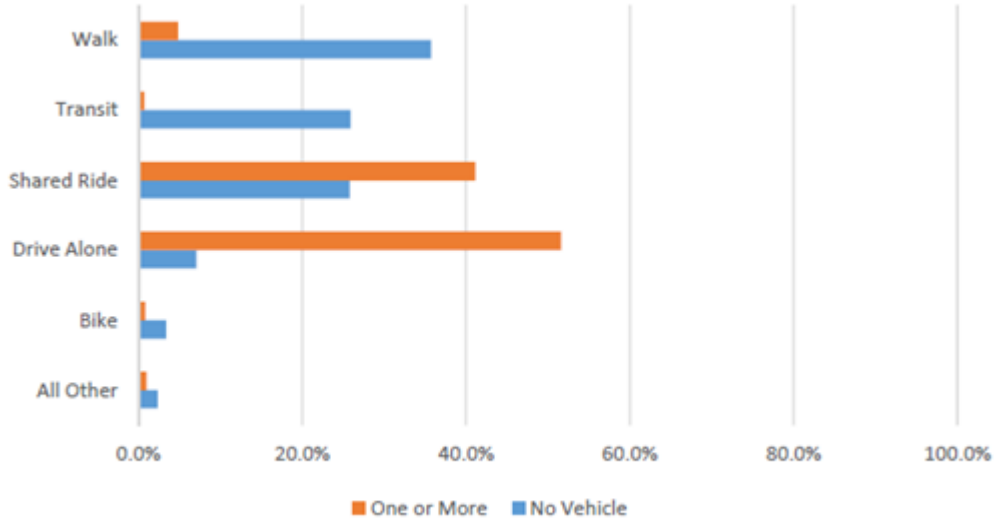



Source: 2015 Michigan Travel Counts Household Survey

## Pedestrian and Bike Use Survey Findings

According to the MTC III Survey, travelers with no vehicle in the household are more likely to take walking (35.7 percent) and biking (3.3 percent) trips than those with one or more vehicle, as shown in Figure 50.

***Figure 50.* Comparison of Means of Travel by People in Households by Whether a Vehicle is Available (ages 15 years and older)**



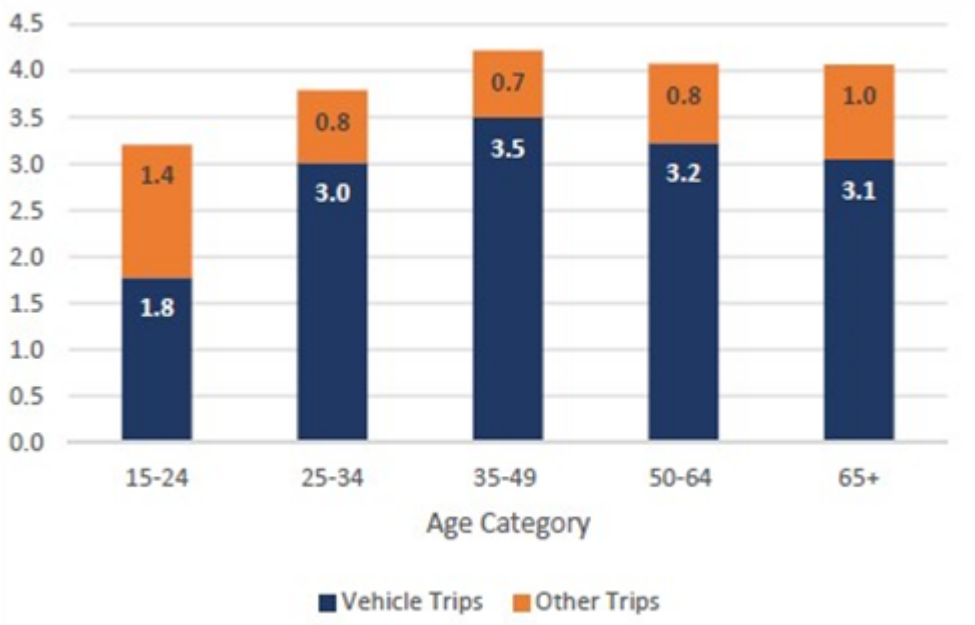

Source: 2015 Michigan Travel Counts Household Survey

### *Pedestrian and Bike Use by Age Group*

Transportation choices vary by age group. Choices depend upon access to various transportation modes, permission to travel (youth may not be permitted to travel to destinations without supervision), and ability to utilize transportation options.

Number of trips and mode of travel change significantly with age. The highest average number of trips is for the age group 35-49 years, which coincides with prime child-rearing and working years. Figure 51 illustrates higher rates of "Other Trips," which includes both trips in vehicles as passengers and active transportation trips. The highest rates of Other Trips are found in the 15-24 years and 65+ years categories.

***Figure 51.* Weekday Trip Rates by Age**

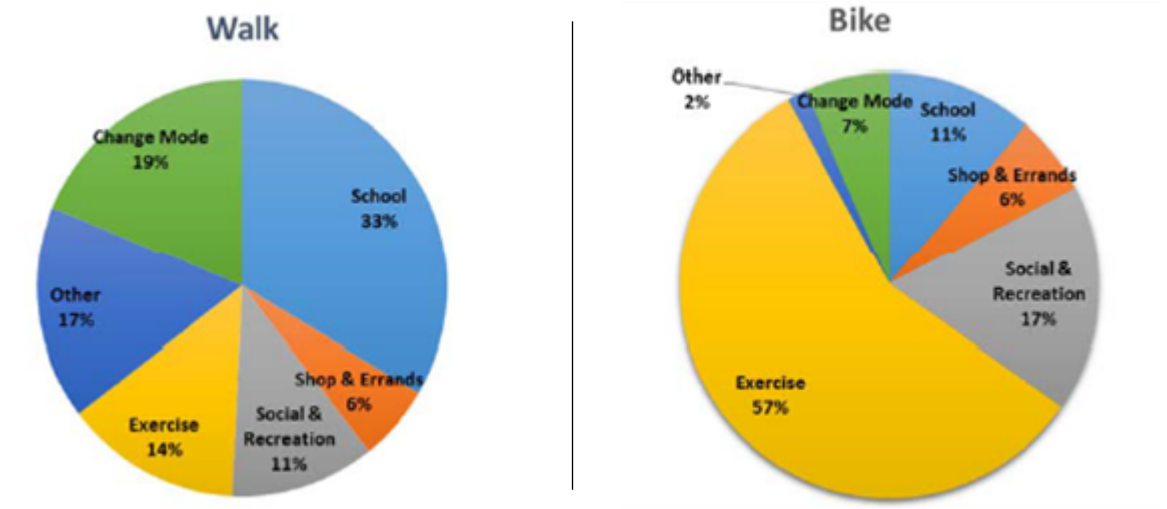



Source: 2015 Michigan Travel Counts Household Survey

It is necessary to recognize pedestrian and bicycle travel by older persons and children, as they are less likely to drive and thus more likely to need safe, alternate accommodations for their daily travel.

Figure 52 indicates that for children under the age of 14 years, bikes are used primarily for exercise (57 percent) and walking trips are mostly for school (33 percent) and to change between other modes of transportation (19 percent) during weekday travel. Data is not available to break down how much children walk and bike as a percentage of their total mobility; however, only one in three children are physically active every day, according to the U.S. Department of Health and Human Services.

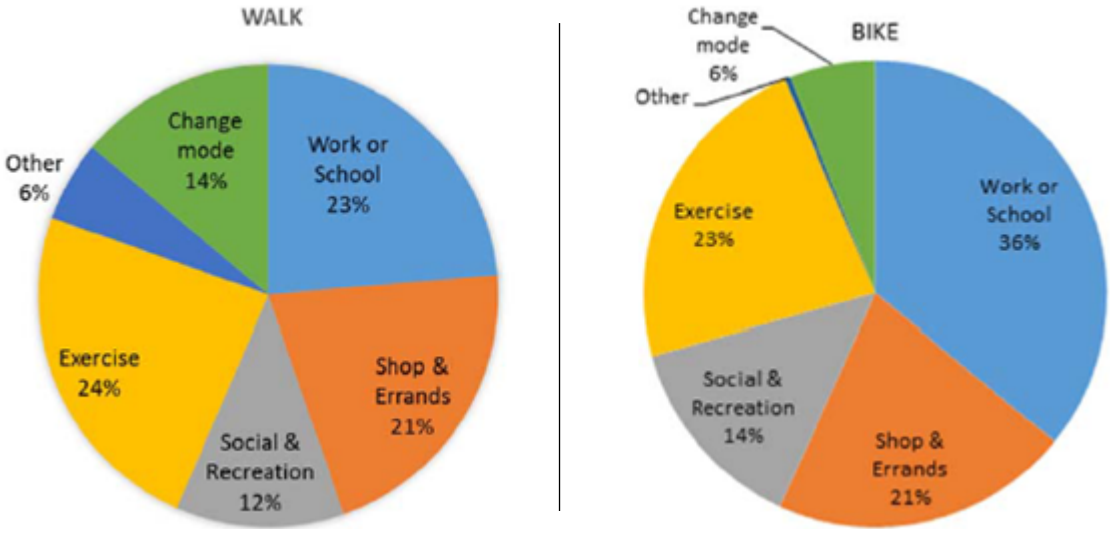
***Figure 52. Purpose of Weekday Walking and Biking Trips – Children Ages 14 Years and Younger***




Source: 2015 Michigan Travel Counts Household Survey

Walk and bike trips by people aged 15 years and older shows a similar distribution of trips for the use of work or school, shopping and errands, and exercising. Figure 53 represents weekday trips for walking and biking, sorted by trip purpose.

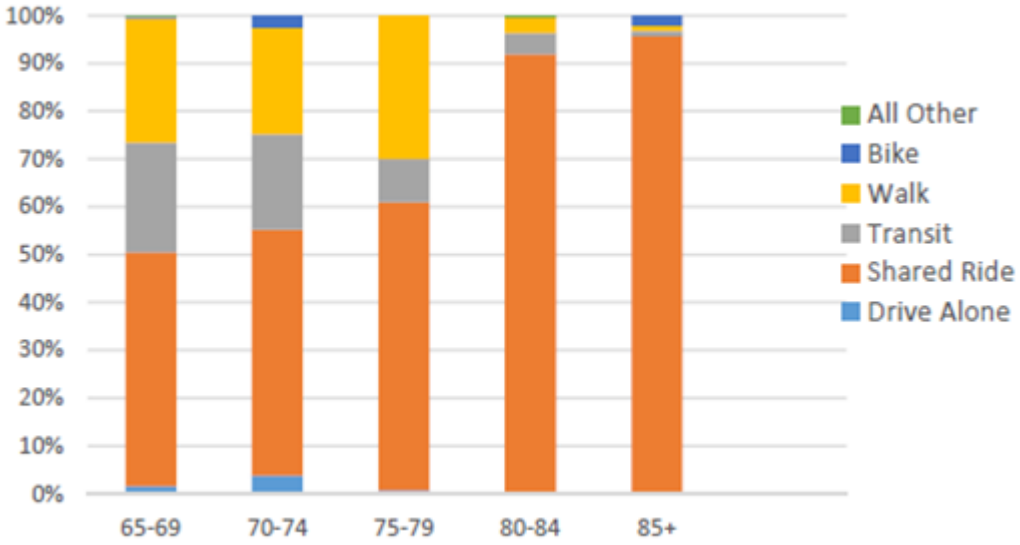
***Figure 53. Purpose of Weekday Walking and Biking Trips – People Ages 15 Years and Older***




Source: 2015 Michigan Travel Counts Household Survey

Approximately 6.3 percent of all seniors over 65 years are not licensed to drive. Figure 54 indicates that older, non-licensed travelers use walking as a means of travel more than biking. The decrease in walking after age 80 is most likely due to mobility limitations. Mobility aids such as motorized wheelchairs are not defined in the data and may or may not be included in the figure.

***Figure 54. Means of Travel for Older, Non-Licensed Travelers***




Source: 2015 Michigan Travel Counts Household Survey

### *Pedestrian and Bike Trips – Journey to Work*

Comparing 2010 census data with the MTC III report shows an increase in walking and biking means of travel to work by 1.8 percent. The census question asked for the "usual means of commute last week," while the MTC III survey asked about both an assigned day and usual means. The day-to-day variation is under-studied and may not reflect an accurate trend because of the difference in data collection. Figure 55 indicates that while most survey respondents reported their assigned day means of travel was the same as their usual means, there is deviation.

***Figure 55. Usual Versus Actual Means of Travel for Commuting***

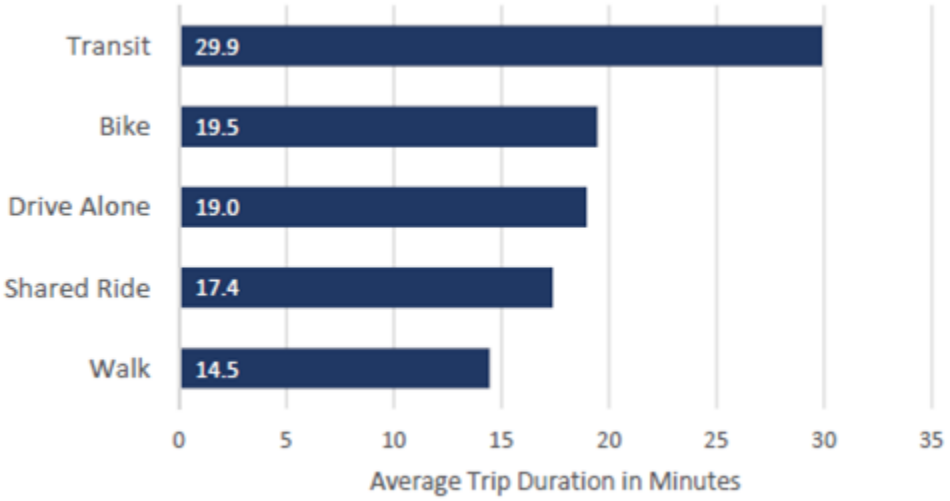
| *Usual Commute:* ↓ | *On Travel Day Commuted by:* | | | | |
|---|---|---|---|---|---|
| | Vehicle Driver | Vehicle Passenger | Public Transit | Walk | Bike |
| Vehicle Driver | 94.8% | 2.7% | 0.2% | 1.9% | 0.1% |
| Vehicle Passenger (Carpool) | 38.0% | 56.4% | 0.3% | 5.0% | 0.1% |
| Public transit | 14.9% | 15.0% | 37.5% | 27.3% | 4.7% |
| Walk | 28.0% | 7.0% | 0.8% | 60.2% | 3.8% |
| Bike | 24.9% | 13.8% | 0.5% | 9.4% | 51.1% |

Source: 2015 Michigan Travel Counts Household Survey

### *Trip Duration*

Average trip duration for all trip purposes is represented in Figure 56 by means of travel. Walking trips have the shortest average duration of 14.5 minutes, while biking trips have the second longest duration, at 19.5 minutes. According to the 2015 SEMCOG Household Travel Survey, the average length of a walking trip was 0.5 miles and a bike trip was 2 miles, while 98 percent of trips were less than 2 miles in length for walking and 10 miles in length for biking. In comparison, 5 percent of all driving trips were less than 0.5 miles, 27 percent were less than 2 miles, and 78 percent less than 10 miles.

**Figure 56. Average Trip Duration (Minutes) by Means of Travel – All Purposes**




Source: 2015 Michigan Travel Counts Household Survey

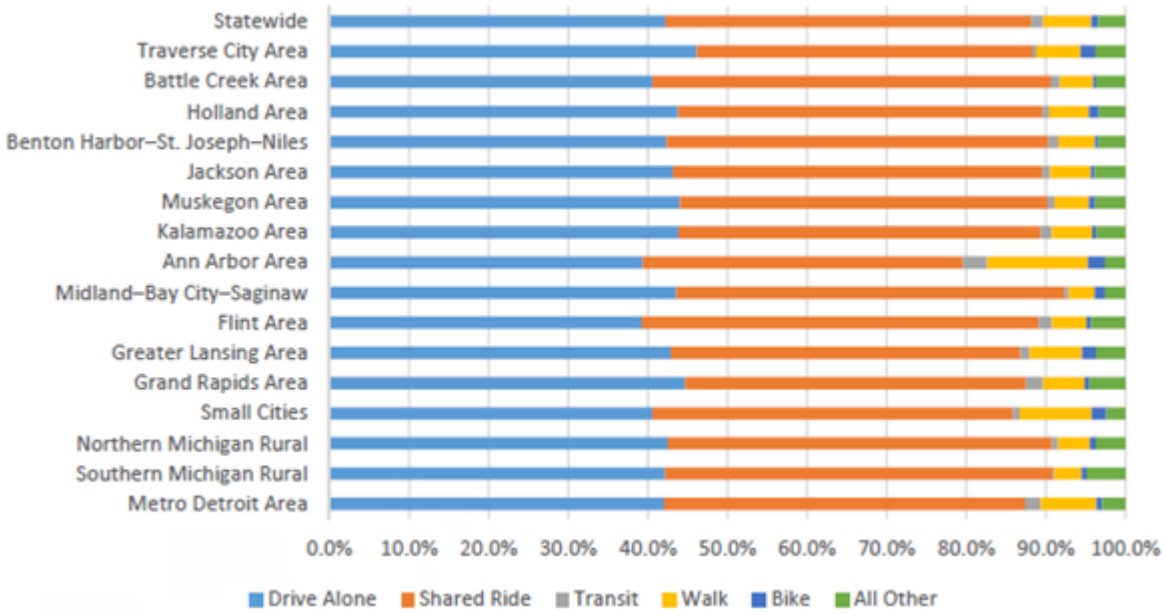
### *Means of Travel by Region*

Figure 57 depicts a comparison of means of travel statewide broken down by various areas within Michigan. The data indicates that generally, throughout the state, the means of travel consistently follows:

- Shared ride – approximately 50 percent,
- Drive alone – approximately 40 percent,
- Walking – approximately 5 percent, and
- Biking – approximately 1 percent.

There is little deviation of significance in the walking and biking trips between the various regions of the study. However, one anomaly that stands out is the Ann Arbor area, which reveals a notably larger portion of weekday trips made via walking. This may be attributed to the density of land uses in Ann Arbor combined with an extensive infrastructure of sidewalks, crosswalks, bike paths, and local transit.

***Figure 57.* Proportion of Weekday Trips by Means of Travel by Region**




Source: 2015 Michigan Travel Counts Household Survey

# Crash Analysis and Public Health

## Crash Analysis

Safety is a vital concern for every mode of travel, but perhaps most serious for pedestrians and bicyclists as they represent the most vulnerable users of the transportation systems. Active transportation users are the most at-risk in crash situations, as their bodies and modes of transportation are not crashworthy. At faster speeds, pedestrians and bicyclists are more severely injured than they would be in vehicle-to-vehicle collisions. Over the last seven years, pedestrians and bicyclists were involved in less than 1.5 percent of the crashes in the state, while disproportionately accounting for nearly 20 percent of fatalities. According to the Michigan Highway Safety Improvement Program Implementation Plan, nearly two in three fatal and serious injury crashes in Michigan occur in an urban area. When accounting for vehicle miles traveled, rural areas remain less safe than urban areas. Every year in Michigan, thousands of preventable crashes occur involving motorists and pedestrians or bicyclists, and the state is faced with hundreds of fatalities each year because of these crashes. In the past, crashes involving injuries and deaths were considered an inevitable byproduct of motorized transportation. However, the reality that we know now is that preventive measures can be taken to prioritize traffic safety as a public health concern.

Between 2013 and 2019, there was an average of 2,261 pedestrian-related crashes (an average of 158 pedestrian-related fatalities) and an average of 1,740 bicycle-related crashes (an average of 27 bicycle-related fatalities) every year throughout the state of Michigan. On average, 7 percent of pedestrian-related crashes and 1.5 percent of bicycle-related crashes resulted in fatalities, compared to an average of 0.3 percent of motorist-only crashes resulting in fatalities for the same seven years. It is important to note that the crash numbers cited only represent reported crashes and therefore do not represent all the pedestrian and bicycle crashes in Michigan. Many minor crashes, which do not involve an injury or $1,000 property damage, are not reported, and crashes between pedestrians and bicycles not involving a motor vehicle are not included in this dataset.

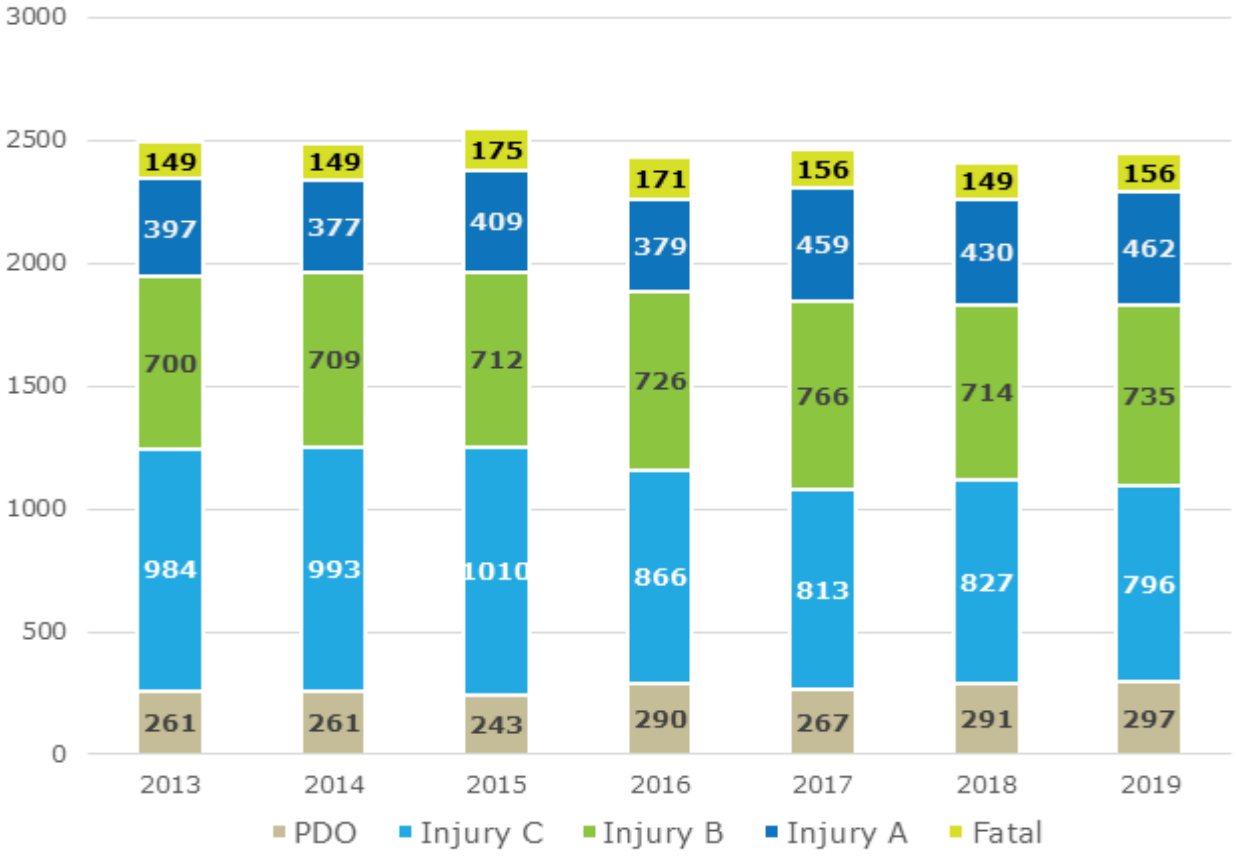
### *Pedestrian Crash Analysis*

Shown in Figure 58 are the pedestrian-related crashes by severity type and year, and in Figure 59, frequencies and the seven-year rolling average for 2013 through 2019. A total of 15,825 crashes involving pedestrians occurred during this seven-year period, representing an average of 2,261 pedestrian-related crashes per year and an average of 158 pedestrian-related fatalities per year.

- Most crashes involving pedestrians resulted in a possible injury (Category Injury C), comprising an average of 39.7 percent of pedestrian-related crashes, annually.
- Non-incapacitating injuries (Category Injury B) were found in 32 percent of the pedestrian-related crashes and incapacitating injuries (Category Injury A) were found in 18.4 percent of pedestrian-related crashes.
- Only 12.1 percent of pedestrian-related crashes resulted in property damage only (PDO) to vehicles with no injury to pedestrians.
- The pedestrian-related frequency of fatalities shows a reduction between 2017 and 2019 compared to 2015 and 2016; however, the rolling average does not indicate a significant downward trend.

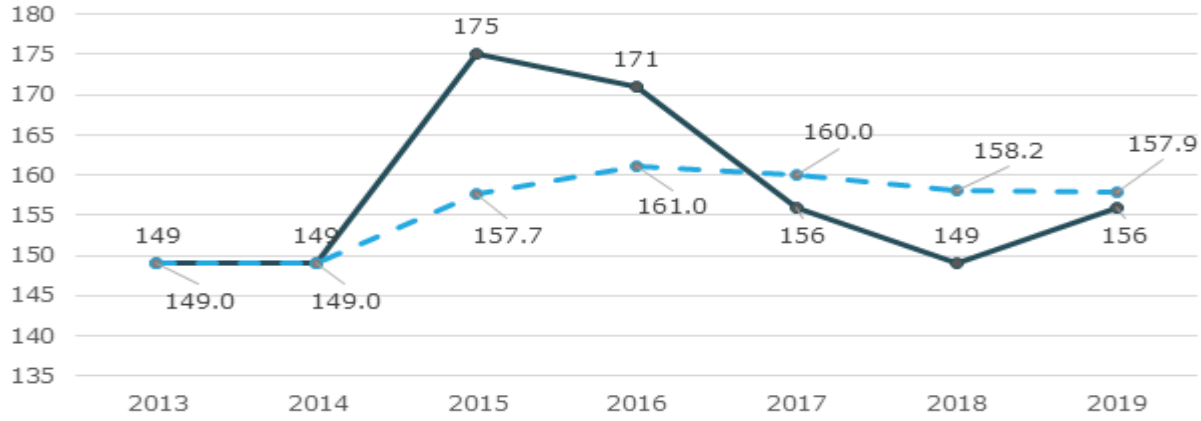
A 10.9 percent decrease is found in pedestrian-related fatal crashes from the high of 175 fatal crashes reported in 2015 to 156 reported in 2019. While there was an increase in Injury A and Injury B categories, there was a 21.2 percent decrease in Injury C in pedestrian-related crashes.

***Figure 58.* Pedestrian-Related Crashed by Severity Type – 2013 to 2019**




Source: Michigan Transportation Crash Analysis Tool, 2013 – 2019

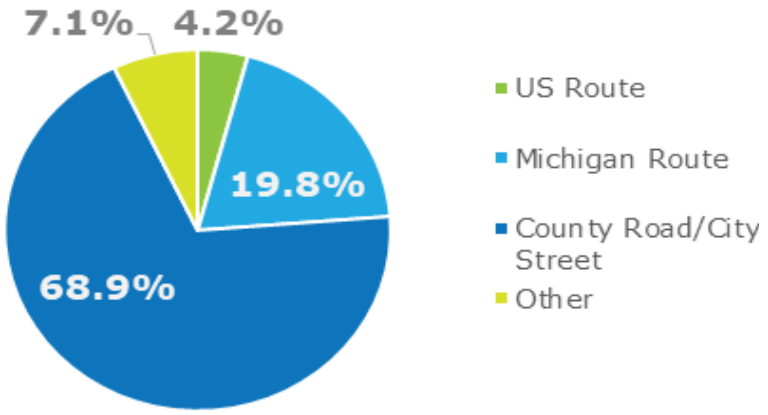
***Figure 59. Fatal Pedestrian Crash by Year and Rolling Average – 2013 to 2019***




Source: Michigan Transportation Crash Analysis Tool, 2013 – 2019

As shown in Figure 60, most pedestrian-related crashes (68.9 percent) that were reported, occurred on county or city roadways. Michigan (M) routes accounted for the next highest percentage of crashes (19.8 percent), while 4.2 percent of pedestrian crashes occurred on US routes. The remaining 7.1 percent of pedestrian crashes occurred on "Other" routes, which includes interstates, interstate business routes, US business routes, M business routes, connectors, and unknown routes.

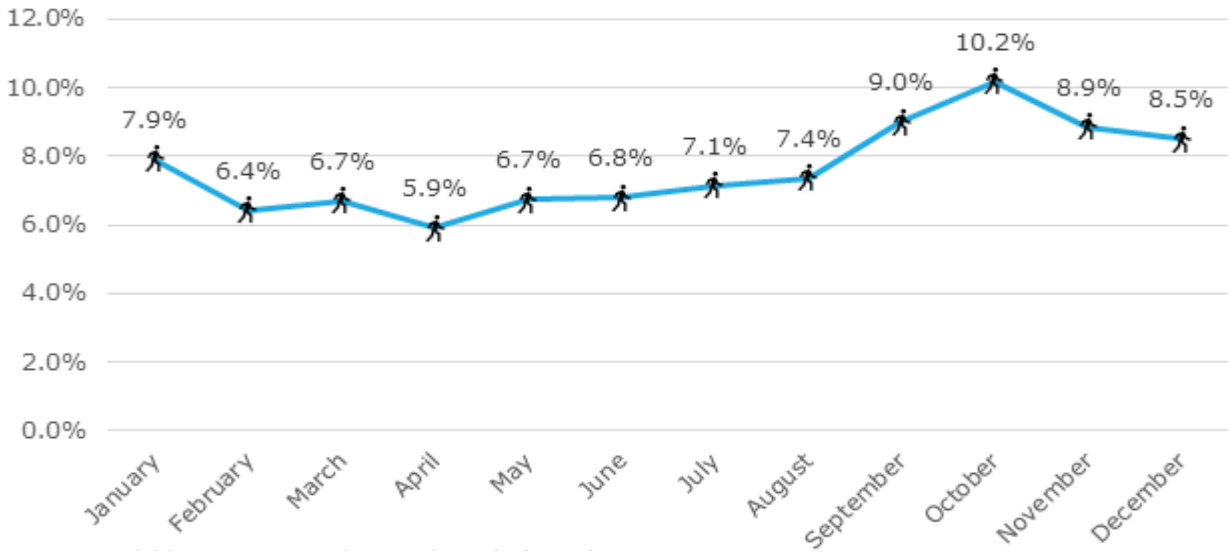
***Figure 60. Pedestrian Crash Locations by Road Type***




Source Michigan Transportation Crash Analysis Tool, 2013 – 2019

Shown in Figure 61 is a plot of average percent of pedestrian-related crashes by month for 2013 through 2019. The fall and winter months experienced the highest percentage of pedestrian-related crashes. While bicycling is a mode of transportation used primarily in the warmer months, walking is a mode of transportation that has higher participation year-round. According to Strava Metro Dashboard, walking activity is only slightly reduced during the winter months compared to bicycling, which is significantly less. Reduced daylight hours during fall and winter months may be a contributing factor to pedestrian crashes at these times, when it may be more difficult, and pedestrians may become wary to go outside and walk in the elements. Another contributing factor may be attributed to inclement weather during these months in Michigan. With not only increased precipitation and lower temperatures potentially decreasing the desire and/or ability to walk, difficulty for walking during the winter is compounded with lack of maintenance of sidewalks and snow blocking the sidewalks and curb ramps. During these winter situations, pedestrian safety is a concern, with pedestrians often having to choose between walking on snowy or icy sidewalks where they could slip and fall or walking in the roadway vehicle lanes that sometimes are the only travel space clear of snow.

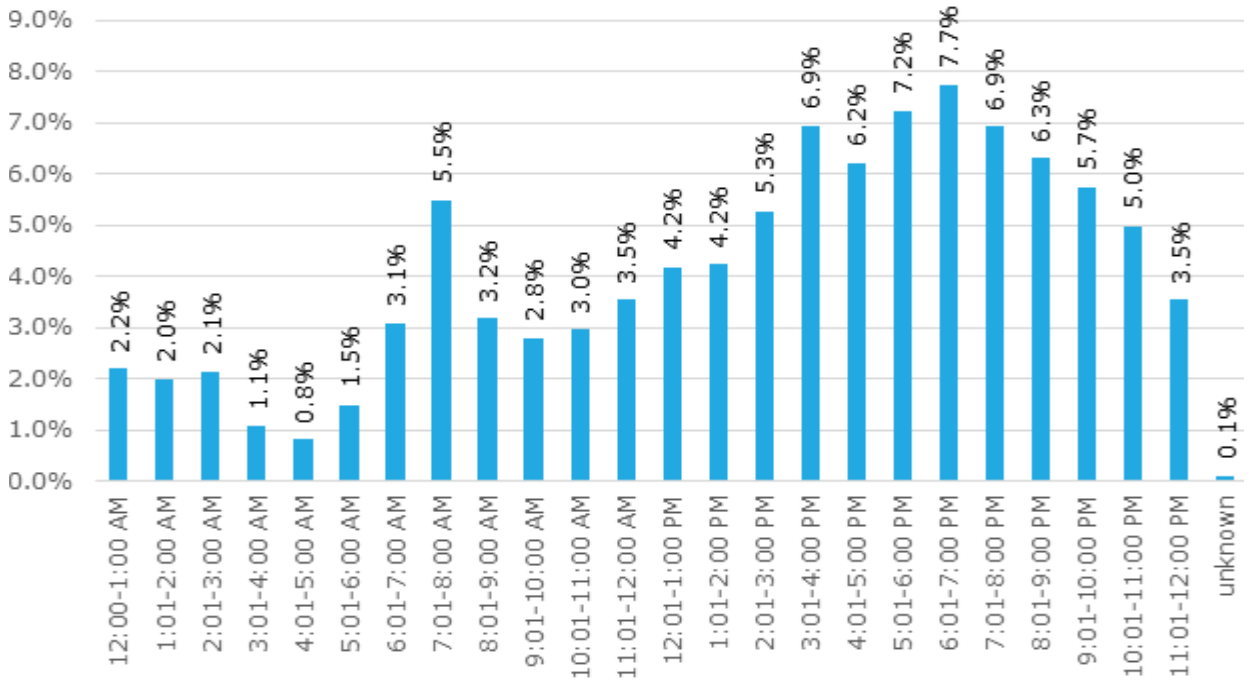
***Figure 61.* Percent of Pedestrian Crashes by Month – Average from 2013 to 2019**




Source: Michigan Transportation Crash Analysis Tool, 2013 – 2019

Shown in Figure 62 is the percent of pedestrian crashes by time of day. More than 40 percent of pedestrian-related crashes occurred between the hours of 2 and 8 p.m., on average, over all months of the year, with the highest percentage between 6 and 7 p.m. (7.7 percent). A smaller spike also occurred in the morning between 7 and 8 a.m., with 5.5 percent of pedestrian-related crashes. The times of day with the peaks in pedestrian crashes are generally the times when vehicular traffic is also the heaviest. Most pedestrian crashes occurred during daylight (51.9 percent) or in dark but lighted settings (27 percent); however, 15.5 percent of pedestrian crashes occurred in dark settings without lighting and 5.5 percent occurred in other/unknown lighting conditions.

*Figure 62.* **Percent of Pedestrian Crashes by Time of Day – Average from 2013 to 2019**



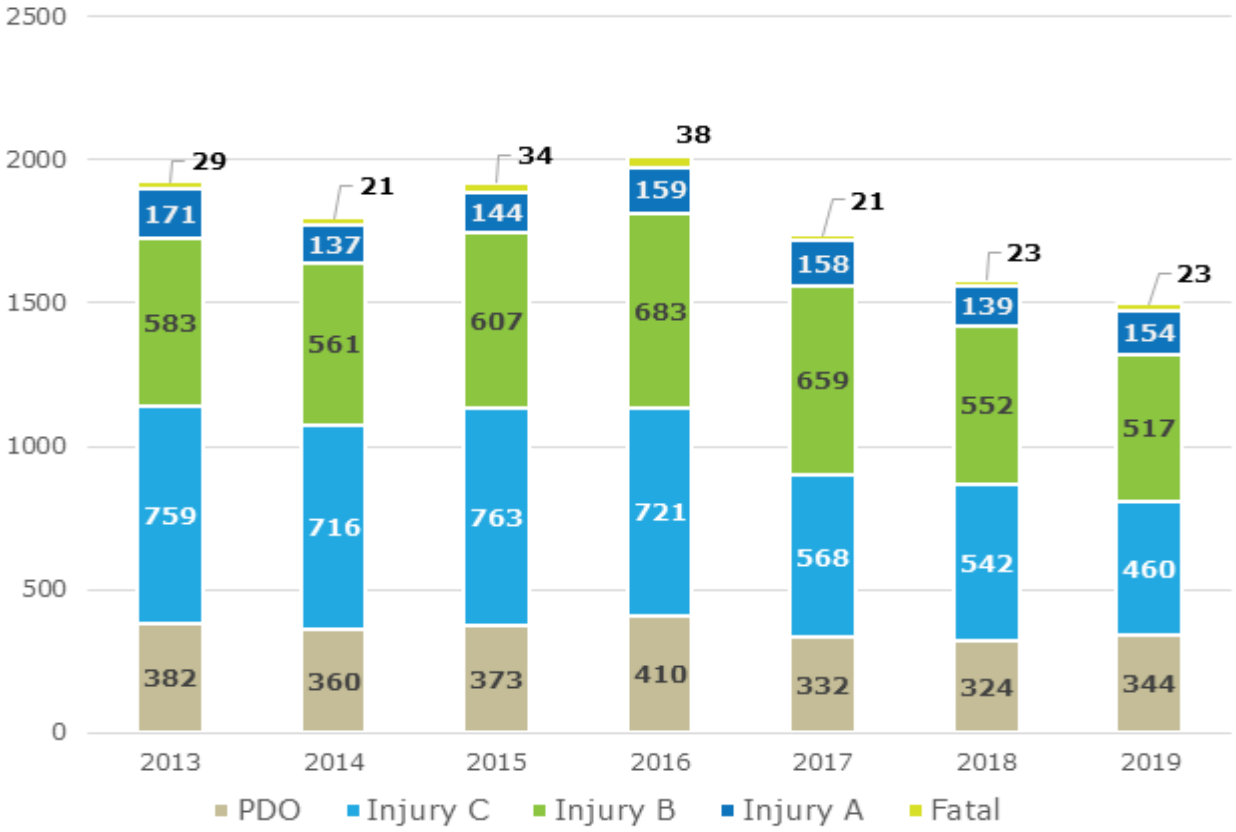

Source: Michigan Transportation Crash Analysis Tool, 2013 – 2019

### *Bicycle Crash Analysis*

Shown in Figure 63 are the bicycle-related crashes by severity type and year, and in Figure 64 are the frequencies and seven-year rolling average for 2013 through 2019. Over this period, there were a total of 12,186 crashes involving bicyclists. The highest number of crashes occurred in 2016; however, the remaining years (2017-2019) experienced a 14.5 percent overall reduction in bicycle crashes compared to years 2013-2015. Of the 12,186 crashes, 189 (1.6 percent) resulted in fatalities and, on average, 27 bicycle-related fatal crashes occurred each year. For the same seven-year period, only 0.3 percent of motorist-only crashes resulted in a fatality.

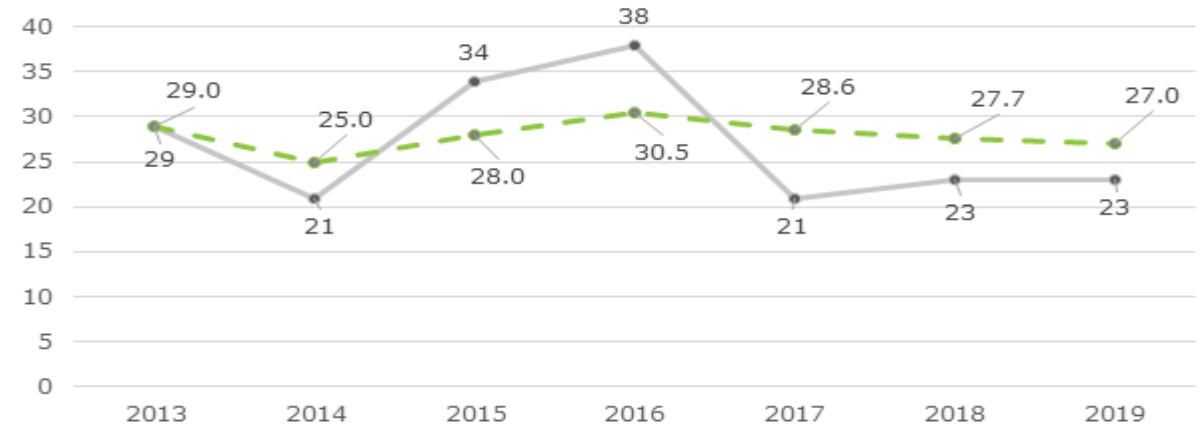
- Most crashes involving bicyclists involved possible injuries (Category Injury C), which comprises an average of 36.9 percent of the bicycle-related crashes, annually.
- Non-incapacitating injuries (Category Injury B) occurred in 34.3 percent of bicycle-related crashes, and incapacitating injuries (Category Injury A) occurred in 8.8 percent of bicycle-related crashes.
- Of bicycle-related crashes, 20.8 percent resulted in PDO with no injury to the cyclist.
- The bicycle-related frequency of fatalities shows a reduction between 2017 and 2019 compared to 2015 and 2016; however, the rolling average does not indicate a significant downward trend.

*Figure 63. Bicycle Crash Injuries by Severity – 2013 to 2019*




Source: Michigan Transportation Crash Analysis Tool, 2013 – 2019

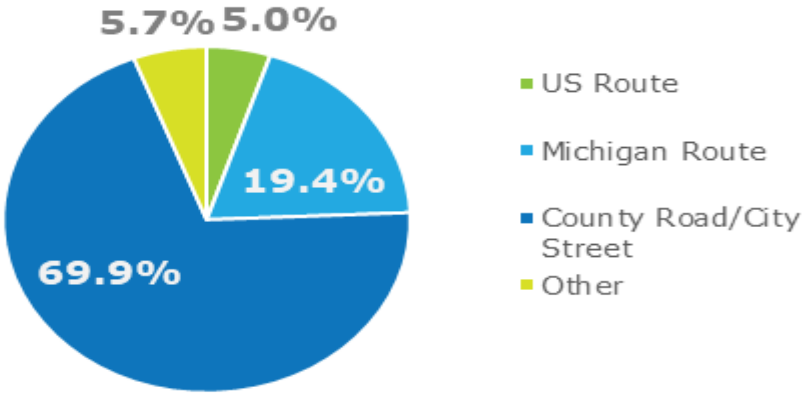
*Figure 64. Fatal Bicycle Crashes by Year and Rolling Average – 2013 to 2019*




Source: Michigan Transportation Crash Analysis Tool, 2013 – 2019

Figure 65 presents a percent chart of bicycle-related crashes by road type for the years 2013 through 2019. As with pedestrian-involved crashes, most of the bicycle-related crashes (69.9 percent) occurred on county or city roadways. M routes accounted for the next highest percentage of crashes (19.4 percent) and 5 percent of bicycle crashes occurred on US routes. The remaining 5.7 percent of bicycle crashes occurred on Other routes, which includes interstates, interstate business routes, US business routes, M business routes, connectors, and unknown routes.

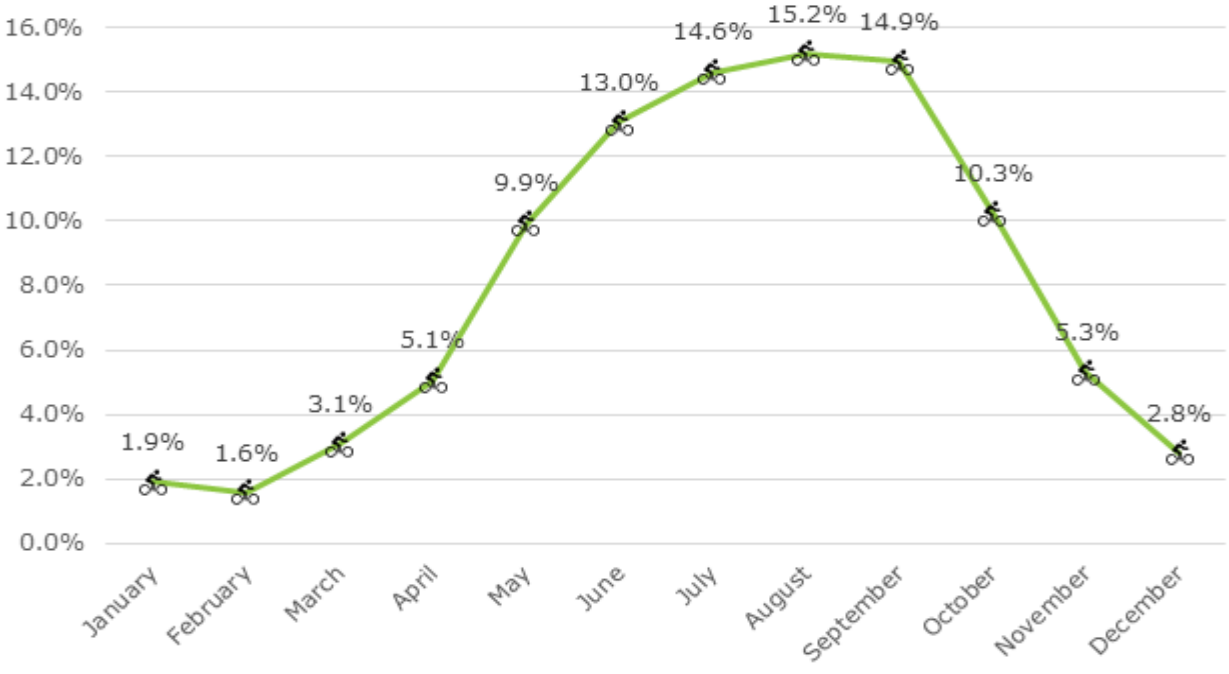
***Figure 65. Bicycle Crash Locations by Road Type – 2013 to 2019***




Source: Michigan Transportation Crash Analysis Tool, 2013 – 2019

Shown in Figure 66 are the percent of bicycle-related crashes by month. More than one-half of all bicycle-related crashes (52.7 percent) occurred during the summer months, between May and August. Although there are year-round cyclists, the winter months typically experience less bicycling activity in Michigan, according to Strava Metro Dashboard and permanent nonmotorized automated counters throughout the state, which is reflected in the lower number of crashes reported during the winter months.

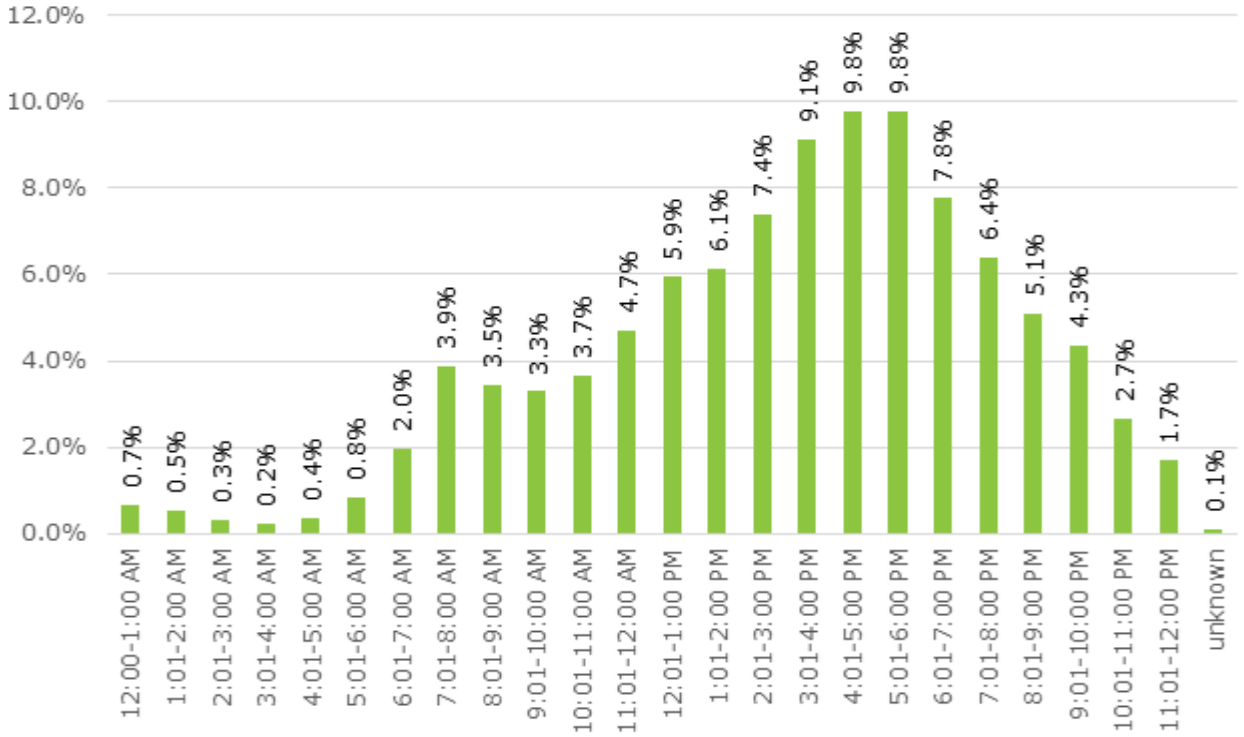
***Figure 66. Percent of Bicycle Crashes by Month – Average from 2013 to 2019***




Source: Michigan Transportation Crash Analysis Tool, 2013 – 201

As shown in Figure 67, more than 50 percent occurred between the hours of 2 and 8 p.m., on average, over all months of the year, with nearly 20 percent of all bicycle-related crashes occurring between the hours of 4 and 6 p.m. A smaller spike also occurred in the morning between 7 and 8 a.m., with 3.9 percent of bicycle-related crashes. The times of day with the peaks in bicycle crashes are generally the times when vehicular traffic is also the heaviest. Most bicycle crashes occurred during daylight (77 percent) or in dark but lighted settings (12.4 percent); however, 5.1 percent of bicycle crashes occurred in dark settings without lighting and 5.5 percent occurred in other/unknown lighting conditions.

***Figure 67.* Percent of Bicycle Crashes by Time of Day – Average from 2013 to 2019**




Source: Michigan Transportation Crash Analysis Tool, 2013 – 2019

## Public Health Trends

### *Obesity*

The United States is amid an obesity epidemic. The 2019 State of Obesity Report, which used data from 2015 through 2016 (the most recent available data), states that the national adult obesity rate was 39.6 percent, and the national child obesity rate was 18.5 percent. These figures represent a 70 percent increase in adult obesity over the last 30 years and an 85 percent increase in children.

The State of Obesity report also found that obesity levels are linked to socioeconomic conditions, with lower income individuals at a higher risk of obesity: "People of color, who are more likely to live in neighborhoods with few options for healthy foods and physical activity." From 2015 to 2016, nationwide obesity rates for Latino/a/x adults were 47 percent and Black adults were 46.8 percent, compared with 37.9 percent for White adults and 12.7 percent for Asian adults. These are comparable to the childhood obesity rates of 25.8 percent for Latino/a/x children, 22 percent of Black children, 14 percent for White children, and 11 percent of Asian children.[6]

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6 Warren, Molly et al "The State of Obesity: Better Policies for a Healthier America with Special Feature on Racial and Ethnic Disparities in Obesity and Advancing Health Equity". Trust for America's Health. 2019. www.TFAH.org.

### *Impacts of Obesity*

Obesity broadly impacts public health. Obese adults compared with adults at a healthy weight are more likely to have a decreased quality of life with an increased risk of developing serious health conditions including:

- Hypertension,
- Type 2 diabetes,
- Heart disease and stroke,
- Sleep apnea and breathing problems,
- Some cancers, and
- Mental illness, such as depression and anxiety.[7]

Nationwide, the economic impact of obesity on healthcare spending is estimated at $149 billion annually. The United Health Foundation has reviewed studies on the costs associated with obesity and obesity-related health problems. "One study estimated the medical costs of obesity to be $342.2 billion (in 2013 dollars). Beyond direct medical costs, the indirect costs of decreased productivity tied to obesity are estimated at $8.65 billion per year."[8] The Michigan Department of Health and Human Services (MDHHS) estimated healthcare expenditures related to obesity quadrupled in 10 years, going from $3.1 billion in 2008 to a projected $12.5 billion in 2018.[9]

Obesity and obesity-related costs accounted for 9.5 percent of total healthcare spending in Michigan in 2015.[10]

### *Obesity: Michigan*

Michigan's public health outcome ranking generally lies within the lower half of all states. According to the Trust for America's Health, Michigan's obesity rate ranks higher than the U.S. median adult obesity rate (30.9 percent), and subsequently both diabetes and hypertension rates fall within the high range. In 2018, the most recent year for which data is available, Michigan faced an adult obesity rate of 33 percent, which is the 19th highest in the country. Also, 18.9 percent of youth ages 10 to 17 years old are obese, setting Michigan at a ranking of 5 out of 51 for this age group, among all states and the District of Columbia.

Michigan's adult obesity rate has been greater than 30 percent since 2012, which is more than double the 14.1 percent obesity rate occurring in 1990. Behaviors and illnesses that are linked with obesity are also negative public health factors within the state. A rate of 23.8 percent of adults reported no physical activity within the previous month outside of their job in 2018 (25th ranking). It is well documented that obesity and physical inactivity are linked to negative health outcomes as well.[11] In 2018, Michigan ranked as the 9th highest state in cardiovascular deaths (300.7 per 100,000 residents) and the adult diabetes rate of 11.7 percent ranked as the 18th highest in the nation. In 2019, rates of diabetes and obesity increased 6 percent and 2 percent, respectively.[12]

The 2017 Behavioral Risk Factor Survey: Health Risk Behaviors within the State of Michigan found an estimated 32.4 percent of Michigan adults were classified as being obese (BMI ≥ 30). In 2014, the disparity in obesity had diminished with the prevalence of obesity among Black, non-Hispanic adults (33.6 percent) being similar to that of White, non-Hispanic adults (30.2 percent). The racial disparity had reemerged in 2015, and continued into 2017 with 41.2 percent of Black, non-Hispanic adults reporting obesity compared to only 31 percent of White, non-Hispanic adults.[13]

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7 United Health Foundation. *America's Health Rankings analysis of CDC, Behavioral Risk Factor Surveillance System*. www.AmericasHealthRankings.org.

8 Biener, Adam, et al. "*The High and Rising Costs of Obesity to the US Health Care System*." Journal of General Internal Medicine, vol. 32, no. S1, Apr. 2017, pp. 6–8. doi:10.1007/s11606-016-3968-8.

9 Michigan Call to Action to Reduce and Prevent Obesity Summit, https://www.Michigan.gov/Documents/MDCH/Obesity_BG_363659_7.pdf.

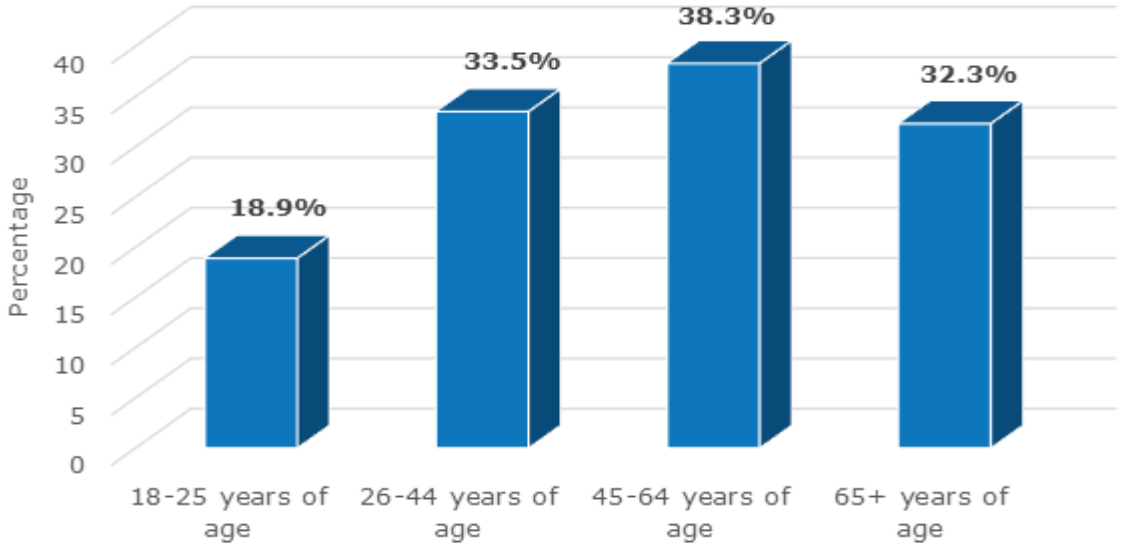
10 Biener, Adam, John Cawley, Chad Meyerhoefer. *The Impact of Obesity on Medical Care Costs and Labor Market Outcomes in the US*. Clinical Chemistry, 2018; 64 (1): 108 DOI: 10.1373/clinchem.2017.272450.

11 Centers for Disease Control, *The Health Effects of Overweight and Obesity*, https://www.cdc.gov/healthyweight/effects/index.html.

12 America's Health Rankings, https://www.americashealthrankings.org/explore/annual/measure/CVDDeaths/state/MI

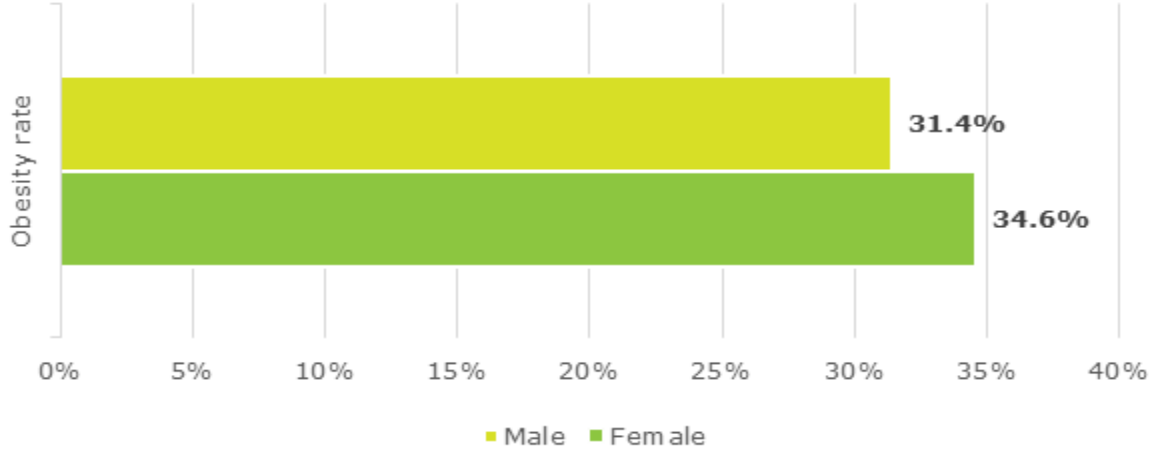
13 Murad, A, S Daniel-Wayman, Health Risk Behaviors within the State of Michigan: 2017 Behavioral Risk Factor Survey, 31st Annual Report. Lansing, MI: Michigan Department of Health and Human Services, Lifecourse Epidemiology and Genomics Division, 2019.

*Figure 68.* **Adult Obesity Rates – 2018**



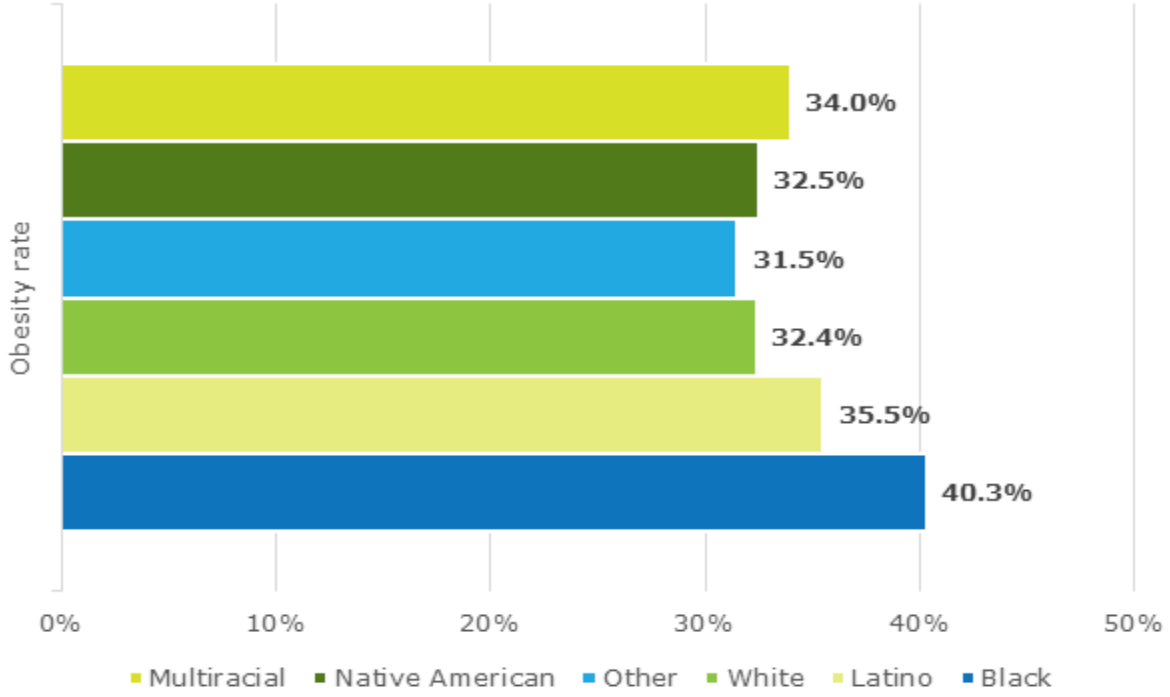

Source: United Health Foundation

*Figure 69.* **Adult Obesity Rate by Gender – 2018**



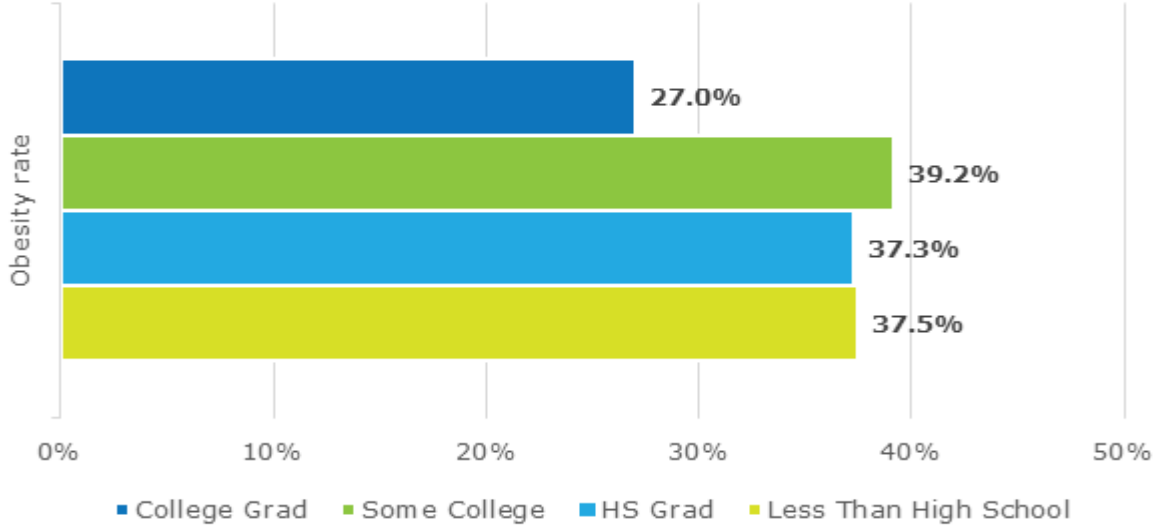

Source: United Health Foundation

***Figure 70.* Adult Obesity Rate by Race/Ethnicity – 2018**



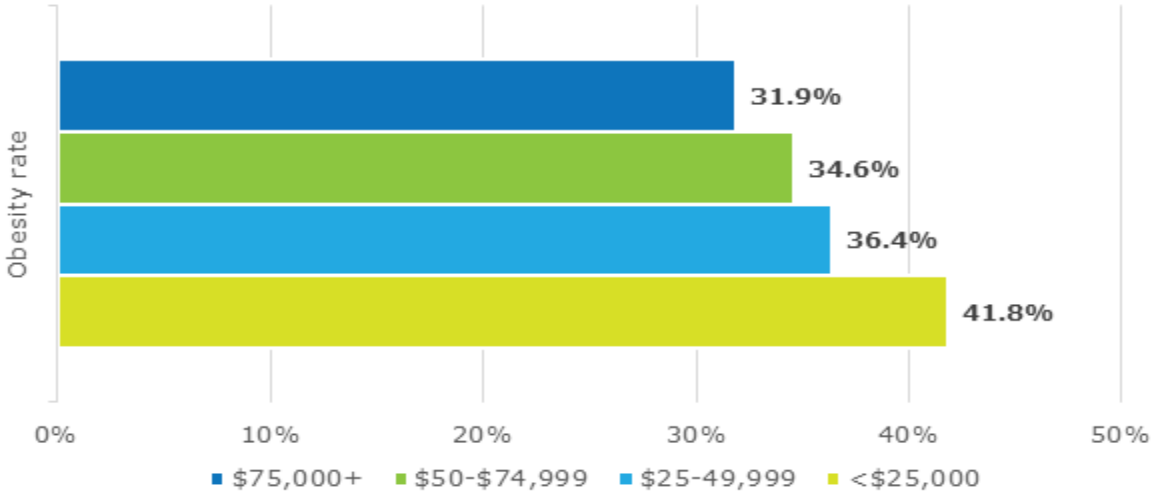

Source: United Health Foundation

***Figure 71.* Adult Obesity Rate by Educational Attainment – 2018**




Source: United Health Foundation

***Figure 72. Adult Obesity Rate by Income – 2018***




Source: United Health Foundation

### *Physical Activity*

Overall, only 24 percent of the U.S. adult population met the physical activity guidelines in 2018.[14] Regular physical activity is defined as 150 minutes a week of moderate intensity aerobic exercise, such as walking, biking, running, swimming, or dancing. Guidelines also recommend muscle strengthening activities, such as stretching, yoga, or weightlifting, two days per week. The Centers for Disease Control and Prevention (CDC) found that for adults older than the age of 25, 8.3 percent of the deaths nationwide could be attributed to physical inactivity.[15] The same study found that healthcare costs associated with are estimated at $117 billion per year.[16]

Nationwide, women are found to engage in higher rates of physical activity than men. Seniors older than the age of 65, and people of color (Black, Latino/a/x, Native American/Alaskan), on average, engage in lower physical activity. Trends in physical inactivity mirror those of obesity described previously where lower incomes, communities of color, and those with lower educational attainment are found to have lower rates of physical activity. These statistics correspond to the built environment in neighborhoods with this socioeconomic profile, which often does not provide opportunities for adequate recreation or active transportation choice. To address many of these trends, the CDC has developed recommendations for improvements to these built environments, which aim to make it easier for people to walk, bike, run, and use wheelchairs to get around their community. These recommendations, taken directly from the CDC's Active People Healthy Nation program, are as follows:

- Adopt combined built environment approaches to enhance opportunities for active transportation and/or leisure-time physical activity.
- Adopt zoning code reforms that promote physical activity.
- Develop shared-use agreements that allow community members to use existing community facilities, such as playgrounds, gyms, or pools.
- Promote social support interventions, such as walking or cycling groups, that create or strengthen social networks that help people increase their physical activity.

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14 Yang, Lin, et al., *Trends in Sedentary Behavior Among the US Population*, 2001-2016, JAMA, vol. 321, no. 16, Apr. 2019, p. 1587. DOI.org (Crossref), doi:10.1001/jama.2019.3636.

15 Carlson, Susan A., E. Kathleen Adams, et al. *Percentage of Deaths Associated with Inadequate Physical Activity in the United States, Preventing Chronic Disease*, vol. 15, Mar. 2018, p. 170354. doi:10.5888/pcd18.170354.

16 Carlson, Susan A., Janet E. Fultona, et al., *Inadequate Physical Activity and Health Care Expenditures in the United States, Progress in Cardiovascular Diseases*, vol. 57, no. 4, Feb. 2015, pp. 315–23, doi:10.1016/j.pcad.2014.08.002.

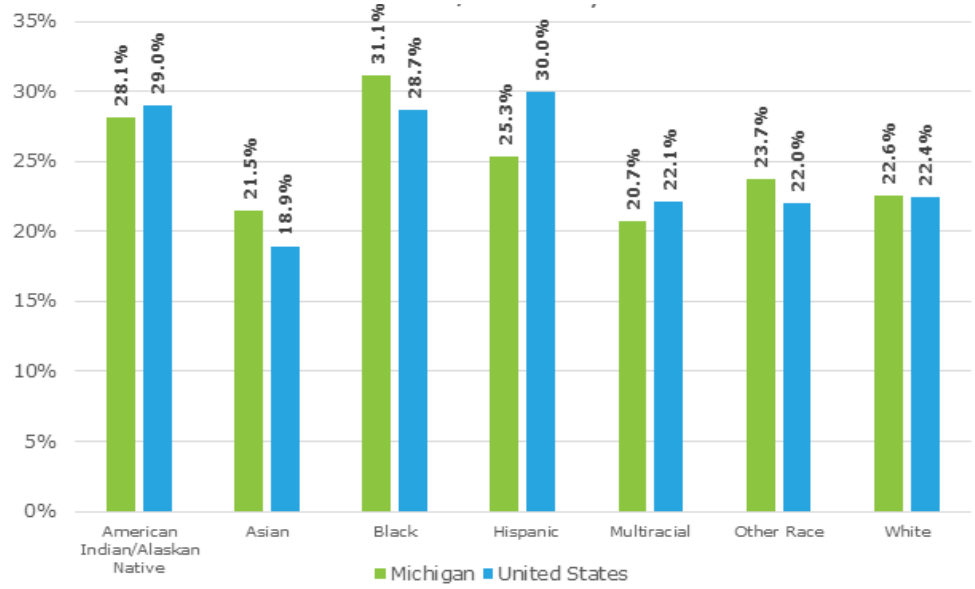
- Create bicycle or pedestrian master plans to make bicycling, walking, wheelchair rolling, and riding transit safer, more convenient, and more realistic travel options.
- Adopt Complete Streets policies for safe and convenient access to community destinations.
- Participate in SRTS programs to create safe, convenient, and fun opportunities for children to bicycle and walk to and from school.[17]

The CDC has developed a Built Environment Assessment Tool (BEAT) that communities can utilize to evaluate the quality of the built environment that affect public health. The tool is free and available online at https://www.cdc.gov/nccdphp/dnpao/state-local-programs/built-environment-assessment/index.htm.

### *Physical Activity: Michigan*

Michigan is equal to the nationwide average in that only 23.8 percent of the adult population meets CDC physical activity guidelines in 2018.[18] Similarly, 26 percent of women and 21.7 percent of men in Michigan reported doing no physical activity or exercise other than their regular job in the past 30 days in 2018. Michigan residents ages 18 to 44 years old are more active than the national average, with 18 percent reporting participating in no physical exercise over the past 30 days, versus 19.3 percent nationwide. Michiganders ages 45 to 64 years are slightly more inactive than peers nationwide, with 26.9 percent being inactive, compared to 26.2 percent nationwide. Michigan seniors are more active than their counterparts nationally, with 30.7 percent being inactive, compared to 31.9 percent nationwide.[19]

***Figure 73.* No Physical Exercise Over the Past 30 Days – By Race/Ethnicity**



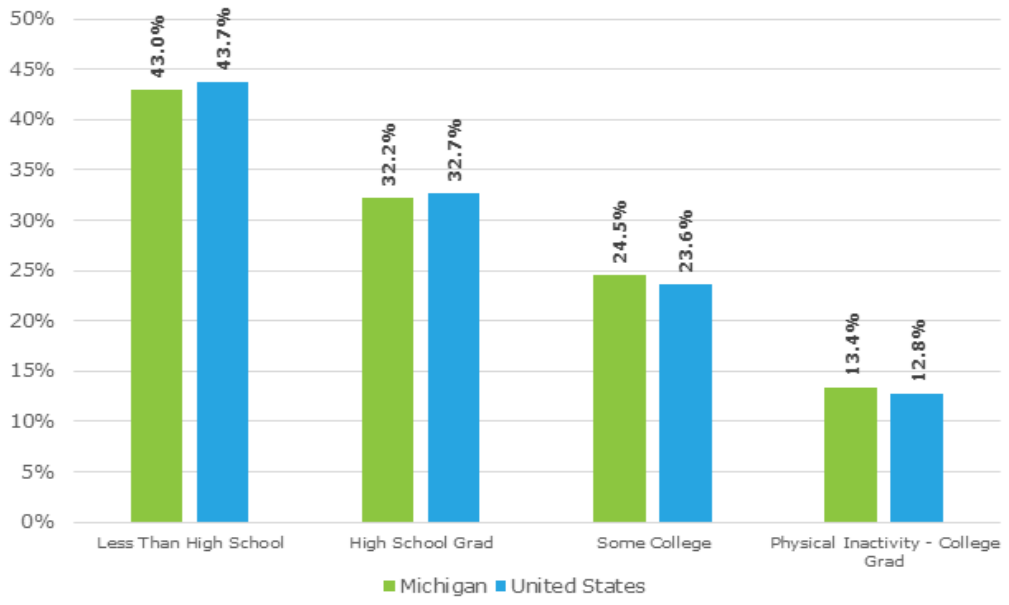

Source: CDC, Behavioral Risk Factor Surveillance System, 2018

17 https://www.cdc.gov/physicalactivity/activepeoplehealthynation/creating-an-active-america.html.

18 United Health Foundation. America's Health Rankings 2019. https://www.americashealthrankings.org/explore/annual/measure/Sedentary/state/MI.

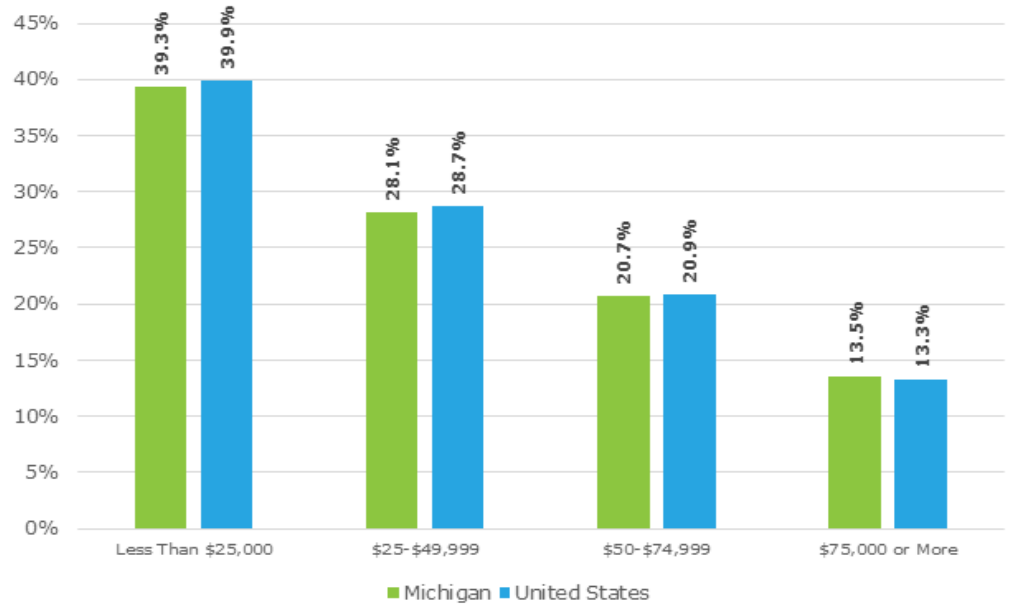
19 Ibid.

*Figure 74.* **Physical Inactivity by Educational Attainment – 2018**




Source: CDC, Behavioral Risk Factor Surveillance System, 2018

*Figure 75.* **Physical Inactivity by Income Level – 2018**




Source: CDC, Behavioral Risk Factor Surveillance System, 2018

Obesity and physical inactivity are two health risks that relate to active transportation. Associated diseases and health risks like diabetes, hypertension, high cholesterol, and chronic obstructive pulmonary disease (COPD) generally all benefit positively with increased physical activity. The key to increasing the amount of the most popular forms of physical activity, walking and biking, is having safe and convenient active transportation choices along with increased consumption of fruits and vegetables, lead to increased healthy outcomes. To that end, MDHHS has created the Michigan Nutrition, Physical Activity and Obesity Program (NPAO), which was created to "prevent and control obesity and other chronic diseases through healthful eating and physical activity."[20]

This program, and programs like it from the CDC, are vitally important for both public health and racial equity. As is described in the report on Active Transportation and Racial Equity, racial minorities and communities of color suffer fewer safe active transportation choices, bear a disproportionate amount of injury and fatalities as pedestrians, and also have a higher prevalence of health risks. Moving forward, active transportation choice is vital for a healthy Michigan and one that seeks to achieve racial equity.[21]

# Transportation Equity and Accessibility

Equity and accessibility considerations significantly impact active transportation utilization and the need for comprehensive active transportation networks in Michigan. Due to affordability issues associated with the high cost of car ownership, these issues affect minority and low-income communities, and populations with greater social and economic need. Economically and socially vulnerable people use active transportation at higher rates. They rely on walking and biking for all, or part of many essential trips and all transit trips begin and end with biking or walking. The 2016 Michigan Traffic Counts III Travel Characteristics Technical Report found that for "people in Michigan living without a private vehicle in their household, walking and transit are the primary methods of getting around. 35.7 percent of trips are by walk and 25.9 percent by transit."[22] However, higher poverty areas suffer disproportionately from fatal crashes and from a number of barriers to access. Equity can be advanced by focusing on improving the quality and safety of first- and last-mile trips, improving safe active transport infrastructure in poorer neighborhoods, and connecting census tracts with lower percentages of car ownership to broader transit and active transportation options. Approaches to identify and address these needs and issues should be considered a priority when developing an active transportation plan, with the goal that the system meets the needs of and is accessible to users of all backgrounds, ages, and abilities.

## Transportation Equity

Local communities and transportation planning agencies should ensure that their transportation planning efforts include demographic analyses of the residents living within their service area to identify the needs and geographic distribution of low income and minority residents. These residents are often the most reliant upon active transportation as a part of their daily lives, but have access to fewer safe, comfortable facilities than other groups. Understanding inequities within communities and regions through evaluating equity and modal split and investing resources accordingly will lead to systems that are more equitable and provide accessibility to all individuals.

In Michigan, 14 percent of households, and 19 percent of children under 18 years old, live below the poverty line. Except for Wayne County in southeast Michigan, the highest concentrations of poverty are in the northeast Lower Peninsula and the Upper Peninsula.[23] Another measure of poverty, which includes the working poor, is the Asset Limited, Income

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20 https://www.Michigan.gov/MDHHS/0,5885,7-339-71550_5104_5279_57685---,00.html#:~:text=The%20aim%20of%20the%20Michigan,healthful%20eating%20and%20physical%20activity.

21 League of American Bicyclists, *The New Majority: Pedaling Towards Equity*, pg.2. Accessed via http://bikeleague.org/sites/default/files/equity_report.pdf.

Smart Growth America, *Dangerous by Design* 2014. pg.20. Accessed via: http://www.smartgrowthamerica.org/documents/dangerous-by-design-2014/dangerous-bydesign-2014.pdf and Bouchard, Mikayla, *Transportation Emerges as Crucial to Escaping Poverty*, The New York Times, May 7, 2015. Accessed via: http://www.nytimes.com/2015/05/07/upshot/transportation-emerges-as-crucial-to-escaping-poverty.html.

22 McGuckin, Nancy, Jesse Casas, and Martha Wilaby. *MI Travel Counts III Travel Characteristics Technical Report*. Michigan Department of Transportation. September 2016. Accessed at: https://www.Michigan.gov/Documents/MDOT/MTC_III_Travel_Characteristics_Report_554341_7.pdf.

23 2018 American Community Survey 1-Year Estimates. https://www.census.gov/programs-surveys/acs/.

Constrained, Employed (ALICE), an indicator developed by the United Way. ALICE is a way to get a snapshot of the working poor, a group that's not captured in the percent below the poverty rate. This indicator is calculated at the household level, not the individual level. The 10 counties in Michigan with the highest percentage of households who live below the ALICE threshold include only one urban county (Wayne) with the remainder being mostly or completely rural.

Michigan's 2018 population is reported as 79 percent White, 14 percent Black or African American, 5 percent Latino/a/x, 3 percent Asian, 2 percent mixed race, and 0.7 percent Native American.[24]

In Smart Growth America's (SGA) analysis, Michigan experienced the 19th highest pedestrian fatality rate of 1.8 per 100,000 residents in comparison to other states between 2008 and 2017. The Detroit-Warren-Dearborn metro area, considered Metro Detroit, ranks as the 18th highest metro area for bicyclist and pedestrians in the SGA Dangerous by Design 2019 rankings. The 757 pedestrian deaths reported in Metro Detroit between 2008 and 2017 was the third highest total in the country.[25] In fact, of the 10 counties with the highest totals of crashes involving active transportation users between 2015 and 2019, six counties – Wayne, Washtenaw, Ingham, Kalamazoo, Genesee, and Muskegon – all have considerably higher poverty rates than the state average.[26] Poverty and race need to be addressed in planning for safe active transportation facilities, as poor and minority communities suffer more crashes and are more reliant upon active transportation for at least part of their daily commutes.

Statistics illustrate broad transportation equity concerns both at the national level and in Michigan:

- Low-income communities are more dependent upon cycling for basic transportation than high-income communities. They also reported that the lowest-income households (Americans making less than $20,000 per year) are twice as likely as the rest of the population to rely on bikes for basic transportation needs like getting to work.[27]
- In 2014, 100 of the 104 U.S. metro areas recorded a higher percentage of pedestrian/cyclist fatalities in the census tracts with poverty levels of 25 percent and greater. Metro Detroit ranked 27th, with the five-year average of fatalities more than double the region average in the poorest census tracts.[28]
- Governing Magazine analyzed crash data from 2008 to 2012 and found that low-income census tracts (those with a per capita income of $21,559 or less) had more than double the deaths per 100,000 residents than high income census tracts.
- Analysis of U.S. census data by the Kinder Institute for Urban Research shows that 49 percent of the people who bike to work earn less than $25,000 per year.[29]
- According to the 2017 National Household Travel Survey, 8.9 percent of households do not have access to a vehicle and are reliant upon transit or active transportation for their travel needs. In Michigan, 3 percent of the working age population has no vehicle available, including 1 percent of workers driving alone to work, 6 percent of carpoolers, and 36 percent of transit users.[30]
- In 2014, SGA found that communities of color suffer a disproportionate amount of pedestrian and bicycle fatalities. The report cites an analysis from the League of American Bicyclists found that Black and Hispanic cyclists had a fatality rate 30 percent and 23 percent higher, respectively, than White cyclists, and similar racial/ethnic safety gaps are found for pedestrians.[31]

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24 https://www.unitedforalice.org/.

25 Smart Growth America. *Dangerous by Design:* 2019. https://smartgrowthamerica.org/dangerous-by-design/.

26 Michigan Traffic Crash Facts. https://www.michigantrafficcrashfacts.org/querytool/common/non-motorists#q1;0;2019,2018,2017,2016,2015;;0,38:1. University of Michigan Poverty Solutions. https://poverty.umich.edu/data-tools-poverty-and-well-being-map-2020/.

27 Anderson, Michael, *Assumption Busters: 12 Facts About Race, Ethnicity, Income and Bicycling*. People for Bikes. March 9, 2015. http://www.peopleforbikes.org/blog/entry/assumption-busters-surprising-facts-about-ethnicity-race-income-bicycles.

28 Maciag, Mike. *America's Poor Neighborhoods Plagued By Pedestrian Deaths*. Governing Research Report, August 2014. http://images.centerdigitaled.com/documents/Governing_Pedestrian_Fatalities_Report.pdf.

29 Keatts, Andrew. *Memo to Cities: Most Cyclists Aren't Urban Hipsters*. The Urban Edge/Kinder Institute for Urban Research, October 2015. http://urbanedge.blogs.rice.edu/2015/10/20/memo-to-cities-most-cyclists-arent-urban-hipsters/#.V30X7_krJpg.

30 2019 American Community Survey. www.census.gov.

31 League of American Bicyclists, *The New Majority: Pedaling Towards Equity*, pg.2. http://bikeleague.org/sites/default/files/equity_report.pdf. Smart Growth America, *Dangerous by Design 2014*. pg.20. http://www.smartgrowthamerica.org/documents/dangerous-by-design-2014/dangerous-bydesign-2014.pdf.

- In Michigan, six of the 10 counties reporting the highest percentage of non-White residents rank among the highest number of crashes involving people walking and biking. Of these counties, only two had a poverty rate below the state average.[32]
- Research conducted for People for Bikes in 2014 found that 38 percent of Hispanic Americans and 26 percent of Black Americans bike at least once a year and that the number of Black Americans biking increased by 90 percent from 2001 to 2009, faster than any other racial or ethnic group.[33]

Transportation safety and equity are intertwined with more low-income residents being dependent upon walking and bicycling. In addition, some larger cities have been unable to prioritize the expenditure of funds necessary to install new active transportation infrastructure that makes the built environment safer, more comfortable, and convenient for safe walking and bicycling. This situation is of special concern because residents of these areas typically have a higher reliance on active transportation to meet daily needs. In many disadvantaged communities, residents are not always included in the discussion of active transportation improvements that would make it safe for biking and walking and would improve connection to other modes of transportation. Further, these communities often have less traffic enforcement and commit fewer resources to education and outreach that improve the safety of walking and biking. Finally, these communities have historically not had investments made in biking and walking infrastructure, which has created the more dangerous conditions. Funding must be considered with equity as a major decision factor.

The National Association of City Transportation Officials (NACTO) has conducted extensive research on equity and active transportation and has confirmed that having more cyclists on the road increases the visibility and safety of cyclists overall, referred to as the "safety in numbers" phenomenon. In other words, the risk of a cyclist being struck by a motorist declines as the number of cyclists on the road increases.[34]

> "The combination of increased ridership and more bike lanes is a powerful recipe for safety. For this paper, NACTO collected data from seven cities across the U.S. on bike network mileage, number of cyclists killed or severely injured (KSI), and bicycle volume. The resulting analysis shows that cycling is on the rise in the U.S. and that there is a clear correlation between an increase in the number of cyclists on city streets, growth in the city's bike lane network, and an improved safety rate for riders. In all seven cities studied, the risk per cyclist decreased as bicycling ridership increased, and the rate of growth in cycling far outstripped the rate of cyclist injuries or fatalities. Municipal policies that increase cycling, like implementing a large-scale bike share system, when combined with significant enhancements to bike infrastructure, are associated with large decreases in the risk of injury or death borne by each person cycling."[35]

Safe street design is paramount, particularly in lower income communities suffering from disproportionately high rates of fatalities. It is therefore important to adopt policies that prioritize the development of infrastructure to encourage walking and biking.

Finally, active transportation is an important part of improving access to employment and economic opportunity. Particularly because disadvantaged communities throughout the state have higher rates of households without access to vehicles, creating safe walking and biking facilities to connect to both transit lines and employment centers creates economic opportunity for these communities.

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32 2020 Poverty and Well-being map, University of Michigan Poverty Solutions. https://poverty.umich.edu/data-tools-poverty-and-well-being-map-2020/.

33 Ibid.

34 Jacobsen, P. L. *Safety in numbers: more walkers and bicyclists, safer walking and biking*, Injury Prevention 2003. 9:205–209. University of New South Wales. *A Virtuous Cycle: Safety in Numbers for Bicycle Riders*, ScienceDaily. September 2008.

35 *Equitable bike share means building better places for people to ride*, NACTO Bike SHARE Equity Practitioners' Paper #3. July 2016. https://nacto.org/wp-content/uploads/2016/07/NACTO_Equitable_Bikeshare_Means_Bike_Lanes.pdf.

## Accessibility

### *Accessibility Defined*

Broadly defined, "accessibility (or just access) refers to the ease of reaching goods, services, activities, and destinations, which together are called opportunities."[36] As noted, one of the key goals of regional transportation networks is to connect people to economic opportunities. Accessibility measures the ease with which individuals can reach destinations, whether by foot, bicycle, car, or assistive device. People living in accessible locations have many options to reach their destinations while those living in inaccessible locations can reach fewer destinations in the same amount of time. Understanding a community's accessibility by various modes is important, especially for communities that have lower rates of access to a vehicle and longer commutes to employment. For example, many of Michigan's lowest-income residents have limited access to employment because job centers are often located in suburban areas, where fewer public transit and active transportation options are typically available. Many communities are also far removed from employment centers, making it impractical to rely on walking or biking as a primary means to access jobs.

Factors that affect accessibility include transportation demand, mobility (travel speed over time), transportation options, modal integration (convenience of connecting between various modes), affordability, and network connectivity. Demographic and financial considerations are often incorporated into accessibility calculations alongside other traditional variable cost factors, including time, (un)reliability, out-of-pocket expenses, and discomfort.[37] This broader view of accessibility has been used to evaluate transportation planning, investment, and operation to consider how accessibility improvements may impact economic and social outcomes.

In the United States, accessibility is often only identified in a limited sense to "access to mobility," especially as it relates to public transit access without the broader concept of accessibility-to-opportunity performance measures.[38]

### *Importance of Accessibility*

In facility planning, including active transportation planning, addressing broader economic opportunity accessibility issues should be an important consideration. Providing safe and convenient walking and biking facilities that connect to transit lines can improve accessibility by reducing time, discomfort, and distance barriers in existing active transportation networks. These trips between home/work and transit stops are called first- and last-mile trips, a part of every transit trip. Poor first- and last-mile connectivity diminishes access to the broader transit network and thus to job opportunities. A focus on improving facilities to better the quality of these first- and last-mile trips will help to improve access to economic opportunities, particularly in disadvantaged neighborhoods and communities.

For populations with limited access to private vehicles or the ability to move about freely due to mobility limitations, access is a key determinate to social mobility, job access, and ease of life. Today, the typical Michigan worker with a car can access at least 1.1 million jobs within an hour's drive, according to analysis from a multi-state study led by MDOT. For people using transit, the number of jobs that can be reached within an hour drops to only 42,000. Overlapping car and transit access, those riding a bicycle can reach an estimated 15,000 to 68,000 jobs within an hour's ride, depending on whether they are comfortable riding on streets that do not have low-stress bicycle facilities. Improving transportation accessibility for people in areas where their transportation is dependent on walking and biking is critical to achieving a system that provides equitable access to employment; core services such as healthcare, school, and shopping; and other destinations. Proactive transportation planning is necessary to improve connectivity and remove accessibility barriers.

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36 Litman, Todd Alexander. *Evaluating Accessibility for Transport Planning Measuring People's Ability to Reach Desired Goods and Activities*. Victoria Transport Policy Institute. June 5, 2020.

37 Koopmans, C., W. Groot, P. Warffemius, J.A. Annema, and S. Hoogendoorn-Lanser, *Measuring Generalised Transport Costs as an Indicator of Accessibility Changes Over Time*. Transport Policy. 2013.

38 Venter, Christo, *Developing a Common Narrative on Urban Accessibility: A Transportation Perspective*. Brookings Institution. November 2016.

### *Analyzing Accessibility Through an Equity Lens*

Accessibility is a considerable factor in economic success and in creating social equity. Two major academic studies link transportation and modal choice to economic success, and both racial and socioeconomic equity. A large study performed by Harvard University[39] known as the Chetty study identified commuting time has emerged as the strongest factor in the odds of escaping poverty. The longer an average commute is (in any given county), the worse the chances are of low-income families moving up the ladder.[40] The Chetty study focuses on commuting time as a key variable in socio-economic mobility, but that variable is more about land use and the physical environment than about access to different modes of transportation. Though the study is often simplified and presented to show longer commute times equal poorer economic outcomes for children, what it really establishes is that place and quality of life are critical variables in economic outcomes.

New York University's Rudin Center for Transportation went more in-depth with a study in New York City, comparing similar neighborhoods by accessibility to transit and the number of jobs within an hour's commute. The conclusions of this study found "that residents of the areas least well served by mass transit relied on personal vehicles which create ready accessibility to economic opportunities. Areas in the middle third — those with some, but insufficient, access to transportation — had the highest rates of unemployment and the lowest incomes, the study found."[41] Based on these studies and other data, communities of color and lower income neighborhoods have less access to transportation choice than more affluent and dominantly White communities. The networks available to these communities are typically the least safe for pedestrians and bicyclists, and result in higher rates of pedestrian and bicycle crashes.

Equity audits and accessibility analyses (including ADA analyses) are important components of active transportation network planning. These tools ensure that public infrastructure investment is fairly distributed to all transportation user groups, with an emphasis on reducing barriers to economic advancement.

A more local example of equity assessments can be found in the Bicycle and Pedestrian Mobility Plan for southeast Michigan developed by SEMCOG.[42]

The plan first identifies equity emphasis areas (EEA) in the region, based upon the concentrations of populations most likely to rely on biking or walking to meet their transportation needs. SEMCOG used five socio-economic categories to map population concentrations and define the locations of the EEAs: population aged 17 years and under; low-income households – households in the lowest income quartile for the region; minority population; senior population aged 65 years and older; and transit-dependent households (zero-car households and households with fewer cars available than workers +16 years of age). The analysis then measures access to existing pedestrian and bicycle infrastructure within to identify EEAs that lack sufficient access to the active transport using the following buffers:

- Beyond 100 feet from the nearest sidewalk or shared-use path,
- Beyond one-half mile from the nearest bicycle facility, and
- Beyond both 100 feet from the nearest sidewalk or shared-use path and one-half mile from the nearest bicycle facility.

SEMCOG's screening approach enables planners to locate EEAs with limited access to infrastructure for safe walking and bicycling.

Comprehensive active transportation network data has not been compiled at the state level, inhibiting a statewide analysis. These parameters, however, can be employed as a guideline by other regional and local agencies to assist in locating, mapping, and identifying equity and accessibility gaps and emphasis areas for the planning and development of walking and biking infrastructure.

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39 Chetty, Raj and Hendren, Nathaniel. *The Impacts of Neighborhoods on Intergenerational Mobility Childhood Exposure Effects and County-Level Estimates*. Harvard University. April 2015. http://www.equality-of-opportunity.org/images/nbhds_exec_summary.pdf.

40 Bouchard, Mikayla. *Transportation Emerges as Crucial to Escaping Poverty*. The New York Times. May 7, 2015. http://www.nytimes.com/2015/05/07/upshot/transportation-emerges-as-crucial-to-escaping-poverty.html.

41 Ibid.

42 https://semcog.org/bicycle-and-pedestrian-mobility.

Increasing equity through increased accessibility can also be measured by analyzing the distribution of constrained capital funds. The Oregon Metro Transportation Equity evaluation exemplifies a capital-investment process grounded in equity and access.[43] This project was the result of a regional process to align the region's transportation investments with its commitment to advancing equity that had significant community, professional and technical meetings resulting in the development of equity evaluation criteria for all regional capital projects. The four equity measures the Oregon Metro process developed are:

- Access to travel options – system completeness and connectivity,
- Access to jobs,
- Access to community places, and
- Share of safety projects.

These examples indicate that robust accessibility analyses designed to advance equity must define and locate the target population, key destinations, and the infrastructure necessary to connect equity populations to opportunity. To fully leverage the benefits of active transportation, spatial and capital program evaluations should also measure the degree of integration between biking and walking infrastructure and the transit network.

# Economic Benefits and Impacts

## Connecting Michigan's Economic Development Goals to Enhancing the State's Active Transportation System

Michigan's current economic development policy is nested within several documents issued by multiple branches of state government. The primary objective of many of these documents is for Michigan's policies to foster an economic environment that ensures Michigan's competitiveness in the 21st century's post-industrial, knowledge-based economy.

### *Quality of Life and Competition for Younger Knowledge Workers and Talent*

The mission of the Michigan Economic Development Corp.'s (MEDC) current five-year strategic plan is to "achieve long-term economic prosperity for Michiganders by investing in communities, enabling growth of good jobs, and promoting Michigan's strong image worldwide." Three of MEDC's five stated strategic focus areas, 1) to attract, retain, and support businesses, 2) foster high-wage skills growth, and 3) develop attractive places, express the need for creating places that offer high quality of life. One of the key metrics to quality of life is the provision of safe and accessible active transportation options within the urban and suburban fabric.

Michigan's population is statistically stagnant. In-migration of non-Americans has prevented actual decline in Michigan's population over the last decade. Michigan's demographics are trending significantly older, with declines in the key 0-17 and 18-24 age groups. The state's average age is also older than the national average, indicating that it has been losing child-rearing age populations as well. To become more competitive, Michigan's 21st Century Economy Commission's final report identifies that Michigan must focus on the "New Economy" and leverage the state's experience in manufacturing and transportation to become a leader in mobility.[44] The New Economy refers to economic activity that is tied to information technology that creates new products and services instead of an economy solely based on manufacturing and commodities.

To attract and retain knowledge-based workers, numerous studies show that workers in this labor pool now choose where they want to live based upon the quality of life of the region. Once they have chosen the destination, they then proceed to search for a job, the inverse of the 20th century model where people would follow the jobs to a specific region. This dramatic change has made economic development and business attraction for new workers much more dynamic. Many young adults desire urban areas that offer high levels of walkability.[45] They are also postponing obtaining licenses

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43 https://www.oregonmetro.gov/sites/default/files/2019/03/13/Transportation-Equity-Evaluation-Final-3.12.19.pdf.

44 *Building Michigan's 21st Century Economy: A Report for Governor Rick Snyder*. Building the 21st Century Economy Commission. May 2017.

45 National Community Preference Survey – October 2013. National Association of Realtors and American Strategies. October 2013.

and purchasing cars, driving 23 percent less, bicycle riding 24 percent more, and riding public transit 40 percent more than previous generations.[46] Placemaking, dense urban fabric, and quality of life (including ease of an active lifestyle and access to active transportation options) are all important components of their locational choices, and thus these components are now important economic development considerations as well.

Many larger corporations recognize this shift and realize that they are not only competing for the best and brightest employees, but they are also competing against companies located in other areas for the same employees. If the region in which they are located isn't competitive for the quality-of-life aspects that make communities desirable, the company will have difficulty in attracting workers to come work for them, no matter the pay premium they intend to offer. As a result, firms may decide not to locate in uncompetitive regions or states or may elect to strategically relocate. An excellent real-world example of this was Detroit's failed bid for the Amazon headquarters campus, which did not make the list of 20 finalist cities due to a lack of talent and regional mobility.[47]

MDNR's current 2018-2022 Michigan Statewide Comprehensive Outdoor Recreation Plan (SCORP) also looks to improve the state's quality of life. The SCORP primary goal is to "protect and manage Michigan's diverse and abundant natural and cultural assets to provide relevant, quality experiences that meet the fun, relaxation, and health needs of Michigan's residents and visitors and support economic prosperity." Of the plan's seven objectives, quality of life components are found in four:

- Improve recreational access for residents and visitors: Recreation opportunities are connected and accessible to residents and visitors of all backgrounds, abilities, means, and geographic locations.
- Provide quality experiences: Michigan's outdoor recreation system provides users with quality experiences in balance with resource management and conservation.
- Enhance health benefits: Outdoor recreation increases physical activity and the health of Michigan's residents and visitors, improves health outcomes.
- Enhance prosperity: Outdoor recreation advances economic prosperity and supports a high quality of life as well as talent retention in Michigan's communities.

Hiking and walking are seen by many as more than a mode of transportation. Twenty-seven percent of Upper Peninsula respondents to the Michigan's 2017 SCORP citizen survey found that outdoor walking, including dog-walking, was identified as the most important outdoor activity for them. Hiking is America's most popular single backcountry activity, with 33 percent of adults participating in 2008. By 2030, this rate is expected to increase by 3 percent, to more than 100 million Americans. In addition, the number of days spent hiking is expected to increase by 33 percent during the same period.[48]

### *Tourism*

Prior to the COVID-19 pandemic, tourism was Michigan's third largest industry. In 2017, tourism supported more than 224,000 jobs and generated $25 billion in visitor spending (amounting to $2.2 billion in local and state revenues).[49] Michigan's tourism development strategies, outlined through its Pure Michigan efforts, reflect its broader economic development strategies. The goals of the state's tourism development campaign include attracting visitors from nearby states and enhancing placemaking.

The Michigan Travel Strategic Plan identifies the state's networks of biking and hiking trails as an opportunity for further emphasis and expansion, with the potential to brand Michigan as "The Trails State."[50]

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46 Davis, Benjamin, Tony Dutzik, Phineas Baxandall. *Transportation and the New Generation: Why Young People are Driving Less and What It Means for Transportation Policy*. Frontier Group and U.S. PIRG Education Fund. April 2012.

47 Gallagher, John. *Amazon to Detroit: You Didn't Have Enough Talent to Get HQ2*. Detroit Free Press. Jan 18, 2018. https://www.freep.com/story/money/business/john-gallagher/2018/01/18/detroit-amazon-headquarters-finalists/1043624001.

48 White, Eric M., J.M. Bowker, Ashley E. Askew, Linda L. Langner, J. Ross, Arnold, and Donald B.K. English. *Federal Outdoor Recreation Trends: Effects on Economic Opportunities*. PNW-GTR-945. November 2016, pg. 9.

49 Michigan Economic Development Corporation. *Michigan Travel Strategic Plan: A Plan for the Industry, By the Industry – Executive Summary*. October 2020, pg. 1.

50 MEDC; *The 2012-2017 Michigan Travel Strategic Plan*. December 2012, pg. 16.

Since the publication of the Michigan Travel Strategic Plan, gravel cycling has expanded tremendously across the United States as well as in Michigan, strengthening Michigan's position as a leading recreational destination. In 2019, the Barry Roubaix (one of Michigan's best known gravel events) attracted 3,500 registered riders, a 10-fold growth rate over its inaugural 2009 event.[51] Growth potential exists throughout the state, even in areas without established trails, thanks to Michigan's wealth of gravel roads. The Michigan Gravel Race Series currently comprises 16 events scattered across the Upper and Lower peninsulas.

Two peer states validate these efforts in their active transportation plans:

- Colorado's 2015 Statewide Bicycle and Pedestrian Plan recognized the importance of supporting tourism in their state. It recommended ensuring that Colorado's active transportation network provides connections to scenic and historic byways, offers links to historic downtowns, and ensures that tourism facilities are enhanced.
- An economic development goal of Maryland's 2019 Bicycle and Pedestrian Master Plan Update is to develop active transportation facilities and programs that support tourism and attract new visitors and to expand access to the economic benefits of bicycling and walking to more Maryland businesses and residents.

## Economic Benefits of Improving the State's Active Transportation System

Over the last 15 years, new research has illustrated the economic impacts of active transportation, building upon earlier research. This new data overwhelmingly illustrates the direct and indirect benefits of active transportation investment. Four areas are explored in detail in the appendices:

- Direct financial impacts of active transportation-related businesses,
- Increased tourism and visitor expenditures,
- Health benefits, and
- Proximity benefits to greenways.

Multiple evaluation approaches may be used to measure the value attributed to active transportation improvements. Some of these evaluation methods include the following:

- Avoided costs: Reduced expenditures on motorized travel or exercise equipment.
- Contingent valuation: Residents' or users' willingness to pay for specific facilities or access to them.
- Hedonic pricing: Effects of access to active transportation facilities on nearby property values.[52]

These evaluation methods are employed to identify both direct and indirect economic benefits of active transportation facilities that accrue to the broader community, or directly associated to an individual. Some of these benefits may have both positive and negative impacts.

Generally, the economic benefits include:

- Reduced roadway congestion.
- Lessened environmental impacts and costs associated with automobile usage.
- Increased property values located near active transportation assets.
- Increased tourism opportunities and recreation-serving business development.
- Improved transportation equity and human health (see Sections 4.5 and 4.6 for more in-depth discussion) and lower medical costs associated with increased physical activity and improved air quality.
- Improved safety and reduction in crashes impacting active transportation users.

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51 https://barry-roubaix.com/results.

52 Ibid., pg13.

- Desirable communities where residents will often pay premiums to live adjacent to active transportation corridors.
- Increased locations to attract businesses and New Economy workers.
- Increased community cohesion (more places for interactions between neighbors).
- Reduced chauffeuring burden.
- Improved security.
- Lower household transportation costs (see Section 4.7).
- Increased retail activity (see Section 4.7).

Numerous studies have identified the positive impacts of living in walkable communities. Their residents are more active and less car-dependent than residents living in less-walkable communities. Environmental impacts are also lower due to a reduction in vehicle trips while average transportation expenses are also lower when compared to more auto-dependent neighborhoods.[53]

A 2020 meta-analysis illustrates the impacts of living in communities that support active transportation. These impacts include shorter trips, reduced chauffeuring (one researcher estimates 10 percent of trips involve this activity),[54] increased public transit use, reduced vehicle ownership, more urban land use patterns, and changing societal norms that increase social acceptance of walking and bicycling as means of transportation.[55]

Many automobile and transit trips have active transportation components. Trips that include a transit link with bike and walk components are defined as transit trips, and trips that require a motorist to walk several blocks from their car parking location to their destination are classified as solely motorized trips. Todd Litman, the founder of the Victoria Transport Policy Institute, estimates that between 10 to 30 percent of trips have active components that are not identified as such.[56]

### *Direct Economic Benefits*

Direct economic benefits can be correlated directly to an event, or activity. In the case of active transportation, direct economic impacts are economic activities that are directly associated to the building or operation of active transportation facilities. These benefits include bicycle and shoe purchase used to ride and walk on new active transportation facilities or attendance at events held at active transportation facilities.

Bicycle sales in the U.S. have ranged between 15.2 and 20.9 million units since 1992, with a modest average growth trend from shy of 16 million units in 1992 to just more than 18 million units in 2015, whereas e-bikes saw significant growth in 2019 and explosive growth after the start of the COVID-19 pandemic in the U.S. in March 2020.[57] Bicycle sales of standard bikes also spiked during the 2020 pandemic, with many shops in short supply of bikes priced less than $2,000 and long waitlists for repairs and tune-ups. In 2017, the U.S. cycling market was estimated at $5.9 billion in sales, while bike services/repairs grew 3 percent, to $312.5 million. Depending upon how bike shops are counted, there are between 3,700 (National Bike Retailers Association, or NBRA – 2016) and 7,000 (Georger Data Service, or GDS – 2018). The NBRA number records any bicycle retailer who does 50 percent, or more of their sales in bicycles and bicycle-related products and services, which would not include sporting goods stores, while the GDS number is from the dealer listings of the 60 major bicycle brands in the U.S.

Michigan's own 2014 study, Community and Economic Benefits of Bicycling in Michigan, found that Michigan households spend $175 million on bicycle-related expenses, with bicycle manufacturing generating $11 million in annual revenue, and

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53 Frank, L. D., Sallis, J. F., Conway, T. L., Chapman, J. E., Saelens, B. E., and Bachman, W., Many Pathways from land Use to Health: Associations between Neighborhood Walkability and Active Transportation, Body Mass Index, and Air Quality, Journal of the American Planning Association, 72(1), pg. 75-87, 2006.

54 Todd Litman, Adjusting Data Collection Methods: Making the Case for Policy Changes to Build Healthy Communities, Inspiration to Action: Implementing Projects to Support Active Living, American Association for Retired Persons (www.aarp.org) and Walkable and Livable Communities Institute, pp. 104-107; 2011.

55 Litman, Todd, Evaluating Active Transportation Benefits and Costs: Guide to Valuing Walking and Cycling Improvements and Encouragement Programs, Victoria Transportation Policy Institute, June 2020, pg. 9.

56 Todd Litman, Adjusting Data Collection Methods: Making the Case for Policy Changes to Build Healthy Communities, pp. 104-107; 2011.

57 www.statista.com/statistics/236152/us-unit-sales-of-bicycles/.com.

bicycling events and tourism generated $38 million in spending.[58] In 2018, a Michigan tourism study found that 15 percent of all visitor spending in Michigan was spent on recreation activities (excluding food, beverages, and lodging).[59]

Traverse City's TART Trails Inc. commissioned a 2019 study that found the annual direct expenditures for trail use on the Leelanau Trail was $71,200, while the Sleeping Bear Heritage Trail was $3,326,000.[60] Ability of trail users to use the trails in the winter due to winter maintenance was seen as an important economic benefit.

### *Indirect Economic Benefits*

Indirect economic impacts are results of activities that are associated with direct economic activities but do not have direct ties to such activities. These indirect benefits may include increased property values of properties adjacent to active transportation facilities or improved health outcomes associated with use of active transportation networks.

MDOT's 2014 study, Community and Economic Benefits of Bicycling in Michigan, found that bicyclists avoided $256 million in healthcare costs compared to the non-cycling resident. These active transportation riders also saved Michigan's economy $187 million dollars in reduced absenteeism expenses.[61] A Redfin real estate study evaluated more than 1 million home sales between 2014 and 2016 in 14 metropolitan areas. It found that as the walk score increased 1 point, those homes located in more walkable areas saw significantly higher increases in valuation (a walk score rising from 19 to 20 netted an increase of $181 dollars, while growing from 79 to 80 netted a $7,000 premium – walk scores range from 1 as the lowest to 100 as the highest).[62]

Reducing congestion by reducing vehicles on the road is another indirect economic benefit of active transportation. Space requirements for various transportation modes vary greatly.

***Figure 76.* Space Requirement for Different Forms of Transit**


Source: Tobin Bennet – Des Moines, Iowa, August 2010

For moving traffic, a 1995 study determined that pedestrians occupy 3 square meters, cyclists occupy 10 square meters,

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58 Community and Economic Benefits of Bicycling in Michigan, BBC Research and Consulting, Prepared for the Michigan Department of Transportation, June 2014.

59 Economic Impact of Tourism in Michigan, 2018, Tourism Economics, May 2019.

60 Klizentyte, Kotryna, Taylor Stein, Leelanau and Sleeping Bear Heritage Trail – Health, Business and Visitor Assessment, School of Forest Resources and Conservation – University of Florida, Dec. 2019.

61 Community and Economic Benefits of Bicycling in Michigan, BBC Research and Consulting, Prepared for Michigan Department of Transportation, June 2014.

62 Bokhari, Sheharyar, How Much is a Point of Walk Score Worth?, Redfin, Aug. 3, 2016.

an automobile at 30 kph occupies about 30 square meters, and a car at 100 kph occupies 300 square meters.63 As such, active transportation modes are significantly more space efficient and would be able to assist in alleviated congestion. Figure 76 visually depicts the amount of physical street space necessary to accommodate the same 40 passenger trips via a single-occupancy car, transit bus or bicycle.

In 2017, 8.8 billion hours of travel delay forced Americans to buy an extra 3.3 billion gallons of fuel, resulting in $166 billion in congestion costs in 494 U.S. urban areas.[64] These numbers do not include the added pollution caused by the time spent in traffic. They also do not account for the healthcare costs placed on the drivers and passengers who are caught in congestion.

The barrier effect (also known as severance) is the travel delay that vehicular traffic imposes on active transportation by expanded roadways, increased signal times, increased motorized traffic, and traffic speeds. Barrier effect costs are typically estimated to average between 0.5 to 1.5 cents per urban automobile mile.[65]

According to the FHWA 2006-2009 National Household Travel Survey, 14 percent of all trips are less than one-half mile, and 28 percent of trips are less than 1 mile. Increasing the percentage of trips taken by walking and bike riding would reduce traffic and the impacts of congestion.

According to the Rails to Trails Conservancy, if the U.S. doubled the number of bike trips from 1 to 2 percent, the country would save 693 million gallons of gasoline, cut air pollution, reduce congestion, lower carbon emissions, and improve public health.

Reduced vehicular travel brought about by increased active transportation would reduce roadway maintenance costs overall. Active transportation modes take up less space than motorized transportation, and significantly less wear and tear is caused by walkers and bicyclists to municipal infrastructure compared to similar trip types made by passenger cars and light-duty trucks. Roadway maintenance costs are estimated at 4 cents per mile for automobiles. By shifting trips from driving to walking or biking, researchers have found cost savings of approximately 5 cents per mile for urban driving and 3 cents for rural driving, including indirect travel reductions leveraged by active transportation improvements.[66]

In evaluating the economic benefit of active transportation, cost savings associated with reduced vehicular parking should also be considered. Surface parking spaces cost between $500 and $3,000 per year to operate, maintain, and service debt. By shifting automobile trips to active transportation travel, demand for parking spaces would decline, and less parking spaces would need to be built and/or maintained. Research has shown that there would be a $2-4 per urban peak trip cost reduction, $1-3 per urban off-peak trip, and about $1 per rural trip in savings per trip, solely from reducing parking space needs to accommodate lower demand.[67]

Fewer vehicle parking spaces would also have positive environmental impacts by reducing heat island efforts, stormwater run-off, impervious surface coverage, and other negative impacts associated with large, paved areas. Each benefit has dollar benefits that could also be calculated.

Due to the increased efficiency in space, one study found that bicycle parking generates five times as much spending per square meter as compared to automobile parking.[68] Businesses located near active transportation corridors benefit from exposure to active transportation users as well. A New York City study found that businesses along Ninth Avenue saw up to a 50 percent increase in retail sales when a bike lane was installed, compared to a 3 percent increase for businesses borough-wide during the four-year study.[69]

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63 Bruun, Eric, Vukan Vuchic, The Time-Area Concept: Development, Meaning and Applications," Transportation Research Record, No. 1499, 1995.

64 2019 Urban Mobility Report, Texas A&M Transportation Institute, August 2019.

65 Litman, Todd, Evaluating Active Transportation Benefits and Costs: Guide to Valuing Walking and Cycling Improvements and Encouragement Programs, pg. 24, June 2020.

66 Ibid., pg. 25.

67 Litman, Todd, Transportation Cost and Benefit Analysis Guidebook, Victoria Transportation Policy Institute, 2009.

68 Lee, Alison, Alan March, Recognising the Economic Role of Bikes: Sharing Parking in Lygon Street, Carlton, Australian Planner, Vol. 47, No. 2, pp. 85 – 93, 2010.

69 Blue, Elly, How Bike Lanes Increase Small Business Revenue, excerpt from Bikenomics: How Bicycling Can Save the Economy, Dec. 2013.

Owning and operating a car is a household's second largest expense. AAA found that it cost $8,700 to own, operate, and insure a new car in 2015.[70] In a similar 2017 AAA study, the average driver spent $8,469 annually, including loan/lease payment, maintenance and repair, fuel, insurance, and depreciation. Trucks, large SUVs, and minivans cost more per year to own and operate than smaller sedans and SUVs. In communities where active transportation options are widely available and residents choose to reduce the number of vehicles they own because of these choices, reducing vehicle ownership would "free up" a significant amount of money that may be spent on other household expenses.

## Costs Associated with Active Transportation Systems

Potential adverse economic impacts associated with the development of active transportation systems may include:

- Incremental cost increases for projects due to greater diversity of maintenance demands (although potential for lower overall maintenance associated with reduced wear and tear).
- Changing traditional methods of service and capital project delivery.
- Increase in vehicular user delays and speed reductions associated with the installation of new active transportation facilities requiring geometric and traffic control changes, such as road diets, pedestrian clearance interval upgrades, leading pedestrian interval installations, and others. However, in many cases, the benefits of the improvements outweigh the costs (which include user delays, time spent, fuel, etc.) as many of the improvements tend to have proportionally small impacts during the peak hours and negligible to zero impacts during off peak hours
- Escalating inequities may be a result from increasing demand for neighborhoods adjacent to new active transportation corridors, which may lead to displacement or rising living costs for low income and minority residents living in these areas.

All roadway crashes, including those involving active transportation and resulting injuries and fatalities, are preventable. To fully understand the economic benefits of active transportation networks, the economic costs of active transportation crashes should also be evaluated.

In 2018, the U.S. saw the number of pedestrians killed grow 3.4 percent to 6,283 deaths, while the number of cyclists killed rose by 6.3 percent to 857 deaths, even as the total number of traffic deaths has generally declined for the last 40 years. These two groups now account for one-fifth of all traffic deaths. A 2004 study determined that pedestrian and cycling injuries occurring in the year 2000 would total $40 billion over the lifetimes of the injured. This estimate includes medical care costs, household and wage work losses, and the value of pain, suffering, and lost quality of life. However, these costs do not include mental health costs, legal and court costs, police and fire service expenses, travel delay costs, and disruption costs to employers of the injured and their families.[71]

According to the FHWA, bike lanes cost between $5,000 and $50,000 per mile to install, which depends upon the condition of the pavement, extent of removing and repainting of lane lines, the need for adjusting signalization, and other factors.[72] These dollar amounts may appear expensive individually, but when included in the initial road design, these costs become a small portion of the entire road building project. Separated bike lanes vary significantly in cost depending upon what method of separation is used. PeopleforBikes.org developed costs for various lane separator systems, ranging from floating parking lanes at $8,000-16,000K per lane mile to planters costing between $80,000-400,000K per lane mile. Other divider options include delineator posts, parking blocks, jersey barriers, rigid bollards, cast in-place curbs, and pre-cast curbing. Examples of separated bike lanes treatments from low to high cost include:

- Parked cars in "floating" park car lane,
- Flexible delineator posts,
- Parking blocks,
- Cast in-place curb,

70 Posts Tagged 'Cost to Own a Vehicle': AAA Reveals True Cost of Vehicle Ownership, AAA Newsroom, Aug. 23, 2017.

71 Miller, Ted R., et. al., Pedestrian and Pedalcyclist Injury Costs in the United States by Age and Severity, Association for the Advancement of Automotive Medicine, 2004.

72 https://safety.fhwa.dot.gov/saferjourney1/library/countermeasures/10.htm.

- Jersey barriers,
- Planters, and
- 12-inch precast curbs.

A research study estimated that a basic 5-foot-wide pedestrian concrete sidewalk costs approximately $170,000 per mile to install. Additional pedestrian amenities, including ramps, signalized crossings, refuge island, curb-extensions, landscaping, and signs, would add to these basic facility costs.[73]

The economic impacts of various road-related building activities vary based upon the type of work each project involves. Two studies compared the rate of job creation in project development projects:

- A June 2011 study by Heidi Garrett-Peltier found that for each road-only building project, $1 million in investment resulted in 7.8 jobs. Projects combining road building with pedestrian and bicycle infrastructure created 8.5 jobs per $1 million investment, while multi-use intermodal projects created 9.6 jobs per each $1 million. Pedestrian-only projects created an average of 10 jobs per $1 million in investment, while cycling-only projects created 11.4 jobs per each $1 million in infrastructure investment.[74]
- An AASHTO 2012 study, commissioned to evaluate the impacts of the American Recovery and Reinvestment Act, found similar results. For each $1 million spent on the building of greenways, sidewalks, and bicycle facilities, 17 jobs were created; pavement-widening and new highway building projects produced 12.5 jobs; bridge building or replacement projects produced 11.6 jobs; safety and traffic management projects created 10.3 jobs; and pavement improvement produced 9 jobs.

These studies show that the development of active transportation systems have measurable economic benefits on the local and regional economy, for residents and visitors alike.

# Emerging Technology and Local Implementation

Trends and future technologies that influence bicycle and pedestrian travel are focused on two areas: micromobility and shared mobility.

- Micromobility is the use of light-weight, low-powered or human-powered personal transportation vehicles that are designed for short trips up to 5 miles. Per a definition created by Horace Dediu in 2017, micromobility devices have a maximum loaded weight of 1,100 pounds. E-scooters are the most well-known micromobility platforms. Other forms of micromobility include e-bikes, “hoverboards,” cargo bikes, and other devices. Providers of these devices focus on providing transportation alternatives to automobile-oriented transportation options.
- Shared mobility is transportation that enables users to reserve vehicles on a short-term, as-needed basis, increasingly through smartphone apps. Shared mobility can include micromobility (shared scooters, e-bikes, and traditional bicycles) but can also include ride hailing (Uber and Lyft) and carsharing (ZipCar). Advances in technology as well as evolving perspectives on car ownership and urban lifestyles have contributed to developments in shared mobility options in recent years.

Micromobility and shared mobility are gaining ground in what is becoming known as “first- and last-mile” connections. These terms are often used to describe the beginning or end of a trip made using public transportation. The gap from public transit to the destination is termed a last-mile connection. In many cases, people are more likely to use public transit if they feel that it is within walking distance. This is typically less than one-quarter mile for a bus and less than one-half mile for rail. When the distance is longer than these thresholds, or if there is an obstacle preventing access, micromobility and shared mobility options are increasingly filling that gap. New services, such as smartphone-enabled mobility-as-a-service (MaaS) platforms, promise to make trip planning and first- and last-mile connections easier. MaaS combines

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73 Bushell, Max, Bryan Poole, Charles Zageer, Daniel Rodriguez, Costs for Pedestrian and Bicycle Infrastructure Improvements: A Resource for Researchers, Engineers, Planners, and the General Public, UNC Highway Safety Research Center, October 2013

74 Garrett-Peltier, Heidi, Pedestrian and Bicycle Infrastructure: A National Study of Employment Impacts, Political Economy Research Institute, UMass – Amherst, June 2011.

real-time availability and scheduling data from public and private transportation services to offer travelers a range of options to reach their destination. Early examples emphasize their user-friendliness and potential to reduce journey times and car reliance while increasing equity, productivity, access to opportunities, and quality of life.

The following provides brief summaries of several emerging transportation technologies that may affect travelers' choices to walk or bike and identifies some considerations that should be evaluated by both MDOT and local units during their implementation. In no way is this an exhaustive listing of all the emerging transportation technologies, their issues, potential implications, and current thinking regarding these technologies.

## Bikeshare Systems

### *Description*

Public bike-sharing is an innovative strategy that supports the shared use of a bicycle fleet by individuals on a short-term basis. This can use a fee-for-service or be offered as a free service. In a bike share system, bikes may be borrowed and returned at docking stations. Alternatively, bikes may be part of a dockless system, where bikes may be found and left at any location within a defined service area. Hybrid lock systems have been developed to offer both physical station-based and "virtual station" bike-sharing, which improves the flexibility of the system to users. Information technology and smartphone mapping apps assist users in locating where bikes can be found and often provide a payment system for those programs that charge users applicable fees. Regarding fee-for-service systems, most vendors use a combined membership and pay-per-use billing system. Trip fees vary from a flat check-out fee for a certain period (with overage charges), which are typical for docked bikeshare systems, or on a per-minute basis, typical for dockless bikeshare. Bikeshare providers are now expanding their systems by adding e-bikes.

Bikeshare systems can provide additional transportation options in a manner similar to public transit. Users may be residents or tourists/visitors who will use the system for sightseeing and recreation. Commuters looking to add an element of exercise into their daily routine or travel short distances during the workday will often utilize bikeshare systems. It provides infinite route options over typically structured transit alternatives without the need to move their personal automobile.

### *Implementation Considerations*

According to the American Community Survey, bicycle use has been increasing in some major cities across the country since at least 2005.

#### Successful Uses

Several Michigan cities have deployed bikeshare systems that provide additional transportation options to both tourists and residents.

#### Where to Use

These systems are most often deployed in central cities where lots of workers, residents, and visitors are present. They may also be deployed in cultural districts and near tourist attractions. Detroit has expanded its MoGo bikeshare program into several of its northwestern neighborhoods and into neighboring communities.

#### Challenges

Bikeshare systems are expensive to set up and maintain. Several Michigan cities have utilized grant funding and nonprofits to operate these systems. The 2019 NACTO Shared Mobility Report found that ridership growth has slowed to 10 percent in 2019 overall, and ridership on smaller bikeshare systems saw declines on 75 percent of the systems.

Safety is a concern with most riders not having their own bike helmets with them at the time of rental, resulting in their increased risks if involved in a crash. To address this issue, the type of bike, including the weight, frame, and width of the tires, are often selected to contribute to rider safety. Bike-sharing equipment is often painted with bright colors to alert drivers of their presence, and many bikeshare bikes include integrated lights, reflectors, and bells to increase visibility. Handlebar safety reminders are another safety precaution put in place by many bikeshare operators.

Equity is often a challenge for these networks to ensure that the bikeshare systems are available and equitably distributed in low-income neighborhoods. Individuals with disabilities are often excluded from these systems as well, but MoGo in Detroit has created a reservation system to offer a variety of adaptive bicycles that may be reserved.

#### Regulation

Local municipalities often own the dock locations and sidewalks where dockless bikes will be parked, so local permitting/approvals are often required.

#### Local Programs

Many bikeshare systems have been developed by local community development organizations in Michigan's larger cities, including Ann Arbor, Detroit, and Grand Rapids.

#### Education

Riders must be able to learn about the system's availability and they must be able to sign up and unlock the bikes easily and conveniently. Through educational programs, Chicago and Cincinnati have successfully targeted minority populations though educational programs and increased their ridership.

#### E-bikes

E-bikes have been added to several bikeshare networks, and these bikes expand the mobility impacts of bikeshare systems by increasing their system capacity over standard bicycles by extending comfortable riding range, increasing carrying capacity, increasing speed, and providing an opportunity for individuals who had previously given up riding to again choose it as a part of their mobility mix.

## Electric Scooter Share System

### *Description*

Similar in concept to bike sharing, electric scooter sharing makes scooters available to use as short-term rentals. Generally, dockless scooters can be borrowed and returned at any location within the service area. Providers are responsible for charging the scooter batteries, as well as redistribution after charging and maintenance. Electric scooters are a relatively new technology, having launched originally in 2012 in San Francisco. The most common method of payment is a pay-per-use system. In the past, scooters were often seen as recreational, but more and more are viewed as a viable method of transportation. As with bike sharing, scooters are used by commuters and residents, can offset traffic congestion, and can reduce transportation costs.

While electric scooter sharing systems have been available in a few large cities since 2017, there was a considerable growth nationwide in 2018. For-profit scooter companies launched in approximately 100 U.S. cities. The NACTO Shared Micromobility in the U.S.: 2019 report found that micromobility scooter trips increased 100 percent between 2018 and 2019.

Electric scooters are an effective tool to close first- and last-mile gaps.

### *Implementation Considerations*

The disruptive techniques employed by private shared scooter operators during their national expansion in 2018, combined with lack of local and state-level regulation, has generated public controversy.

#### Successes

As of fall 2020, scooter share systems have been deployed in several communities including Ann Arbor, Detroit, Lansing/East Lansing, and Grand Rapids.

### Where to Use

Electric scooter systems tend to be found in areas similar to bikeshare systems, with locations in dense urban areas that have a mixture of residents, workers, and visitors/tourists. As of 2018, Michigan adopted a law that now permits electric scooters, described as “electronic skateboards with handlebars” to legally operate on sidewalks. They may also be used on streets with posted speeds less than 25 mph and in bike lanes.

### Challenges

Parking is a serious concern, with complaints of blocked sidewalks and curb ramps and abandoned and damaged vehicles. To assure future viability and to leverage new technology that advances their mobility goals, municipalities will need to continue to balance scooter companies’ business interests with their responsibility as stewards of the public ways.

Ensuring equitable access to scooter systems based on income and race/ethnicity are serious concerns. According to the 2019 NACTO micromobility study, several systems have taken active steps to remove barriers to access including: Chicago (targeted advertising and reduced pricing), Cincinnati (customer service, discounted rides, and education), and San Francisco (rebalancing of vehicles).

Safety is also a major concern, due to the exposure of the rider and potential conflicts with vehicles. In addition, the small wheels on scooters make riders vulnerable to small imperfections in the road or sidewalk surfaces which could cause riders to crash.

### Regulation

In 2018 and 2019, scooter companies were actively entering markets without concession agreements with the local municipalities, but this trend has appeared to ebb significantly with licensing agreements now being completed before operators enter new markets. To allow for cross-jurisdictional use, East Lansing and Lansing adopted similarly worded ordinances. The Detroit Department of Public Works has issued a memorandum of interpretation with guidelines for best practices, safety, and preserving public spaces related to electric scooter sharing systems within the city and is currently developing a micromobility ordinance.

### Local Programs

As a part of the local operating agreements between the scooter providers and the municipalities, rider information-sharing agreements are negotiated and most of the providers allowing the municipalities to learn general information about ride trips.

### Education

To assist ridership in low-moderate and minority neighborhoods, education efforts have been shown to be successful to increase ridership in these communities.

## Carsharing and Ride-Hailing

#### *Description*

Carsharing makes vehicles available to individuals on a temporary basis without the costs and responsibilities of ownership. Users typically sign up for a membership with a private company (e.g., ZipCar) that maintains a fleet of vehicles within publicly accessible areas, paying a fee each time they borrow a vehicle. Carsharing companies provide a range of vehicles meeting diverse needs. Households can borrow a smaller, fuel-efficient car for long distances, or a larger vehicle with additional storage capacity when transporting more people or larger items.

Ride-hailing companies like Lyft and Uber connect drivers of personal vehicles with passengers. These services are prearranged or on-demand and match the transportation needs of consumers with compensation for personal vehicle owners. Smartphone applications facilitate these connections along with payment.

### *Implementation Considerations*

The rise of carsharing and ride-hailing has influenced vehicle ownership, mostly in large cities where these technologies are most prevalent, by offering lower-cost alternatives to those who drive less frequently.

#### Successful Uses

Carsharing services have floundered in the United States, with several companies pulling out of the country since 2018, but many companies are still successfully operating in Europe and Asia. Ride-hailing services have grown exponentially since Uber was launched in 2011. In communities that have suffered from poor taxicab service, ride-hailing services have increased the quality of service available to many.

#### Where to Use

As of fall 2020, ZipCar operates in nine Michigan cities (Ann Arbor, Dearborn, Detroit, East Lansing, Ferndale, Flint, Houghton, Oak Park, and Romulus). Ride-hailing companies operate in most larger Michigan urbanized regions.

#### Challenges

Carsharing services in the U.S. have had difficulties and Enterprise Carshare closed many of their U.S. operations during the COVID-19 pandemic. Ride-hailing applications have faced criticism for classifying drivers as independent contractors, non-compliance with minimum-wage laws, price-fixing, increased congestion, carbon emissions, and reduction in usage of public transport.

Equitable challenges arise with lower rates of smart phone ownership due in part to lack of credit and/or credit card access. This results in lower and moderate-income residents often having less access to ride-hailing services.

#### Regulation

In 2017, Michigan passed Public Act 345 that began regulating ride-hailing companies like limousine and taxicab companies with requirements for criminal background checks, vehicle inspections, and zero-tolerance policies for drivers operating drunk or drugged.

#### Local Programs

Smaller Michigan communities have struggled to establish ride-hailing services because of the smaller pool of potential drivers impacting their ability to offer around-the-clock services and enough riders to support the drivers.

#### Education

Discrimination based upon disabilities is not permitted in Michigan under its 2017 law, but there are concerns that not all special needs passengers are being accommodated without additional charges. Additional driver and customer education is required.

Reductions in vehicle ownership from carsharing and ride-hailing may lead to increased use of public transit and nonmotorized transportation options.

## E-Bikes and Other Personal Systems

### *Description*

Electronic assist bicycles (e-bikes) are rapidly growing in popularity in the United States. They are bicycles with either electric motor assist or may operate in full electric mode without passenger pedaling. E-bikes reduce riding effort and may increase the speed of the rider or distance that they are otherwise willing to travel. Michigan has adopted manufacturer-sponsored legislation that divides scooters into three product tiers that are noted below under Regulations.

Users of “hoverboards,” cargo e-bikes, and as-yet to be developed personal transportation systems will want to utilize the nonmotorized network. It is prudent to anticipate new platforms, designs, and uses as battery power, range, and reliability continue to improve.

### *Implementation Considerations*

Users of larger electric powered personal micromobility vehicles will want to utilize the nonmotorized network. Regulations regarding size of vehicles to be allowed on active transportation facilities and top speeds permitted will have to be developed and enforced.

#### Successful Uses

According to NPD Group, e-bike sales grew by 51 percent in 2019. E-bikes may increase the number of bicycle commuters and become an important tool for first- and last-mile transit connections. With the ease of e-bikes, former bicycle riders, including older populations and those with injuries or disabilities that prevented them from riding traditional bikes, may choose to take up riding again, which may diversify the riders who use on-street and off-street facilities.

#### Where to Use

Class 1 and Class 2 e-bikes may be used on roads, in bike lanes and on improved shared-use pathways and trails that regular bikes may be ridden unless otherwise posted. No class of e-bike is permitted on natural surface mountain bike trails unless signed to the contrary.

#### Challenges

Most e-bikes are significantly more expensive than regular bikes. Due to their increased costs, e-bike owners desire more intensive secure locking systems and parking areas located where they may be more easily observed.

#### Regulations

E-bike regulations are generally the same as bicycles according to Michigan law, with the rules of the road applying to both e-bikes and traditional human-powered bicycles. Michigan's adoption of the e-bike manufacturer's three-tier regulatory system includes:

- Class 1: Bicycle equipped with a motor that provides assistance only when the rider is pedaling, and that ceases to provide assistance when the e-bike reaches 20 mph.
- Class 2: Bicycle equipped with a throttle-actuated motor that ceases to provide assistance when the e-bike reaches 20 mph.
- Class 3: Bicycle equipped with a motor that provides assistance only when the rider is pedaling, and that ceases to provide assistance when the e-bike reaches 28 mph.

#### Local Programs

To ensure even deployment of e-bikes and other micromobility platforms that may assist those with disabilities to become more active again, communities may choose to develop programs that purchase/support shared e-bikes to ensure that they are more broadly available.

#### Education

With the broader deployment of e-bikes and other micromobility platforms, local efforts should be considered to ensure that underserved populations have confidence that these transportation tools are available for their use.

## Connected and Autonomous Vehicles

### *Description*

The connected and autonomous vehicle (CAV) is a new form of technology where a vehicle uses sensors to interpret its environment to move safely with little to no human input. At present, a range of CAVs are actively on the roads or being tested. A full autonomous taxi service was launched in December 2018 in Chandler, Arizona, and some newer models of personal vehicles have been produced and sold to the public requiring various levels of human intervention during driving. The long-distance trucking industry has also invested in adopting the technology into its practices to increase safety and fuel efficiency.

Autonomous delivery vehicles, also known as delivery bots and delivery drones, are a second autonomous vehicle market segment. Restaurants, grocery stores, and retailers are interested in utilizing this type of platform to deliver products directly to user homes. An Ann Arbor-based company conducted testing in fall 2019.

#### *Implementation Considerations*

The long-term implications of full integration of CAVs have the potential to be profound and far-reaching. From land use and road and vehicle design to insurance and delivery options, it is yet unknown what the number of changes to daily life is that could result from CAVs. Over the next couple of decades, their adoption could significantly upend transportation in general. In the transition phase, it has been predicted that small-scale autonomous delivery vehicles will be operating on sidewalks, in bike lanes, and on shared-use paths, affecting active transportation.

#### Successful Uses

CAVs and delivery bots/drones are still in the testing phase and deployment is predicted to occur over the near to mid-term period.

#### Where to Use

Deployment is expected to be nearly universal, although as deployed increases, use restrictions may be implemented in some locations.

#### Challenges

Issues concerning safety are the largest and most important questions surrounding the deployment of CAVs. Near universal acceptance of CAVs may also be a challenge. Another challenge might be the imbalanced deployment across urban and rural areas.

#### Regulation

As of fall 2020, the Michigan Legislature is in the process of adopting a law that would establish regulations allowing for-profit companies to use semi-autonomous “personal delivery devices” (autonomous delivery vehicles/delivery bots) to utilize roads and sidewalks for deliveries. Additional regulation will be likely as this market continues to evolve.

#### Local Programs

Too early to identify at this time.

#### Education

CAVs will need to be programmed to adapt to interactions with humans in pedestrian spaces to ensure that both able-bodied pedestrians and individuals with disabilities aren’t negatively impacted. It will take time for pedestrians to adapt to the additional uses of pedestrian spaces, and agencies deploying said vehicles in pedestrian spaces should implement educational campaigns to minimize the number of conflicts between pedestrians and delivery bots.

As discussed in the 2018 report, The Shared Use City: Managing the Curb, prepared by International Transport Forum, there is evidence of growing congestion in prime ride-hailing drop-off and pick-up locations, and this will likely increase with full deployment of CAVs. To address this congestion, municipalities and their parking regulations will have to adapt, which will impact curb areas, bike lanes, and sidewalks.

## Smart Phone Applications

#### *Description*

Smart phone applications are playing an increasingly important role in transportation networks and connecting people to multimodal transportation options. Many of these applications can be used to aid in understanding the services and choices available to users and what influences travel behavior. Applications can be linked directly to transportation services, such as the locations of shared mobility options or real-time information on public transit schedules and availability. Digital mapping and route planning service apps (Google Maps, MapQuest, and Waze) provide smart

phone users with route choices based upon parameters that they may choose (most direct, no freeways), and these applications may provide turn-by-turn prompts to assist navigation. Additionally, applications may be indirectly connected to transportation services, such as health applications, environment/energy consumption applications, or insurance applications, including drivers who use a pay-per-mile auto insurance model.

To ease the integration of all the public and private transit options now available, MaaS applications are being developed that will create unified portals that will create and manage trip planning for users. Through MaaS, a single application will plan the trip, select and reserve the various providers (e.g., ride-hailing ride to public bus, to ferry, to ride-hailing), and pay for all of the trip segments through a single portal, often on a user's smart phone.

Ride-hailing is one of the most visible smart phone applications that have disrupted motorized transportation services. Smart phone applications may be able to play a role in selecting active transportation options, especially in the first- and last-mile settings.

### *Implementation Considerations*

#### Successful Uses

Ride-hailing, route planning, information gathering, trip planning (MaaS), congestion avoidance, work zone area identification, and exercise app mapping are only a few of the currently available smart phone uses for transportation.

#### Where to Use

They are nearly ubiquitous where cellular phone service or Wi-Fi is available.

#### Challenges

User data security is a major concern where personally identifiable information (PII) may be actively collected without the phone user's knowledge. Smart phone app developers collect a significant amount of data that may be useful to transportation planners, but these companies may not be willing to share this proprietary information with the transportation entities that could utilize this information for improving transportation for the broader public. One concern regarding this data is that this application-based information can be very specific to certain app users so that the reliability of this data may not be representative of all travelers. To be able to use this information in a broader context, it will have to be evaluated and normalized to determine if it is applicable to all or if the patterns and information provided is only valid to a specific subset of travelers. Public agencies and application developers should consider ensuring digital accessibility. While smart phone ownership continues to grow, the cost of devices and data packages can be prohibitive for low and moderate-income households. It is important that communities work with disadvantaged households to ensure that information provided via smart phone applications are still available in other formats. In addition, less urbanized areas and rural areas may face additional challenges in operating and supporting smart phone applications. Cellular networks, data speeds, and service quality may be intermittent, and may make it difficult for users in these areas to utilize mobile transportation applications.

#### Regulation

Public agencies and governments can play a role in alleviating some risks by addressing privacy issues through security standards and consumer privacy protection laws.

#### Local Programs

Not applicable.

#### Education

Older and disabled individuals may need special assistance and training on how to engage with their smart phones.

Route-planning applications have impacts upon travel choices made by users. These apps' route-planning algorithms make decisions based upon traffic, construction, specific traveler interests (e.g., only bike lanes), and other inputs that users may not have been aware of previously. These tools may also be beneficial to road agencies by granting them the ability to direct travelers around work zones.

For trips requiring multiple modes, deployment of MaaS will simplify route planning and may make multiple-leg trips more competitive compared to travelers just choosing to drive in their own personal vehicles. One of MaaS's goals is also to unify all transportation systems into a single application so that users will not have to learn and use multiple travel planning applications for different destinations. MaaS technology will be able to assist with easing first- and last-mile connections.

## Local Implementation Consideration

With new mobility technologies and widespread deployment of active transportation facilities, significant changes are occurring on Michigan's roads. These transportation changes may be the most substantial since the widespread adoption of the automobile more than a century ago in the 1910s. Ride-hailing services and e-commerce deliveries, for instance, are placing new demands on curb space and changing the conversation about parking.

The following sections describe items that regional, county, and local jurisdictions, as well as private practice consultants and other organizations interested in the expansion and safe operation of the active transportation network, will have to consider in the near future.

### *Reallocation of the Curb*

This term refers to changing how much of the street curb on any given block is reserved for vehicular parking, curbside bike lanes, delivery loading and unloading zones, and transit stops. Until recently, most cities actively worked to provide the largest amount of on-street parking available. With the advent of ride-hailing services increasing the numbers of people arriving without having to park a vehicle, the need for on-street parking is less of a priority in certain areas. Conversely, ride-hailing services are creating a growing demand for pick-up and drop-off zones. With the changing delivery models, curb space should be considered as more of a terminal where bikeshares, micro-transit, and autonomous shuttles are located instead of uniformly parallel-parked passenger cars. Efforts should be devoted to prioritizing curb access over vehicular storage, which may increase areas for pedestrians and bicyclists.

### *Autonomous Delivery Vehicle*

Companies have begun to pilot the use of driverless delivery vehicles. Some of these vehicles will be traditional-sized panel vans that will require a human to access the vehicle while other delivery vehicles may include a number of smaller vehicles (delivery bots or drones) that will utilize the sidewalk to directly deliver the door. These delivery bots will be delivered by a larger vehicle to a location where a wave of delivery bots will be released onto sidewalks and active transportation routes. Active transportation users will have to become accustomed to small personal delivery devices operating in areas that were traditionally reserved for pedestrians and bicyclists. Active transportation facility design may have to be revised to accommodate these devices, and in certain busy areas, these facilities may have to be expanded to safely accommodate the added number of users.

### *Increased Need for Charging Stations and Micromobility Parking*

Currently, there are few communities that mandate required spaces for parking of micromobility devices like bicycles and scooters. With the anticipated growth of e-bikes and other electric-powered micromobility vehicles, there will be an increasing demand for covered and enclosed parking spaces that offer electrical charging as well. With the higher costs of e-bikes and other electric-powered micromobility vehicles, parking area security will be a concern. Locations should be selected that are generally visible and afford surveillance and are located near business entrances.

### *First/Last-Mile Connectivity Improvements*

To ensure equity and increase transit ridership, local, regional, and statewide entities should become more involved in working with transit providers to ensure that first/last-mile improvements are made. These approaches include significant infrastructure improvements at and around transit stops, greater emphasis on pedestrian-network connectivity, enhanced active transportation routes, and regulations that encourage more intensive transit-orientated development near all transit routes.

### *Flexibility in Adapting to New Micromobility Systems*

As battery technology improves, the diversity of micromobility platforms is expected to grow exponentially in the coming years. As autonomous vehicles develop, it is forecasted that their deployment may allow for narrower lanes and shorter following distances. Several researchers are anticipating changes to roadway width requirements, and it may be possible for new active transportation lanes to be established for autonomous and human-guided and propelled micromobility platforms. Uniformity in the development of the design and regulation of these lanes will be required.

## 2020 Pandemic Trends

In March 2020, significant changes occurred within Michigan's active and motorized transportation networks due to the COVID-19 pandemic reaching Michigan, and there has been a significant drop in motorized travel during this time. More than 20 percent of working Michiganders were laid off or furloughed in the second quarter of the year, with many other workers working remotely on a daily basis.

Communities across the U.S. took steps to create temporary bike lanes to increase areas for bike riding, while also growing areas for increased social distancing on sidewalks and allowing retailers and restaurants to utilize sidewalks in downtown districts for expanded business uses, primarily dining. Some of these temporary facilities may remain after the pandemic ends.

Because of these work changes and the closure of schools, commuting and motorized traffic were cut drastically on Michigan roads. At the same time, active transportation increased significantly during the same time period. There were dramatic increases in active transportation modes for both transportation and exercise. Eco-Counter, a cycling analysis company, reported a 253 percent increase in biking levels in the western U.S. in late April 2020. It is expected that much of the state's vehicle traffic will return to pre-pandemic levels over time, but remote working and increased active transportation use is expected to continue to some degree. The extent of these changes is currently unknown.

CHAPTER 5

# Policies, Programs and Practices

## Zero-Focused Traffic Safety Programs

### Description, Local Context, and Implementation Resources

Zero-focused traffic safety programs are national initiatives focused on reducing traffic fatalities to zero, with the shared goal of safe mobility for all people. The three programs include Toward Zero Deaths (TZD), Vision Zero, and Road to Zero. These programs have expanded exponentially since the millennium as communities around the world became concerned with unacceptable rates of traffic deaths, particularly pedestrians and bicyclists, who suffer fatalities and serious injury crashes at rates much higher than motorists. Initiatives such as the zero-focused traffic safety programs in the United States and around the world have been growing over the last 25 years to address this concern.

#### *Description*

In 1997, Sweden was the first country to adopt a national Vision Zero policy with the stated goal of eliminating all traffic-related deaths, viewing the causes that lead to traffic deaths as preventable. Since then, these zero-death focused campaigns have expanded worldwide. These zero-focused efforts strive toward reducing the number of people killed worldwide because of traffic crashes. Numerous entities estimate that up to 1.5 million people die annually in traffic-related crashes across the globe.

These traffic safety efforts are now broadly referred to as zero-focused traffic safety programs. Their goals are all very similar – to prevent all avoidable traffic fatalities and eliminate all avoidable serious injury crashes – but their approaches are different.

#### *Local Context*

Impetus to focus on the elimination of fatalities in the U.S. grew in the 2010s as traffic deaths began to increase after a general decline from America's peak year in 1972. In 2019, the National Highway Traffic Safety Administration (NHTSA) recorded 33,654 fatal motor vehicle crashes in the U.S., with 905 occurring in Michigan. The National Safety Council estimated that 4.4 million people were injured enough to require medical attention. During the COVID-19 pandemic, the rate of fatalities spiked in 2020 by nearly 25 percent, the highest increase since 1924. An additional 400,000 roadway users were seriously injured.[75]

Of particular concern was the number of fatalities and serious injuries suffered by pedestrians and bicyclists. In 2009, there were 4,109 pedestrian deaths in the U.S., climbing to 6,283 in 2018. The proportional number of pedestrian fatalities increased from 12 percent of all traffic deaths in 2008 to 17 percent in 2018.[76] In 2018, 857 bicyclists were killed. Of the 36,560 traffic fatalities reported in 2018, pedestrians and bicyclists comprised 19.5 percent of all traffic fatalities, which are the highest share of fatalities since 1990.[77]

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75 https://www.nsc.org/newsroom/motor-vehicle-deaths-2020-estimated-to-be-highest.

76 National Center for Statistics and Analysis, 2018 Fatal Motor Vehicle Crashes: Overview, National Highway Traffic Safety Administration, Washington DC, October 2019.

77 Traffic Safety Facts – Research Note, National Highway Traffic Safety Administration, DOT HS 812 826, October 2019

A new focus on engineering safety has spurred the creation of several zero-focused American traffic safety efforts with the goal for eliminating all traffic-related deaths. The three largest efforts to reaching zero deaths support the same goal of safe mobility for all people are Road to Zero, TZD, and Vision Zero. The goals are similar, but the approaches vary. TZD emphasizes behaviors/personal responsibility and uses enforcement and education tools. On the other hand, Vision Zero places the onus of responsibility on government agencies and professional designers, observing that design drives behavior and emphasizing safe system design that slows speeds. All these efforts work with their constituent groups to incrementally reduce American traffic deaths and serious injuries toward the zero goal.

Each of these campaigns focus on different sectors of American transportation, and the following sections elaborate on specific initiatives of each campaign.

### Road to Zero

Road to Zero is a collaborative effort led by the National Safety Council in partnership with various agencies within the U.S. Department of Transportation (USDOT), including FHWA, the Federal Motor Carrier Safety Administration, and the NHTSA. The Road to Zero coalition is managed by the National Safety Council and includes advocacy organizations and associations such as motor vehicle, motorcycle, pedestrian and bicycling groups, DOTs, government, cities and counties, automotive and auto makers, business, education, insurers, public health and medical centers, and survivor/advocates.

Efforts are focused on strengthening existing evidence-based roadway safety programs while supporting technology improvements in vehicles and infrastructure and implementing a safe system approach, which aims to support a shift toward a roadway safety culture built on greater collaboration.

The safe system approach strives to reduce human error and severity of injury, and is based on the following tenets:

- Humans make mistakes that can lead to road crashes.
- The likelihood of severe injury increases dramatically with increases in speed.
- It is a shared responsibility to ensure road crashes do not lead to serious or fatal injuries.
- All parts of the system must be strengthened so that if one part fails, road users are still protected.
- A proactive approach should be taken rather than waiting for events to occur and reacting.
- No death or serious injury should be accepted in return for faster mobility.
- It is critical to identify and understand crash causation and make evidence-based decisions.[78]

### Toward Zero Deaths

TZD is a national highway safety campaign that developed out of a 2009 national safety workshop held in Savannah, Georgia. A National Strategy on Highway Safety – Toward Zero Deaths was the result of this workshop and subsequent conferences and meetings. TZD organizations include state roadway agencies and designers, including enforcement, engineers, auto manufacturers, and marketers of safety. This strategy was formally released in June 2014.

In Michigan, the TZD effort is jointly led by MDOT and the Michigan State Police (MSP). TZD focuses on six emphasis areas:

- Safer drivers and passengers,
- Safer vulnerable users,
- Safer vehicles,
- Safer infrastructure,
- Enhanced emergency medical services, and
- Improved safety management.

78 Abel, Sarah, Jeffrey A. Lindley, and Jeffrey F. Paniati, Road to Zero: Taking a Safe System Approach, ITE Journal, May 2020.

All six areas support the development of a traffic safety culture, striving to create an environment where drivers refrain from risky behaviors and safety is incorporated into decisions by all transportation system decision-makers.

Actions include dynamic messaging that reports the numbers of fatalities to date in Michigan; local safety initiatives that assist local agencies with crash analyses, field visits, and identifying safety countermeasures; road safety audits; education efforts; design options; and supporting and enhancing existing safety programs.

The FHWA states that zero fatalities on our nation's roadways is the only acceptable goal. The FHWA does not prescribe a methodology for states to set their annual safety performance targets, giving states flexibility; however, they encourage states to review data sets, trends and factors affecting targets so that targets are data-driven, realistic, and attainable. In efforts to meet FHWA performance management requirements, Michigan communities are encouraged to implement additional zero-focused safety programs, as described in the following section.

### Vision Zero

Vision Zero efforts are collaborative in nature and participants are mainly municipalities, who engage in peer-to-peer sharing and weave equitable public involvement in the planning process. The four Vision Zero principles are:

- Recognize that traffic deaths are preventable, and are a public health issue best addressed by prevention-based systems-level strategies.
- People make mistakes and safeguards should be in place within the transportation network to lessen the severity of human error.
- Utilize an interdisciplinary approach to roadway safety that includes a diverse group of stakeholders, including public health, transportation, policymakers, law enforcement, and communities.
- Utilize data to drive safety decisions that combine the power of data with human experience and an ethical responsibility to ensure public safety.

Once a community has committed to Vision Zero, its next step is to create an action plan to guide implementation. These plans prioritize proven safety strategies deployed across multiple departments. One of the key concepts is that through a systems-based approach, saving lives is not expensive but develops and expands over time. Like Road to Zero, Vision Zero is based on the safe system approach.

Vision Zero incorporates a significant equity element into the planning process, striving to ensure that marginalized and vulnerable communities' safety issues are addressed. One common approach is to prioritize safety improvements in traditionally underserved areas, which tend to bear a disproportionate burden of traffic-related injuries and fatalities. This process is accomplished through including robust engagement strategies to reach the most vulnerable and traditionally underserved populations during action plan development and continued evaluation during implementation.

Recently, Vision Zero efforts have increasingly focused on engineering and design interventions proven to prevent traffic deaths, as well as equity. Lowering speed limits and controlling speeding have become central to many national and local Vision Zero strategies. Enforcement has been de-prioritized in recognition that safe design precludes the need for enforcement and the inequitable impact of enforcement and fines on communities of color.[79]

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79 https://visionzeronetwork.org/acting-for-racial-justice-just-mobility/

### *Implementation Resources*

The following table is a partial listing of zero-focused safety resources that are available on the internet.

***Table 5.* Educational Resources**

| Agency | Content | Web Address |
|---|---|---|
| City of Ann Arbor | Localized Approach for Vision Zero | https://www.a2gov.org/departments/engineering/pages/ann-arbor-moving-together-towards-vision-zero.aspx |
| Detroit Greenways Coalition | Localized Approach for Vision Zero | http://www.detroitgreenways.org/vision-zero-detroit/ |
| Institute of Transportation Engineers | Vision Zero Task Force | https://www.ite.org/technical-resources/topics/transportation-safety/vision-zero/ |
| MDOT | TZD | www.Michigan.gov/ZeroDeaths |
| National Safety Council | Program Information | http://www.nsc.org/road-safety/get-involved/road-to-zero |
| Pedestrian and Bicycle Information Center | Pedestrian and Bicycle Information | http://www.pedbikeinfo.org/ |
| TZD | Safety Strategies Marketing and Communication | http://www.towardzerodeaths.org/ |
| USDOT | National Safety Initiative and Resources | http://www.safety.fhwa.dot.gov/zerodeaths/ |
| Vision Zero Network | Main Resource for Municipalities | https://visionzeronetwork.org/ |

## Education and Encouragement

### *Education*

The zero-focused safety initiatives include educational programs directed at both the public and transportation system professionals. The public educational efforts are targeted toward increasing safety education and awareness for the traveling public regardless of mode of travel. However, most educational efforts targeting transportation professionals involve how to design the various components of the transportation system to improve safety for all users.

All zero-focused safety programs should undergo periodic refreshing to ensure they continue to be current, timely, effective, and are based on the latest research.

### General Public

To create a culture of safety, zero-focused safety efforts targeting the public include:

- Conducting public safety campaigns focused on preventability and the leading contributors of fatal and serious injury crashes, particularly driving behaviors that lead to deaths and serious injuries for people walking and biking. This includes focusing on improving safety culture of modifying motorist behaviors such as speeding, use of cell phones and other distracted driving, and driving under the influence. MDOT provides a wide range of resources and educational videos on their website (Table 5).
- Encourage local safety programs, as well as utilizing data to prioritize the most effective educational strategies. Knowing the most frequent crash locations involving pedestrian and bicyclists and utilizing a data-driven approach can assist in educating the community and other stakeholders. Evaluation of public safety programs will help road agencies determine how well they are working individually, how they interact with other safety efforts, and how they should be improved. Funding and staffing are necessary to implement these results.

### Practitioner Education

Practitioner education is geared toward establishing a culture of safety among transportation professionals and law enforcement by:

- Regularly updating and communicating information on new and existing safety laws and technologies to decision-makers, design professionals, and law enforcement.
- Improving training and education for all design professionals, emphasizing speed reduction and bicycle and pedestrian safety.
- Improving access to data and best practice examples to evaluate alternatives, conduct outreach, and adopt effective policies and plans.
- Providing training to road agency employees regarding safety programs, including best practices and results of effective safety program implementation.
- Aiding local communities in investigating crashes and identifying and deploying countermeasures (examples include the provision of centerline rumble strips and increased use of higher-friction pavements on curves and installation of pedestrian refuge islands).
- Providing training on how to systematically perform road safety audits where routine consideration is given for active transportation facilities that can be built independently and/or in conjunction with roadway projects.
- Expanding/enhancing outreach efforts to new and existing safety partners across all modes and disciplines (e.g., public health), including materials and communications to be used by all.
- Expanding opportunities for peer-to-peer networking for municipalities through MDOT support of the Vision Zero efforts and providing technical assistance to improve the quality and ease of implementation of local action plans.

### *Encouragement*

Encouragement efforts for zero-focused safety programs include:

- Expanding or initiating participation in safety efforts that tie into existing efforts like U.N. Global Safety Week, National Youth Traffic Safety Month, Pedestrian Safety Month, etc.
- Supporting temporary pilot efforts that may improve transportation safety in an area or testing of temporary active transportation facilities that may become permanent.
- Supporting the initiation of safe driver challenges and provide incentives for the programs.

- Encouraging the implementation of Complete Streets strategies by all roadway agencies and entities providing design services. As there is not a requirement to reporting or tracking Complete Streets policies, the full picture of the Complete Streets efforts in communities across Michigan is unknown and may have lost momentum since 2012. Increased participation is encouraged among communities and designers. Partnerships of organizations including state, county, local entities, and groups such as the Michigan Municipal League (MML), League of Michigan Bicyclists (LMB), American Association of Retired Persons (AARP), and a host of other agencies and organizations that are encouraged to take an active role to reinvigorate this effort.
- Supporting the spread of the concept of play streets, one-time or recurring events that temporarily close public streets, allowing area children to use the right of way for play, and open streets, which allows residents and visitors to reimagine what is possible for street design and street use. MDOT and local agencies should ensure its permitting guidance supports these passive uses of the right of way.
- Supporting short and long-term efforts to change the public and practitioner safety culture.

An example of safety culture change can be found in Detroit. The City of Detroit completed its first nonmotorized urban transportation master plan, which established a framework for future action (formally adopted in 2008). Biking culture continued to expand in the early 2010s in the city with much progress being made on building out parts of the system envisioned in previous plans. Detroit has expanded and enhanced pedestrian amenities, including providing safe walking connections to Midtown, New Center, Corktown, and the Villages neighborhoods, mobility corridors, separated bike lanes, and shared-use paths. In addition, the city has developed a robust SRTS program, the Dequindre Cut, and the Detroit Riverwalk.

Another example of the safety culture shift is found in the city of Grand Rapids. The city has adopted Vision Zero principals through their Vital Streets Program. These goals have become part of the city's value system; when developing projects, they always include Vision Zero principles. They will take action to work toward making progress toward the "zero" goal. There was a Vision Zero resolution made at the city commission level in order to "cement" this into the city's process, and it has become a tenant of the city's planning documents. Grand Rapids is looking at Vision Zero from a comprehensive level, beyond just infrastructure, including guidance documents, policy, and education.

Other examples include Traverse City's successful trial of temporary painted bike lanes on 8th Street, which has led to permanent separated bike lanes and a road diet in the trial area. In addition, Detroit and other cities have also used open streets to illustrate the value of well-balanced streets to communities, which may support changes in the concept of what streets can be and what users should have access to these facilities. Other successful examples in various Michigan communities can be found in Appendix B of the Michigan Active Transportation Plan.

## Policy and Planning Trends Analysis

### *Policy*

Efforts to advance equity have taken on a new gravity during the 2020s in the United States, including equal access to active transportation. Inequities that disabled people, minorities, and low-income residents face regarding fatalities are trending upward, with urban fatalities among these groups increasing 34 percent since 2009, pedestrian fatalities increasing by 69 percent and fatalities among cyclists increasing by 48 percent over the same period.[80] Equitable safety measure trends support walking and biking to protect from injury and death, which, nationwide, has a disparate impact on low-income people, women, and people of color. Recommended strategies to identify and mitigate these trends include the following:

- Conducting a system-wide analysis of Michigan's active transportation network to identify safety priority corridors through design audits and crash incident reports and incorporate a safety improvement ranking in the state's project selection evaluation process.
- Altering Michigan's state agencies, MPOs, universities, and other applicable agencies' fleet vehicle procurement standards to encourage purchase of compact, low stand-over vehicles with features proven to optimize pedestrian and bicyclist safety. As most pedestrians are struck by the front of a vehicle, taller vehicles impact the pedestrian higher on the body and tend to be more severe.

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80 Traffic Safety Facts – Research Note, National Highway Traffic Safety Administration, DOT HS 812 826, October 2019.

- Tracking the number of partners working with the state's TZD program, the number of attendees at safety events, and the number of people downloading safety/crash data, all of which foster the state's safety culture.
- Engaging in mainstreaming of Road to Zero and Vision Zero design and policy principles to ensure internal rapid adoption of a safe system approach and development of a broader traffic safety culture across Michigan. MDOT actively tracks crashes and continually publishes updated numbers posted to their website.

The Michigan Strategic Highway Safety Plan (SHSP) identifies pedestrians and bicyclists as at-risk road user emphasis groups. The SHSP recommends determining which communities and cities have the highest need for increased pedestrian and bicycle safety efforts and prioritizing resources there. In addition to addressing the safety needs in these communities, the use of best practices in the design and operation of facilities should happen statewide. SHSP pedestrian and bicycle safety strategies include:

- Identify and promote the use of best practices when designing and operating facilities.
- Raise awareness of pedestrian and bicycle safety initiatives.
- Determine focus communities, cities, and agencies for priority assistance using data.
- Provide recommendations related to pedestrian and bicycle safety legislation.
- Support, promote, and implement the TZD national policy.

Currently, motor vehicle crash data is not obtained for several situations where incidents involving pedestrians and bicyclists occur. Incidents involving trains/horse-drawn/self-propelled street cars with pedestrians and bicycles are not reported in roadway crash data because a motor vehicle is not involved, thus no UD-10 crash report is generated. Another area outside of current data reporting is pedestrian and bicycle crashes caused by motor vehicles on private property. Generally, a UD-10 crash report is not generated because the incident did not occur within a public highway right of way. To better identify the number and types of crashes involving pedestrians and bicycles, these incidents could be submitted to MSP and collated so that the cause(s) of such incidents can be understood, and safety countermeasures implemented where appropriate.

In instances where UD-10 reports are made, categories that could be included to assist practitioners in better analyzing these types of crashes include data on:

- Specific Pedestrian/Bicycle Location Information
  - At intersection
  - Not at intersection
- Specific Pedestrian/Bicycle Action Information
  - Crossing against signal
  - Crossing without signal
  - Crossing at unsignalized marked crosswalk
  - Crossing at unsignalized unmarked crosswalk
  - Walking/riding along roadway with traffic
  - Walking/riding along roadway against traffic
  - Emerging from in front of or from behind a parked vehicle
  - Going to or from school bus
  - Playing in roadway
  - Not in roadway

### *Planning Trends Analysis*

Adoption of zero-focused traffic safety programs have shown promising results across the globe, and Michigan should continue to adopt these approaches across all parts of the state's transportation planning and facility delivery systems. Utilization of active transportation analysis measures like safety audits, multimodal level of service (MMLOS) or bicycle level of comfort (BLOC) studies could be incorporated as safety proxies in selection of funding for transportation projects.

As active transportation planning becomes more widespread in Michigan, data collection about the users and safety issues will become more important and valuable. This data collection should be encouraged and supported so that the results may support safety-related design guidance.

## Land Use and Zoning Implementation

Zoning and community master plans set the basic community form. There are several land use policies and zoning requirements that can assist in improving active transportation safety, including:

- Revising zoning requirements that ease/support the implementation of access management design requirements, which limits curb-cuts along commercial corridors and driveways crossing sidewalks and bicycle pathways. In conjunction with access management efforts, traffic calming measures and/or traffic safety measures (i.e., medians, narrowing lanes, crosswalk enhancements, etc.) should be considered to improve road crossing conditions and ease of use by pedestrians and bicyclists.
- Ensuring that local site plan reviews include the requirement that onsite sidewalks or pathways connect efficiently and safely to the surrounding public active transportation network. This requirement would apply to all schools, whether new construction on newly developed properties or rebuilding on existing properties.
- Requiring the building of sidewalks and pathways when sites are developed instead of waiting until adjoining properties are developed.

Each of these actions either improve or expand local active transportation networks that increase safety for all roadway users.

## Design Guidance

Traditionally, roadway design guidance has placed a priority on traffic speed and safety of the motorist at the expense of other roadway users. To adjust this focus toward zero-focused traffic safety, implementing the following measures should be considered:

- Revise engineering standards away from requiring 12-foot-wide lane widths in urban areas and consider narrower curb-to-curb streets designs that slow traffic by utilizing lane width minimums based upon adjoining land use, traffic, and other variables.
- Ensure that tight curb radii, curb bump-outs, and other safety countermeasures are deployed along arterials, collectors, and local streets.
- Routinely evaluate the applicability of the 85th percentile speed limit method and mandate/permit other approaches to establish safer speed limits, especially in urbanized areas, to ensure that posted speeds do not prioritize speed or throughput over pedestrian/bicyclist safety.
- As zero-focused goals include improving bicycle and pedestrian safety, access, and mobility as part of all primary and secondary highway projects, the state has a design exception process in place that must be followed. This process is intended as a solution of last resort when a specific element of a project does not lend itself to active transportation design elements that meets minimum standards. The unintended consequence is that when faced with the task of seeking a design exception, many projects simply forgo the active transportation components of the project. One way to minimize such a negative outcome is to develop an easy-to-use design exception process and associated tracking mechanism that will allow projects to proceed based on context-sensitive design solutions.

Expand use of new design guidance and tools should be incorporated in with the zero-focused safety efforts. Performance-based practical design (PBPD) is a decision-making approach that assists agencies in better managing transportation investments to address system-level needs and performance priorities given limited resources. PBPD uses quantitative analyses to guide decision-making, including safety and operations analysis throughout the project development process. It emphasizes scoping projects to meet an agency's core purposes and needs.

Fully implementing PBPD would require a cultural shift for MDOT and local agencies in relation to planning and programming as well as project design. Data driven safety analysis (DDSA) can be implemented utilizing the AASHTO Highway Safety Manual (HSM). Adoption of PBPD by MDOT will require the use of DDSA, which utilizes the HSM. Discussions are being held when to implement incorporation of these safety methods.

Michigan provides calibrated data for the manual's use in the state. The HSM facilitates safety-focused project scoping and delivery by integrating safety analysis and countermeasure selection alongside other transportation performance measures.

DDSA is a separate process that employs newer evidence-based models to quantify safety impacts.

Michigan has undertaken additional programs to make use of roadway, traffic, and crash data to improve safety. These include the Local Safety Initiative, which offers technical assistance to local agencies with road safety audits and local road safety plans; the use of Roadsoft, a GIS-based roadway management system including crash data; and input into MSP training programs and materials that ensures quality reporting of crash information.

Additional specific technical planning, scoping and design guidance materials related to active transportation are included in the Appendix C of this report.

# Complete Streets

Complete Streets are streets designed so that different modes of transportation (pedestrians, bikers, motorized vehicles, and transit) can all safely access and use the transportation network. The concept of Complete Streets isn't a static idea, rather one that is constantly evolving. Complete Streets requires significant communication and coordination between state, county, and local agencies with regulatory actors and the public all being part of the design conversation.

During the COVID-19 pandemic, most municipalities have experienced a surge in active transportation (walking and bicycling) and have modified their streets to accommodate that increase in use. The different measures local governments have taken to make active transportation alternatives safer for a wider range of users include lane reductions, traffic calming or slow street measures, and total street closures. The COVID-19 pandemic has demonstrated the public's desire for a true multimodal transportation network that safely accommodates and provides equitable access for all users.

As the primary state agency, albeit one with only limited oversight over the state's entire road network, MDOT sets the example for local and regional implementation of Complete Streets and serves as an informational and policy resource for MPOs, county road commissions (CRC) and local governments. Within Michigan, some jurisdictions have adopted Complete Streets ordinances while others have developed policies requiring Complete Streets consideration when possible. In all cases, local zoning, street design requirements and public input determine different treatment options on local streets. MDOT controls only about 6 percent of roadway open to bicycles and pedestrians, thus these local and regional agencies are the key to creating a connected multimodal transportation network.

## Description, Local Context, and Implementation Resources

Michigan Public Act 135 of 2010 legally defines Complete Streets in Michigan as "roadways planned, designed, and constructed to provide appropriate access to all legal users in a manner that promotes safe and efficient movement of people and goods whether by car, truck, transit, assistive device, foot, or bicycle."

The USDOT defines Complete Streets as "streets designed and operated to enable safe use and support mobility for all users. Those include people of all ages and abilities, regardless of whether they are travelling as drivers, pedestrians, bicyclists, or public transportation riders."[81] SGA goes further in its definition:

81 USDOT. https://www.transportation.gov/mission/health/complete-streets.

> Complete Streets are streets for everyone. They are designed and operated to prioritize safety, comfort, and access to destinations for all people who use the street, especially people who have experienced systemic underinvestment or whose needs have not been met through a traditional transportation approach, including older adults, people living with disabilities, people who cannot afford or do not have access to a car, and Black, Native, and Hispanic or Latino/a/x communities. Complete Streets make it easy to cross the street, walk to shops, jobs, and schools, bicycle to work, and move actively with assistive devices. They allow buses to run on time and make it safe for people to walk or move actively to and from train stations.[82]

Complete Streets mark a significant departure from the historic approach to street design, which focused primarily on the safety and efficiency of motorized vehicles as the primary design consideration.

### *Description*

Michigan Public Acts 134 and 135 of 2010 defined and established the guidelines for Complete Streets in Michigan and created planning regulations related to Complete Streets. These acts did not require communities to adopt Complete Streets policies, nor did it tie funding allocations to Complete Streets policies. The passage of PA 135 of 2010 marked the beginning of MDOT's formal collaboration with local jurisdictions on multimodal road design and planning under the banner of complete streets. Multimodal transportation planning and Complete Streets are also addressed extensively within MDOT's Context-Sensitive Design program and the Multimodal Development and Delivery Guidebook (M2D2), all of which are briefly reviewed below.

#### Public Act 134 of 2010

Public Act 134 of 2010 made changes to the Michigan Planning Enabling Act, including modifying the definition of a street to include all legal users, revising the elements of a master plan to allow the inclusion of all elements of transportation systems that move people and goods, and provides the opportunity for the transportation elements of the master plan to be considered with the support of the CRC and MDOT.

#### Public Act 135 of 2010

Public Act 135 of 2010 defined Complete Streets in Michigan and created the Complete Streets Advisory Council (CSAC) to provide advice to the Michigan State Transportation Commission (STC) regarding adoption of Complete Streets policies. The STC adopted the following Complete Streets vision upon recommendation of the CSAC:

- A transportation network that is accessible, interconnected, and multimodal and that safely and efficiently moves goods and people of all ages and abilities throughout the state of Michigan.
- A process that empowers partnerships to routinely plan, fund, design, construct, maintain and operate Complete Streets that respect context and community values.
- Outcomes that will improve economic prosperity, equity, accessibility, safety, and environmental quality.

The CSAC was disbanded following MDOT's formal adoption of the Complete Streets policy.

MDOT's Complete Streets goal, adopted in 2012 through the MDOT Policy on Complete Streets, is to improve bicycle and pedestrian safety, access, and mobility as part of all primary and secondary highway projects.

The local opt-in provision codified in Michigan's Complete Streets laws creates challenges for uniformly achieving MDOT's goals. The MDOT Policy on Complete Streets, adopted in 2012, recognizes that the extent of MDOT jurisdiction is less than 10 percent of total roadway miles in the state and even fewer are open to bicyclists and pedestrians.

Furthermore, MDOT is a facilitator for local jurisdictions to help understand the provisions of the Complete Streets policy and to work with them to further the development of Complete Streets. To date, more than 100 local jurisdictions across Michigan have adopted either Complete Streets ordinances or policies. MDOT can support communities to make trunklines and MDOT-controlled roads multimodal and complete for all legal users. Additionally, MDOT, as the state transportation agency, can provide leadership and be a powerful example to local jurisdictions who look to MDOT for design guidance. Because MDOT leadership can only carry implementation so far, local agencies must work to implement these policies to make broad change across the state.

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82 SGA. https://smartgrowthamerica.org/program/national-complete-streets-coalition/publications/what-are-complete-streets/.

### Context-Sensitive Solutions

Within MDOT, Complete Streets is part of the department's Context-Sensitive Solutions (CSS) program. The CSS program began in 2003 with a directive from then Gov. Jennifer Granholm. CSS "is a collaborative interdisciplinary approach to developing transportation projects. CSS is the name given to the MDOT project development and stakeholder engagement process. Under CSS, MDOT solicits dialogue with stakeholders including but not limited to residents, local governments, road commissions, industry groups, land use advocates, and state agencies early in a project's planning phase. A cooperative spirit and an awareness of community interests help achieve the ultimate goal: projects that fit their surroundings while effectively serving transportation needs."[83] CSS shapes the MDOT engagement process. Though it does not prescribe a rigid participation and engagement template, it does inform the types of engagement that are warranted for different levels of project complexity and local impact.

### Multimodal Development and Delivery Guidebook

MDOT also developed the Multimodal Development and Delivery guidebook (M2D2) in 2019 for the purpose of supporting Michigan's economic recovery and "MDOT's institutional capacity to plan, construct, operate, and maintain Michigan's transportation system for Complete Streets and multiple modes."[84] This guidebook provides an educational resource for MDOT and partners (nonprofits, other state agencies, local jurisdictions) to evaluate infrastructure updates to the transportation network.

#### *Local Context*

Complete Streets are implemented at all levels, including the local level. Every jurisdiction (counties, cities, villages, and townships) is responsible for determining needs and planning for transportation developments that meet the needs of the jurisdiction, including and surpassing traditional mobility and access needs. As discussed, Public Act 135 of 2010 does not require local jurisdictions to develop or adopt Complete Streets policies. However, all infrastructure improvements should be evaluated within their local context. This provides the opportunity for local jurisdictions to determine improvements necessary to make the transportation networks safe and accessible for all users, including addressing gaps and barriers in the bicycle and pedestrian network in conjunction with larger transportation improvement projects.

#### *Implementation Resources*

There are several resources available to local jurisdictions that provide design and implementation best practices. A broad sampling of these is listed in Table 6.

***Table 6.* Education Resources**

| Agency | Content | Web Address |
|---|---|---|
| American Planning Association | Best Policy and Implementation Practices Report<br>Policy Inventory | http://www.planning.org/research/streets/ |
| Detroit Greenways Coalition | Stormwater Management Incorporation | http://www.detroitgreenways.org/complete-streets/ |
| Michigan Complete Streets Coalition | Sample Policies and Ordinances | https://michigancompletestreets.wordpress.com/ |

83 MDOT. https://www.Michigan.gov/MDOT/0,4616,7-151-9621_41446---,00.html.

84 Multimodal Development and Delivery Guidebook. MDOT. 2019. Pp 3.

| Agency | Content | Web Address |
|---|---|---|
| MDOT | Frequently Asked Questions<br>Executive Directive<br>Draft Implementation Plan | https://www.Michigan.gov/MDOT/0,4616,7-151-9621_41446_41895---,00.html |
| MDOT | Guidance for Trunkline Main Streets | https://www.Michigan.gov/Documents/MDOT/TrunklineMainStGuidanceReport_541913_7.pdf |
| MDOT | Multimodal Development Guidebook | https://www.Michigan.gov/Documents/MDOT/M2D2_Guidebook_682744_7.pdf |
| Michigan Municipal League | Michigan Resolutions<br>Michigan Ordinances | http://www.mml.org/resources/information/complete_streets.html |
| Minnesota Complete Streets Coalition | Local Toolkit (MN)<br>Public Communication Samples | http://www.mml.org/pdf/resources/21c3/mn_cslocalgovttoolkit.pdf |
| Pedestrian and Bicycle Information Center | Resources<br>Examples<br>Educational Webinars | https://www.pedbikeinfo.org/topics/completestreets.cfm |
| SEMCOG | Access Management<br>Safety Audits<br>Green Infrastructure/Low-Impact Development | http://www.semcog.org/complete-streets |
| SGA | Definition<br>Benefits Fact Sheets<br>Policy Inventory | http://www.smartgrowthamerica.org/program/national-complete-streets-coalition/ |
| USDOT | Bicycle and Pedestrian Program Guide | https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/design.cfm |
| USDOT | Health Benefits<br>Health Tool Indicators<br>Case Studies | http://www.transportation.gov/mission/health/complete-streets |

Implementation depends upon financial resources. While the state does provide some funding that can be used for Complete Streets improvements on state trunklines or via SRTS, projects typically require collaboration and partnerships with local jurisdictions to fund extensive Complete Streets projects. There is high demand for the small pool of available funds to support Complete Streets-type projects. Overall, the current level of funding available to all road agencies and the funding structure prioritizes investments in maintaining the current vehicular infrastructure over projects requiring extensive design to accommodate, encourage, and increase safety for active transportation users as standalone projects. Funding streams should be increased and modified so that multimodal projects can be included in projects as a primary part of the project scope, rather than as a supplemental addition that requires matching local funds.

Public Act 51 of 1951 is the state law that creates and regulates the Michigan Transportation Fund, which is the primary mechanism for funding road improvements for many jurisdictions. Section 10k requires that agencies spend at least 1 percent of their Act 51 allocations on nonmotorized improvements. Specifically, the act requires agencies to have a plan in place for nonmotorized improvements. In practice, MDOT looks at every agency's 10-year spending to determine compliance with the nonmotorized requirements. Legislative changes could be considered to clarify what the 1 percent plan must include. Changes may include requiring active transportation improvements to be included in an agency or municipal five-year capital improvements plan, amendments to consider active transportation improvements that enhance Complete Streets in asset management plans, and a requirement for agencies and local governments to have adopted Complete Streets plans, policies, or ordinances.

## Education and Encouragement

### *Education*

The concept of Complete Streets, while now part of the mainstream discussion of infrastructure, still requires education for practitioners, officials, and users to continue building public support for multimodal and context-sensitive improvements. Different treatments will require different education and outreach efforts depending on the context for improvements. MDOT can play a vital role in sharing information and helping local governments and agencies build capacity. Specific outreach should include the following:

- Expand Complete Streets training for state, county and local road agency staff and offer these programs to other local officials and consulting design professionals.
- Host accessibility workshops to train state, county and local road agencies, local officials, and professional engineers to better understand needs of those with accessibility issues and how to meet their accessibility requirements on state, county, and local road projects.

### *Encouragement*

Complete Streets policies and physical improvements are all intended to encourage active transportation. Safety, and the perception of safety by the users, is essential to increasing active transportation. Complete Streets improvements often address these issues, enhancing the active transportation user's experience. All road agencies (MDOT, CRCs, and local governments) can partner with a number of state agencies and nonprofit partners to promote and encourage active transportation as part of broader public health and economic development initiatives. These partnerships are vital to encouraging active transportation use and improving the safety and connectivity of a multimodal network across the state.

Many jurisdictions look to MDOT and the regional Transportation Service Centers (TSCs) for design guidance. MDOT also has the opportunity to promote temporary installations and/or pilot projects to test different road treatments and active transportation improvements. The TSCs play a particularly important role in supporting these kinds of activities within many communities. MDOT can support the spread of the concept of play streets, one-time or recurring events that temporarily close public streets, allowing residents to use the right of way for play, and open streets, which allows residents and visitors to reimagine what is possible for street design and street use. MDOT and other road agencies should ensure its permitting guidance supports these passive uses of the right of way.

## Policy and Planning Trends Analysis

### *Policy*

Complete Streets policy, CSS, and M2D2 all work toward the primary Goals and Implementation Strategies of MM2045. Specifically, these policies address the following Implementation Strategies:

- Prioritizing Safety
  - Prioritize infrastructure and facilities improvements with proven safety benefits.
- Managing Resources Responsibly
  - Advance Transportation Asset Management to optimize transportation investments.
- Providing Accessibility and Mobility for All
  - Enhance the mobility of Michigan's residents and non-residents.
  - Define, measure, and improve equitable access.
  - Develop projects that meet community mobility needs.
- Supporting Michigan's Health
  - Participate in and contribute to initiatives to improve air quality and reduce emissions.
  - Expand support for, in collaboration with, and across local and regional transportation providers and public health interests.
  - Encourage healthy lifestyles.
- Working Together
  - Expand public sector partnerships and collaboration.
  - Improve and expand relationships with private and nonprofit partners.
- Economic Vitality
  - Create vibrant sustainable communities.

As MDOT's Complete Streets goal is to improve bicycle and pedestrian safety, access, and mobility as part of all primary and secondary highway projects, the state has a design exception process in place. This process is intended as a solution of last resort when specific context of a project does not lend itself to active transportation design that meets minimum standards. The unintended consequence is that when faced with the task of seeking a design exception, many projects simply forgo the active transportation components. One way to minimize such a negative outcome is to develop an easy-to-use design exception/variance process and associated tracking mechanism that will allow projects to proceed based on context-sensitive design solutions. The tracking mechanism will allow for data-driven analysis of the reasons for exceptions and support faster policy analysis and change. This kind of policy tool should be shared widely as an example of how to address challenging site-specific conditions instead of abandoning active transportation improvements. Ideally, this process can be shared as a model policy with CRCs, MPOs, local governments, and consultants to better support active transportation implementation, even when specific standards cannot be met because of site specific conditions.

### *Planning Trends Analysis*

The Complete Streets approach has been widely adopted by many jurisdictions across the United States and by examining these efforts, a wealth of academic research on the benefits of Complete Streets has been developed. This information and research have and should continue to influence Complete Streets implementation in Michigan. Complete Streets isn't a static idea but one that is constantly evolving. New policies, safety innovations, implementation strategies are constantly developed and refined. Continuing research and sharing of best practices will help to continually promote the development of the safest, most cost-efficient multimodal network.

What is currently absent from Michigan's Complete Streets discussion is a full identification and accounting of the state's Complete Streets assets. Priority data collection includes:

- Define, inventory and analysis of Complete Streets improvements,
- User counts,
- Active transportation network connectivity,
- Active transportation level of service/level of traffic stress, and
- Other metrics as appropriate.

Collecting this information will create a baseline of performance and service. With Michigan's existing Complete Streets network established, a clear understanding of the steps necessary to equitably expand this network throughout Michigan can be made. Local agencies and governments are already required to submit significant documentation of nonmotorized expenditures to MDOT as a part of Act 51. Local agencies and governments can also begin tracking active transportation improvements for asset management and include that information in reporting to the state.

Adoption of local Complete Streets resolutions and ordinances seems to have slowed in the last five years. MDOT may consider partnering with organizations such as the Michigan Municipal League, Michigan Township Association, County Road Association, Michigan Association of Planning, and others to reinvigorate these local planning endeavors. The most effective way to engage local jurisdictions in the implementation of Complete Streets is to tie a funding source to having a locally adopted Complete Streets policy, as Massachusetts does. In Michigan, MDNR uses a similar approach of tying Natural Resources Trust Fund awards to local parks and recreation master plans; this can be a template for similar funding sources being tied to the adoption of local Complete Streets policies or ordinances.

## Land Use and Zoning Implementation

MDOT trunkline and state highway projects are guided by their CSS and Complete Streets policies, but local street design is guided by the local jurisdiction: county road commissions, cities, villages, and townships. These local jurisdictions have applied a variety of techniques to create Complete Streets networks, from road diets to separated bike lanes. Some jurisdictions have adopted Complete Streets ordinances while others have developed policies requiring Complete Streets consideration when possible. In all cases, local zoning, street design requirements and public input determine different treatment options on local streets.

MDOT's role in the advancement of Complete Streets at the local level has been largely hands-off, as MDOT has direct control of about 6 percent of Michigan roadways where active transportation is permitted. The balance is under the jurisdiction of local governments and road commissions. MDOT provides guidance and technical assistance on state trunklines and state highways, over which MDOT has jurisdiction. To assist in expanding the state's Complete Streets network, MDOT can assist local jurisdictions in improving the technical expertise of their staff and their design consultants in the implementation of Complete Streets solutions at the local level.

## Design Guidance

The MDOT M2D2 Guidebook (2019) provides the most detailed implementation guidance from MDOT to date for jurisdictions and partners. Specifically, M2D2 shares best examples of how to collect data, how to classify streets based on best practices, and provides sources for design recommendations. M2D2 also provides a big picture summary of what Complete Streets may be in both urban and rural settings.

Local implementation, however, is left to smaller jurisdictions. M2D2 and the MDOT Guidance for Trunkline Main Streets (GTMS) provide tools and references for these local jurisdictions, but there is no requirement that any jurisdiction needs to follow these best practices. The GTMS document is meant as a tool for local agencies to understand what to expect and what is needed for different types of improvements along trunklines.

Many local agencies, particularly CRCs, use the MDOT Road Design Manual as their design guidance, which defers to AASHTO's Guide for the Development of Bicycle Facilities and NACTO design guidance as useful tools and resources for consideration in the development of context-sensitive multimodal facilities. The NACTO guides are a resource that provide a toolbox of items that can be used to enhance pedestrian and bicycle travel safety and, in many situations, offers innovative approaches to active transportation facility design. Currently, the AASHTO guidance is under revision and due for publication with the next few years, with updated information, guidance, and standards.

Within the Michigan transportation system, MDOT develops and implements rules (based on rules set by USDOT and FHWA) and, perhaps most importantly, influences local agency transportation decisions by what is often not said. CSS and M2D2 have started the very important process of telling these local agencies that it is okay to try different approaches and suggest design solutions. These two efforts (CSS and M2D2) are designed to encourage a more holistic view and a system approach to multimodal transportation with an end goal of making sure everything works together and moves Michigan closer to the goal of zero deaths. Massachusetts DOT (MASSDOT) has taken the step of adopting new highway engineering guidelines that require traffic engineers to include sidewalks, crosswalks, bus stops, and high-quality bike facilities when they design upgrades for major roadways.[85] MDOT can build on what CSS and M2D2 have started by adopting standards like those MASSDOT adopted for MDOT trunklines and state roads and highways. Formal guidance to require active transportation elements in state road projects provides the direction to local agencies and jurisdictions that these facilities should be included in local projects as well as MDOT.

### Summary

Michigan's transportation network is perhaps best defined by the volume of different agencies (more than 600) that have jurisdiction over streets in the state. Connecting communities across jurisdictional boundaries is a constant concern. Encouraging regional cooperation and communication to provide access to transit and active transportation access across corridors is essential to completing the active transportation network. Though MDOT has direct responsibility for a small percentage of roadway in the state, it plays a vital role in helping to provide guidance to and coordination with local agencies.

## Safe Routes to School

### Description, Local Context, and Implementation Resources

The SRTS program aims to reduce the barriers that limit or hinder children commuting to school via active transportation. There are a number of causes that are fueling the reduction of school age children actively commuting. Infrastructure barriers, social concerns, personal safety concerns, and neighborhood blight issues along with less dense suburban districts that rely on busing all are contributing factors.

85 MilNeil, Christian. New 'Controlling Criteria Will Require Sidewalks, Bike Lanes in State Road Projects. March 22, 2021. StreetsBlogMass https://mass.streetsblog.org/2021/03/22/new-controlling-criteria-will-make-sidewalks-bike-lanes-a-default-feature-in-state-road-projects/

Many program actions are focused on addressing the impacts of suburbanization on students' and parents' commuting patterns. School siting, design practices and transportation network planning focused on auto mobility have led to many schools that are not safely accessible for children to approach on their own. Urban schools, with existing sidewalk networks, may also face a variety of active commuting hurdles, including infrastructure, vehicle traffic speeds, and traffic volumes that, according to surveys, are among the top concerns of parents. Commuting children and their caregivers often encounter non-ADA-compliant sidewalks, wide roads with fast moving traffic, blight, and few safe crossings. Student surveys reveal that students are wanting someone to walk or bike with them as their top concern. In addition, schools-of-choice, magnet schools, and charter schools have all complicated this issue of assisting children in being able to actively commute to their schools. Programming for non-infrastructure activities is key to a successful local program, especially if it is sustained past the grant-funding period.

Through Michigan's SRTS program, a wide variety of implementation resources are available to communities to address the various barriers that hinder children in actively commuting to school.

### *Description*

Recognizing that physical barriers, school policy changes (busing), legislative changes (schools of choice), and perceived issues prevent students from safely choosing to actively commute to school, advocates initiated the SRTS effort to combat these systemic issues. Both national and Michigan SRTS organizations provide a wealth of online resources about the program's operation, sample documents, and case studies that communities may utilize in implementing their active transportation efforts focused on children.

#### Program History

In the 1990s, concerned about students' increasing reliance on vehicular transportation and the growing sedentary nature of American youth, a few American cities and one state led the way in developing the SRTS concept.

Statistics illustrate the decline in walking and biking to school. According to the National Center for Safe Routes to School, 48 percent of children walked or biked to school in 1969 while the same study found only 13 percent did so in 2009. The 2017 National Household Transportation Survey found a further reduction: only 10.4 percent of students either walk or bike to school. However, preliminary research has found that sustained implementation of an SRTS program can reverse these trends. The National Center for Safe Routes to School's travel mode database found that after five years of SRTS participation, the number of students walking and biking to school increased by an average of 31 percent.

In 2005, a national campaign emerged. Congress passed a transportation bill signed into law, the Safe, Accountable, Flexible, Efficient Transportation Equity Act (SAFETEA-LU), that recognized the concerns of the SRTS initiative. Over the next six years, the federal bill provided $1 billion in funding to support infrastructure improvements and programming to make it safer and more desirable for children across the United States to walk and bike to school. This initial funding also provided for SRTS coordinators in each state and supported the establishment of the National Center for Safe Routes to School.

Michigan began its SRTS program in 2003 as an MDOT pilot program with the Michigan Fitness Foundation (MFF, part of the Governor's Council on Physical Fitness) as a project partner via an MDOT contract with MFF as the prime contractor. With the development of federal support, the program was expanded statewide in 2005 with MDOT entering into a new contract with MFF. In 2007, MDOT received the Oberstar Award, the national award for excellence in SRTS activity, for the SRTS action planning process and resource guidebook (described as a toolkit with web link in text below) developed with MFF during the pilot project. MDOT also hosted the first national SRTS conference at The Henry Ford in Dearborn. National SRTS conferences continued bi-annually until after the SRTS program was combined/absorbed into the TAP.

Since the 2005 federal legislation, SRTS has been modified by the two subsequent transportation bills. The 2012 federal transportation bill, Moving Ahead for Progress in the 21st Century Act (MAP-21), combined funding for transportation enhancements (primarily bicycling and walking), recreational trails and SRTS into the Transportation Alternatives Program (TAP). This collectively reduced the spending on all three of the programs by 30 percent. Program changes also allowed states to direct these funds towards other efforts and added the requirement for a 20 percent local match for all SRTS funding. The 2016 federal transportation bill, Fixing America's Surface Transportation Act (FAST Act), retained most of the program requirements but renamed the TAP program as a set-aside program within the larger federal Surface Transportation Program (STP), now referring to all transportation enhancements as STP set-asides.

### Program Goals

The threefold purpose of the SRTS program is to encourage more children to walk or bike to school, to increase safety for all children who walk or bike to school, and to reduce traffic congestion that contributes to air pollution around schools.

Systemic factors, including school siting and street design practices that create barriers to walking and biking, have led American children to become more sedentary, leading to poor health outcomes. As children's rate of active transportation to school has declined, the percentage of overweight and obese children has significantly increased. In 1974, the CDC reported that 4 percent of American children were overweight, while a 2017 Kaiser Frasier Foundation report found that 30.7 percent were overweight.

Reductions in walking and biking to school have resulted in a cascade of undesirable social outcomes and unintended consequences. This reduction has had negative impacts on children's levels of activity, with less than one-third of Michigan children meeting the daily recommendation for physical activity. This is detrimental because physical activity has been shown to improve mental alertness and readiness for learning, leading to better educational outcomes. More children being driven to school has increased the amount of vehicle traffic in school zones, adding to the perception/reality that walking and bicycling to school is unsafe. Morning and afternoon congestion is worsened by the large numbers of students being taken to and from school in individual vehicles. Automobile-related air pollution has consequently increased around school zones. Free unprogrammed time, outdoor play, and interaction with other children is reduced when children do not actively commute to school on their own. These outcomes could be mitigated if higher rates of students walked or biked themselves to school.

By encouraging children to be more active as youths, the program also hopes that more active lifestyle choices will continue into their teenage and adult years, increasing their active transportation participation rates and, in turn, reducing the societal cost of preventable disease and premature deaths.

### Michigan SRTS Program

Michigan's program follows the federal structure; however, Michigan's program is administered by an MDOT SRTS program manager through a contract with the MFF. MFF handles all day-to-day operations, including outreach, training, education, planning and grant application, technical advice, and contract management for the non-infrastructure grants. If a school or community wishes to pursue SRTS activities or funding, they must first register the school(s) with the MFF and establish a relationship with a grant coordinator and register with the Michigan SRTS program. Next, they must designate an SRTS coordinator and establish a SRTS team. The MFF grant coordinator provides guidance and technical advice throughout the SRTS planning and grant application processes.

The local SRTS team must assess attitudes and behaviors related to walking and biking around their school(s) through surveys of parents and students regarding their behaviors, beliefs, and attitudes towards commuting to school. Next, the team must complete audits that assess the existing walking and biking routes, identifying the physical routes to school, their condition, and all barriers to safe travel.

With the development of this background information completed, the SRTS team may then prepare an SRTS action plan that incorporates the results of the surveys and the walking audit into a plan that addresses each of the program's six "Es":

- Engagement: All SRTS initiatives should begin by listening to students, families, teachers, and school leaders, working with existing community organizations, and build intentional, ongoing engagement opportunities into the program structure. In Michigan, communities that still want to conduct enforcement efforts as part of their SRTS efforts can under the Engagement program.
- Equity: Ensuring that SRTS initiatives are benefiting all demographic groups, with particular attention to ensuring safe, healthy, and fair outcomes for low-income students, students of color, students of all genders, and students with disabilities.
- Engineering: Creating physical improvements to streets and neighborhoods that make walking and bicycling safer, more comfortable, and more convenient.
- Encouragement: Generating enthusiasm and increased walking and bicycling for students through events, activities, and programs.

- Education: Providing students and the community with the skills to walk and bicycle safely, educating them about benefits of walking and bicycling, and teaching them about the broad range of transportation choices.
- Evaluation: Assessing which approaches are successful, ensuring that programs and initiatives are supporting equitable outcomes, and identifying unintended consequences or opportunities to improve the effectiveness of each approach.[86]

With the SRTS action plan completed, a formal application may be submitted to MDOT, and the community is then eligible to apply to Michigan's SRTS program. Grant applications appropriate for federal TAP funding include elements of the SRTS action plan that are high priority for federal transportation funds. In addition, the SRTS movement offers mini-grants to help schools and communities make incremental changes to educate and encourage students to stay healthy and active and improve active transportation infrastructure on school routes.

Michigan's SRTS program includes a toolkit that contains a wealth of information on how to conduct route assessments, approach parent and student engagement, hands-on demonstrations, and informational aids on how to prepare fliers, invitations, and press releases. Additional information is available at https://saferoutesmichigan.org/.

### Project Types

MDOT's SRTS program's "Six Es" guide its efforts: Engaging and Educating the community while ensuring that Equity is addressed; Encouraging students to walk or bike to school; Engineering that accommodates users of active transportation; Evaluating programs and adjusting when needed. These six E project cornerstones are accomplished through two major project types: infrastructure projects and non-infrastructure projects. Infrastructure awards are available up to $220,000 and non-infrastructure awards may be up to $10,000. Due to their scope and expense, differing levels of funding are available for each.

Infrastructure Projects: Infrastructure projects provide funds for the planning, design, and building of projects that will substantially improve the safety and ability of students to walk and bicycle to school on selected routes. Activities may include sidewalk improvements, traffic calming, street crossing enhancements, on-street bicycle facilities, off-street bicycle and pedestrian facilities, secure bicycle parking, and strategies for speed reduction and/or traffic diversion in the vicinity of schools.

Non-Infrastructure Projects: Non-infrastructure projects focus on Engagement, Encouragement, and Education. Funds may be used for initiatives that encourage walking and bicycling to school; public awareness campaigns; outreach to the media and community leaders; traffic education and enforcement in the vicinity of schools (although there have been few requests in recent years); training for students on bicycles, pedestrian safety, health, and environment; and funding for training for volunteers and managers of SRTS programs. Encouragement, Education, and Enforcement programs are further explored in Section 7.2. Evaluation is accomplished by MFF with data provided by participating schools.

#### *Local Context*

Since 1970, most of America's residential growth has been in suburban areas with lower densities that do not support community schools (sited in such a manner that would permit a majority of students to walk or bike). Until the turn of the millennium, many communities did not require sidewalks within subdivisions, sidewalk connections between subdivisions, or sidewalks along major arterial roads to be built during the development process. Lack of these active transportation facilities makes it both difficult and dangerous for students to walk or ride to school in some communities.

Current school siting guidelines have only exacerbated the problem by directing new schools to be sited on large parcels of land that, due to their size and cost, often require greenfield sites at the edges of the urbanized areas. Once built, many of these greenfield school sites are not connected to the community's sidewalk or path network, thus reducing the likelihood of students walking or biking to school.

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86 https://www.saferoutespartnership.org/safe-routes-school/101/6-Es.

### *Implementation Resources*

Communities do not have to register to be formal members of the SRTS program to take advantage of the following online resources that are designed to assist in increasing students use of active transportation to school:

***Table 7.*** **SRTS Education Resources**

| Agency | Content | Web Address |
|---|---|---|
| CDC | Childhood Overweight and Obesity Information | https://www.cdc.gov/obesity/childhood/index.html |
| Kaiser Family Foundation | Childhood Obesity Facts | https://www.kff.org/other/state-indicator/overweightobese-children/?currenttimeframe=0&sortmodel=%7b%22colid%22:%22location%22,%22sort%22:%22asc%22%7d |
| League of Michigan Bicyclists | Law Enforcement Education | https://www.lmb.org/initiatives/education/ |
| MFF | Michigan SRTS | https://saferoutesmichigan.org/ |
| National Center for Safe Routes to School | Data Tool | http://saferoutesdata.org/ |
| Safe Routes Partnership | Six Es | https://www.saferoutespartnership.org/safe-routes-school#:~:text=the%20most%20successful%20safe%20routes,engineering%2c%20enforcement%2c%20and%20equity |
| SRTS | Walk to School Day | https://saferoutesmichigan.org/walk-to-school-day/ |
| Students Against Violence Everywhere | National Youth Traffic Safety Month | https://nationalsave.org/pdf/national-youth-traffic-safety-month-web.pdf |
| USDOT FHWA | FAST Act/TAP Information | https://www.fhwa.dot.gov/fastact/summary.cfm |
| USDOT FHWA | MAP-21 Information | https://www.fhwa.dot.gov/map21/ |
| USDOT FHWA | National Household Travel Survey | https://nhts.ornl.gov/ |

## Education and Encouragement

### *Education*

The successful and safe implementation of an active transportation network will rely upon educating all road users (pedestrians, bikers, and motorists) to the rules of the road. To ensure safe use of the transportation network, these educational efforts should be tailored to specific user groups by age and by physical and cognitive abilities.

For student participants, Michigan's SRTS program has a significant educational focus on safety issues. Due to their unique needs, specialized training modules are available for each group. Young children are taught how to safely cross the street without adult supervision, while older children are trained to ride in the street safely and follow the rules of the road. For example, Norte, a nonprofit organization based in Traverse City, operates youth programs that teach bike safety to older children and learn-to-ride programs to preschoolers. School safety officers are also a good resource in offering these safety trainings as a part of their student engagement efforts. The Detroit Public Schools Community District utilizes its police officers to assist in implementing its SRTS efforts.

SRTS training courses are offered every month through the SRTS website. Topics covered in the educational series include bike fitting, helmet fitting, bicycle operation safety, roadway signs, rules of the road for pedestrians and cyclists, walking safety, and other safety topics. Additional information on getting started, programs, events, updates, news, funding information, and resources is also available. The Michigan SRTS Handbook is available on the website to assist with the grant planning and application process, complete with modules and supporting documents. Resources on the website provide guidance to better understand engineering and planning, assist in building programming, help identify a safety curriculum, as well as provide additional funding tips. Finally, the SRTS media kit can be found on the website, which provides a student photo release form, the SRTS and MFF logos that can be used in press releases, and other communications documents.

### *Encouragement*

A variety of SRTS tools and programs have been created to encourage children to choose active transportation options and for parents to support and encourage their children to do so. Youth encouragement programs are designed to set a more balanced approach to active school transportation options. A number of these youth programs entail contests and prizes, including bike-giveaways, bike decorating contests, safety poster design contests, and giveaways of inexpensive prizes like stickers, wristbands, temporary tattoos, etc.

Youth encouragement efforts are designed to illustrate to both students and their parents/caregivers that safe options exist for them to commute to school other than by car. Children learn lifelong habits about walking and bike riding that may make them more open to active transportation options as teenagers and adults. Norte in Traverse City and the Detroit Public Schools Community District both successfully use encouragement efforts to increase the number of students walking and biking.

Norte's founders started their organization with planning group encouragement initiatives to increase active commutes to and from school with "walking school buses," "bicycle trains," and remote children drop-off locations. These efforts are designed to encourage children to utilize active transportation early in their lives with the hope that they will be more likely to continue using active transportation later in life. To address serious health issues related to poor diet and lack of exercise, Detroit focuses its encouragement efforts on improving kids' activity levels. Encouragement efforts often include partnerships between law enforcement and schools and other groups like service clubs and coordinated youth organizations.

## Policy and Planning Trends Analysis

Several of Michigan's peer states have linked their active transportation plans to their general statewide policies, providing added relevance for these active transportation plans.

### *Policy*

The SRTS program supports three of Michigan's broad, statewide initiatives:

- Enhance Quality of Life: Ensure that the state's active transportation assets improve the quality of life for all residents while serving as a tool to attract tourists and potential employees to Michigan. Opportunities for physical activity also enhances physical health resulting in improved personal quality of life and more vibrant communities.
- Improve Connectivity: Ensure that the state's active transportation network connects to Michigan's bounty of historic and recreational assets, allowing residents and visitors to explore Michigan's outdoors and many communities both easily and actively. Furthermore, interconnected networks bolster the utility of these systems for transportation purposes and increased safety.
- Increase Equity: Utilize the state's active transportation network to improve equity by broadening access and mobility to underserved populations throughout Michigan, ensuring all ages, abilities, backgrounds, and incomes have access to the state's active transportation network, especially to the state's schools.

Research has shown that multi-year participation with the SRTS program has increasing impacts through at least year five. The SRTS partnership is especially helpful for low-income and minority communities that need resources to create and apply sustainable goals that improve children's health and promote social equity (Lieberman and Zimmerman, 2015). Data showed that after five years of SRTS participation, the number of students walking and biking to school increased by an average of 31 percent.[87]

### *Planning Trends Analysis*

Two existing planning trends impact the ability of students to have safe, accessible routes to school:

- School siting: The frequent siting of new school facilities in undeveloped areas is a concern due to its negative impacts upon supporting active transportation options for students. Michigan does not have specific school facility planning standards available to practitioners at this time, but the Association for Learning Environments (formerly known as the Council of Educational Facility Planners, International) does offer general design guidance for school facility site-size based on whether the school is a primary, secondary, or high school and its number of students. For a small elementary school of 200 students, it recommends a 12-acre site, while a high school of 1,000 students would require 40 acres of land. These site requirements often force new school siting outside of built-up areas. To better support active transportation by students to these facilities, facility location should be an important site-selection criterion.
- Lack of connectivity: A second concern is the lack of active transportation connectivity often found at these new facilities. The cost to install active transportation connections is not typically included in the overall project development costs. Connection of the school facility to the community's existing active transportation network could be required for inclusion in the overall development costs of new school facilities. However, local units of government have no zoning or regulatory authority to require such connections. Schools share their plans with local communities, but this is only informational.

The statewide connectivity maps and gap analysis results found in Section 5 of this plan are important tools in helping identify needed active transportation connections that will support SRTS efforts.

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87 McDonald,Noreen C., Ruth L. Steiner, Chanam Lee, Tori Rhoulac Smith, Xuemei Zhu, and Yizhao Yang, *Impact of the Safe Routes to School Program on Walking and Bicycling*, Journal of the American Planning Association, p.153-167, 2014.

## Land Use and Zoning Implementation

Various types of local development requirements may be adopted in communities that wish to encourage more active transportation-friendly patterns that support SRTS goals. These better-supported land use patterns may result from local adoption of:

- Transit-Oriented Development (TOD) design principles: Encourage higher-density walkable developments. TOD developments are often mixed-use, low to mid-rise developments that are located within a half-mile of transit stops and provide bicycle-friendly accommodations within 2 miles of all transit stops. School siting can be incorporated into these more urbanized environments. TOD-style development encourages higher-density mixed uses on smaller blocks that increase the number of individuals who live within a comfortable walking or bicycling commute distance to transit.
- Form-Based Codes, Smart Growth design principles and Traditional Neighborhood Development (TND) design standards: Each of these similar zoning approaches may be incorporated into the community's zoning and subdivision regulations to promote more compact development patterns, which supports more active transportation users for schools and other facilities.
- 20-Minute Neighborhood Design: An urban design principle where nearly all a resident's daily needs may be found within a 20-minute walk or bike ride.

Neighborhoods developed along these land use and zoning principles would lead to environments that would be more pedestrian-friendly and support SRTS goals.

Altering local zoning to allow for more mixed-use developments may also support more compact neighborhoods that may be served by community schools that are easily accessible by students. Modifying local zoning codes to require active transportation connections to local parks and connections between subdivisions and/or cul-de-sac streets enhances community walkability and increases SRTS options for children. School siting is currently exempt from local zoning. Local municipalities are only required to be informed about local land use decisions to be carried about by schools. Allowing for local communities to have a more formal role in reviewing school siting would be beneficial regarding allocation of public infrastructure resources. Finally, requiring setbacks from existing roadways be provided along with provision of easements and/or building of active transportation side paths or sidewalks when adjoining properties are developed would significantly further community connectivity, which makes achieving SRTS goals more attainable as well.

## Design Guidance

The following specific recommendations, drawn from the peer-state review of best practices, include:

- Use best practices to characterize SRTS facility use and context to help ensure appropriate design treatments are integrated into project development and maintenance processes.
- Increase design flexibility to assist in the creative insertion of active transportation facilities into locations in the road right-of-way where they would not be permitted through standard design guidance. Adopt CSS that allow local and regional authorities the ability to adapt the shared right of way to accommodate all uses including SRTS facilities.
- Support the broad adoption of Complete Streets design guidance, which will ensure that the road network leading to and around schools are designed for users of all ages and abilities, especially students.
- Support the spread of the concept of play streets, one-time or recurring events that temporarily close public streets, allowing area residents to use the right of way for play, and open streets, which allows residents and visitors to reimagine what is possible for street design and street use. MDOT should ensure its design guidance supports these passive uses of the right of way.

Some of the steps that MM2045 can take to improve system connectivity are design-related. It is important that the most current design requirements are accepted and used throughout MDOT and by local agencies and consultants, which will ensure best practices and design guidance are followed and that AASHTO and Manual on Uniform Traffic Control Devices (MUTCD) design guidance and standards are met. Additionally, concepts and designs presented by NACTO and other entities that improve connectivity should be considered and implemented where appropriate.

### Additional Potential Recommendations for Advancing Safe Routes to School Program Outcomes

Following are additional recommendations further future consideration.

- Local Context
  - Support revision of state school site facility design guidelines to require all new school projects to include the cost of installing nonmotorized pathways to all new school complexes as part of the overall project budget and determine fiscal impacts on utilities, public services, infrastructure, and tax base of site selection.
  - Support changes to Michigan's Zoning Enabling Act to mandate local zoning ordinances to require site-adjacent nonmotorized facilities to be built as a part of site development, where appropriate.
  - Support local planning that leverages SRTS investment to broaden connectivity and improve active transportation from schools to local neighborhoods and other relevant sites beyond the geographic limits of SRTS funding.
- Education
  - To ensure the relevance of the information, routinely review all SRTS program information and update recommendations and resources to current conditions, and routinely evaluate the effectiveness and updating of materials as necessary.
- Encouragement
  - To ensure the relevance of the information, routinely review all SRTS program information and update recommendations and resources to current conditions.
- Policy and Planning Trends Analysis
  - Establish a state-funded SRTS program and dedicated funding source.
  - Require all MDOT-funded projects that intersect with locally identified safe routes to complete an active transportation audit and consider recommendations from the SRTS audits into the project design.
  - Increase the SRTS funding cap on infrastructure projects.
  - Eliminate the requirement for SRTS to provide a local match.
  - Reduce the upfront costs/effort necessary for communities/schools to enter the program.
  - Conduct a thorough evaluation of the SRTS program by contacting past program participants to gather input about the program and what changes should be made to improve Michigan's SRTS program and determine roadblocks and unnecessary requirements.
  - Determine if the local communities receive enough technical support from the MDOT regional offices.
  - Engage in mainstreaming efforts for active transportation programs and infrastructure so that MDOT, county and local road agency staff, along with consultants, understand the cultural shift to multimodal design and the benefits to residents and travelers regardless of mode.

## First/Last-Mile Connections

### Description, Local Context, and Implementation Resources

First/last-mile connections refer to the multimodal types of transportation that are employed for getting commuters from their starting (first mile) or ending (last mile) locations to/from their transportation transfer point where they will often board/disembark transit vehicles or other ridesharing mode for most of their trip. Bicycling and walking are common forms of first/last-mile transportation connections. Buses, carpools, ferries, and trains typically make up the transit segments of the journey.

Solutions that may improve first/last-mile connections include feeder buses or shuttles, improved walking and cycling infrastructure, and urban planning reform that increases density and discourages sprawl near transit facilities or along transit routes. Other solutions include striving to accommodate micromobility options, including scooters, dock and dockless bikeshare systems, and e-bikes.

Focus on improving multimodal transit access is a benefit to this type of approach, rather than one specific mode, such as personal vehicle accommodation.

### *Description*

First/last-mile connections recognize that multimodal transportation travelers often face hurdles in reaching the transfer point for making the connection between their primary transportation mode and their starting/ending destination or have issues at the connection point itself. These gaps and challenges from the starting point to transit or from transit to the destination are often referred to as the first/last-mile problem.

First/last-mile connections vary in length considering the form of transportation. On average, walkers can cover two to three blocks in 10 minutes while bicycle riders are able to ride almost 2 miles in the same period. Thus, the distance of first/last-mile connection improvements required for walking and bicycling will vary greatly due to the differing sizes of the area covered by the differing forms of locomotion.

An added benefit for encouraging traditional commuters who use a car for the first/last-mile connection to bicycle riding is that the space at the station required for bicycle parking is significantly less than for car parking.

Significant impediments in ease-of-use for the first- and last-mile segments of a trip and the difficulty/unpleasantness of the actual connections with transit negatively impact the number of people willing to use transit.

### *Local Context*

There are several hurdles that have direct impacts upon first/last-mile connections, and not all locations are the same. Stations and stops served by high frequency transit will have larger first/last-mile catchment areas than a bus stop on an infrequent bus route. The general hurdles include:

- Distance from starting or ending point (more than one-half mile walking, or 2 miles biking).
- Gaps in walking and biking infrastructure, including ADA deficiencies and inadequate, or unsafe crossing.
- Safety and level of comfort on transit vehicles.
- Personal safety (crime, poor lighting, etc.).
- Physical barriers including geography and topography.
- Weather and urban heat island effect.
- Lack of supporting infrastructure, such as bathrooms, bicycle or other micromobility vehicle storage, e-bike charging stations, and bus shelters or benches.
- Long dwell times waiting for transit connections.
- Lack of on-board storage for bicycles, assistive devices, and other mobility devices.
- Lack of convenient ride-hailing services or easy curb-side pick-up/drop-off.
- Poor wayfinding, including lack of actual directional signs or lack of accurate posted transit schedules.
- Poor out-of-vehicle experience, including lack of real-time arrival and routing information, lack of shelter, difficulty in ticketing, unattractive and/or unsecure waiting areas.

To increase transit ridership, facilitating first/last-mile trips with attractive, convenient transportation infrastructure is key. Safe, comfortable, and convenient routes to transit stations/stops significantly expand the number of households that will choose to access transit services. Increasing those walking or riding to transit will limit congestion and demand for car parking near transit stations. Offering a variety of amenities may also expand transit ridership and increase the number of people to complete first/last-mile connections.

Equity is another concern as transit riders often belong to households with limited or no vehicle access. Improvements to first/last mile connections will ease their transportation burden.

### *Implementation Resources*

There are several resources that can assist in improving first/last-mile connectivity. Improvements that make streets more complete for all users and those that address issues that inhibit students safely walking or riding to school will often improve first/last-mile connections, too. Additional implementation ideas related to active transportation infrastructure and planning that support first/last-mile can be found here in the Complete Streets and SRTS sections.

***Table 8.* Implementation Resources**

| Agency | Content | Web Address |
|---|---|---|
| Congress for New Urbanism | Form-Based Codes | http://www.cnu.org/ |
| NACTO | Transit Street Design Guide | https://nacto.org/publication/transit-street-design-guide/ |
| National Complete Streets Coalition | Complete Streets Initiatives | https://smartgrowthamerica.org/program/national-complete-streets-coalition/ |
| Transit Oriented Development Institute | TOD Design Guidance and Information | http://www.tod.org/ |

## Education and Encouragement

### *Education*

Understanding and recognizing the challenges that face travelers at their first/last-mile connections is key to increasing transit ridership and enhancing the usability of the state's active transportation network. The following educational efforts may assist in bridging the first/last-mile gaps:

- Mainstreaming active transportation by bringing it on par with motorized transportation and shifting the culture to support active transportation.
- Educational programs (such as SRTS) that are designed to strengthen outreach and incentives promoting active travel options.
- Support for planning and design decisions that promote the attractiveness and ease of biking and walking for all residents, including students and individuals with disabilities.
- Technical assistance, design guidance, and investments to improve access to commercial hubs, schools, campuses, and neighborhoods.

By improving the first/last-mile connections, the utility of Michigan's active transportation network can serve more residents and visitors. Local governments, communities and agencies around the state viewing walking and biking as forms of transportation equal with motorized transportation is important for this effort.

### *Encouragement*

First/last-mile connections may include physical and non-physical hurdles for travelers. Non-physical hurdles include not using the transit system due to the lack of knowledge of how the system works or concern over the ease of using the system. Encouragement activities are designed to urge travelers to try active transportation and/or transit. First/last-mile connection encouragement activities include:

- Walk/Bike/Transit to Work Day/Week (active commute) educational efforts.
- First/last-mile connection improvements including maps showing up-to-date active transportation facilities in relation to transit routes.
- Information and resource-sharing efforts that describe various active and transit options available, including bike racks on buses and how to use them.
- Employers providing transit vouchers for workers willing to commute by transit to work or cash payments for not utilizing employer-paid parking and other pre-tax or employer provided benefits.
- Secure bicycle parking areas or bike lockers and employee showers/changing rooms.

An example of first/last-mile connection improvement efforts can be found in Detroit, which has had success in developing new shared-use paths that have become significant active transportation amenities and mobility corridors. Both the Dequindre Cut and the Detroit Riverwalk have become destinations for residents and visitors interested in promenading, but also provide safe connections to Midtown, New Center, Corktown, and the Villages neighborhoods. Using sidewalks and new and existing bike lanes, these new pathways have greatly expanded connectivity to neighborhoods not adjacent to the trails, like Detroit's New Center. Trails along with the Joe Louis Greenway planning effort will create a circular greenway connecting to major commercial and residential districts, transit stops and core services within Detroit, Hamtramck, Highland Park, and Dearborn.

All encouragement efforts are designed to expose individuals to active transportation options and urge them to expand/increase active transportation segments in their current personal transportation mixes.

## Policy and Planning Trends Analysis

### *Policy*

There is a growing recognition of the importance of addressing first/last-mile connections among both urban planners, transportation planners, and transit agencies. These changes expand transit ridership catchment areas near transit stops while improving the pedestrian and bicycle rider experience. Recognition that these enhancements will improve Michigan's quality of life for people living or conducting business within these areas and will improve the state's attractiveness to individuals and businesses looking for multimodal communities, are necessary so that policies may be undertaken that improve the first/last-mile connections. Numerous policy actions are possible that transit, road, state, and local agencies may take to assist in closing these gaps include:

- Including sidewalk, ADA, and pathway building along roadway projects.
- Providing first/last-mile connections planning between transit providers and municipalities.
- Developing active transportation inventory, planning, and gap analysis, including ADA deficiencies.
- Providing resources for communities to address first/last-mile connection issues.
- Improving communication with existing transit riders and develop surveys and outreach strategies to learn why commuters who could easily take transit do not.
- Supporting transit fare integration between transit providers by encouraging transit providers to provide MaaS or transit and vehicle payment technologies via automatic fare collections (AFC) 2.0 technology and E-ZPass that ease route planning across multiple transit providers.

- Involving transit providers in the project development process from scoping through design engineering.
- Changing policies to allow microtransit and micromobility companies to be able to directly coordinate route planning efforts with transit agencies.
- Increasing funding for maintenance and installation of amenities at transit hubs.
- Expanding the internal and external perception that most transit customers are users of last resort and change transportation provider mind-sets to target commuters-of-choice, including recognizing the impacts of ride-hailing services on transit ridership.
- Evaluating where bicycles may be stored on transit vehicles and expanding where permitted with easy-to-use intuitive options.
- Ensuring transportation planning is designed to minimize wait times at transfer points and between local and longer haul transit systems.
- Considering allowing ride-hailing services to match up vetted drivers with transit riders in an ad-hoc taxi-like system.
- Encouraging communities and MPOs to develop policies and support for first/last-mile connection projects that are eligible and competitive for TAMP and Congestion Mitigation and Air Quality (CMAQ) funds.

To ensure parity in improving first/last-mile connections, analysis could be done to ensure that active transportation routes are distributed across various regions. Ongoing analysis would monitor whether gaps in the region's high-comfort active transportation routes near transit corridors are being filled equally across the entire region. Further analysis should be made to determine if certain populations have higher/lower percentages of boarding at transit connection points that are not connected to high-comfort active transportation routes. Partnerships with bikeshare operators could ensure that first- and last-mile solutions are offered equally in all communities. Finally, an analysis of the spatial distribution of regional station/stop amenities could also be conducted.

Developing policies that address first/last-mile connections will improve Michigan's equity position by making transit function better for all residents, especially those Michiganders who depend on public transportation and do not have automobile access.

### *Planning Trends Analysis*

The physical layout of areas near public transportation hubs significantly impacts how many people can easily bridge their first/last-mile connection gaps. Areas of low-density residential development with few active transportation linkages increase the hurdles faced by area residents, making transit access less convenient or accessible. Conversely, areas with higher density and/or an abundance of active transportation options/facilities increases the number of potential transit riders within convenient first/last-mile catchment areas.

Several broad planning trends may be driving increased demands/needs for improvements to first/last-mile connections:

- Millennials delaying car ownership.
- Increased demand for more dense missing middle housing choices that includes duplexes, triplexes, fourplexes, townhouses, garden apartments, courtyard apartment buildings, and live/work mixed use buildings.
- Transit, especially bus ridership, had been declining prior to the pandemic, and improved connections may stop/slow/reverse these declines.
- Increased demand for urban living options among many of America's demographic segments.
- Increased flexibility in routing and openness to innovative solutions by transit agencies.
- Increased development of local and regional active transportation plans can be better used to identify locations of first/last mile connections gaps.

Active transportation network planning should include route planning to transit stations and stops for both pedestrians and cyclists. Site plan review requirements for active transportation accommodation should be enhanced for all projects located within 2 miles of all current and planned transit corridors. All motorized transportation-related projects located within 2 miles of transit routes, stops or stations should consider how to incorporate walking and biking access into their designs.

## Land Use and Zoning Implementation

Land use and the regulation of land through zoning have significant impacts upon active transportation systems and transit viability. Land use can increase or decrease user demand for active transportation systems and transit. Interesting and well-designed active transportation routes may increase active transportation traffic and have an impact upon overall activity levels. An example is found in Lansing, where form-based code was recently adopted that allows for mixed land uses. Higher-density development is encouraged by eliminating or reducing parking requirements for businesses in some areas, including the arterial and transit route of Michigan Avenue between downtown Lansing and East Lansing.

Modifications to zoning can impact demand as well as the quality and ease of first/last-mile connections:

- Upzone (increase the allowable density) areas within one-half mile of transit stops.
- Use of tax increment districts to capture the added taxable value in areas where first/last-mile improvements are implemented near transit stops.
- Active transportation supportive design features, including convenient locations for pedestrian access to buildings from the sidewalk network, building orientation that is convenient to active transportation users (i.e., zero lot line developments), façade transparency, adjacent transit stop amenities, interconnection of the site's interior walking network with offsite sidewalks, bicycle facilities, and bicycle parking.
- Fine-grained connectivity of the city street grid by ensuring zoning codes require high-intersection density or, at least, nonmotorized connections to local parks and connections between subdivisions and/or cul-de-sac streets.
- Sidepaths/sidewalks to be built when adjoining properties are developed.

Several urbanist design principals can also be employed in communities that are aiming to create higher-density developments that can support first/last-mile connections. TOD design principles and zoning incentives (such as density bonuses) encourage higher-density walkable developments within one-half mile of transit stops and bicycle-friendly accommodations within 2 miles of all transit stops. TOD-supportive zoning requirements encourage mixed uses on smaller blocks, which would increase the density of individuals living within a comfortable walking or bicycling commute distance to transit. Form-based codes, smart growth design standards, and traditional neighborhood development (TND) principles may also be incorporated into the community's zoning ordinance to improve first/last-mile connectivity.

Municipal zoning review requirements could be strengthened to require developers to provide secure bike parking areas in convenient locations. For multi-family residential developments, secure bicycle storage areas should be considered, along with building design standards that accommodate bicycles being regularly brought inside (widened doorways, larger elevators, scuff-proof walls in hallways and on elevators, and wider hallways). For office developments, covered and secure bicycle parking locations could be required along with showers for bicycle commuters. During special event permitting, municipalities could also encourage/require bicycle valet services for attendees and staff members. Transit providers and larger commercial developments could be encouraged to provide bicycle repair stations as well. Reductions in required parking could be an incentive that communities use to encourage developers to add indoor bicycle storage and other desired bicycle amenities. These desired outcomes could be achieved through modifying local zoning ordinances. In the city of Grand Rapids, surface parking requirements have been reduced for commercial developments in exchange for the provision of bicycle parking.

## Design Guidance

The following specific design recommendations can be pursued to support active transportation modes and address first- and last-mile connection challenges:

- Local incorporation of Complete Streets design guidance, which will ensure that the first/last-mile connection improvements are made to accommodate all transportation users.
- Increase flexibility within municipal engineering standards related to roadway and road rights of way width. Increased flexibility allows communities to be adaptable to provide enough space for all modes, including active transportation facilities in all contexts (greenfield and in developed areas). Allow for widening or narrowing of pavement widths (for on-street bike facilities or shared streets/woonerfs) and/or provide for/require new active transportation systems be built along with road building.
- Improving streetscape/landscape designs so that the first/last-mile connections are more appealing and aesthetically interesting, including pedestrian scale lighting and use of dense canopy shade trees.
- Evaluate and consider modifications to fire department access guidance to allow for narrow roads and slower non-emergency traffic. Many fire marshals require 24-feet-wide roadways to allow for two 12-foot-wide travel lanes on local residential streets, even where traffic volumes are minimal. In some communities, they may even require wider road widths to allow for on-street parking. Restricting on-street parking to one side, and/or on one side with alternating days may be a reasonable compromise.
- Ensuring that high-comfort pathways and routes with limited intersection delays for active transportation users are considered that reduce trip planning efforts when new developments are considered near transit stops and for when road work projects are being designed in areas that support high active transportation mobility.
- Ensuring that curbside management is considered near all transit stations and incentivize carpool parking.
- Expanding bike parking at stations and stops that is safe, secure, and covered, if possible.
- Promoting improvements, including typology guides, that illustrate typical changes that can be made near mobility hubs that can assist local communities engage in first/last mile mobility planning.
- Providing real-time arrival information at all new transit stops where possible and expand offerings that include text-based offering of arrival information.

Additional specific technical design guidance materials are included in the Appendix C.

Ensuring that year-round maintenance is considered during the design process is important so that snow storage and ice accumulation are addressed during system design. Year-round maintenance of the first/last-mile connections is important as it extends the season that people are willing to walk or bicycle as a part of the travels involving transit trips. It also ensures continued comfort and safety of the users and extends the lifespan of the facilities themselves. Without seasonal maintenance, users are also more susceptible to falls and injuries from poor surface conditions. Addressing year-round maintenance is vital to eliminating or reducing first/last-mile connections hurdles and improving the comfort of the system user.

CHAPTER 6

# Performance Measures

Performance measures are used to track the effectiveness of infrastructure and program improvements. This document presents possible measures and metrics that could be deployed for tracking the successes of Michigan's active transportation plan and monitor its implementation. Gaps in existing data collection in relation to walking and biking are identified. Numerous options are presented, but further research and investigation will be required to determine which of these measures should be pursued in Michigan based upon data availability, institutional capacity, and interest/desirability of potential results.

Performance measures set targets that are consistent with and assist with implementing state and national active transportation priorities. Michigan's 2040 State Long-Range Transportation Plan included the federally required performance measure of tracking the total number of nonmotorized crash fatalities and serious injuries, but few other performance measures that focused on or prioritized active transportation roadway users. This plan identifies numerous performance measures for adoption for measuring the implementation of Michigan's active transportation plan and in the MM2045. Consideration will also be given to tracking performance measures at the regional and local levels. More localized evaluation of performance measures allows for a better evaluation of how services are being provided to differing populations and being installed and maintained in differing environments across Michigan.

## Input Measures

Performance measures evaluate both implementation and performance of the transportation system. Input measures study the inputs that impact project development. These inputs may have direct effects on the development of the active transportation system (increased funding), or they may alter the design environment (increased numbers of engineers who have been trained in utilizing active transportation design manuals).

Input measures may be utilized to track the progress of MDOT, MPOs, local road agencies, and local stakeholder actions to determine success in implementing the active transportation plan and its various recommendations. It is expected that input measures positively impact system performance. They cannot be used to determine if implementation is resulting in improvements for bicycling and walking; rather, they can be used to determine whether implementation is occurring and at what pace. Both input measures and performance measures may be used to evaluate active transportation network implementation.

Michigan's active transportation input measure categories that should be tracked as part of the evaluation of the implementation of the state's active transportation network include funding, education, and policy.

### Incorporation of Active Transportation into Local Project Development

As local, county and regional transportation entities will be vitally important in the efforts to build out Michigan's active transportation facilities, the process of how active transportation projects can be evaluated on a network planning and project development level is presented.

### Network Planning

The key to successful development of a comprehensive statewide active transportation network will require active transportation planning efforts within local jurisdictions to be a part of long-range and current transportation plans. The planning process for budgeting for local and intermediate/regional routes not already part of the state's formal transportation network is important when federal funds are a part of funding the active transportation facility, or if it is a part of a larger project.

Performance measures allow transportation agencies and local legislative bodies to align their transportation planning decisions with existing community goals. These community goals are usually established through comprehensive or capital improvement planning and outreach efforts. During development of the local plans, stakeholder input and community engagement are often important preliminary steps in the plan development. Through the community planning process, how these goals are to be achieved through infrastructure investment are established.

Federal statutes guide both statewide and regional transportation planning efforts, and these laws (23 U.S.C. 134 and 23 U.S.C. 135) ensure that the community goals are incorporated into the MPO and statewide transportation plans. Ten factors are used to develop the regional and statewide transportation plans, which include: supporting economic vitality, improving safety, increasing security, increasing accessibility, protecting and enhancing the human and natural environment, enhancing modal integration, improving system efficiency, encouraging preservation of existing network, improving resiliency, and enhancing travel and tourism.[88]

These factors aid in the development of the regional and statewide plans that are used in the allocation of federal dollars for investment in Michigan's transportation network. Colorado's statewide active transportation plan offers a good example of developing a scoring system for rating active transportation projects. This scoring system can be used to help prioritize specific active transportation projects during the funding planning phase.

With federal funds often playing a role in the funding of nearly all regional and statewide networks, the impacts of federal requirements are still felt down at the local level where this network meets the locally planned and development system. Most local roads that are funded through Act 51 funds do intersect directly or indirectly with the state's federally supported road network.

Federal transportation investments are generally divided between current and long-term transportation plans. MPOs are responsible for evaluating transportation projects to determine prioritization at the regional level while MDOT is responsible for statewide transportation planning. The evaluation procedures and performance measures that MPOs and MDOT use to evaluate transportation planning projects and related financial investments have been revised over the years so that performance priority measures include motorized as well as active transportation projects.

To improve active transportation network planning, it would be appropriate for local and regional active transportation plans to coordinate with each other and ensure cross-community interconnections between various local and regional active transportation networks occurs. This coordination would improve both short-term and long-range transportation planning as it relates to active transportation investments.

## Project Development

Performance measures are valuable in project development and planning to ensure that the needs of all users of the transportation system, including pedestrians and bicyclists, are addressed in projects. Projects should be developed with active transportation during all phases of project selection, scoping, design, building, and maintenance. Agencies must first identify what the appropriate type of pedestrian and bicycle accommodations should be utilized into their projects. Considerations that planners and engineers should evaluate include developing a vision and goals, assessing existing conditions and local needs, equity, prioritization, health and safety, and accessibility. Projects should be, to the best extent possible, designed and constructed in accordance with the MDOT Road Design Manual, the AASHTO Guide for Development of Bicycle Facilities, the AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities, the MMUTCD, the U.S. Access Board's Accessibility Guidelines and Public Rights of Way Access Guidelines (PROWAG), and others described in the Design Guidance section of the active transportation plan.

In 3R (Resurfacing, Restoration, or Rehabilitation) Projects, the USDOT policy states that bicycle and pedestrian accommodations should be considered for all federally funded projects in addition to ADA upgrades. As these projects usually necessitate the need for new pavement markings, it is important that 3R projects consider treatments and upgrades for improving active transportation facilities. This may include improvements such as road diets with striping for bike lanes or paved shoulders in the existing or widened roadway, marking, and signs for high-visibility crosswalks, pedestrian signals and timing improvements, etc. The MDOT Local Agency Programs Guidelines for Geometrics on LAP

88 Semler, Conor, Adam Vest, Karla Kingsley, Susan Mah, Wayne Kittelson, Carl Sundstrom, Kristen Brookshire; Guidebook for Developing Pedestrian and Bicycle Performance Measures; UNC Highway Research Center Kittelson and Assoc.; FHWA, Washington, D.C., March 2016.

shows that 3R projects may be opportunities for adding bicycle accommodations, as paved shoulders under 3R have become increasingly more desired at higher average daily traffic for improved safety and use of shoulders by active transportation users. In addition, at intersections where preventive maintenance concrete patches exceed 50 percent of the intersection area, ADA sidewalk/ramp compliance must now be completed. Information on LAP project guidelines can be found on the MDOT LAP site: https://www.Michigan.gov/MDOT/0,4616,7-151-9625_25885---,00.html.

# Investment Decision Criteria Performance Measures

Performance measures are essential for assessing the efficacy of different programmatic choices. The most effective programs build performance measures into investment decisions. This tool allows policymakers to assess decisions based on a quantitative analysis that determines how each project and investment achieves the goals of MM2045.

Earlier analysis of other state active transportation plans and programs yielded some best practices for investment criteria performance measures. Different states use varying performance measures, particularly regarding investment and funding decisions. Colorado is perhaps the best example of a practice that requires a detailed cost benefit analysis for all investment decisions so that benefits can be quantified and decisions made based on the highest benefits. Massachusetts, for example, measures investments based on the reduction of greenhouse gas emissions. Iowa focuses on collecting more accurate use data. Maryland's Bicycle and Pedestrian Master Plan requires a level of traffic stress (LTS) analysis as part of strategic planning and implementation.

As previously mentioned, developing strong performance measures for transportation investments is essential for Michigan to achieve the goals of creating a safe, accessible, multimodal transportation network. In addition to using standard safety measures, Michigan can work toward stronger data gathering and reporting for developing a more detailed picture of active transportation within the broader transportation system. While some regional organizations have been steadily working to improve active transportation trips and use, there is generally a substantial deficit of accurate active transportation use data. Because this data has been measured independently from vehicular and transit trips, Michigan has little baseline information that assesses how active transportation trips work in conjunction with transit and vehicular trips. Utilizing some of the measures found in the Iowa and Maryland plans, Michigan can develop the baseline snapshot of active transportation use that can then be used to help make better funding decisions. Further, building greenhouse gas reduction into funding decisions and establishing clear metrics will help to accomplish the state's broader climate goals.

# Benchmarking and Financials

This subsection describes the three basic benchmarking performance measure categories:  usage, safety, and accessibility. The chapter also suggests four additional benchmarking performance measure categories from best practice states: connectivity, economic development, health, and equity. Each of these performance measure categories are described and opportunities for implementation of the active transportation plan. The aim for developing financial performance measures is also explored.

## Benchmarking

Benchmarking baseline data for each active transportation performance measure is vital to being able to properly track the implementation of the active transportation plan. From the baseline benchmark, a trend line for each benchmark performance measure should also be established. This trend line is important in being able to track rate of progress for achieving each of the performance measures. An important tool of benchmarking is tracking and reporting change over time, which may be done through annual reports, transportation dashboards, or other reporting mechanisms.

### *Usage*

Measuring the amount of active transportation occurring throughout the multimodal network is an important measure that can be used as a benchmark. To understand trends across the entire statewide system, information from local, regional, and state agencies are necessary to record periodic counts to measure usage over time. Both walking and bicycling baselines for active transportation usage should be established. Usage performance measures may include the following:

- **Active Transportation System User Counts:** Deploy traffic counters designed to capture active transportation users on various regional and statewide systems to determine number of users. Vermont proposed to evaluate this data after a three-year trial period to determine whether the information provided a useful and accurate representation of active transportation use over time. If the data is determined to be useful after the trial period, it could then be used as a performance measure. Additional active transportation use counts may be gained by incorporating active transportation collection when motorized traffic counts are being conducted. This data may not provide an accurate statewide representation of active transportation use, but it is likely to provide basic data that may illustrate actual use of various existing transportation facilities. Because traditional traffic count methodologies may not translate well to the collection of active transportation users, new or modified collection methodologies may be necessary.
- **Number of minutes per day the average Michigander spends engaging in active transportation:** This may be measured in two ways. One available tool is the U.S. census American Community Survey journey to work datasets; however, this excludes all other trip types and does not completely measure active transportation trips (only the primary mode is counted). An estimated modal split between trips for work versus all other active trips would have to be developed to solely use this data set. Michigan's 2015 Travel Counts survey could be used to develop a standard modal split. Future travel counts surveys could also provide this data. The desired performance goal for both pedestrian and bicycle mode share is for increasing active transportation shares. This information can be reviewed over time to illustrate changes in active transportation use; however, it will not describe why these changes are occurring.
- **Change in percent of all workers who commute to work by active transportation means:** The U.S. census American Community Survey data on work travel modes may be used to illustrate changes in commuter modal type. Limitations in the data include undercounting multimodal trips, commuters who periodically use active transportation, and youth, elderly, and other non-workers. This information will only capture working populations and may not truly reflect all Michiganders and their active transportation use.
- **Increased mobility of share system users, miles ridden, and trips using multiple modes of transportation:** How the active transportation system improves the function of the motorized network may also be tracked with various performance measures, including share system users and miles ridden, such as bicycles and e-scooters. Colorado proposed tracking these measures including the proposed facility's connectivity to an existing active transportation facility, the project's location along or parallel to a congested motorized route, and/or the project's ability to provide a direct connection to transit services. Projects that address these issues would increase the functionality of the state's existing network.

### *Safety*

Existing and proposed data collection methods may be deployed or developed that will enable safety performance measures to be tracked. This may include the following:

- **Utilization of standard crash data to establish a baseline for improvements for active transportation users:** Pedestrian and bicycle benchmark baselines should be established for active transportation users, including the number of fatalities and serious injuries crashes involving pedestrians or bicyclist as federally required in long-range transportation planning. This data should be analyzed to determine if any collision/crash patterns are correctable with proven countermeasures, and this safety information may be developed into a key safety performance measure. Crash data may also be analyzed to identify high crash locations, and deployment of countermeasures at these locations could be tracked over time.

- **Active transportation crash rate by police-reported pedestrian and bicyclist crashes per number of minutes spent engaged in active transportation:** This measure used in Vermont would allow for an analysis of the exposure of risk for active transportation participants. One approach to reach a result is to use the minutes reported from the Michigan transportation survey. An analysis would be completed to extrapolate the minutes per day into a yearly figure and then divide by the number of reported crashes for the year of the survey data. Two limits to this information are that they do not capture minor injury crashes or those that aren't reported on police UD-10 crash reports (e.g., crashes with trains, streetcars or occurring on private property).
- **Utilization of risk assessment tools:** The Michigan Bicyclist and Pedestrian Exposure and Risk Assessment Tool is a web-based tool developed by UMTRI in collaboration with MDOT that could be utilized to estimate bicyclist and pedestrian exposure and risk in Michigan. Data from this tool may allow for risk assessment by geographic area and assist in identifying areas of focus for where safety investments may have the biggest impact. Reduction in risk would be a desired trend. Identifying a tool to easily identify level of traffic stress for active transportation system users is also important as higher levels of stress reduce user likelihood to engage in active transportation activities, especially for less confident riders.

Evaluation of crashes related to pedestrians and bicyclists may provide insight into collision patterns that may be correctable with proven countermeasures. The new trend in scooter use as a transportation means is quickly escalating in areas, including many of Michigan's larger cities, and this trend may eventually need to be considered as a distinct mode to measure. However, crash data on other modes such as scooters is limited at this time.

If additional datasets are required, MDOT can work with MSP and its local and regional partners to start collecting this data. Desired performance metric trends for both pedestrian and bicycle safety would be for both crashes and injuries to be decreasing.

It is important to address all modes through various strategies in measuring performance, and to promote a plan that best addresses the Pedestrian and Bicycle Safety Strategic Highway Safety Plan (SHSP) focus area. The active transportation plan emphasizes safety for all modes through design standards, education, and performance monitoring, and supplements promotion of MDOT's Comprehensive Highway Safety Improvement Program (HSIP), which seeks innovative solutions to address safety for all modes of travel. An emphasis area of the HSIP is pedestrian and bicycle safety in relation to system-wide initiatives, strategies, education, outreach, etc. Other recommendations impacting safety and ultimately additional performance measures for consideration include:

- Promote collaboration and information sharing among the various partners to ensure that stakeholders are actively engaged in implementation of the active transportation plan.
- Provide tools to local agencies more familiar with the area to make informed mode planning decisions.
- Provide training and information to regional and local agencies on the use of new and proven safety countermeasures.
- Provide guidance on prioritization and implementation of safety projects.
- Evaluate and emphasize safety countermeasures for all modes legally permitted to utilize a road right of way that can be considered and included with every road project.
- Promote data-driven design and analysis utilizing crash and count data. Build upon and expand active transportation count programs that are underway with MDOT and MPOs.
- Increase focus and statewide strategies on safety planning for active transportation modes. The M2D2 imitative is relevant to the MM2045 planning effort by improving MDOT's institutional capacity to plan, design, construct, operate, and maintain Michigan's transportation system for Complete Streets and multiple modes.
- Improve and expand education and outreach on safe behaviors and new active transportation facilities.
- Incorporate emerging technology for improved pedestrian and bicycle safety.
- Support regional and local safety plan implementation activities.

### *Accessibility*

Accessibility is defined as people's ability to reach desired services and activities. Many factors impact accessibility including mobility (ease of movement), the quality and affordability of transport choices, transportation system connectivity, mobility substitutes, and land use patterns.[89] Possible accessibility performance measures include:

- **Tracking a variety of transportation system-related statistics:** These statistics include the percentage of rural and urban networks suitable for walking and bicycling, average distance of a resident from an active transportation facility (or percentage of residents within given distance of a bicycle or shared-use facility), number of school districts that have enrolled in the SRTS program, proximity to universities and other schools, and statewide average job accessibility, including the number of jobs available within specific non-personal automobile trip distance; etc.
- **Evaluation of desirability of transportation system:** For bike riding, reducing the level of traffic stress for users and/or improving the level of comfort to transit points are important system improvements, and tracking these two metrics will help determined the network's overall desirability. Certain types of transit are seen as less desirable than others (bus riding or walking to work) and prioritizing funding for needed improvements often loses out to auto-focused improvements. Location and number of carpool lots are important to encourage cross-modal connectivity at carpool lots. Location and availability of bike racks and long-term bike parking/storage also impacts the desirability of utilizing bicycles for transportation trips. Maryland and Ohio propose tracking installation of transportation facilities and amenities to gauge system desirability.

Mobility and accessibility are often confused where conventional transportation planning tends to evaluate transportation system performance based on motor vehicle travel conditions (roadway condition, travel speed, level of service) over accessibility to desired services and activities.[90] The desired performance trend for accessibility and bicycle level of comfort would be increasing while a reduction in the level of traffic stress would be the desired trend.

### *Connectivity*

Several factors impact connectivity, including street design, presence and quality of active transportation infrastructure, signs, and the design of the street grid all impact local connectivity. Regional connectivity is affected by the presence of/lack of transportation (transit) options and infrastructure connectedness. Active transportation's connectivity performance measure may be obtained through a variety of metrics:

- **Miles of active transportation facilities:** Many states use these measures, which include the miles of locally/regionally owned active transportation facilities, including trails, sidewalks, bike lanes, and paved shoulders wider than 4 feet. Illinois proposes that this active transportation network be updated annually with miles completed, and further granularity can be achieved by tracking miles under construction and in planning. Installation of various facilities could also be tracked, including number of accessible ramps, number of enhanced crossings, and designated bicycle facilities. Vermont proposed to track miles of sidewalks/paths along state highways, excluding interstate highways, as another connectivity performance measure. For further granularity of the data, these numbers may be further segregated between on-road and out of the road right of way locations.
- **Reduction in miles of system gaps:** Reductions in the number/miles of gaps in local, regional, and statewide active transportation networks can be prioritized and their elimination can be tracked. To utilize this performance measure, gaps should be identified and prioritized through active transportation planning during the next five years.
- **Assess percentage of short trips to determine modal mix and change over time:** To assess connectivity, the number of people choosing to walk or bicycle on short trips may be a good determinate of system connectivity. Massachusetts proposes tracking what percentage of short trips (under X miles for bicycle and X miles on foot) are made by active transportation, which would be a good method of tracking increasing system connectivity. Further evaluation may be required to confirm this approach.
- **Job creation:** Track the numbers of jobs that are created in businesses directly related to active transportation, including jobs making and selling bicycling equipment and gear, jobs associated with active transportation events, and hospitality businesses that are developed to cater to users of active transportation facilities (including hotels, restaurants, sporting goods stores, etc.).

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89 Litman, Todd; Evaluating Accessibility for Transport Planning: Measuring People's Ability to Reach Desired Services and Activities; Victoria Transportation Policy Institute; March 2021.

90 Ibid., pg. 2.

The desired facility mileage performance metric trend is to increase from the baseline. Increasing both the number and rate of elimination of gaps on local, regional, and state active transportation networks are both important performance trends.

### *Economic Development*

Section 5 clearly identifies the economic value of active transportation to Michigan and performance measures that track active transportation project's role in supporting economic development should also be established. These measures may include:

- **Number of in-state and out-state tourists utilizing the state's active transportation network:** Tourist data that is being collected by the state and its various tourist entities could be modified to ensure that it collects information about the number of visitors that come to use the state's best-in-class network of active transportation facilities.
- **Connection of natural and scenic destinations to active transportation networks:** Many travelers desire having a choice of transportation modes when they are on vacation, and to ensure Michigan's competitiveness in the tourism industry, having the state's historic, scenic, and cultural destinations accessible by other than personal vehicle is an important goal. Identifying those sites that are not currently accessible is the necessary benchmark. Colorado proposes a connectivity performance measure that bases investment on addressing connectivity issues.

### *Health*

Easy access to active transportation opportunities is an important factor in supporting the creation of healthy resident populations, and the state's active transportation network can play a positive role in increasing Michiganders' physical activity levels. Certain public health statistics may be used as performance measures:

- **Changes in health statistics:** Careful use of public health statistics (obesity rates, populations receiving sufficient exercise) may be used as performance measures. Changes from a sedentary lifestyle through convenient access to active transportation may be a relevant factor in improved health statistics; however, it is important to clearly note that these increased activity statistics are not the only contributing factors.
- **Increased minutes of physical activity:** A percentage change in average minutes of physical activity per day per capita over a specific period of years may serve as a valuable performance measure. Depending upon the measure, the desired trend may be increasing or decreasing.

### *Equity*

Transportation systems often provide inequal benefits to different populations. Communities that may be inequitably served include low-income communities that must rely upon transit to access work and complete daily activities. Less affluent residents, who have less opportunities to afford to own and/or operate personal vehicles and Michigan residents with disabilities who are unable to operate personal vehicles on their own and require transit services or active transportation for their daily trips, are not as well served as Michigan's motoring public. Most of Michigan's investment is in the state's motorized transportation networks that can be perceived as making the state's transportation network less equitable. To evaluate the equity of transportation investments, several performance measures may be utilized:

- **Tracking first/last-mile improvements:** With higher rates of transit use by disadvantaged communities, enhancing the ease and safety of making transit connections is important. A performance measure that tracks investments by local and regional entities in improving first- and last-mile connections would be important in tracking how this group's transportation experience is changing.
- **Review of safety data for equity throughout various populations:** Safety data should be reviewed to ensure that certain populations are not suffering from crashes at higher rates than other populations. If discrepancies between various groups are found in the data during the benchmarking process, performance measures should be established to address these issues.
- **Accessibility for those with disabilities:** A performance measure or multiple performance measures that identify points of inaccessibility for those with disabilities to the active transportation network and tracks the elimination of those accessibility issues over time. Usage of ADA transition plans may be a part of the performance measures.

**Table 9. Michigan's Active Transportation Plan Performance Benchmarks**

| Performance Measure | Priority Areas Performance Measure Informs | | | | Timeframe for Establishing the Measure | Agency Responsible for Implementation | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Complete Steets | SRTS | TZD | First/ Last-Mile Connect | | MDOT | MPOs | Counties | Cities | MFF |
| Pedestrian and bicyclist counting program. | ✓ | ✓ | ✓ | ✓ | Mid-Term | ✓ | ✓ | | ✓ | |
| Percentages of active transportation mode share. American Community Survey to determine baseline for walking and biking. Increased mobility. | ✓ | ✓ | ✓ | ✓ | Current | | | | | |
| Trips using multiple modes of transportation. | ✓ | ✓ | ✓ | ✓ | Mid-Term | | | | | |
| Utilization of standard crash data for improvements for active transportation users. Establish a nonmotorized safety baseline. | ✓ | ✓ | ✓ | ✓ | Current | ✓ | ✓ | ✓ | ✓ | |
| Five-year moving average: number of nonmotorized fatalities and serious injuries (all public roads): MM2045. | ✓ | ✓ | ✓ | | Current | ✓ | ✓ | ✓ | ✓ | |
| Statewide statistics on pedestrian and bicycle crashes: frequency of crashes per year, time of year, time of day. | ✓ | ✓ | ✓ | | Current | ✓ | ✓ | ✓ | ✓ | |
| Utilization of risk assessment tools. | ✓ | ✓ | ✓ | | Mid-Term | ✓ | ✓ | ✓ | ✓ | |
| Statistical models to identify bicycle compatibility ratings for roads. | ✓ | ✓ | ✓ | ✓ | Long-Term | | ✓ | | ✓ | |
| Number of school districts enrolled in the SRTS program. | ✓ | ✓ | ✓ | | Current | | | | ✓ | ✓ |
| Carpool lots, Amtrak, transit stops, airport and bike rack availability. Cross modes at carpool lots. | ✓ | | | ✓ | Mid-Term | ✓ | ✓ | | ✓ | |
| Review of safety data for equity throughout various populations. | ✓ | ✓ | ✓ | ✓ | Mid-Term | ✓ | ✓ | ✓ | ✓ | |

Source: Wade Trim

Notes: MPO – Metropolitan Planning Organization DNR – Department of Natural Resources MFF – Michigan Fitness Foundation

## Financials

Expanding investments on active transportation facilities could have financial relevance upon state, county, and local municipal budgets. Creating financial metrics to identify these financial influences would be a valuable performance measure in gauging how active transportation investments are affecting transportation agency budgets.

Financial impacts for adding active transportation facilities to a larger transportation project may lead to a reduction in overall costs or increases in building and/or maintenance costs to the appropriate roadway agency. Often the earlier that an active transportation facility is added to the design of a motorized transportation project, the less expensive it is to incorporate the required improvements into the overall project. Better understanding these costs and cost savings of various active transportation facilities may help in identifying where additional active transportation projects could be targeted.

With transportation funding constrained, understanding the cost impacts of new active transportation facilities on overall transportation budgets should be measured to understand how it is impacting both motorized and active transportation investments. Is the percentage of funding for active transportation facilities increasing or decreasing within an agency? Are certain active transportation investments too expensive for the local agency to consider? Performance measures that clarify the financial impacts of active transportation investments on transportation agency budgets should be studied and identified.

Performance measures that identify these financial impacts and gauge how local units of government and the state address both understanding and preparing for active transportation system investments would be valuable. These measures may help understand the costs or savings associated with active transportation investments and assist in determining an agency's ability to implement various active transportation investments.

## Funding

Available funding to invest in both motorized transportation and active transportation facilities will influence how quickly and broadly Michigan's active transportation network will be built out and enhanced in the near, mid, and long terms. Limited funding will constrain or draw out the construction window while significant increases in funding could rapidly shorten the time necessary to complete large portions of the state's incomplete active transportation network.

A more nuanced understanding of the total amount of spending available for active transportation investments is necessary to gauge the success of building out Michigan's active transportation network. Though not a performance measure, funding is a key input measure and should be determined each year.

Funding of active transportation can be evaluated in multiple ways. Total amount of funds being spent on active transportation in Michigan is a basic (but difficult to achieve) calculation that, alone, doesn't allow for a clear understanding of activities at the local level, where much of the investment in active transportation occurs. To add to the granularity of this input measure, this general number can be further dissected by the amount of funding that is being spent on MDOT-funded projects and the amount of funding being spent by local jurisdictions. Further complicating this analysis is the complexity and diversity of funding sources that could be used for active transportation infrastructure developments, which could include safety related investments, dedicated active transportation dollars (TAP funds or DNR funds), and other funding sources, including private funds, create challenges with this evaluation method. Despite these challenges, some basic funding input measures could include:

- Overall active transportation funding spent.
- Total active transportation funding spent by a road agency.
- Percentage of TAP and/or CMAQ dollars spent on active transportation projects.
- Amount of safety funding dollars spent on active transportation network improvements.
- Amount of private funds spent on active transportation projects.

Another more difficult input measure is to track the amount of active transportation investment that is occurring, and facilities being built as parts of a road project that incorporated active transportation components and do not use specifically identified active transportation funds or project pay items. To fully track active transportation investment, a method to track these investments that are part of a larger project may need to be developed.

As an input measure, total funding in each of the above categories should be benchmarked as a starting level. The desired trend would be for total dollars and percentage of total transportation funds to be increasing.

### Education

There are several educational input factors that will impact the implementation of Michigan's active transportation network. These factors include:

- **Professional training:** Engineers, planners, and other professionals involved with transportation, land use, site plan development, etc., that have been exposed to best practices for bicycle/pedestrian facility design and safety may be more likely to choose incorporating active transportation choices at project initiation and continue supporting these options that exceed design standards through project design completion than those not exposed to this type of training. This active transportation design training will also assist in "mainstreaming" active transportation within MDOT, the local units of government, and the transportation design professionals' community. Vermont has an input metric that tracks the numbers of state staff, locals, and outside consultants that participate in scheduled active transportation training.
- **Safety culture:** Expansion of Michigan's safety culture can be tracked through collecting data on participants in a number of transportation safety programs. Numbers of schools/students participating in SRTS safety programs or events is one input measure. Numbers of schools participating in SRTS programs is another safety measure, as identifying and correcting safety issues on school routes is an important program objective. Tracking the number of engineers participating in zero-focused traffic safety programs through participating in Road to Zero or TZD programs would be a valuable metric in measuring expansion of Michigan's safety culture.

Fostering a data-driven transportation safety culture in Michigan is vital to making Michigan's roads safer for all users. Tracking educational programs is a key input measure for expanding Michigan's active transportation network. The desired trends for all education input measures would be more increasing.

### Statewide Policy

Statewide policies regarding adoption and mainstreaming of active transportation projects and programs is an important yet difficult metric to accurately measure. Efforts should be made to identify ways to accurately track this input measure.

Annual reports should be prepared that describe new or revised policies that improve or advance Michigan's development of active transportation facilities on the statewide, regional, and local levels. To ensure longevity and continuity, this report should be made public and updated annually. Its release could correspond with and be featured prominently at an annual event or conference that celebrates Michigan's active transportation achievements.

An example of a statewide policy is Colorado that uses performance measure metrics to categorize prospective projects. Projects that achieve better performance measure results in desired active transportation plan goals receive higher scoring in competitive programs versus projects that do not achieve such high scores.

## Local Policies and Actions

With Michigan's tiered jurisdictional system of transportation facility delivery, much of the work involving implementation of Michigan's active transportation network will be completed by local units of government, including counties and regional planning authorities. Measuring local policies and actions that will further the implementation of Michigan's active transportation network are important.

Some measurable local activities include:

- Number of counties, townships, cities, and villages that have adopted Complete Streets policies or resolutions.
- Number of communities that adopt local active transportation plans.
- Number of bicycle racks installed at public locations.
- Number of local public transit vehicles that accept bicycles in vehicles or on exterior racks.

- Number of new partnerships formed between local municipalities, school systems, nonprofits, and other entities related to expanding safe active transportation opportunities.
- Number of communities that have adopted Vision Zero policies and drafted local action plans.
- Number of communities that have performed safety audits on active transportation facilities within their communities.
- Number of communities that have passed millages or created special assessment districts that support the development of active transportation facilities.
- Number of communities establishing or maintaining pedestrian and bicyclist counts.
- Number of communities that have utilized the Michigan's Bicyclist and Pedestrian Exposure and Risk Assessment Tool, developed in partnership between the University of Michigan Transportation Research Institute (UMTRI) and MDOT, or other bicycle level of comfort modelling system to evaluate their local transportation network, which can identify where active transportation concerns exist.
- Number of active transportation safety countermeasures deployed by local units of government.

These local performance measures will assist Michigan in measuring the implementation of Michigan's active transportation plan at the local level. This plan provides design guidance that can assess the bicycle friendliness of local roadways and their comfort levels so that future active transportation projects can be planned and designed to address areas of the local network that are not bicycle or pedestrian-friendly or have high levels of user stress.

Performance measures outlined in this chapter can assist MDOT or local road agencies in developing a system to benchmark progress in expanding and improving Michigan's active transportation network. Those performance measures selected for implementation are intended to directly influence how MDOT and local agencies implement their active transportation efforts; however, those chosen performance measures will rely upon many interagency partnerships, including local agencies, transit, and regional planning organizations, to be achievable and relevant.

CHAPTER 7

# Funding and Financing

## Overview

States provide funding for transportation needs in many ways and relies on many different sources of funding for successful project planning and delivery. States obtain funding from sources such as the TAP, the Surface Transportation Block Grant Program (STBG), the HSIP, and CMAQ to fund active transportation improvements. Additionally, many states have state-specific funds that have been created by their legislatures to fund nonmotorized transportation improvements. For instance, Illinois dedicates funds to Complete Streets projects based on the IDOT multi-year, multi-modal program. Maryland created its Highways Safety Office that has funding dedicated to bicycle programs. Massachusetts uses the Chapter 90 Program that is a 100 percent reimbursement program for the funding of capital improvements that can be used for active transportation projects. It is important to note that the levels of guidance provided regarding funding in the selected state plans that were reviewed vary considerably. Michigan currently mandates 1 percent of Michigan Transportation Fund (Act 51) funding goes toward projects that support pedestrian and bicyclists and is one of the few states to do so.

Local agencies, in all states, also use a variety of funding mechanisms to provide additional funding for active transportation, ranging from millages to sales or use taxes, depending on the state and enabling legislation.

## Federal, State, and Local Programs

Michigan communities use a combination of federal, state, local, and private sector funds to finance active transportation projects. MDOT and MPOs are typically the administrative leads for many federal programs, while MDOT oversees state transportation funds, and MDNR administers programs that can fund trails. CRCs and municipal governments oversee local pots of funding and often work with the private sector to create public-private partnerships (P3) to provide yet another potential source of funding.

Current public funding sources for nonmotorized transportation in Michigan are described in the following subsections.

### Federal Programs

Active transportation infrastructure facilities and programs are broadly eligible under many federal transportation funding programs. When accommodations are considered early in the transportation planning and scoping process, funding for these accommodations can often be covered by one federal source or another. Guidance from the FHWA encourages agencies to fully integrate active transportation accommodations into all surface transportation projects. Section 1404 of the FAST Act modified 23 U.S.C. 109 to require federally funded projects on the National Highway System to consider access for other modes of transportation and provides greater design flexibility to do so. Achieving this outcome can be realized in part through the leveraging of the following federal funding programs:

- **Surface Transportation Block Grant Program (STBG):** Projects are selected through the local MPO during the TIP process. STBG funds may cover up to 80 percent of the total project costs, and bicycle, pedestrian accommodations are broadly eligible.

- **Highway Safety Grant Program:** The NHTSA Office of Regional Operations and Program Delivery administers more than $500 million in grants annually throughout all of the U.S. and its territories. This program provides funding for a variety of safety measures, including occupant protection grants, impaired/drunk driving, traffic safety information systems, distracted driver, motorcycle safety, graduated driver licensing incentives, nonmotorized safety, and racial profiling data collection grants.
- **Recreational Trails Program (RTP):** A set-aside of TAP funding that is taken off the top as a flat amount. RTP provides funds to states to develop and maintain recreational trails and trail-related facilities for both nonmotorized and motorized recreational trail uses. In Michigan, the projects are selected by MDNR and administered through MDOT.
- **Transportation Alternatives Program (TAP):** A competitive grant program that uses federal transportation funds designated by Congress for specific activities that enhance the intermodal transportation system and provide safe nonmotorized transportation options. The Michigan TAP program is administered by MDOT and includes the MDOT TAP program and TAP programs for six MPOs. Grants can be awarded for up to 80 percent of the project cost, with the remaining 20 percent coming in the form of a local match. However, due to the competitive nature of TAP, higher local match of 40 percent or more are more competitive.
- **Safe Routes to School (SRTS):** A national program that is one of the categories of the TAP program described above. This program is administered through MDOT as a competitive grant program that utilizes TAP funds for a variety of efforts to increase children walking and bicycle riding to school by creating safe routes for them to use. School districts should be encouraged to consider health of students in siting and transportation issues.
- **Highway Safety Improvement Program (HSIP):** FHWA has developed a wide variety of resources to help states plan highway safety improvement projects using a performance-driven process, implement those projects, evaluate the effectiveness of past projects, and report annually on the status of HSIP implementation effort. The HSIP provides limited funding for bicycle and pedestrian safety projects that are consistent with the state's SHSP, that correct or improve a hazardous road location or feature, or address a highway safety problem. The FAST Act limits HSIP eligibility to only those listed in statute, most of which are infrastructure-safety related.
- **Congestion Mitigation and Air Quality Improvement Program (CMAQ):** CMAQ Program funds may be used for a transportation project or program that is likely to contribute to the attainment or maintenance of a national ambient air quality standard, with a high level of effectiveness in reducing air pollution, and that is included in the MPO's current transportation plan and TIP, or the current STIP in areas without an MPO. Eligible active transportation expenses include bike lanes, bike racks for transit, bike parking, repair stations, sidewalks, crosswalks, ramps, and training.
- **Better Utilizing Investments to Leverage Development (BUILD):** BUILD grants are earmarked for investments in surface transportation infrastructure and have been awarded on a competitive basis to projects with a significant impact in their local or regional communities. BUILD funding supports roads, bridges, transit, rail, ports, or intermodal transportation. In 2019, 50 percent of the grants were to projects in rural areas, with a maximum grant of $25 million and no more than $90 million awarded to any single state.
- **Infrastructure for Rebuilding America (INFRA):** INFRA is a discretionary grant program that is designed to promote projects with national and regional economic vitality goals while leveraging non-federal funding to increase the total investment by state, local, and private partners. INFRA grants may be used to fund a variety of components of an infrastructure project; however, the USDOT is specifically focused on projects in which the local sponsor is significantly invested and is positioned to proceed rapidly to construction. Eligible INFRA project costs may include rebuilding, rehabilitation, acquisition of property (including land related to the project and improvements to the land), environmental mitigation, construction contingencies, equipment acquisition, and operational improvements directly related to system performance.

## State Programs

- **Act 51 Michigan Transportation Fund:** Public Act 51 of 1951 is the state law that creates and regulates the Michigan Transportation Fund, which is the primary mechanism for funding road improvements for many jurisdictions. Section 10k requires that agencies spend at least 1 percent of their Act 51 allocations on nonmotorized facilities and services when averaged out over 10 years. While Act 51 requires agencies to have a plan in place for nonmotorized improvements, in practice, MDOT monitors every agency's 10-year record of spending to determine compliance with the nonmotorized requirements.
- **Michigan Natural Resources Trust Fund:** Grants of unlimited amounts are available for acquisition of land for public recreation that could include land for trails and pathways. The local community must provide a local 25 percent match. For recreation-related building projects, the Trust Fund will grant up to $300,000, with the same 25 percent local matching requirements. A portion of the funds may be used for design. Some projects are both good transportation projects and good recreation projects; these projects could be competitive for both a TAP grant and an MNRTF grant, and the funds may count as match for each other.
- **Land and Water Conservation Fund (LWCF):** The National Park Service is the originator of the LWCF, and MDNR administers this federal program here in Michigan. These funds may be used for the acquisition and development of public outdoor recreation areas and facilities. Grants may range from $30,000 to $500,000.

## Local Programs

- **Special Local Millages:** A millage is a tax on property owners based upon the value of their home. Special millages are use-specific and approved by the vote of the residents. Depending on the ballot language, millages can be used to hire designers, staff, fund building activities, provide maintenance, or serve as the basis for a bond issue. An example is Milford Township that passed a special local millage to fund the building of the Kensington-Milford Trail. Similarly, voters in Washtenaw County passed a four-year roads millage that allocated 20 percent of the funding to facilitate the completion of the Border-to-Border Trail.
- **Local General Fund:** As part of the annual budget process, a portion of municipal General Fund dollars may be appropriated by the local legislative body to build nonmotorized improvements. For example, Ann Arbor directs 20 percent of rebates from the 2018 Washtenaw County Public Safety and Mental Health millage to pedestrian safety improvements.
- **Local Bond Funds:** Through the sale of General Obligation bonds, this municipal debt funding mechanism can be used to fund capital assets, including nonmotorized capital investments.
- **Local Special Assessment:** A special assessment is a unique type of tax that is levied on a specific portion of the community. Special assessments are placed upon those adjacent landowners who will receive the greatest benefit from the project to be funded by the special assessment. Special assessments have been utilized by local units of government to fund sidewalk building, street paving, and improvements.
- **Interlocal agreements and Trail Management Councils:** The Natural Resources and Environmental Protection Act (Public Act 451 of 1994) provides the opportunities for local governments to form a multijurisdictional trail management council for the development and management of a trail pursuant to the Urban Cooperation Act of 1967. The Paint Creek Trail in southeast Michigan is one example where a multijurisdictional trail management council, the Friends of the Paint Creek Trail, has been created to share in the maintenance and management of the trail, and to receive grants to improve the trail.
- **Philanthropy and Public-Private Partnerships (P3):** Local community foundations, businesses, and residents may be sources of funding for projects that meet the donor's specific giving goals. The Ralph Wilson Foundation is currently funding active transportation projects along the Detroit River waterfront. The Community Foundation Southeast Michigan Foundation, largely through the Greenways Initiative, has helped funded more than $100 million that created significant trail and greenway connections across southeast Michigan. Another example of philanthropy and a P3 is the Iron Belle Trail Fund campaign, which aims to raise $155 million in private funds to further the completion of the statewide Iron Belle Trail.

# Opportunities for Integration

Funding continues to be a major impediment for agencies across the state as they look to undertake active transportation projects. It is particularly challenging for smaller and more rural communities that frequently do not have the proficiency necessary to pursue these funding options and may not have the staffing to pull together P3s or organize large philanthropic efforts. Small and rural communities also struggle with meeting the match requirements for a project, which becomes especially onerous when projects require expensive elements like bridges, boardwalks, or extensive retaining wall. Further, philanthropic funding has increasingly been the foundation of funding for major active transportation projects that go through multiple jurisdictions or for major projects accomplishing many community goals. Funding maintenance of shared-use pathways and trails has historically been challenging for communities and cross-jurisdictional organizations; philanthropy has increasingly filled this void. The day-to-day active transportation projects that address first- and last-mile connections and SRTS are typically funded with some combination of federal, state, county, and local dollars.

MDOT and MPOs act as a clearinghouse of information and can provide local communities, partners, agencies, and organizations with a funding toolbox, as well as potentially providing technical assistance for certain funding applications. The role of MDOT and MPOs as coordinating agencies is crucial, and local communities look to these agencies for guidance on how to implement and fund many of the nonmotorized projects initiated by their citizens.

Recommendations drawn from the peer state review of best practices are listed below:

- To the best extent possible, modify funding streams to pair active transportation infrastructure from the same source as roadway projects.
- Eliminate gaps and barriers in the bicycle and pedestrian network in conjunction with larger transportation improvement projects.
- Compile and disseminate funding and project information to improve transparency and performance.
- Provide guidance to include active transportation projects in the state, regional and MPO transportation plans to ensure they are included when setting project budgets.

CHAPTER 8

# Conclusion

Michigan's first active transportation plan demonstrates the importance of creating an environment that is conducive to safe, accessible, and efficient walking and bicycling. This plan envisions an ever-expanding active transportation network that supports economic development, provides opportunities for healthy living, addressing climate change, builds transportation equity and accessibility, and enhances Michigan's quality of life.

Strategies of the MM2045 Active Transportation Plan: A Bold Vision aim to enhance and increase active transportation opportunities for the most vulnerable users of the roadway: pedestrians and bicyclists. Achieving the MM2045 vision requires coordination between MDOT and its public and private partners over the next 25 years. These achievements will be developed through improved partnerships between all the entities and agencies that work together to design, build, and operate Michigan's transportation network. This plan details actions that can be taken for integrating policies, programs, and practices that include first- and last-mile connections, the SRTS and Zero-Focused Safety programs, and Complete Streets principles that will lead to a walking and bicycling environment that enhances Michigan's vitality and attractiveness for residents and visitors alike.

Several recommendations of this active transportation plan will require multiple steps to be taken over the course of many years. Some may require additional planning, analysis, and continued education for agencies and the public. The plan provides a comprehensive implementation approach for engagement, education, equity, encouragement, engineering, evaluation, and enforcement. The active transportation performance measures outlined in the plan will track the outcomes of policy and program actions, inform decision-making, and show progress toward local, regional, state, and national goals. Periodic updates to this active transportation plan should occur as infrastructure, legislation, and programs evolve that affect pedestrian and bicycle facilities and as the network matures.

Michigan Department of Transportation

# Michigan Mobility 2045

A transportation plan for a connected future #MM45