I-75 CORRIDOR PLAN

Final Report

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MDOT
Michigan Department of Transportation

Prepared by
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Notice

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LIST OF ACRONYMS

AADT	Annual Average Daily Traffic
BL	Business Loop
CCTV	Closed-Circuit Television
DMS	Dynamic Message Sign
DTW	Detroit Metropolitan Wayne County Airport (call letters)
EGLE	Michigan Department of Environment, Great Lakes, and Energy
ESS	Environmental Sensor Station
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
F/I	Fatal and Injury (Crashes)
FPPA	Farmland Protection Policy Act
GCMA	Genesee County Metropolitan Alliance
GPMPC	Genesee County Metropolitan Planning Commission
GIS	Geographic Information System
GM	General Motors
HOV	High-Occupancy Vehicle (Lane)
HSM	Highway Safety Manual
ISATe	Enhanced Interchange Safety Analysis Tool
ITS	Intelligent Transportation System
LOS	Level of Service
MDOT	Michigan Department of Transportation
MM2045	Michigan Mobility 2045 Plan
MPO	Metropolitan Planning Organization
MSP	Michigan State Police
MTA	Mass Transit Authority (Flint)
MTCF	Michigan Traffic Crash Facts
NAFTA	North American Free Trade Agreement
NEPA	National Environmental Policy Act
OU	Oakland University
PA116	Farmland Development Rights Agreement
PDO	Property Damage Only
PTI	Planning Time Index
RITIS	Regional Integrated Transportation Information System
RSL	Remaining Service Life
RCOC	Road Commission for Oakland County
RSU	Roadside Unit
RTA	Regional Transit Authority of Southeast Michigan
SEMCOG	Southeast Michigan Council of Governments
SMART	Southeast Michigan Rural Area Transportation
SPF	Safety Performance Function
TDM	Travel Demand Model
TDMS	Transportation Data Management System
TIF	Tax Increment Financing
TIP	Transportation Improvement Program
TTI	Travel Time Index
US	United States
V/C	Volume to Capacity (Ratio)
VHT	Vehicle Hours Traveled
VMT	Vehicle Miles Traveled

1. INTRODUCTION AND BACKGROUND

The intent of this study of I-75 from Square Lake Road in Oakland County to US-23 in Genesee County is to establish a sustainable multimodal corridor consistent with the vision, goals and strategies of the Michigan Mobility 2045 Plan (MM2045). Its purpose is to evaluate future mobility needs for I-75 and the parallel and intersecting transportation network in the study area in order to provide recommendations to decision-makers to meet those needs.

1.1 Background

I-75 is part of the original interstate system. It connects Sault Ste. Marie, Michigan, to Miami, Florida. As the population in the state grew, segments of I-75 were built, and eventually I-75 would become Michigan's critical north-south corridor serving regional mobility needs.

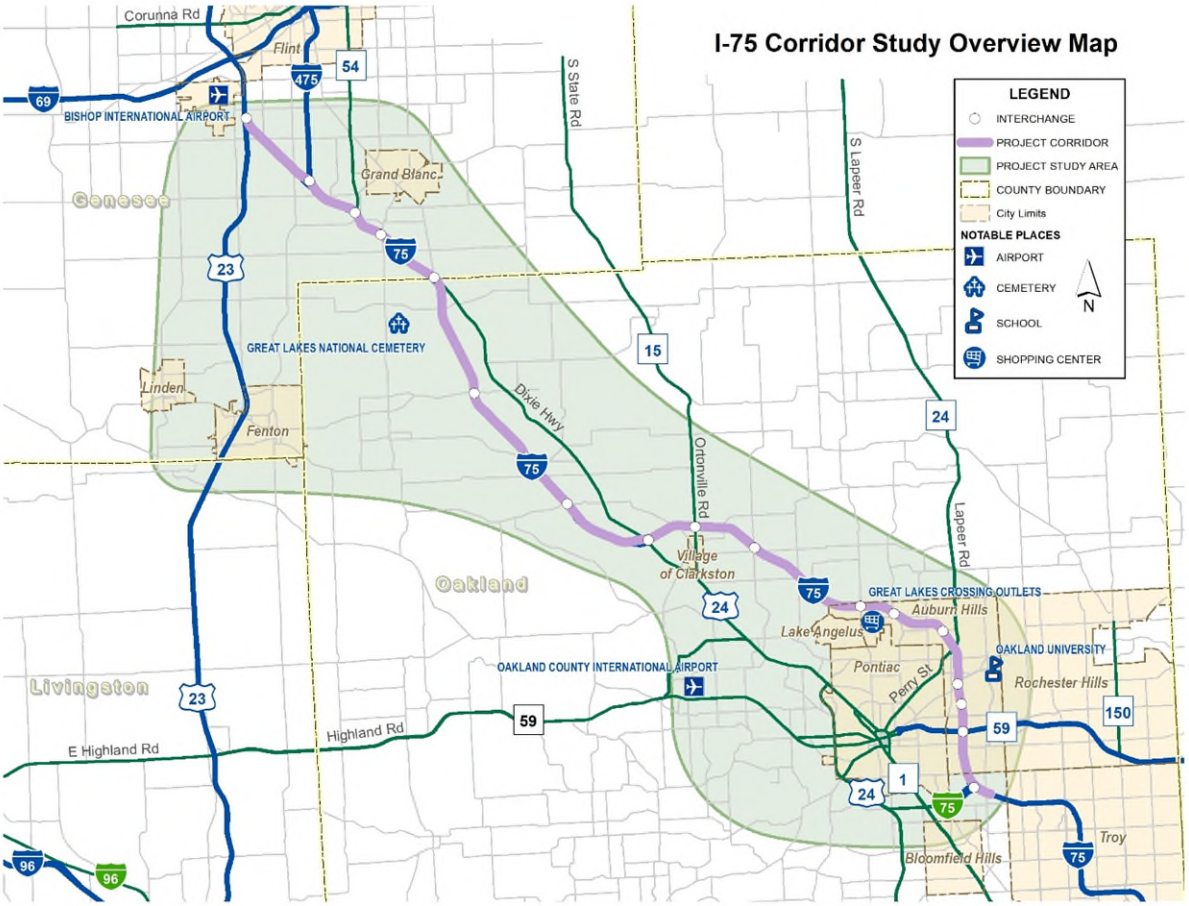
I-75 is an internationally recognized trade corridor. The I-75 corridor has many location advantages that make it suitable as an international trade hub and a manufacturing base. These location advantages include proximity to international border crossings in Sault Ste. Marie, Port Huron and Detroit, as well as the Detroit Intermodal Freight Terminal and the Detroit Metropolitan Wayne County Airport (DTW). Available land sites and a distribution network that extends across the United States make I-75 an ideal location for companies seeking to relocate or expand their distribution and manufacturing operations. Existing and proposed development projects along I-75 cater to the needs of North American Free Trade Agreement (NAFTA)-related traffic, resulting in many manufacturing and truck/distribution-related development projects. There are clusters of warehousing and manufacturing facilities along the corridor, mostly focused on the north and south ends of the study area.

Oakland and Genesee counties are the second and fifth-most populous counties, respectively, in the state of Michigan. The U.S. census in 2020 identified that Oakland County had a population of nearly 1.3 million residents, making up approximately 12.6 percent of the state's population. Genesee County's population of more than 400,000 residents makes up 4 percent of the state's population.

1.2 Study Limits

The project limits extend along I-75 from Square Lake Road (Exit 75) in Oakland County to US-23 (Exit 115) in Genesee County. Figure 1 illustrates the corridor study area. The corridor study area is defined as the freeway mainline and interchange areas. It also includes the I-75 Business Loop (BL) segments of Square Lake Road, Woodward Avenue and Perry Street through portions of Bloomfield Township, Pontiac and Auburn Hills. In addition, several interchanges on US-23 between I-75 and Fenton are included in the study. It is recognized that the corridor study area is one of regional significance and the recommendations provided to improve mobility within the corridor study area may also have applications and benefits beyond it.

Figure 1: Study Area



1.3 Project Goals

The main challenges and areas of improvement to address in this study are:

- Significant growth has strained the capacity of I-75, resulting in recurring congestion during peak hours. This condition may worsen as growth over the decades ahead link Flint and southeast Michigan.
- In addition to improving overall mobility in the corridor study area, it is critical to ensure that those who live and work along the corridor can access essential daily needs (e.g., healthcare, education, healthy food).

1.4 Goals and Strategies of MM2045

The MM2045 Plan is the State of Michigan's long-range transportation plan. It is intended to set the long-term direction for transforming the transportation system to the year 2045. As a part of

the plan, a series of goals and strategies were developed. These six goals articulate broad priorities for Michigan's multimodal transportation system.

Quality of Life: Enhance quality of life for all communities and users of the transportation network.

Mobility: Enhance mobility choices for all users of the transportation network through efficient and effective operations and reliable multimodal opportunities.

Safety and Security: Enhance the safety and ensure the security of the transportation network for all users and workers.

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.

Economy and Stewardship: Improve the movement of people and goods to attract and sustain diverse economic opportunities while investing resources responsibly.

Partnership: Strengthen, expand and promote collaboration with all users through effective public and private partnerships.

The MM2045 strategies were shaped by stakeholders at all levels of Michigan's transportation system. The strategies correspond to multiple goals and objectives.

1. Prioritizing Safety
    a. Promote safe behavior.
    b. Prioritize infrastructure and facility improvements with proven safety benefits.
    c. Support and implement state-of-the-art safety technology solutions.
    d. Collaborate with transportation partners and emergency medical and trauma services.
2. Managing Resources Responsibly
    a. Advance transportation asset management to optimize transportation investments.
    b. Streamline and improve data, data management systems and processes.
    c. Right-size Michigan's transportation network and systems.
3. Providing Accessibility and Mobility for All
    a. Improve the reliability of the transportation network and systems.
    b. Enhance the mobility of Michigan's residents and non-residents.
    c. Pursue a statewide mobility as a service (MaaS) platform.
    d. Support the increased use of the passenger transportation system.
    e. Define, measure and improve equitable access.
    f. Develop projects that equitably meet community mobility needs.
4. Supporting Michigan's Health
    a. Participate in and contribute to initiatives to improve air quality and reduce emissions.
    b. Support and implement approaches that preserve Michigan's natural resources.
    c. Foster collaboration between local transportation providers and public health interests.
    d. Encourage healthy lifestyles.
5. Building Resilience

   a. Identify and address risks to Michigan's transportation network.
   b. Promote and research an implementation plan for transportation infrastructure protection, security and emergency management.
   c. Improve organizational resiliency.

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

7. Technology
   a. Prepare for and enable widespread connected and automated vehicle (CAV) adoption.
   b. Regularly evaluate new transportation technology and adopt those that best support Michigan's goals.
   c. Promote standards-based approaches to network technology and deployment.

8. Economic Vitality
   a. Promote freight service, infrastructure improvements and intermodal connectivity.
   b. Continue to partner in transit-oriented development projects.
   c. Continue to be a leader in innovative transportation technology and education partnerships.

As an outcome of this study, several challenges and solutions were identified within the study area. These solutions and strategies were developed to align with MM2045 and are not intended to be projects but instead a potential approach or set of approaches to improvements.

2. EXISTING CONDITIONS SUMMARY

To assess the baseline conditions for the study area, several features were examined. This included existing land use, local area demographics, established planning documents and studies, roadway crash history, nonmotorized facilities, traffic volumes (existing and forecasted), travel time reliability, asset conditions, and environmental features. The summary includes strengths and weaknesses present in the transportation network. A copy of the full existing conditions report can be found in the Appendix.

2.1 Land Use Summary

The study area spans two counties and features diverse land uses, including state/regional parks, agriculture, residential areas (both rural and suburban), commercial centers, office parks, and industrial zones. Institutional facilities like hospitals and entertainment venues are also present along the corridor. The route serves local and regional traffic, connecting commuters to major employment centers and supporting goods movement. Population and housing density are highest in the southern end of the study area (Independence Township and the city of Auburn Hills). The northern Oakland County portions (Holly and Springfield townships) have a more rural character, with recreational and agriculture/mining land uses. The portion of Genesee County within the study area has moderately dense population and housing, primarily consisting of single-family residences. Commercial and retail development is distributed throughout the corridor, with large-scale commercial centers at the northern and southern ends. Automobiles remain the dominant mode of commute due to the suburban and rural context. Residents in the study area currently rely more on automobiles than alternative transportation modes for commuting purposes.

2.2 Demographics and Environmental Justice

Environmental justice (EJ) and Title VI considerations:

- **EJ Areas.** Within a half mile of the I-75 corridor, 53 census tracts were analyzed. Several of these tracts are considered EJ areas because they have higher proportions of people of color and/or low-income people.
- **Income and Poverty Rates.** The median household income in the study area is $71,366. The overall poverty rate in the study area is 40.8 percent, with the portion of the study area in Oakland County (46.1 percent) higher than the study area portion in Genesee County (28.9 percent). These numbers are much higher than the overall poverty rate in the state of Michigan (13.4 percent), the whole of Oakland County (8.2 percent) and the whole of Genesee County (16.2 percent).
- **People of Color.** MDOT defines person of color as someone whose racial/ethnic group includes the U.S. census categories of Black or African American, Hispanic, or Latino, American Indian or Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, Some Other Race Alone or Two or More Races. Approximately 56.6 percent of the study area population is considered people of color, with variations across counties (65.1 percent in

Oakland County, 35.6 percent in Genesee County). These numbers are much higher than the overall percentage of people of color in the state of Michigan (26.5 percent), the whole of Oakland County (26.5 percent) and the whole of Genesee County (30 percent).

Title VI protections prohibit discrimination based on race, color and national origin. Impacts from any future projects with regard to EJ populations will be assessed during the National Environmental Policy Act (NEPA) process, ensuring all communities benefit equitably.

2.3 Existing Plan Reviews

As part of the Existing Conditions and Baseline Corridor Performance Assessment Review, the following activities were conducted:

- **Plan Reviews.** Existing planning documents from agencies and communities in the study area, such as transportation master plans, land use plans, nonmotorized studies and the like, were reviewed.
- **Data Collection**. Data was collected from cities, townships, counties, and metropolitan planning organizations (MPOs). This review encompassed available study reports from 19 local agencies and relevant reports from five other entities (state, county and MPO).

Details of the existing plan reviews can be found in the Appendix.

2.4 Asset Management

As a part of the existing conditions, a thorough review of the inventory and condition account was prepared. This included the following features:

- Pavement condition
- Bridge structure condition
- Culverts
- Traffic signals
- Traffic signs
- Noise walls
- Intelligent transportation system (ITS) devices (closed-circuit television [CCTVs], dynamic message signs [DMS], environmental sensor stations (ESS), and roadside units [RSUs])
- High-mast lighting
- Rest areas
- Pavement markings

The study area contains 1,698 miles of roadway. This includes 268 miles of state trunkline roadways (I, US and M routes), including freeways and ramps, and 1,430 miles of local major roadways. Two different rating systems are employed for each. In general, more than 60 percent of the pavement condition is good or fair condition while more than 80 percent of bridges are rated good or fair. The percent by condition of the roadways and bridges are shown in Figures 2 and 3.

Figure 2: I-75 Pavement Condition (RSL)

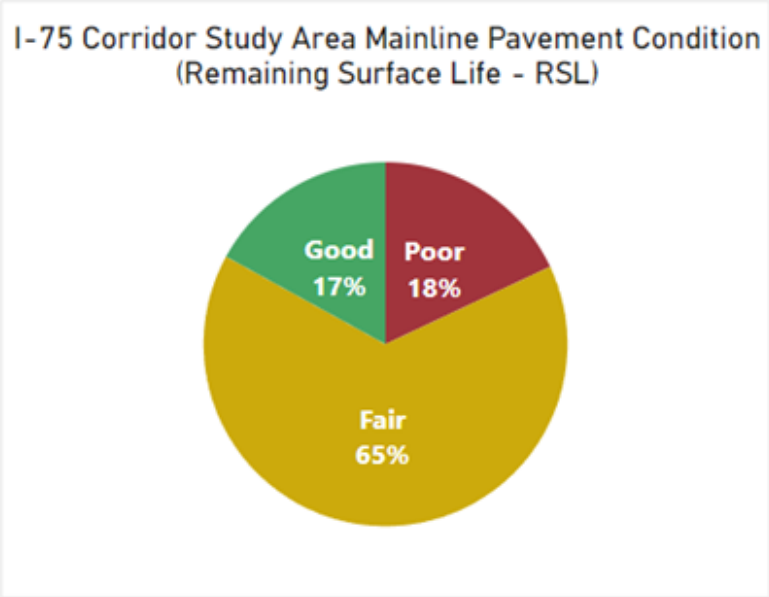
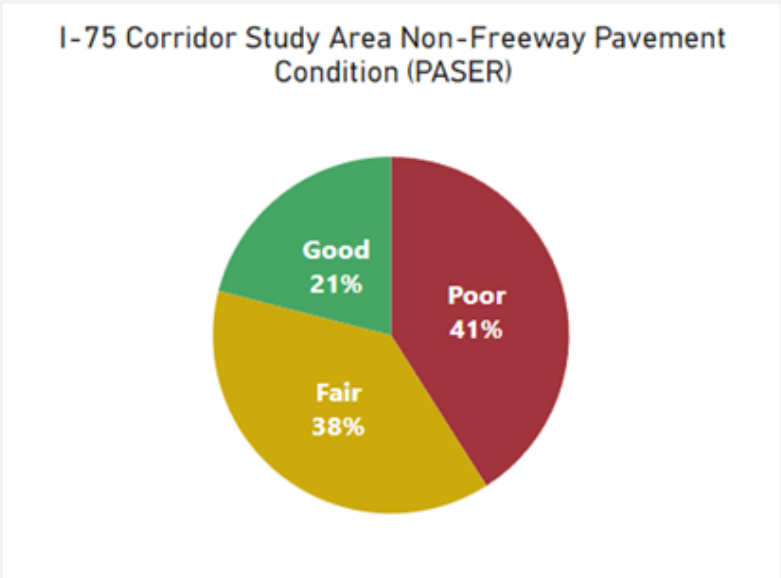
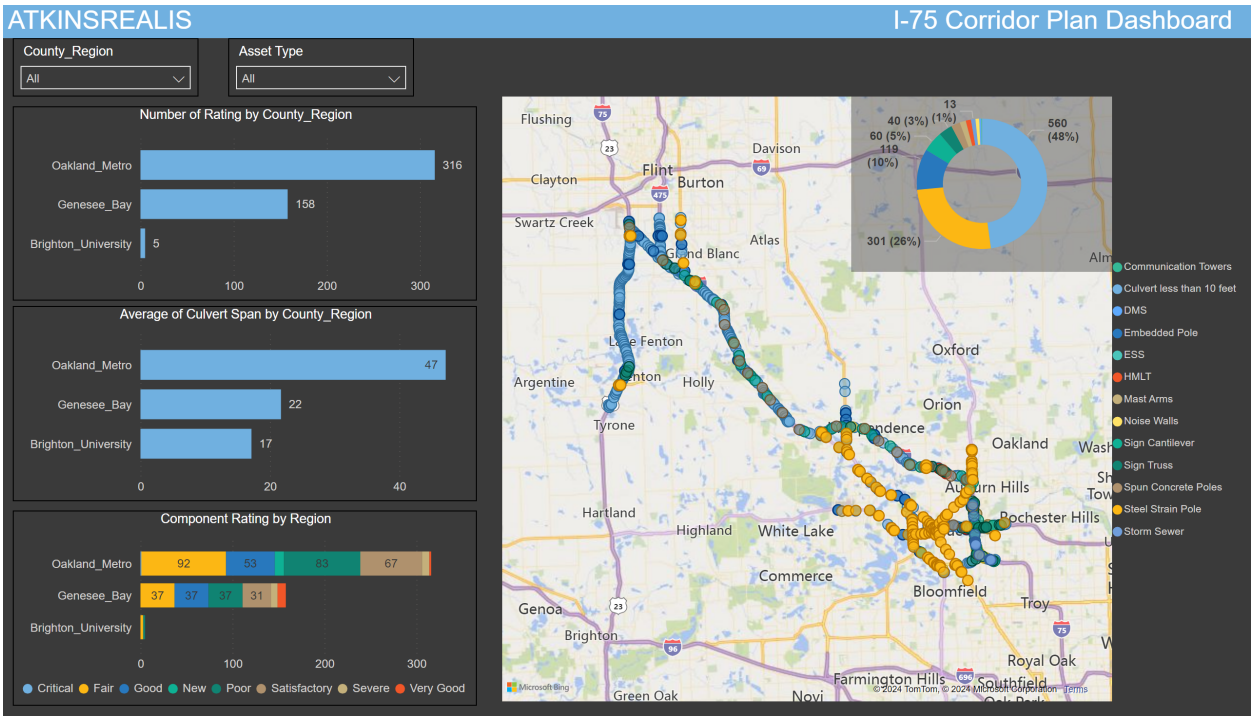


Figure 3: Non-freeway Pavement Conditions (PASER)



The different assets were mapped and integrated into dashboards for simple reference of the number, location and condition (if available) of the various items. A sample of the dashboard is shown in Figure 4.

Figure 4 Sample Dashboard



2.5 Safety

Traffic safety in the study area was examined using Michigan State Police (MSP) data and publicly available spreadsheet tools. Five years of crash data (2018-2022) were analyzed (animal-related crashes were excluded). Crash analysis methods used for the study include:

- **Federal Highway Administration (FHWA) Enhanced Interchange Safety Analysis Tool (ISATe)** used for I-75 and US-23 freeway elements. Roads were segmented based on lane changes, width variations, shoulder width, and traffic volume. Traffic data from the MDOT Transportation Data Management System (TDMS) (2022 baseline) was used for analysis.
- **Highway Safety Manual (HSM)** methodologies were used for arterial roads. More than 250 intersections, both stop-controlled and signalized, were analyzed. Factors considered include lighting, right turn on red prohibitions, major road speed limit, and left-turn movements. This produced a calibrated output of expected and predicted crashes based on county-specific Safety Performance Functions (SPF).

Key takeaways of the crash analysis.

- **Crash Severity:** The majority of crashes were property damage only (PDO)-related (80 percent for I-75 and 77percent for US-23). Injury crashes and fatal crashes represent less than 23 percent of the total, with fatalities occurring in less than 1 percent of all crashes. Despite the low percentage of overall crashes, fatal and serious injury crashes (known as K/A crashes) have the highest severity and require further examination for

safety improvements. The I-75 corridor reported 831 injury-related crashes, including nine fatalities and 73 serious injuries.

- **Common Crash Types:** Single-motor vehicle, rear-end and sideswipe same-direction crashes are most common. Single-motor vehicle crashes account for about 40 percent, followed by rear-end crashes at 34 percent. Sideswipe same-direction crashes represent 25 percent (I-75) and 21 percent (US-23). For K/A crashes, these types are also the most prevalent.
- **Pavement Conditions:** The majority of crashes occurred on dry pavement conditions. Around 40 percent of reported crashes occurred on wet pavement surfaces with wintery conditions like ice, snow and slush making up most of those crashes (53 percent for I-75, 73 percent for US-23).
- **Lighting Conditions:** Most crashes happened during daylight hours (65 percent). Night crashes at unlighted locations account for 23 percent (I-75) and 26 percent (US-23).

2.6 Active Transportation

An inventory of existing nonmotorized infrastructure was compiled along with an examination of crash history and a review of existing nonmotorized plans in the study area.

The inventory process for existing nonmotorized infrastructure was completed by conducting a visual survey throughout the study area. The survey identified sidewalks, crosswalks, Americans with Disabilities Act (ADA)-compliant ramps, bike lanes, special traffic control, and shared-use paths. Key findings include:

- Most interchanges in the southern part of the I-75 corridor had sidewalks on one side of the bridge structure.
- In the more rural northern end, sidewalks were absent and some locations had varying-width shoulders.
- No on-street bike lanes were found at any of the reviewed locations. A shared-use path for pedestrians and bicycles exists on the east side of M-15 (Ortonville Road), connecting Clarkston to Independence Township. Sashabaw Road features a combination side path/sidewalk system around the interchange.

An examination of crashes (2018-2022) involving vulnerable road users (VRUs) was conducted. While only 47 of the crashes in that timeframe involved VRUs, the risk of severe injury or fatality is greater.

- The majority of these crashes occurred on the arterial roadway network.
- Eight fatal crashes occurred during the analysis period. Five involved pedestrians crossing arterials midblock instead of at intersections. There were two freeway-related fatalities: one pedestrian crossing the freeway (disabled vehicle) and another involving a driver retrieving lost cargo. One fatal crash involved a bicyclist who failed to stop at an intersection.

2.7 Travel Demand Modeling

An evaluation of existing traffic forecast models was conducted to develop study-level traffic projections in the study area.

- **Traffic Volumes:** Daily traffic volumes were analyzed for both existing year 2025 and the horizon year 2045.
- **Baseline Conditions:** These traffic forecasts evaluated the baseline transportation conditions for 2025 and 2045, considering planned capacity improvements within the Southeast Michigan Council of Governments (SEMCOG) and Genesee County Metropolitan Planning Commission (GCMPC) Transportation Improvement Programs (TIP), regional transportation plans, and local agency capital plans.
- **Proposed Improvements:** The modeling and evaluation of proposed transportation improvements informed the formulation of the corridor development plan.

The study collected annual average daily traffic (AADT) volume data for 2018, 2019 and 2022 from MDOT's Transportation Data Management System. Notably, 2020 traffic counts were excluded as they were generally lower than those in 2019 and 2018 due to the COVID-19 pandemic. For detailed AADT traffic counts by route, refer to the Appendix.

The corridor falls within both the GCMPC and SEMCOG areas, each with its own travel demand model (TDM) reflecting their specific region. Additionally, the network is part of the MDOT Statewide Model. Below is a summary of the models considered:

- **Michigan Statewide Passenger and Freight Travel Demand Model:** This model includes 2015 base data and forecast years (2020, 2025 and 2045 scenarios).
- **Genesee County Model (GCMPC):** The GCMPC model comprises 2014 base data and forecast years (2020, 2025, 2035, and 2045 scenarios).
- **SEMCOG E7 Travel Model:** Acquired from SEMCOG, this model covers base year 2015 and forecast years (2020, 2025, 2030, 2035, 2040, and 2045).

These models play a crucial role in assessing transportation conditions and informing corridor development plans. Below is a summary of data considered within the travel demand modeling.

- **Future Projects:** A review of existing and future planned TIP projects identified three potential projects that could impact travel patterns in 2045. These projects were included in network updates.
- **Transit:** Based on the 2023 SMART Expansion Map, new transit routes and expansions are planned. These may affect travel demand in 2025 and 2045 and were incorporated into transit network updates.
- **Population and Employment Trends:** Historical population growth trends (2010 to 2019) show Genesee County experiencing a -5 percent growth while Oakland County had steady growth until 2017, followed by a plateau (total growth of 5 percent over the time period). Employment opportunities in Oakland County grew steadily by 23 percent from 2010 to 2019, whereas Genesee County saw slower employment growth at 11 percent. Projections for 2020 to 2045 vary. The statewide model predicts higher employment growth (28 percent) in Oakland County, similar population growth (5 percent) to SEMCOG, and significantly higher employment growth (20 percent) but negative population growth (-2 percent) in

Genesee County. MPO models project more modest growth trends in both population and employment.

During the review of all three models, adjustments were made to reflect the I-75 configuration in 2020. Notably, the statewide model was revised due to the inclusion of high-occupancy vehicle (HOV) lanes. The SEMCOG and GCMPC models remained unchanged. Assessing traffic growth from 2020 to 2045, the statewide model projected higher average growth (11.3 percent) compared to SEMCOG (5.8 percent) and GCMPC models. Detailed TDM growth factors can be found in the Appendix.

Below is a summary of key findings for the I-75 study corridor:

- **Travel Patterns:** Travel patterns are expected to remain similar from 2025 to 2045. The I-75 corridor is expected to experience about a 5 percent increase in total daily volumes during this period.
- **Congestion and High-Volume Segments:** Segments within the southern section of I-75 (approximately M-59 to Sashabaw Road) exhibit the highest volumes and experience congestion during both morning and evening peak periods. Congestion worsens during the evening peak in densely populated areas from Pontiac to Independence Township and around the M-59 interchange.
- **Interchanges With Deficiencies:** Several interchanges show deficiencies in operations, particularly in 2045, on the ramps and segments due to high volumes and close proximity. These interchanges include M-59, University Drive, Lapeer Road, Baldwin Road, and Grange Hall Road.
- **Truck Traffic:** Daily truck percentages varied from 3 to 6 percent in 2025 and increased up to 11 percent in 2045 at segments near the US-23 interchange in Genesee County. International border crossing freight volumes are not significant in the study corridor. Specific segments with increased daily truck percentages include I-75 north of the Dixie Highway interchange (Exit 106), I-75 north of the I-475 interchange, and US-23 segments near the interchange with I-75.

2.8 Travel Time Reliability (TTR)

The analysis utilized information from the Regional Integrated Transportation Information System (RITIS) online platform, which integrates INRIX probe speed data. INRIX aggregates data from various sources (phones, vehicles and cities) to provide accurate traffic insights. The traffic information it offers is real-time, predictive and includes historical data to help agencies understand drive times and road conditions. The corridors were assessed for travel speed, planning time index (PTI) and travel time index (TTI) trends over a four-year period. Below is a summary of the TTR findings for the I-75 study corridor:

- **Mainline Corridor:** No negative trends in average speed, TTI or PTI were observed. Travel time, TTI and PTI were more reliable or less congested in 2022 and 2023 compared to 2018 and 2019, likely due to recent rebuilding and modernization of I-75 and the changing work environment from the COVID-19 pandemic.
- **Westbound I-75 Business Loop (BL) Corridor:** The segment between I-75 and M-1 (Woodward Avenue) experienced noticeable PTI degradation during the 7 to 9 a.m.

weekday timeframe. The rest of the corridor (including northbound and southbound portions) along Woodward Avenue through US-24 showed no significant performance issues over the years.

- **Arterials and Cross Streets:** Most arterials and I-75 cross streets analyzed did not degrade in average speed or experience increased TTI and PTI. Some corridors saw improved average speeds and decreased TTI and PTI in 2023 compared to 2018 and 2019. Notably, University Drive and Joslyn Road exhibited increased average speeds and reduced PTI.

2.9 Environmental Screening

Baseline Environmental Data:
The study collected baseline environmental desktop data from readily available sources, including MDOT's Dynamic Environmental Geographic Information System (GIS) Resource, Michigan GIS Open Data, and the Michigan Department of Environment, Great Lakes and Energy (EGLE) Environmental Mapper. Environmental constraints considered include air quality, noise, wetlands, streams, hazardous waste sites, historic properties, parks, threatened and endangered species, flood zones, and community demographics.

Environmental Screening Results: Constraints that could impact future projects were identified. Factors with potential impacts include EJ priority areas, prime farmland, floodplains, wetlands, migratory birds, contaminated sites, above-ground and archaeological historic properties, cultural resources, and recreational resources.

MDOT subject matter experts assessed the agricultural properties, stormwater quality, above-ground and archaeological historical properties, and threatened and endangered species within the study area. The experts provided one-page summaries for their respective fields, including regulatory requirements, timelines, surveys, and cost estimates. These summaries and maps can be found in the Appendix. These summaries are dependent on project specifics and are subject to change.

3. COMMUNITY ENGAGEMENT

3.1 Public and Stakeholder Participation Plan

A public and stakeholder participation plan (PSPP) was prepared just after project kickoff. The plan outlines communication and outreach strategies to build awareness, trust and support among stakeholders and the public. A copy of the plan can be found in the appendix.

Stakeholders were identified and grouped into committees. The Corridor Steering Committee (CSC) has representatives from MDOT and the two MPOs within the study area, SEMCOG and GCMPC. Representatives from all local agencies within the corridor study area were invited to participate in the Local Advisory Committee (LAC), as well as regional transit authorities, private partners and local advocacy groups.

3.2 Corridor Steering Committee (CSC)

The CSC kickoff meeting was held July 18, 2023, with the intent to collaborate with the MPOs to explain the intent of the study, obtain feedback and build support. A second meeting was held on Oct. 24, 2023, to gather input on the draft corridor goals and objectives (Task 1.8). A third meeting, held on Jan. 25, 2024, presented the draft existing conditions report (Task 1.10). The fourth meeting, held on May 9, 2024, reviewed the final existing conditions report, the draft needs analysis (Task 2), the development of potential solutions and strategies (Task 3), and the virtual survey (Task 5). A final meeting on Nov. 18, 2024, reviewed the public engagement responses, challenges, solutions and strategies (Task 3), as well as the prioritization matrix and methodology.

3.3 Local Advisory Committee (LAC)

The LAC kickoff meeting was held Sept. 27, 2023, to introduce the study, review the schedule and discuss outcomes. Comments received from LAC members included:

- Oakland County: The cities of Troy, Auburn Hills and Rochester Hills discussed issues surrounding the M-59 interchange, pedestrian access over I-75, development near the Baldwin and Joslyn road interchanges, and increased traffic near the GM Orion plant.
- Genesee County: Mundy Township, Grand Blanc Township and the City of Grand Blanc discussed several developments impacting the local road network and connections to I-75, as well as future improvement needs/desires on Hill, Baldwin, and Grand Blanc roads.

A second LAC meeting was held Feb. 1, 2024, to discuss final corridor goals and objectives, and the draft existing conditions report. A third meeting was held May 22, 2024, which reviewed the final existing conditions report and the draft needs analysis as well as the virtual survey.

The final LAC meeting was held Dec. 2, 2024, to discuss the public engagement survey results and the draft report.

Twenty-two local agencies were invited to participate in the LAC meetings. The following agencies attended at least one meeting:

Bloomfield Township

City of Auburn Hills

City of Clarkston

City of Grand Blanc

City of Rochester Hills

City of Troy

Fenton Township

Friends of Grand Blanc Grid

Grand Blanc Township

Groveland Township

Mundy Township

Mass Transit Authority (MTA)

Springfield Township

Suburban Mobility Authority for Regional Transportation (SMART)

Road Commission for Oakland County

Waterford Township

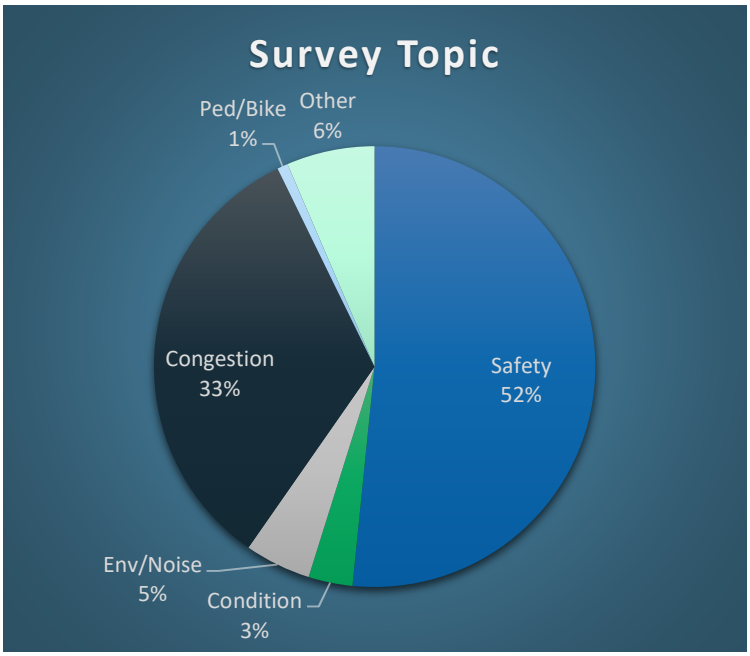
Oakland County

3.4 Public Engagement Touchpoint 1

Due to the size of the study area, it was determined an online survey would be the best tool to gather input from the public. The web-based tool Social Pinpoint was used to host the survey, launching June 27, 2024. The comment period was open for three months. During that timeframe there were a total of 1,791 visits to the site by 1,341 unique visitors. Of those visitors, 69 provided feedback for a total of 124 comments received.

- Sixty-four percent of traffic to the site was driven from social media; posts were made advertising the survey on MDOT's social media platforms on Aug. 9 and Sept. 4.
- Fourteen percent of traffic to the site was directed from the project webpage link.

Figure 5: Responses Received by Survey Topic



Visitors to the site could leave comments under six headings: safety issue, pedestrian/bike, traffic congestion, roadway condition, environment/noise, and other. Eighty-five percent of the comments received fell under the congestion or traffic safety headings (see Figure 5). Other comments of note included:

- Six comments were received under the environment/noise heading. Four of those referenced freeway noise and/or the desire for sound barriers.
- One comment was received under the pedestrian/bicycle heading. It referenced adding a separation, such as flexible bollards, on the Grand Blanc Road bridge over I-75.

Safety

The Safety category received the most comments at 64. More than 30 percent of those comments (21) were associated with the M-59 interchange. This interchange has a cloverleaf

design and comments referred to weave/merge issues commonly found in that type of design. A widespread theme was for MDOT to completely reconfigure the interchange design or add collector/distributor ramps that separate entering/exiting traffic from mainline traffic.

Twenty-seven percent of the safety comments were associated with the two interchanges with Dixie Highway (exits 93 and 106). Of these comments, 17 referred to the left exit/entrance ramps at these interchanges. Ten of the comments were directed at Exit 93 in Clarkston and the remaining seven were about Exit 106 in Grand Blanc and Holly townships.

Traffic Congestion

Traffic congestion received the next highest number of comments, at 41. Nearly 60 percent of those comments were placed on the map between M-24 and Sashabaw Road, and all referenced the lane drop that occurs southeast of Joslyn Road (four lanes to three).

Top Five Interchanges

The majority of comments were focused around five interchanges in the study area. A summary of the number of comments and their topics can be found in Table 1.

Table 1: Top Five Interchanges

Topic	M-59	Dixie Highway/ M-24	US-23/I-75	Dixie Highway/ Saginaw Road	I-475
Safety	21	10	2	7	3
Congestion	1	1	4	0	0
Noise	0	0	0	0	1
Other	0	0	3	0	1
Total	22	11	9	7	5

3.5 Public Engagement Touchpoint 2

A news release sent out on Dec. 13, 2024, informed the media and public that the draft corridor plan was available for review on the project webpage, a video summarizing the project was available for viewing, and MDOT was taking comments on the draft plan. Links to all three items were provided in the news release.

A narrated PowerPoint video created to inform the public about the study was posted to MDOT's YouTube webpage, which has more than 8,400 subscribers. The video received more than 400 views in one month. Eighteen comments were submitted using the form posted on the project webpage, and six additional comments were made on the video's YouTube page.

Comments identified several interchanges needing improvements, including I-75/M-59, I-75/Dixie Highway and I-75/M-24 in Oakland County, as well as I-75/Hill Road, US-23/North Road and US-23/Silver Lake Road in Genesee County. Seven comments (39 percent) mentioned improving and/or expanding transit services for commuters in the region.

A full list of the comments can be found in the Appendix.

4. SUCCESSES WITHIN THE STUDY AREA

Over the last decade, numerous successes have been accomplished in the study area. These achievements encompass enhancements in safety, improved transit connectivity, more complete street networks, and decreased congestion.

Square Lake Road

Improvements in 2018 flipped the northbound I-75 entrance and exit ramps from the left side of the mainline freeway to the right side. Shifting slower merging traffic to enter from the right side is safer overall and meets driver expectations.

University Drive

This interchange was reconfigured from a partial cloverleaf to a diverging diamond interchange (DDI) in 2015, becoming the first DDI in Michigan. Removing the loop ramps eliminated the conflict between merging traffic and mainline traffic.

Grange Hall Road

This project will replace the existing stop-controlled intersection ramps with roundabouts, reducing left-turn queues on Grange Hall Road. It is included in the MDOT Five Year Transportation Program (5YTP) and is expected to be built in the next five years.

M-54 (Dort Highway)

This interchange was reconfigured from a trumpet design to a partial cloverleaf with roundabouts at the ramp terminals in 2020. Additionally, Dort Highway was extended to the south, connecting I-75 to Baldwin Road and the Genesys Health Park.

Holly Road

This interchange was reconfigured from a diamond to a partial cloverleaf in 2017. Adding the loop ramp to northbound I-75 provided a faster, safer way for vehicles leaving the Genesys Health Park to access the interstate and reduced large left-turn queues on Holly Road.

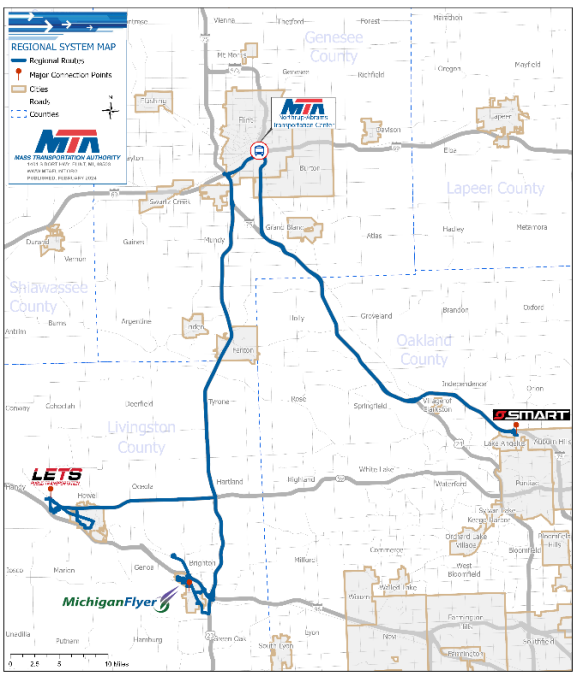
Southbound I-75 at US-23

At this junction, the three southbound lanes split to I-75 or US-23 with the center lane acting as an optional lane to either highway. Shield pavement markings were added in 2015-2016 to reduce driver confusion.

Woodward Loop

This project will reconnect surrounding neighborhoods to downtown Pontiac and make it more pedestrian-friendly. Proposed improvements include converting the roadway from one-way to two-way traffic, filling sidewalk gaps, adding pedestrian refuge islands, reconfiguring intersections, and installing a nonmotorized path.

MTA Transit Service



Three regional routes run seven days a week, connecting riders from Flint to employment centers in Brighton, Howell and the Great Lakes Crossing Mall.

US-24 (Dixie Highway) at White Lake Road

Proposed intersection improvements include adding an additional left-turn lane on northbound White Lake Road. This will help reduce congestion and improve traffic flow. Construction is anticipated in 2026.

Baldwin Road

Starting in 2018, major improvements were made to Baldwin Road from Morgan to Walden roads. This includes widening Baldwin Road from two lanes to a four-lane boulevard and building roundabouts at five major intersections.

I-75 BL (Perry Street)

A project in 2018 reconfigured the roadway from Woodward Avenue to Giddings Road from four lanes to two with a center left-turn lane and buffered bike lanes.

5. CHALLENGES, SOLUTIONS AND STRATEGIES

The existing condition analysis in conjunction with input gathered from the LAC and public feedback formed the basis to identify challenges in the study area. These include locations with known geometric deficiencies, high crashes, recurring congestion, and forecasted 2045 traffic capacity deficiencies.

These locations and their challenges were vetted at project workshops to determine the appropriateness of each solution and then further screened by team members. Locations were separated into four categories: freeway interchange, active transportation, intersection, and network. For each challenge, the relationship to MM2045 strategies was also identified. A list of locations can be found in Tables 2-5.

Table 2: Freeway Interchange Challenges

Code	Location	MM2045 Strategies
F-1	I-75/M-59 Interchange (Exit 77)	1b, 2c, 3a, 3b, 5a, 8a
F-2	I-75 Between Chrysler Drive and University Drive (Exits 78 and 79)	1b, 2c, 3a, 3b, 5a, 8a
F-3	I-75/M-24 (Lapeer Road) Interchange (Exit 81)	1b, 2c, 3a, 3b, 5a, 8a
F-4	I-75/Joslyn Road Interchange (Exit 83)	1b, 2c, 3a, 3b, 5a, 8a
F-5	I-75/Baldwin Road Interchange (Exit 84)	1b, 2c, 3a, 3b, 5a, 8a
F-6	I-75/Sashabaw Road Interchange (Exit 89)	1b, 2c, 3a, 3b, 5a, 8a
F-7	I-75/M-15 (Ortonville Road) Interchange (Exit 91)	1b, 2c, 3a, 3b, 5a, 8a
F-8	I-75/US-24 (Dixie Highway) Interchange (Exit 93)	1b, 2c, 3a, 3b, 5a, 8a
F-9	I-75 at Dixie Highway/Saginaw Road (Exit 106)	1b, 2c, 3a, 3b, 5a, 8a
F-10	I-75/Holly Road Interchange (Exit 108)	1b, 2c, 3a, 3b, 5a,
F-11	Southbound I-475 Ramp to Southbound I-75 (Exit 111)	1b, 2c, 3b, 5a, 8a
F-12	US-23/Hill Road Interchange (Exit 90)	1b, 2c, 3a, 3b, 5a, 8a
F-13	US-23/Grand Blanc Road Interchange (Exit 88)	1b, 2c, 3a, 3b, 5a, 8a
F-14	US-23/North Road Interchange (Exit 80)	1b, 2c, 3a, 3b, 5a, 8a
F-15	US-23/Silver Lake Road Interchange (Exit 79)	1b, 2c, 3a, 3b, 5a, 8a

Table 3: Active Transportation Challenges

Code	Location	MM2045 Strategies
A-1	Featherstone Road Over I-75	1b, 2c, 3b, 3f, 4a, 4d, 8a
A-2	Auburn Road Under I-75	1b, 2c, 3b, 3f, 4a, 4d, 8a
A-3	Pontiac Road Under I-75	1b, 2c, 3b, 3f, 4a, 4d, 8a
A-4	Giddings Road Over I-75	1b, 2c, 3b, 3f, 4a, 4d, 8a
A-5	I-75 BL (Lapeer Road) Under I-75	1b, 2c, 3b, 3f, 4a, 4d, 8a
A-6	Joslyn Road Under I-75	1b, 2c, 3b, 3f, 4a, 4d, 8a
A-7	Baldwin Road Over I-75	1b, 2c, 3b, 3f, 4a, 4d, 8a
A-8	Clintonville Road Under I-75	1b, 2c, 3b, 3f, 4a, 4d, 8a
A-9	M-54 (Dort Highway) Over I-75	1b, 2c, 3b, 3f, 4a, 4d, 8a
A-10	Clarkston Road Under I-75	1b, 2c, 3b, 3f, 4a, 4d, 8a
A-11	Fenton Road Over I-75	1b, 2c, 3b, 3f, 4a, 4d, 8a

Table 4: Intersection Challenges

Code	Location	MM2045 Strategies
I-1	US-24 (Telegraph Road) at US-24 (Dixie Highway)/US-24 Business Route (BR) (Cesar Chavez Avenue)	1b, 3a, 3b, 3f, 5a, 7b, 8a
I-2	M-1/I-75 BL (Woodward Avenue) at Square Lake Road	1b, 3a, 3b, 4a, 5a, 7b, 8a
I-3	US-24 (Dixie Highway) at Walton Boulevard/Williams Lake Road	1b, 3a, 3b, 7b, 8a

Table 5: Network Challenges

Code	Location	MM2045 Strategies
N-1	Northbound I-75 Between Joslyn Road and Baldwin Road	1b, 2c, 3a, 3b, 8a
N-2	Northbound I-75 Between Baldwin Road and Sashabaw Road	1b, 2c, 3a, 3b, 5a, 8a
N-3	US-24 (Dixie Highway) from US-24 (Telegraph Road) to I-75	1b, 2c, 3a, 3b, 3f, 7b, 8a
N-4	Dixie Highway from I-75 (Exit 93) to I-75 (Exit 106)	1b, 2c, 8a
N-5	Grange Hall Road Between I-75 and Fenton	1b, 2c, 3a, 3b,
N-6	M-15 (Ortonville Road) from I-75 to Seymour Lake Road	1b, 2c, 3a, 3b, 8a
N-7	Hill Road between I-475 and US-23	1b, 2c, 3a, 3b, 3f, 7b, 8a
N-8	M-24 from Brown Road to I-75 Ramps	1b, 2c, 3a, 5a, 7b, 8a
N-9	Grange Hall Road Park and Ride Lot	3b, 3d, 4a
N-10	Expanded Transit Routes	3b, 3d, 4a

5.1 Freeway Interchange Challenges

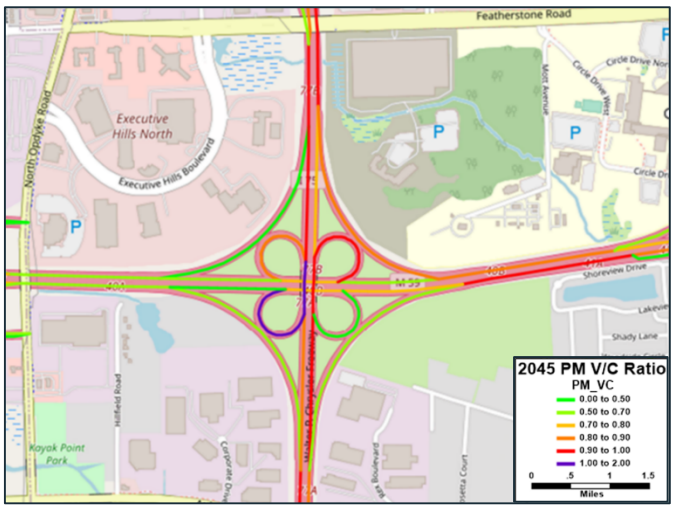
F-1: I-75/M-59 Interchange (Exit 77)

Challenge: The I-75/M-59 interchange is a full cloverleaf design with short weaving sections. This interchange faces several challenges, including:

- The combination of low-speed loop ramp traffic merging with high speeds on I-75 and M-59 results in significant speed differences.
- The significant peak-hour traffic accessing the interchange system leads to severe turbulence in the traffic stream.
- Queues are expected in the southbound I-75 loop ramp to eastbound M-59 (V/C greater than 1) and northbound I-75 loop ramp to eastbound M-59 (V/C greater than 0.9) under 2045 baseline conditions during the evening peak hour.
- The interchange influence area is experiencing an average of 109 crashes per year, of which 22 percent involve a fatal or injury type (FI) crash.

CHALLENGE TYPE

Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	-	-



Solutions and Strategies: Conduct a study to evaluate various options to reconfigure the interchange and identify next steps. Items to evaluate include:

- Proximity of the M-59/Opdyke Road, M-59/Squirrel Road, and I-75/ Chrysler Drive interchanges.
- Both I-75 bridges over M-59 were built in 1963 and are currently rated fair. Major improvements or replacement may be needed if their condition deteriorates to poor.
- The potential changes in staffing levels related to the Stellantis headquarters as well as the addition of the Amazon fulfilment facility on Opdyke Road and the many automotive suppliers located in the area could impact traffic forecasts and routing.
- The potential to reconfigure the southbound I-75 loop ramp to eastbound M-59 to a fly-under/over design like US-131 at I-94 in Kalamazoo County.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network and enhancing mobility, **Building Resilience** by identifying and addressing risks to Michigan's transportation network, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

F-2: I-75 Between Chrysler Drive and University Drive (Exits 78 and 79)

Challenge: The spacing between the Chrysler Drive interchange and the University Drive interchange on northbound I-75 is less than 1,100 feet. The high-speed mainline traffic mixes with the entering ramp traffic and then transitions at the dual exit lanes of University Drive. The collector-distributor connects the interchange but high-speed differentials and "drag racing" are common with weaving traffic.

CHALLENGE TYPE

Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	-	-

Solutions and Strategies:

- Restripe dual-lane ramp to single-lane only and designate through-lane to the left.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network and enhancing mobility, **Building Resilience** by identifying and addressing risks to Michigan's transportation network, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

F-3: I-75/M-24 (Lapeer Road) Interchange (Exit 81)

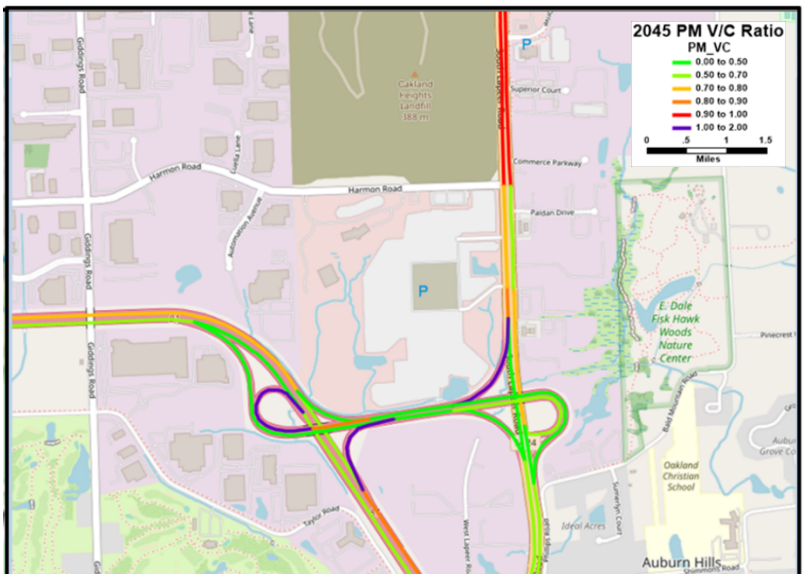
Challenges: The existing interchange utilizes a dual-trumpet configuration linked by a connector road (I-75 Connector). While land use has changed around this interchange with the closure of the Palace of Auburn Hills, there has been significant growth north of the interchange in communities such as Lake Orion and Oxford for which this is the primary access point to I-75. The following ramps are forecasted to operate at V/C greater than 1 during the evening peak in 2045.

- Southbound M-24 to I-75 Connector
- I-75 Connector loop ramp to southbound I-75
- Northbound I-75 to I-75 Connector

Several segments of M-24 north of I-75 are expected to operate at V/C greater than 0.9 in 2045. The interchange is experiencing an average of 37.8 crashes per year, of which 18 percent are fatal/injury (FI) crashes. Several environmental constraints, including streams, wetlands and floodplains, should be considered if the interchange is redesigned.

CHALLENGE TYPE

Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	-	-



Solutions and Strategies: Evaluate the feasibility of redesigning the interchange to provide better traffic operations and improve safety.

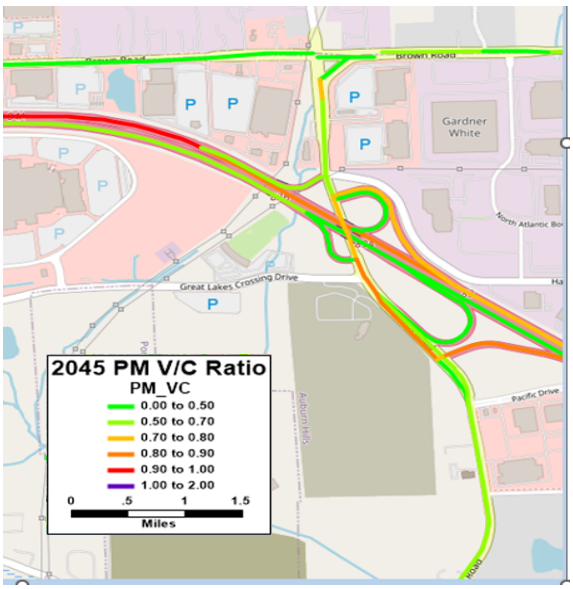
These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network and enhancing mobility, **Building Resilience** by identifying and addressing risks to Michigan's transportation network, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

F-4: I-75/Joslyn Road Interchange (Exit 83)

Challenge: This interchange has a partial cloverleaf configuration with tight loop ramps in the northeast and southwest quadrants. Due to its proximity to the Great Lakes Crossing Outlets mall located just west of Joslyn Road and south of I-75, this interchange attracts a high volume of traffic. The southbound Joslyn Road on ramp to southbound I-75 experiences V/C greater than 0.8 during the 2045 evening peak. The segment of Joslyn Road between the southbound I-75 off ramp and southbound I-75 on ramp also experiences V/C greater than 0.8 during the 2045 evening peak. Similarly, the northbound I-75 off ramp experiences longer queues and occasionally extends back to the northbound I-75 travel lanes. The interchange is experiencing 71.6 crashes per year, of which 18 percent are FI crashes.

CHALLENGE TYPE

Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	-	-



Solutions and Strategies: Evaluate the feasibility of redesigning the interchange to provide better traffic operations and improve safety. Eliminating the fourth lane drop in the northbound direction on I-75 would alleviate the congestion between this interchange and M-24.

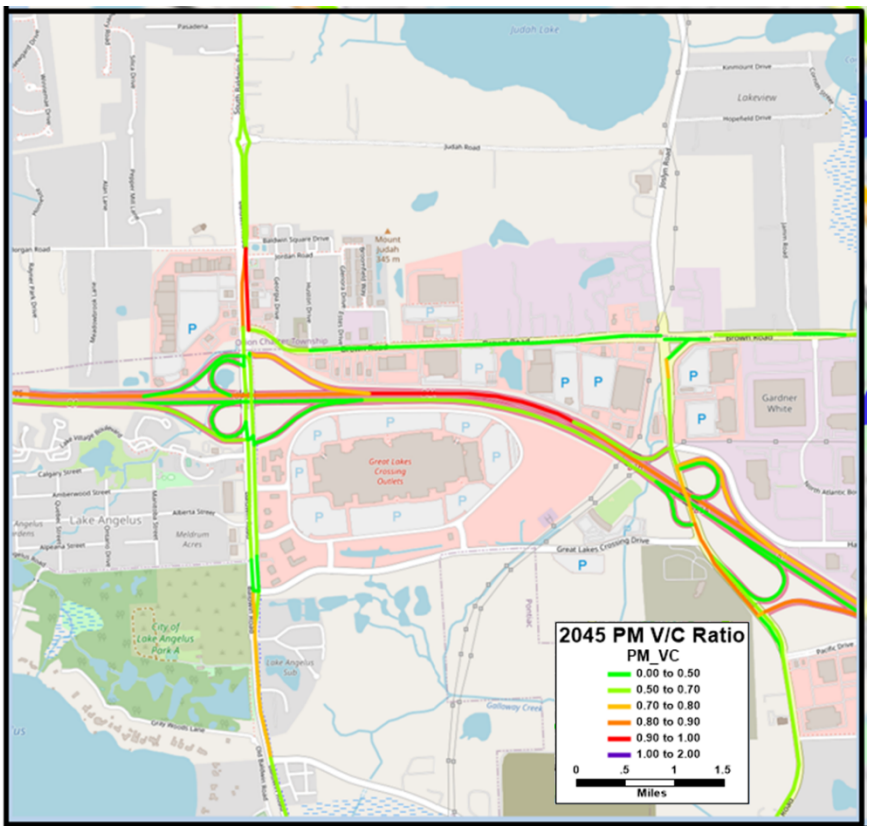
These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network and enhancing mobility, **Building Resilience** by identifying and addressing risks to Michigan's transportation network, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

F-5: I-75/Baldwin Road Interchange (Exit 84)

Challenge: This interchange has a partial cloverleaf configuration with tight loop ramps in the southwest and northwest quadrants. Great Lakes Crossing Outlets, one of the busiest outlet malls in Michigan, is in the southeast quadrant of this interchange. The interchange is experiencing an average of 45.6 crashes per year, of which 15 percent are FI crashes.

CHALLENGE TYPE

Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	-	-



Solutions and Strategies: Evaluate the feasibility of converting this interchange design to a DDI to provide better traffic operations and improve safety. The addition of an auxiliary lane in the northbound direction between the Joslyn and Baldwin road exits could help alleviate congestion.

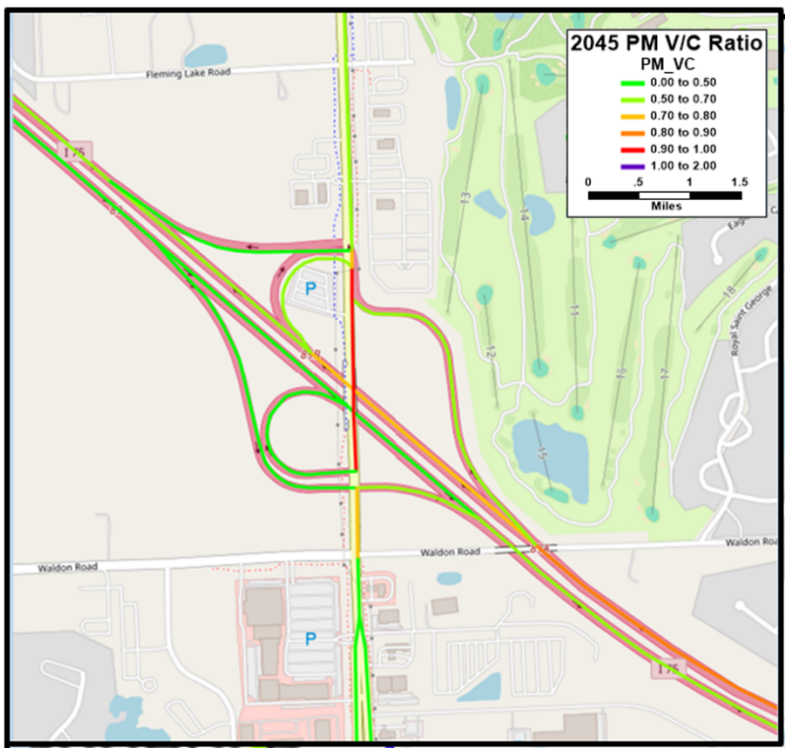
These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network and enhancing mobility, **Building Resilience** by identifying and addressing risks to Michigan's transportation network, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

F-6: I-75/Sashabaw Road Interchange (Exit 89)

Challenge: This interchange has a partial cloverleaf configuration with tight loop ramps in the southwest and northwest quadrants. The segment of Sashabaw Road between the I-75 ramps experiences V/C ratio of greater than 0.9 and northbound Sashabaw Road left-turn movements to northbound I-75 are expected to experience queuing during the 2045 evening peak. The interchange is experiencing 38 crashes per year, of which 15 percent are FI crashes. The northbound I-75 exit ramp experiences severe congestion associated with special events at Pine Knob Amphitheatre (greater than 40 per year).

CHALLENGE TYPE

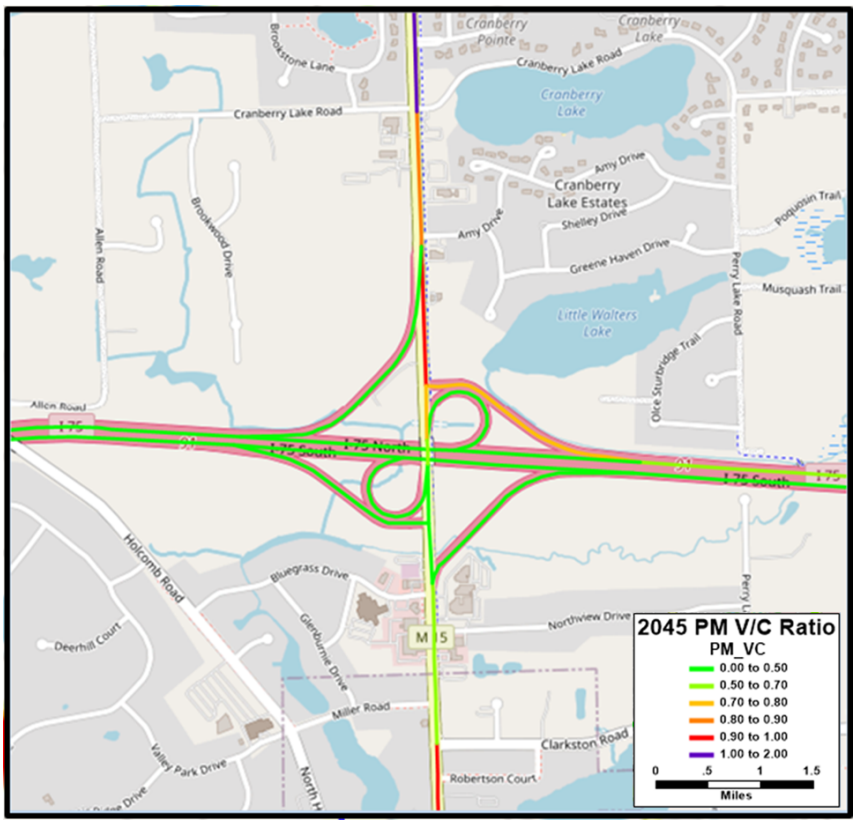
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	-	-



Solutions and Strategies: Evaluate the feasibility of converting this interchange to a DDI to provide better traffic operations and improve safety. An additional lane on northbound I-75 between Baldwin Road and this interchange would also help alleviate congestion.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network and enhancing mobility, **Building Resilience** by identifying and addressing risks to Michigan's transportation network, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

F-7: I-75/M-15 (Ortonville Road) Interchange (Exit 91)				
Challenge: This interchange has a partial cloverleaf design with tight loop ramps in the northeast and southwest quadrants. M-15 is forecasted to operate at V/C greater than 1 during the evening peak in 2045. The interchange is experiencing 24 crashes per year, of which 19 percent are FI crashes.				
CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	-	-



Solutions and Strategies: Evaluate the feasibility of converting the current interchange design to a DDI or other design to provide better traffic operations and improve safety along M-15. Widening M-15 (north of Cranberry Lake to Glass Road) should also be considered.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network and enhancing mobility, **Building Resilience** by identifying and addressing risks to Michigan's transportation network, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

F-8: I-75/US-24 (Dixie Highway) Interchange (Exit 93)

Challenge: The northbound and southbound entrance ramps to I-75 currently merge into the left lane of traffic. This creates safety issues due to the speed differential of merging traffic and the variance from normal driver expectations.

The interchange is experiencing an average of 68 crashes per year, of which 12 percent are FI crashes.

CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	-	-

Solutions and Strategies: Evaluate the feasibility of reconfiguring the interchange to eliminate the left-hand entrance ramps to provide better traffic operations and improve safety.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network and enhancing mobility, **Building Resilience** by identifying and addressing risks to Michigan's transportation network, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

F-9: I-75 at Dixie Highway/Saginaw Road (Exit 106)

Challenge: The northbound and southbound entrance ramps to I-75 currently merge into the left lane of traffic. This creates safety issues due to the speed differential of merging traffic and the variance from normal driver expectations. The interchange area experiences an average of 41 crashes per year, of which 54 percent are FI crashes.

CHALLENGE TYPE

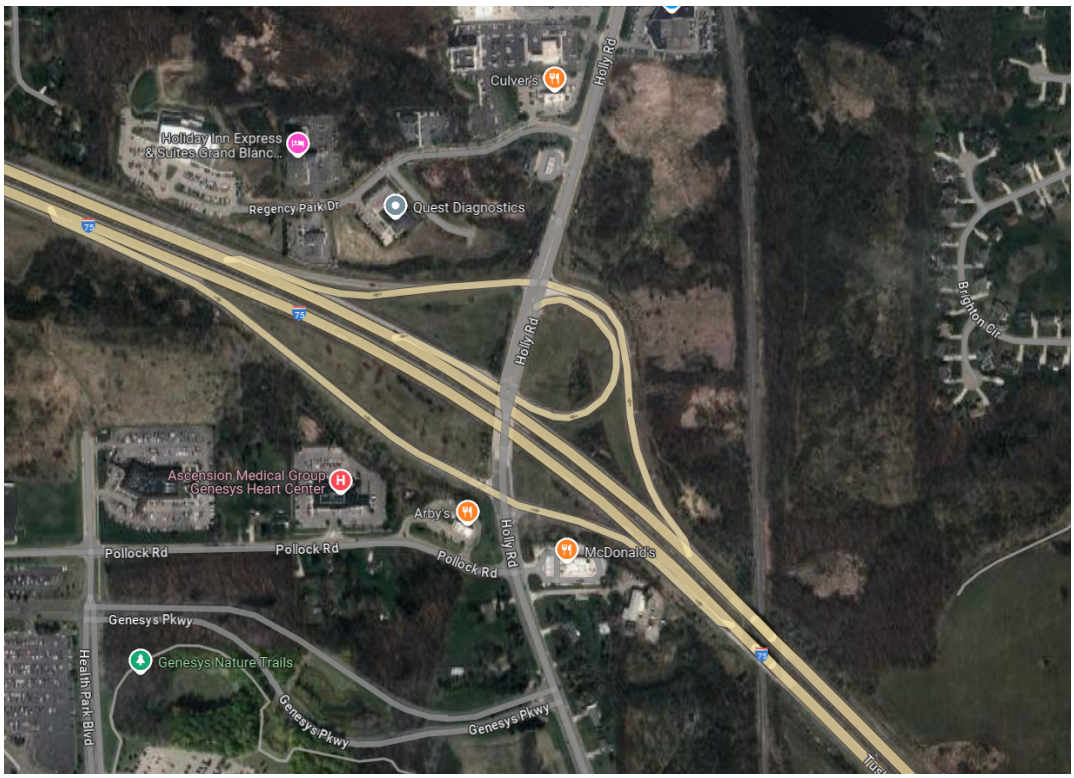
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	-	-	-

Solutions and Strategies: Evaluate the feasibility of reconfiguring the interchange design to change left-side merging ramps to right-side merging ramps. This aligns with driver expectations, reduces merging traffic speed differentials, and reduces the need for mainline driver lane changes.

Short-term solutions include installing clear and prominent signs to alert drivers well in advance of the left-side entrance ramp merge. Supplemental pavement markings to better delineate the lane drop will also assist merging traffic.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network and enhancing mobility, **Building Resilience** by identifying and addressing risks to Michigan's transportation network, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

F-10: I-75/Holly Road Interchange (Exit 108)				
Challenge: The prominence of the expanding Ascension Genesys Health medical campus and surrounding retail, office and residential development has impacted this interchange. The interchange area is experiencing 44 crashes per year, of which 38 percent are FI crashes. The predominate number of crashes occur at the ramp terminals as angle or rear-end crash types.				
CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	-	-	-



Solutions and Strategies: Conduct an interchange study to identify alternative scenarios such as the feasibility of converting this interchange to a DDI. This is to provide better traffic operations and improve safety along Holly Road and the interchange area. This study should include microsimulation modeling of the alternatives and will be sensitive to traffic caused by sporadic hospital shift changes.

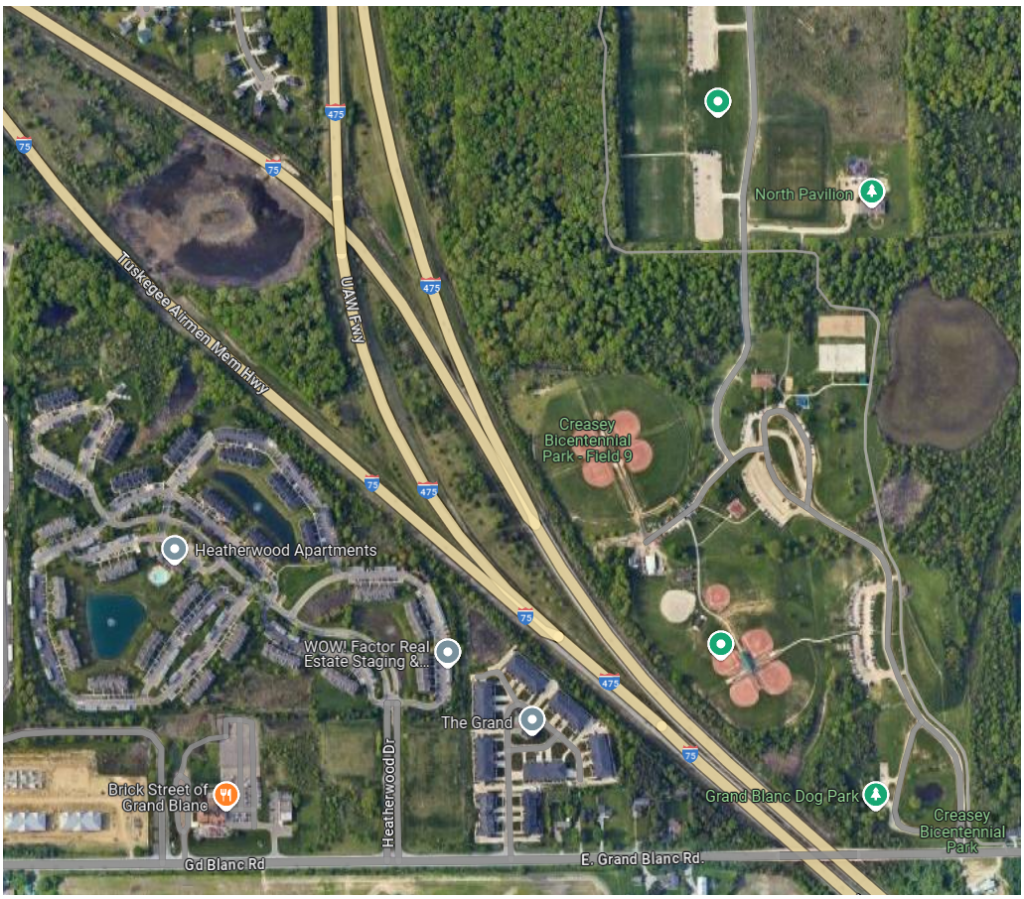
These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network and enhancing mobility, and **Building Resilience** by identifying and addressing risks to Michigan's transportation network.

F-11: Southbound I-475 Ramp to Southbound I-75 (Exit 111)

Challenge: The southbound I-475 entrance ramp to southbound I-75 enters on the left side of traffic. This configuration causes a speed differential between merging and through-traffic. This left-side placement does not meet normal driver expectations and introduces safety issues. The interchange is experiencing an average of 14 crashes per year, of which 62 percent are FI crashes.

CHALLENGE TYPE

Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	-	-	-	-



Solutions and Strategies: Reconfigure the southbound merge to the right-hand side, if feasible, in a future project. This aligns with driver expectations and reduces the need for lane changes.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by enhancing mobility, **Building Resilience** by identifying and addressing risks to Michigan's transportation network, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

F-12: US-23/Hill Road Interchange (Exit 90)

Challenge: This interchange is a compact rural diamond design. Over time, commercial development along Hill Road has expanded, leading to a significant increase in traffic. The closely spaced ramps, which have signalized terminals, have limited left-turn queue capacity. Additionally, a short entrance ramp to southbound US-23 does not provide adequate acceleration distance.

CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	-	-

Solutions and Strategies: Lengthen the southbound US-23 acceleration lane. Evaluate other interchange designs that could fit into the footprint, such as a single-point urban interchange (SPUI), DDI or roundabouts. The US-23 corridor study being conducted by GCMPC provides detailed operational analysis and has similar recommendations.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network and enhancing mobility, **Building Resilience** by identifying and addressing risks to Michigan's transportation network, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

F-13: US-23/Grand Blanc Road Interchange (Exit 88)
Challenge: The interchange is a compact rural diamond design. The closely spaced ramps, which have signalized terminals, are prone to left-turn overlap. The current four-lane design does not provide protected left-turn storage on the bridge deck.

CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	-	-

Solutions and Strategies: In the short term, reconfigure striping on the bridge to designate a left-turn lane to access the US-23 entrance ramps. Long-term solutions include rebuilding the interchange with a new design within the existing footprint and evaluating the use of roundabouts at the ramp terminals over signal control. The US-23 corridor study being conducted by GCMPC provides detailed operational analysis and has similar recommendations.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network and enhancing mobility, **Building Resilience** by identifying and addressing risks to Michigan's transportation network, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

F-14: US-23/North Road Interchange (Exit 80)
Challenge: This interchange has an outdated layout with short entrance and exit ramps and is only 1,000 feet from the Silver Lake Road interchange, which adds a weave movement into already slow merging traffic. Residential and commercial development over the last two decades has resulted in substantial traffic growth and exceeded the operational limits of the existing design.

CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	-	-

Solutions and Strategies: Evaluate potential interchange designs that incorporate movements with the Silver Lake Road interchange. The US-23 corridor study being conducted by GCMPC provides detailed operational analysis and includes recommendations to install roundabouts at the North Road and Torrey Road ramp intersections.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network and enhancing mobility, **Building Resilience** by identifying and addressing risks to Michigan's transportation network, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

F-15: US-23/Silver Lake Road Interchange (Exit 79)				
Challenge: This interchange is a folded diamond design with tight loop ramps. This area has experienced significant commercial growth in the last 25 years. A rail line just north of the interchange restricts access and limits design options.				
CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	-	-

Solutions and Strategies: Evaluate incorporating roundabouts at the ramp terminals over signal control; this would require coordination with the GCRC as there are nearby signals at Fenway Drive and Silver Parkway. Consider a new interchange design incorporating the Torrey Road/North Road interchange. The draft recommendations from the US-23 corridor study suggest the addition of roundabouts at the northbound ramp terminals and the realignment of Fenway Drive.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network and enhancing mobility, **Building Resilience** by identifying and addressing risks to Michigan's transportation network, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

5.2 Active Transportation Challenges

A-1: Featherstone Road Over I-75				
Challenge: Nonmotorized access is provided on the south side of the roadway over I-75 via a separated path. However, no facility exists on the north side, forcing users who want to travel on the north side of the roadway to cross Featherstone Road twice in order to get across I-75.				
CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	✓	-

Solutions and Strategies: Future replacement of the north structure over I-75 should provide adequate width for nonmotorized facilities.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving mobility and developing projects that equitably meet community mobility needs, **Supporting Michigan's Health** with initiatives to improve air quality and reduce emissions and encouraging healthy lifestyles, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

A-2: Auburn Road Under I-75				
Challenge: Nonmotorized access is provided on the north side of the roadway via a pathway through the slope paving and behind the pier. No facility is present along the south side. There are intermittent sidewalks/shared-use paths along the south side of Auburn Road. Several pedestrian generators (residences, parks, churches, schools) dot the area.				
CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	✓	-

Solutions and Strategies: Future bridge replacement should provide clear distance to accommodate nonmotorized uses. Modifications through the slope paving, similar to the north side of the bridge, could be implemented if path connections are added in the future.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving mobility and developing projects that equitably meet community mobility needs, **Supporting Michigan's Health** with initiatives to improve air quality and reduce emissions and encouraging healthy lifestyles, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

A-3: Pontiac Road Under I-75

Challenge: Nonmotorized access is provided on the south side of the roadway via a pathway between the pier and guardrail. Facilities exist on the north side of the roadway between Opdyke Road and University Drive, but there is currently a 1,700-foot gap from Allerton Road to 2391 Pontiac Road, located approximately 475 feet west of the bridge. Several pedestrian generators (residences, parks, churches, schools) dot the area.

CHALLENGE TYPE

Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	✓	-

Solutions and Strategies: In the future, when bridges are replaced, consider moving bridge piers/abutments to provide a wider buffer between the path and roadway. When the path is completed on the north side of the roadway, build a connection between pier and guard rail, similar to the south side, to allow a shared-use path to connect under I-75. An enclosed storm drain to convey runoff may be needed.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving mobility and developing projects that equitably meet community mobility needs, **Supporting Michigan's Health** with initiatives to improve air quality and reduce emissions and encouraging healthy lifestyles, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

A-4: Giddings Road Over I-75				
Challenge: Nonmotorized facilities exist along the west side of Giddings Road but there is a lack of connection across I-75. Access over I-75 requires nonmotorized users to travel into the roadway; the existing bridge width does not allow room for shoulders.				
CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	✓	-

Solutions and Strategies: Widen the structure over I-75 to accommodate a dedicated nonmotorized facility or wide shoulders when major improvements or replacement occurs.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving mobility and developing projects that equitably meet community mobility needs, **Supporting Michigan's Health** with initiatives to improve air quality and reduce emissions and encouraging healthy lifestyles, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

A-5: I-75 BL (Lapeer Road) Under I-75				
Challenge: There are no nonmotorized facilities present through the interchange area. Desired paths can be seen on grass along the roadway. There are nonmotorized facilities located sporadically along Lapeer Road.				
CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	✓	-

Solutions and Strategies: Future bridge replacement should accommodate nonmotorized access. Shorter-term solutions could include adding a path through the slope paving and behind the pier, like at Auburn Road.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving mobility and developing projects that equitably meet community mobility needs, **Supporting Michigan's Health** with initiatives to improve air quality and reduce emissions and encouraging healthy lifestyles, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

A-6: Joslyn Road Under I-75 (Exit 83)

Challenge: Joslyn Road is a four-lane roadway with narrow shoulders and no existing nonmotorized facilities in the interchange area. Sidewalks are present along Great Lakes Crossing Drive and on the west side of Joslyn Road south of Great Lakes Crossings Drive. Numerous retail properties exist at the mall and along Brown Road north of the interchange.

CHALLENGE TYPE

Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	✓	-

Solutions and Strategies: Install sidewalk connections north and south of the interchange and continue through under the bridge. Will require structure/slope paving modifications to accommodate.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving mobility and developing projects that equitably meet community mobility needs, **Supporting Michigan's Health** with initiatives to improve air quality and reduce emissions and encouraging healthy lifestyles, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

A-7: Baldwin Road Over I-75 (Exit 84)

Challenge: Nonmotorized access is provided on the east side of the roadway over I-75 connecting to existing pathways. There is a signal-controlled nonmotorized crossing at Great Lakes Crossings Road. There is no connection for nonmotorized users to cross Baldwin Road north of I-75 until they reach Judah Road, nearly a half mile north of I-75.

CHALLENGE TYPE

Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	✓	-

Solutions and Strategies: In the short term, provide a signal-controlled east-west crossing for nonmotorized users just north of I-75. Continue pathways north and south of the interchange on the west side and provide space to travel over the structure. This will require widening or cantilevering to the existing structure or possibly adding a separate nonmotorized structure.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving mobility and developing projects that equitably meet community mobility needs, **Supporting Michigan's Health** with initiatives to improve air quality and reduce emissions and encouraging healthy lifestyles, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

A-8: Clintonville Road Under I-75

Challenge: Clintonville Road is a three-lane roadway with narrow shoulders. A sidewalk is present along the east side of the roadway and connects to a sidewalk on Maybee Road with push-button signal activation.

CHALLENGE TYPE

Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	✓	-

Solutions and Strategies: Long-term improvements include better accommodation of the existing path with future bridge replacement. If a sidewalk connection is added on the west side of Clintonville Road, accommodations should continue through under the bridge. This would require structure/slope paving modifications to accommodate.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving mobility and developing projects that equitably meet community mobility needs, **Supporting Michigan's Health** with initiatives to improve air quality and reduce emissions and encouraging healthy lifestyles, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

A-9: M-54 (Dort Highway) Over I-75 (Exit 109)
Challenge: No dedicated nonmotorized facilities are present. There are shoulders on M-54 over I-75 and north and south of the interchange. The ramp terminals were recently rebuilt to include roundabouts. The shoulder disappears in the circulating roadway, no nonmotorized space is present and transition from the shoulder is abrupt (bicyclists would need to take a lane to get through).

CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	✓	-

Solutions and Strategies: While this location is not currently listed on the GCMPC Nonmotorized Plan, it could be considered for a future route. Providing a side path on the outside of the roundabout with transitions to the shoulder/roadway could be a long-term solution. A short-term solution includes restriping the pavement and augmenting them with bike sharrows and transition areas.

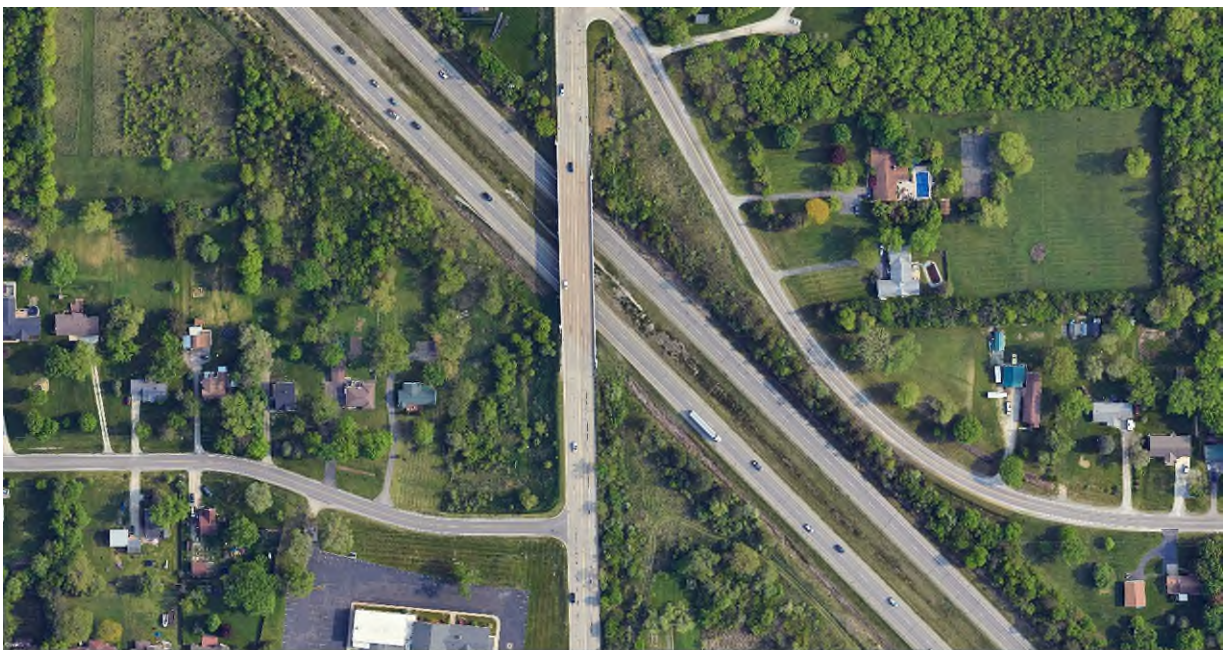
These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving mobility and developing projects that equitably meet community mobility needs, **Supporting Michigan's Health** with initiatives to improve air quality and reduce emissions and encouraging healthy lifestyles, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

A-10: Clarkston Road Under I-75				
Challenge: A sidewalk facility is located on the west side of the roadway under I-75 between the slope paving and bridge pier. No facility exists on the east side.				
CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	✓	-

Solutions and Strategies: Long-term improvements include better accommodation of the existing path, along with the possibility of providing a wider path, in a future bridge replacement project.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving mobility and developing projects that equitably meet community mobility needs, **Supporting Michigan's Health** with initiatives to improve air quality and reduce emissions and encouraging healthy lifestyles, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

A-11: Fenton Road Over I-75				
Challenge: The bridge deck consists of a four-lane section with no shoulders and no pedestrian facilities. Fenton Road itself does not have sidewalks but has numerous residences and pedestrian generators. It is listed as a Tier 3 trail location in GCMPC's 2023 Genesee County Trail Priorities map.				
CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	✓	-



Solutions and Strategies: Future replacement of the structure over I-75 should provide adequate width for future nonmotorized facilities or a wide shoulder at a minimum.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving mobility and developing projects that equitably meet community mobility needs, **Supporting Michigan's Health** with initiatives to improve air quality and reduce emissions and encouraging healthy lifestyles, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

5.3 Intersection Challenges

I-1: US-24 (Telegraph Road) at US-24 (Dixie Highway)/US-24 BR (Cesar Chavez Avenue)
Challenge: At this location, US-24 transitions from Telegraph Road to Dixie Highway. This results in heavy left-turn movements from northbound Telegraph Road to northbound Dixie Highway. The signal utilizes split phasing to handle the left-turning traffic, which results in longer wait times, negatively impacting the operations of the intersection. Other challenges related to safety and operations include: • The intersection experiences more crashes than similar facilities and has an excess expected crash frequency of 13 crashes per year. • More than 25 percent of all crashes at the intersection are left-turn head-on or angle. • The north leg of the intersection is forecasted to operate at LOS E in 2045.

CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	-	-

Solutions and Strategies: To address the safety and operational challenges with this intersection, an alternative intersection configuration may be considered. MDOT may want to consider adding a quadrant road in the southeast quadrant. Restricting direct left turns at the intersection would eliminate the need for split phasing the signal and significantly improve operations. It would reduce more severe angle and left-turn crashes as well as less severe rear-end crashes caused by queueing. This design would require right of way acquisition and may require additional signals at the quadrant road as well as coordinating with the signal at the US-24 BR/Kennett Road intersection. Wetlands located in the southeast quadrant are an environmental consideration.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network, improving mobility and developing projects that equitably meet community mobility needs, **Building Resilience** by identifying and addressing risks to Michigan's transportation network, **Technology** by evaluating and adopting new transportation technology to support Michigan's goals, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

I-2: M-1/I-75 BL (Woodward Avenue) at Square Lake Road

Challenge: This intersection is one of the highest volume at-grade intersections in the state, with more than 120,000 vehicles per day. It is forecasted to grow to more than 130,000 vehicles per day by 2045. While its innovative design with directional crossovers on all four legs has long been considered a national model, the congestion issues on the Square Lake Road approaches in the evening peak period are expected to increase. Challenges related to safety and operations include:

- The intersection experiences more crashes than similar locations, such that it has an excess expected crash frequency of 21 crashes per year.
- The adjacent Square Lake Road/Lahser Road intersection has an excess expected crash frequency of 15 crashes per year.
- During the evening peak, the westbound Square Lake Road approaches to both Woodward Avenue and Lahser Road are forecasted to have a LOS F in 2045. The eastbound Square Lake Road approach to Woodward Avenue is forecasted to operate at LOS E in 2045.

CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	✓	-

Solutions and Strategies: To address both safety and operational challenges at this location, MDOT should consider implementing an adaptive signal system along Square Lake Road between US-24 (Telegraph Road) and I-75. This would include the signals at Telegraph Road, Franklin Road, Lahser Road, Woodward Avenue, and nearby crossovers/quadrant roads, as well as other adjacent signals in the area. An adaptive signal system can dynamically allocate green time between Woodward Avenue, which is forecasted to operate at LOS B, and Square Lake Road, which is forecasted to operate at LOS F. More effective signal operations should reduce crashes at the intersections.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network and enhancing mobility, **Supporting Michigan's Health** with initiatives to improve air quality and reduce emissions, Building Resilience by identifying and addressing risks to Michigan's transportation network, Technology by evaluating and adopting new transportation technology to support Michigan's goals, and Economic Vitality by promoting freight service, infrastructure improvements and intermodal connectivity.

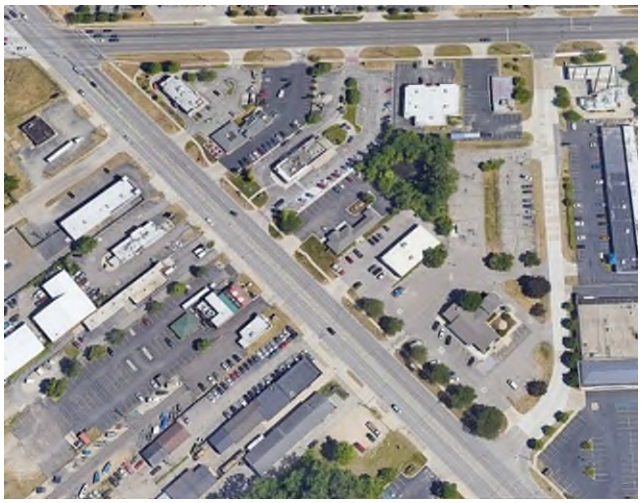
I-3: US-24 (Dixie Highway) at Walton Boulevard/Williams Lake Road

Challenge: This intersection has an AADT of 50,000 and is forecasted to grow to 60,000 vehicles per day in 2045. Both roads have five-lane cross sections. Northbound and southbound right turns are restricted at the intersection. Quadrant roads funnel right-turning traffic out of the intersection. The northwest quadrant road is much shorter than the southeast quadrant road. Below are challenges related to safety and operations:

- During field reviews, significant queues were observed during the evening peak.
- The eastbound approach of Williams Lake Road is forecasted to operate at LOS E in 2045.
- The intersection is averaging 46 crashes per year, of which 20 percent involve an FI crash. In addition, 21 percent of the crashes involve an angle or left-turn crash.
- Two pedestrian-involved crashes occurred during the study period.
- There are 21 excess crashes occurring at the intersection, which indicates that with the implementation of safety countermeasures, crashes could decrease up to 46 percent.
- An additional 19 crashes per year involve the southeast quadrant road (Floradale Street).

CHALLENGE TYPE

Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	-	-



Solutions and Strategies: To address the safety and operational challenges at the intersection, the following items may want to be considered.

- Enhance signs at quadrant roads and add advanced signs.
- Conduct an operational study to evaluate various alternatives to determine whether the quadrant road could be utilized more effectively to enhance intersection operations by redirecting the left turns from the intersection. This may require adding a westbound left-turn phase to the signal at the Walton Boulevard/Floradale Street intersection and adding a signal at the Dixie Highway/Floradale Street intersection. The study should also evaluate the impact of shifting the southbound left turns to Floradale Street as well. The eastbound left turns could potentially be shifted to the northwest quadrant road. This may require widening the existing northwest quadrant road and adding signals at both ends.

- Due to variable traffic conditions along Dixie Highway, adaptive signal control should be considered at this intersection as part of a corridor-wide implementation.
- Eliminating direct left-turn movements at the intersection will reduce the risk for pedestrians crossing. It would also allow for the addition of median refuges to shorten the crossing distance.
- To address access management crashes along Dixie Highway near the intersection, a narrow median (4-6 feet) should be considered between Floradale Street and the northwest quadrant road intersections. Left turns from driveways to Dixie Highway could be redirected to the existing quadrant roads. An operational analysis should be conducted to evaluate the impacts of this proposed change.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network and enhancing mobility, **Technology** by evaluating and adopting new transportation technology to support Michigan's goals, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

5.4 Network Challenges

N-1: Northbound I-75 Between Joslyn Road and Baldwin Road				
Challenge: Frequent congestion is experienced between the two interchanges, as both are connected to intense retail development. The entrance ramp from Joslyn Road ends approximately 1,400 feet south of the exit ramp for Baldwin Road. 2045 travel demand model forecasting shows V/C ratios exceeding 1 in this segment.				
CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
-	✓	-	-	-

Solutions and Strategies: Create a continuous northbound auxiliary lane between the interchange ramps.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network and improving mobility, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

N-2: Northbound I-75 Between Baldwin Road and Sashabaw Road				
Challenge: Frequent congestion and queues occur between the two interchanges. Special events at Pine Knob Amphitheatre exacerbate the issue.				
CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	-	-

Solutions and Strategies: Add a fourth northbound lane between Baldwin Road and Sashabaw Road. Add additional deceleration length to the northbound off ramp to Sashabaw Road.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network and improving mobility, **Building Resilience** by identifying and addressing risks to Michigan's transportation network, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

N-3: US-24 (Dixie Highway) from US-24 (Telegraph Road) to I-75				
Challenge: This segment is a five-lane section with frequent signalized intersections. High volumes of traffic combined with numerous driveways cause recurring congestion during peak periods.				
CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	-	-

Solutions and Strategies: Implement access management strategies. Consider adaptive traffic signal control through the corridor.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network, improving mobility and developing projects that equitably meet community mobility needs, **Technology** by evaluating and adopting new transportation technology to support Michigan's goals, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

N-4: Dixie Highway from I-75 (Exit 93) to I-75 (Exit 106)				
Challenge: Dixie Highway has a 55 mph speed limit with a four-lane cross section north of Davisburg Road and five lanes south to I-75. It functions as an alternate route to I-75 and connects to seasonal attractions such as Mt. Holly Resort, the Holly State Recreation Area, and the Michigan Renaissance Festival. High speeds and numerous left-turn crashes are reported.				
CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	-	-

Solutions and Strategies: A four-lane to three road diet could be appropriate north of Davisburg Road, as it has traffic volumes that range from 8,000 to 12,000 vehicles per day. The Road Commission for Oakland County (RCOC) has jurisdiction; a study will be needed.

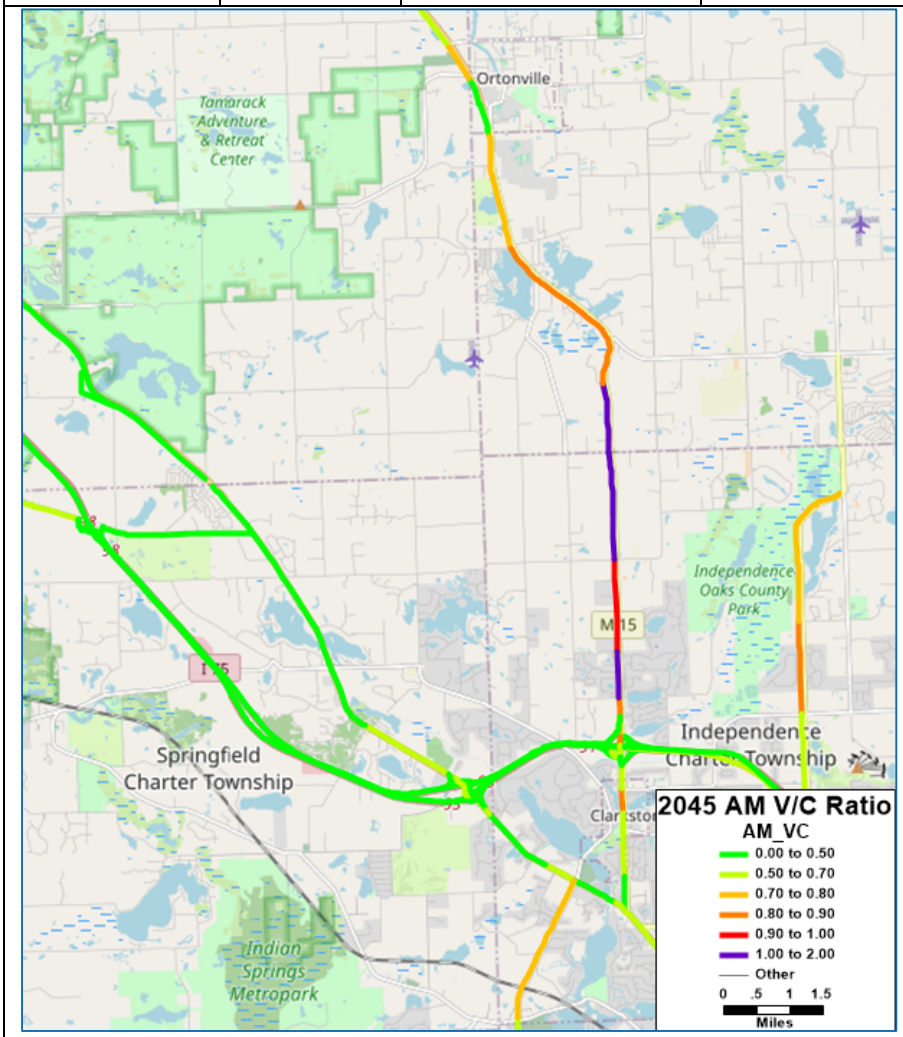
These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

N-5: Grange Hall Road Between I-75 and Fenton				
Challenge: Grange Hall Road is a major east-west connection in the area with an average daily traffic of 13,000-17,000 vehicles per day. It is the most direct way to access I-75 from both Fenton and Holly and generally only has one through-lane in each direction in its entirety. There are a few dedicated right or left-turn lanes sporadically placed throughout its 8-mile length. Travel demand modelling shows V/C ratios exceeding or approaching 1 in 2045 peak periods.				
CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	-	-

Solutions and Strategies: Widening to include turn lanes in specific locations could increase throughput of the roadway without diminishing safety. Further study to determine locations and limits of need is recommended. The roadway is under RCOC's jurisdiction.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, and **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network and improving mobility.

N-6: M-15 (Ortonville Road) from I-75 to Seymour Lake Road				
Challenge: With population shifting to northern Oakland County, traffic volumes and congestion along M-15 are forecasted to grow. By 2045, LOS is forecasted to be E or F in this segment during both the morning and evening peak periods. M-15 is a four-lane road for 0.6 miles north of the I-75 interchange and transitions to a two-lane road. The M-15/Seymour Lake Road intersection is located on a horizontal curve at the north end of the segment. A safety analysis indicated the four-lane section has five excess expected crashes per year while the two-lane section has one excess expected crash per year.				
CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	-	-



Solutions and Strategies: To address the operational challenges on this segment, MDOT may want to consider conducting a feasibility study considering the following options:

Roundabouts. Evaluate whether converting the following intersections along the corridor to roundabouts can help to alleviate the congestion.

- **M-15/Seymour Lake Road intersection** - A roundabout would help improve operations and address the geometric issues of this intersection in which all three approaches are on horizontal curves. The intersection is located adjacent to wetlands, which could affect this design option.
- **M-15/Cranberry Lake Road intersection** - A roundabout at this location may improve the transition between the urban multi-lane and rural two-lane segments.

Widening M-15. Consider widening M-15 from I-75 to Seymour Lake Road. There are several wetlands that would be impacted by a change in cross section and right of way acquisition may be costly.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network and improving mobility, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

N-7: Hill Road between I-475 and US-23				
Challenge: Hill Road is a major east-west connection across southern Genesee County. The commercial corridor from Fenton Road to Torrey Road has continued to grow over the last 20 years and housing has increased toward the west. Congestion is common.				
CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	-	-

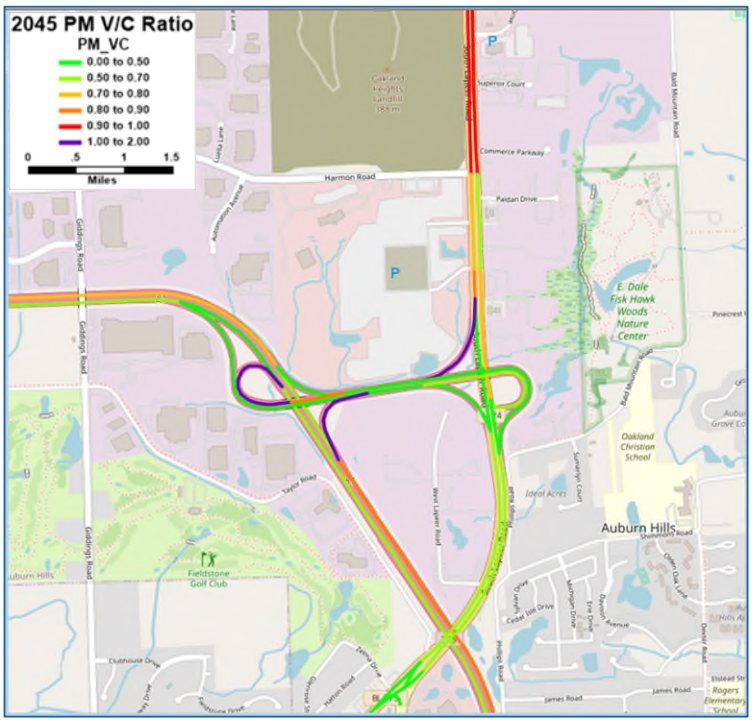
Solutions and Strategies: Spot widening of the roadway in the area may be needed. A future boulevard treatment and/or access management treatment between US-23 and Torrey Road. Due to the rural tight diamond, a reconfiguration may be needed. Detailed traffic operational analysis of the area should be undertaken.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network, improving mobility and developing projects that equitably meet community mobility needs, **Technology** by evaluating and adopting new transportation technology to support Michigan's goals, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

N-8: M-24 (Lapeer Road) from Brown Road to I-75

Challenge: This location is a divided boulevard carrying 45,000 vehicles per day with nearby land uses consisting of a landfill, a GM assembly plant, and various automotive/tech suppliers. At the present time, the Palace of Auburn Hills site is being redeveloped into a research and technology park. The 110-acre site with more than 1 million square feet of commercial and mixed-use space is zoned for mixed-use, retail, medical, and research development. The 2045 travel demand model indicates this segment of roadway will be approaching capacity (V/C of 1) and the ramp system accessing I-75 is showing volumes exceeding capacity.

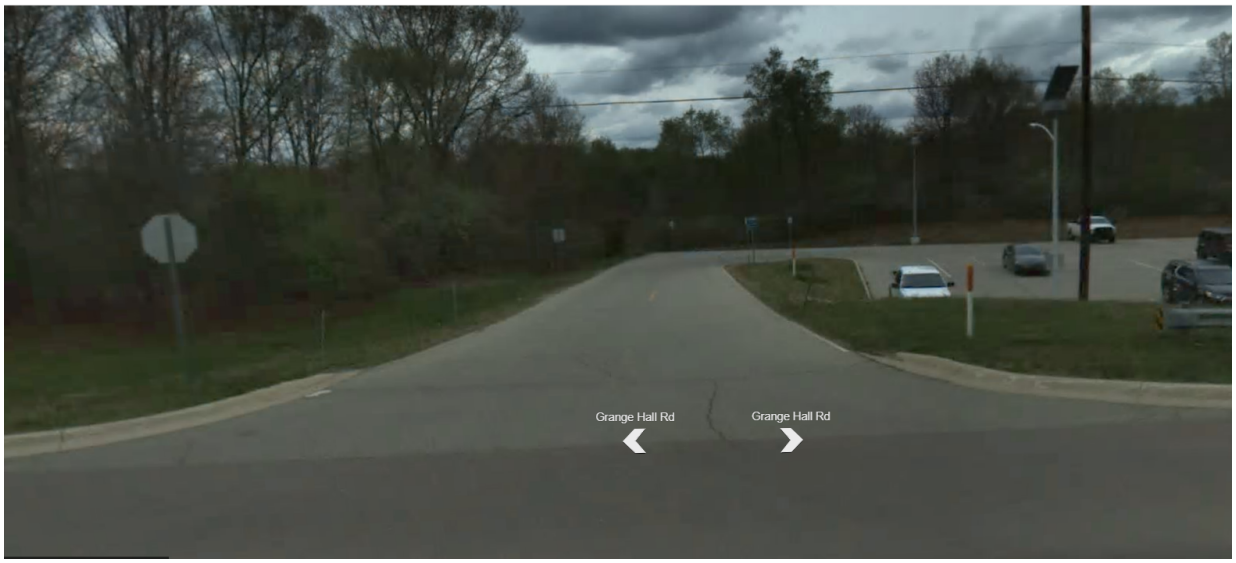
CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	-	-



Solutions and Strategies: In the near term, widening the roadway from Harmon Road to Championship Drive, along with reconfiguring some of the M-24 crossovers, is planned to accommodate traffic to the old Palace site.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network, **Building Resilience** by identifying and addressing risks to Michigan's transportation network, **Technology** by evaluating and adopting new transportation technology to support Michigan's goals, and **Economic Vitality** by promoting freight service, infrastructure improvements and intermodal connectivity.

N-9: Grange Hall Road Park and Ride				
Challenge: Recent attempts to add regional transit service to the area fell short due to space limitations at the lot. A 40-foot bus is not able to turn around in the existing configuration.				
CHALLENGE TYPE				
Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
✓	✓	✓	-	-



Solutions and Strategies: Redesign the existing area to allow turning radius of buses. Options include but are not limited to providing a wider throat on the entrance driveway, adding a second entrance point on the west end of the lot, providing larger radius or a bump out, or eliminating some parking spaces.

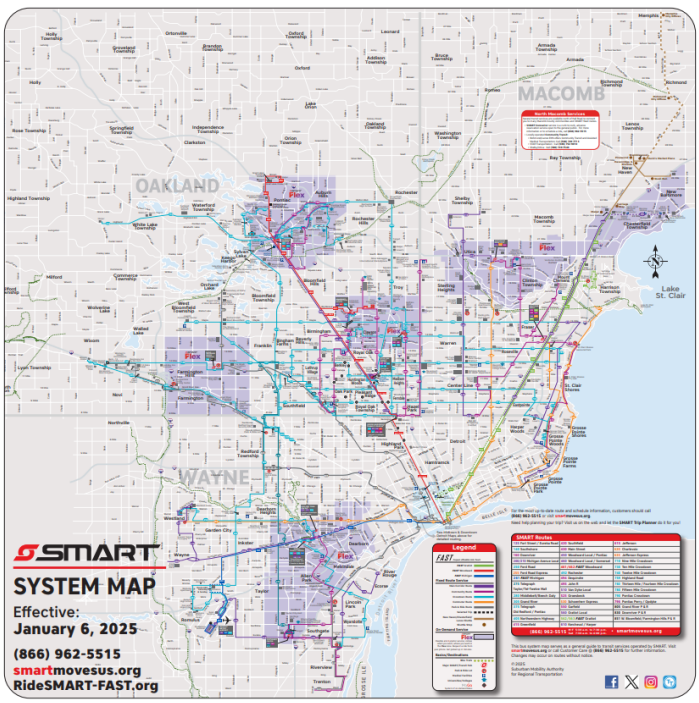
These solutions and strategies were developed to align with the MM2045 goals of **Providing Accessibility and Mobility for All** by enhancing mobility in Michigan and supporting the increased use of the passenger transportation system and **Supporting Michigan's Health** through initiatives to improve air quality and reduce emissions.

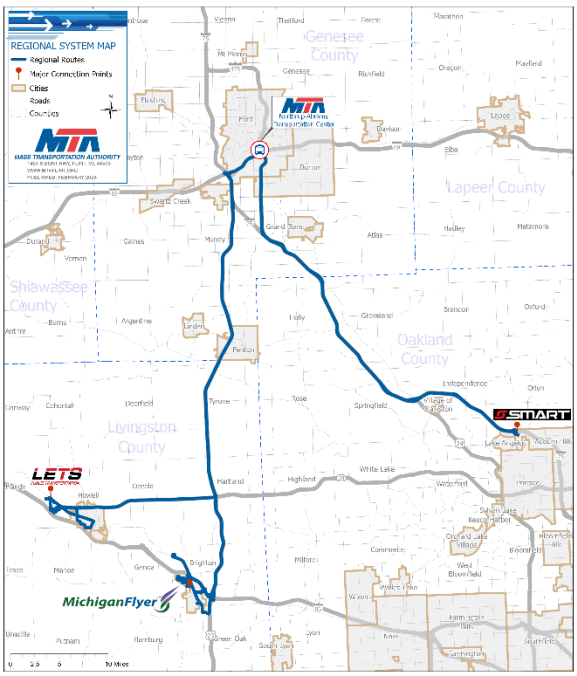
N-10: Expanded Transit Routes

Challenge: In general, the SMART system does not extend beyond the northern Pontiac area. Gaps are present in the transit network along and surrounding the I-75 corridor. Oakland Transit has provided for some expansion of the system and the Western Oakland County Transit Authority (WOTA) provides on demand service in the northwest portion of the county. While MTA does provide commuter service into Oakland County, this is limited to a specific stop and SMART does not operate any express bus on highway facilities.

CHALLENGE TYPE

Safety	Operational	Asset Management	Active Transportation and Multimodal	Socioeconomic
-	✓	✓	✓	-





Solutions and Strategies: Increase transit service to the northwest portion of Oakland County. This may include route deviation by on demand service, improved on demand scheduling, commuter express bus service (beyond the county boundaries) and additional fixed routes to improve connections to the I-75 corridor (and MTA service). This will require increased coordination between SMART and MTA, increased transit funding and private/public partnerships.

These solutions and strategies were developed to align with the MM2045 goals of **Prioritizing Safety** with infrastructure and facility improvements incorporating proven safety benefits, **Managing Resources Responsibly** by right-sizing Michigan's transportation network and systems, and **Providing Accessibility and Mobility for All** by improving the reliability of the transportation network and improving mobility.

6. SOLUTIONS AND STRATEGIES ANALYSIS

6.1 Safety

For safety analysis, the American Association of State Highway and Transportation Officials (AASHTO) 2010 Highway Safety Manual (HSM) methodology was used. This method employs statistical analysis based on historical data to predict future crashes on roads depending on their design and configuration. Initially, the 2010 HSM was used to examine existing conditions and identify high-risk crash areas. Although valuable in the planning stage by showing how decisions affect roadway safety, this method does not apply a more robust planning and alternative analysis process, which would be included within planning and environmental linkages (PEL) or NEPA studies. At this stage, alternatives are still conceptual and detailed analysis with HSM occurs later.

The outcomes of the HSM analysis are outlined below. Expected crashes were calculated using ISATe for freeways and the Michigan HSM spreadsheets for arterials. Crash modification factors were selected using the FHWA CMF Clearinghouse website to forecast the potential reduction in crashes. Using this approach, the expected FI crashes were calculated for both using a Chi-Square statistical analysis; reductions in anticipated crashes were tested for statistical significance. Implications of the data for each alternative are presented after the tables.

Table 6: Predictive Safety Analysis

No	Challenges	Proposed Mitigation	CMF	Expected Fatal and Injury Crashes		CHI Square	Statistically Significant Crash Reduction
				Before	After		
F-1	I-75/M-59 interchange (Exit 77)	Reconfigure interchange from full cloverleaf to directional	0.8	24.40	19.52	1.2200	No
F-3	I-75/M-24 (Lapeer Road) interchange (Exit 81)	Widen interchange	0.65	6.80	4.42	1.2823	No
F-4	I-75/Joslyn Road interchange (Exit 83)	Convert to DDI	0.66	21.40	14.13	3.7486	No
F-5	I-75/Baldwin Road interchange (Exit 84)	Convert to DDI	0.66	14.83	9.79	2.5978	No
F-6	I-75/Sashabaw Road interchange (Exit 89)	Convert to DDI	0.66	14.46	9.55	2.5335	No
F-7	I-75/M-15 (Ortonville Road) interchange (Exit 91)	Convert to DDI	0.66	22.99	15.17	4.0267	Yes
F-8a	I-75/US-24 (Dixie Highway) interchange (Exit 93)	Convert to DDI	0.66	6.10	4.02	1.067	No
F-8b	I-75/US-24 (Dixie Highway) interchange (Exit 93)	Signalize southbound off ramp, high friction and extend ramp	0.512	6.10	3.12	2.8354	No
F-9	I-75 at Dixie Highway/Saginaw Road interchange (Exit 106)	Flip left ramps to right ramps	0.66	22.19	14.65	3.8867	Yes
F-10	I-75/Holly Road interchange (Exit 108)	Convert to DDI	0.66	19.77	13.05	3.4632	No
F-11	Southbound I-475 to southbound I-75 (Exit 111)	Flip left ramps to right ramps	0.66	12.64	8.35	2.2146	No
F-12	US-23/Hill Road interchange (Exit 90)	Roundabout	0.604	6.07	3.66	1.5752	No
F-13	US-23/Grand Blanc Road interchange (Exit 88)	Roundabout	0.604	7.88	4.76	2.0446	No
F-14	US-23/North Road interchange (Exit 80)	Roundabout	0.604	4.19	2.53	1.0882	No
F-15	US-23/Silver Lake Road interchange (Exit 79)	Roundabout	0.604	1.58	0.95	0.4100	No
I-1	US-24 (Telegraph Road) at US-24 (Dixie Highway)/ US-24 BR (Cesar Chavez Avenue)	Quadrant road	0.75	10.46	7.84	0.8715	No

No	Challenges	Proposed Mitigation	CMF	Expected Fatal and Injury Crashes		CHI Square	Statistically Significant Crash Reduction
				Before	After		
I-2	M-1/I-75 BL (Woodward Avenue) at Square Lake Road	Adaptive signals	0.95	65.76	62.47	0.1731	No
I-3	US-24 (Dixie Highway) at Walton Boulevard/Williams Lake Road	Quadrant road	0.25	13.23	3.31	29.7675	Yes
N-1	Northbound I-75 between Joslyn Road and Baldwin Road	Northbound auxiliary lane	0.8	1.87	1.49	0.0933	No
N-2	Northbound I-75 between Baldwin Road and Sashabaw Road	Northbound auxiliary lane	0.8	9.25	7.40	0.4623	No
N-3a	US-24 (Dixie Highway) from US-24 (Telegraph Road) to I-75	Adaptive signals	0.95	42.56	40.43	0.1120	No
N-3b	US-24 (Dixie Highway) from US-24 (Telegraph Road) to I-75	Median south - Telegraph Road to Hatchery Road	0.63	15.84	9.98	3.4421	No
N-3c	US-24 (Dixie Highway) from US-24 (Telegraph Road) to I-75	Median central - Walton Boulevard to Maybee Road	0.63	22.90	14.43	4.9762	Yes
N-3d	US-24 (Dixie Highway) from US-24 (Telegraph Road) to I-75	Median north - M-15 to I-75	0.63	14.78	9.31	3.2126	No
N-4	Dixie Highway from I-75 (Exit 93) to I-75 (Exit 106)	Four-to-three-lane conversion	0.91	2.82	2.56	0.0251	No
N-5	Grange Hall Road between I-75 and Fenton	Widening from two lanes to four	1.16	15.68	18.19	0.3460	No
N-6	M-15 (Ortonville Road) from I-75 to Seymour Lake Road	Widening	0.83	17.50	14.59	0.5781	No
N-7a	Hill Road between I-475 and US-23	Fenton safety	0.55	7.25	3.99	2.6708	No
N-7b	Hill Road between I-475 and US-23	Median - Torrey Road to US-23	0.63	5.00	3.15	1.0861	No

6.2 Operations

The travel demand models utilized in the existing condition analysis were also used to identify future deficiencies and to test solutions and strategies. This included development of a no build 2045 network and 2045 build network with proposed improvements.

Model Scenarios

Three scenarios were developed for the travel demand forecasts:

- 2025 Existing: Includes HOV lanes on I-75 in Oakland County, 2023-2026 TIP projects, and new transit routes and expansions.
- 2045 Baseline: Includes planned and future constructed transportation improvements and new transit routes and expansion for 2045.
- 2045 Build: Includes proposed improvements.

Interchanges Operations

There are a total of 15 interchanges along the 40-mile I-75 study corridor. Several interchanges show a deficiency in operations on ramps and segments between interchanges in both 2025 and 2045 conditions. The deficiencies in these interchanges and segments are worse during the evening peak period, caused by a combination of high volumes and interchanges being close in proximity, resulting in merging and weaving. These interchanges are:

- M-59
- University Drive
- Lapeer Road
- Baldwin Road
- Grange Hall Road

2045 Build

Proposed Network Updates

To address the operational deficiencies observed in the 2045 no build network, proposed network updates were coded in the 2045 build network. These network updates provide additional capacities to alleviate the congestion and they include:

1. I-75/M-59 interchange: Additional lanes on the ramps with LOS D or worse (V/C greater than 0.8).
2. I-75/M-24 interchange: Additional lanes on ramps with LOS D or worse (V/C greater than 0.8).
3. Northbound I-75 between lane drop north of Lapeer Road and Joslyn Road: Add one lane.
4. I-75 between Joslyn Road and Baldwin Road: Add one lane in each direction.
5. Northbound I-75 near Sashabaw Road: Add one northbound lane for Pine Knob queues.
6. I-75/Sashabaw Road interchange: Add loop from northbound Sashabaw Road to northbound I-75.
7. M-15 from I-75 to Seymour Lake Road: Add extra lane in each direction.
8. Grange Hall Road from I-75 to North Holly Road: Add one extra center turn lane on the west.

9. M-24 (Lapeer Road) north of I-75: Add one lane.

Since all the proposed improvements are located in Oakland County, only the SEMCOG model was used to analyze the 2045 build scenario. Table 6 summarizes the changes in morning peak and evening peak V/C ratios. The proposed improvements have been shown to reduce the V/C ratios, with the magnitude of the reduction varying by segment.

Morning preak V/C ratio reductions range from -0.02 on the Sashabaw Road on ramp to northbound I-75 to -0.53 on the southbound I-75 exit ramp to eastbound M-59. Evening peak V/C ratio reductions range from -0.02 on the Sashabaw Road on ramp to northbound I-75 to -0.59 on the southbound I-75 exit ramp to eastbound M-59. Overall, the proposed improvements have provided congestion relief at several bottlenecks, such as the southbound I-75 exit ramp to eastbound M-59 and M-15 north of I-75.

Please note that the travel demand model results provide a high-level analysis of the proposed improvements' impacts on traffic conditions. Turning movement counts will be needed for operational analysis at the interchanges, using microsimulation software such as VISSIM to accurately assess the benefits of the proposed improvements.

Table 7: 2045 No Build Versus 2045 Build

Route	Location	Network Updates	Morning Peak V/C			Evening Peak V/C		
			No Build	Build	Change	No Build	Build	Change
Northbound I-75	Exit 74 to Exit 75	Add a lane	0.71	0.54	-0.17	0.90	0.69	-0.21
Southbound I-75	Exit Ramp at M-24	Add a lane	0.83	0.56	-0.28	0.93	0.62	-0.30
Northbound I-75	Westbound M-59 Exit Ramp	Add a lane	0.58	0.29	-0.29	0.98	0.49	-0.49
Southbound I-75	Eastbound M-59 Exit Ramp	Add a lane	1.10	0.57	-0.53	1.25	0.66	-0.59
Westbound M-59	Southbound I-75 Exit Ramp	Add a lane	0.70	0.35	-0.35	0.85	0.44	-0.41
Westbound M-59	Southbound I-75 Exit Ramp	Add a lane	0.62	0.31	-0.32	0.80	0.40	-0.41
Northbound Lapeer Road*	Harmon Road to West Scripps Road	Add a lane	0.62	0.49	-0.14	0.90	0.75	-0.15
Southbound Lapeer Road*	Harmon Road to West Scripps Road	Add a lane	0.86	0.73	-0.14	0.80	0.68	-0.13
Northbound I-75	Baldwin Road to Sashabaw Road	Add a lane	0.30	0.23	-0.07	0.86	0.66	-0.19
M-15*	Cranberry Lake Road to East Seymour Road	Add a lane	1.04	0.77	-0.27	1.07	0.82	-0.25
Grange Hall Road*	I-75 to North Holly Road	Add center lane	0.72	0.71	-0.01	0.85	0.85	0.00

Route	Location	Network Updates	Morning Peak V/C			Evening Peak V/C		
			No Build	Build	Change	No Build	Build	Change
Northbound I-75 On Ramp	Sashabaw Road	Add a new ramp	0.16	0.14	-0.02	0.24	0.22	-0.02
Northbound I-75*	Joslyn Road to Baldwin Road	Add a lane	0.31	0.24	-0.08	0.88	0.68	-0.20
Southbound I-75	Joslyn Road to Baldwin Road	Add a lane	0.81	0.60	-0.20	0.51	0.39	-0.13
Average V/C			0.72	0.56	-0.16	0.88	0.70	-0.18

* Average link level V/C for the impacted segments

7. PRIORITIZATION

7.1 Approach

Assessing the solutions and strategies effectively necessitates evaluating multiple factors through a blend of quantitative and qualitative analyses. A two-step process was employed to assess the potential solutions.

Step 1: Conduct an economic analysis that considers safety, travel performance, implementation cost, and operations and maintenance costs.

Step 2: Prepare an evaluation matrix that prioritizes the study goals of active transportation, safety, travel performance, multimodal, asset management, environmental, right of way, and equity.

7.2 Benefit-Cost Analysis

Using the results from the safety and operational analysis, the safety and operational impacts were quantified for each of the challenges. The benefit-cost analysis considered service life and a 6 percent discount rate. Additionally, it assumed annual maintenance costs. To calculate the benefits, crash data was compared to societal costs of traffic crashes from the National Safety Council. Planning-level cost estimates were a part of the project as well. For operations, the total delay was calculated for each alternative. The user delay cost analysis for each alternative used MDOT's Construction Congestion Cost (CO3) calculator.

For safety and operations, the change in crashes and user delay involved calculating the differences between the proposed mitigation and no action. The equivalent uniform annual cost and benefits methodology was applied. The benefit-cost ratio (BCR) for each alternative is shown in Tables 8-10.

Table 8: Economic Analysis - Freeway Interchange Challenges

Code	Location	Potential Solution	Safety Benefit	Operations Benefit	Total Benefit	Construction Cost	Amortized Cost	BCR	Breakeven Cost
F-1	I-75/M-59 interchange (Exit 77)	Reconfigure interchange	$1,962,918	$8,219,099	$10,182,017	$1,000,000,000	$74,000,000	0.1	$137,594,823
F-3	I-75/M-24 (Lapeer Road) interchange (Exit 81)	Widen ramps	$1,003,244	$0	$1,003,244	$40,000,000	$2,960,000	0.3	$13,557,350
F-4	I-75/Joslyn Road interchange (Exit 83)	Reconfigure interchange to DDI	$3,089,938	$1,424,880	$4,514,818	$15,000,000	$1,110,000	4.1	$61,011,055
F-5	I-75/Baldwin Road interchange (Exit 84)	Reconfigure interchange to DDI	$2,369,621	$2,109,972	$4,479,593	$40,000,000	$2,960,000	1.5	$60,535,043
F-6	I-75/Sashabaw Road interchange (Exit 89)	Reconfigure interchange to DDI	$2,179,222	$1,318,733	$3,497,955	$40,000,000	$2,960,000	1.2	$47,269,666
F-7	I-75/M-15 (Ortonville Road) interchange (Exit 91)	Reconfigure interchange to DDI	$3,253,005	$0	$3,253,005	$40,000,000	$2,960,000	1.1	$43,959,530
F-8a	I-75/US-24 (Dixie Highway) interchange (Exit 93)	Reconfigure interchange to DDI	$1,527,728	$0	$1,527,728	$40,000,000	$2,960,000	0.5	$20,644,972
F-8b		Northbound off ramp improvements	$1,397,864	$0	$1,397,864	$2,000,000	$148,000	9.4	$18,890,057
F-9	I-75 at Dixie Highway/Saginaw Road (Exit 106)	Flip right ramps to left ramps	$1,527,728	$0	$1,527,728	$50,000,000	$3,700,000	0.4	$20,644,972
F-10	I-75 and Holly Road (Exit 108)	DDI	$1,539,252	$1,237,778	$2,777,030	$40,000,000	$2,960,000	0.9	$37,527,438
F-11	Southbound I-475 to southbound I-75 (Exit 111)	Flip southbound left side on to right side	$859,845	$0	$859,845	$30,000,000	$2,220,000	0.4	$11,619,532
F-12	US-23/Hill Road interchange (Exit 90)	Roundabouts at ramp terminals	$627,047	$99,736	$726,783	$6,000,000	$444,000	1.6	$9,821,394
F-13	US-23/Grand Blanc Road interchange (Exit 88)	Roundabouts at ramp terminals	$675,176	$67,866	$743,042	$6,000,000	$444,000	1.7	$10,041,104
F-14	US-23/North Road interchange	Roundabouts at ramp terminals	$453,750	$704,717	$1,158,467	$6,000,000	$444,000	2.6	$15,654,955

Code	Location	Potential Solution	Safety Benefit	Operations Benefit	Total Benefit	Construction Cost	Amortized Cost	BCR	Breakeven Cost
F-15	US-23/Silver Lake Road interchange	Roundabouts at ramp terminals	$301,638	$660,907	$962,545	$6,000,000	$444,000	2.2	$13,007,359

Table 9: Economic Analysis - Intersection Challenges

Code	Location	Potential Solution	Safety Benefit	Operations Benefit	Total Benefit	Construction Cost	Amortized Cost	BCR	Breakeven Cost
I-1	US-24 (Telegraph Road) at US-24 (Dixie Highway)/ US-24 BR (Cesar Chavez Avenue)	Quadrant road	$1,065,132	$1,991,703	$3,056,835	$7,000,000	$618,000	4.9	$41,308,582
I-2	M-1/I-75 BL (Woodward Avenue) at Square Lake Road	Adaptive signal system	$1,353,213	$5,673,142	$7,026,354	$5,000,000	$572,750	12.3	$74,313,634
I-3	US-24 (Dixie Highway) at Walton Boulevard/Williams Lake Road	Quadrant road and restrict left turns	$4,042,370	$1,805,784	$5,848,155	$5,000,000	$470,000	12.4	$79,029,116

Table 10: Economic Analysis -– Network Challenges

Code	Location	Potential Solution	Safety Benefit	Operations Benefit	Total Benefit	Construction Cost	Amortized Cost	BCR	Breakeven Cost
N-2	Northbound I-75 between Baldwin Road and Sashabaw Road	Widen from six lanes to eight	$787,610	$1,270,048	$2,057,659	$60,000,000	$4,589,999	0.4	$27,806,198
N-3a	US-24 (Dixie Highway) from US-24 (Telegraph Road) to I-75	Adaptive signal control	$871,100	$1,998,614	$2,869,714	$5,000,000	$622,750	4.6	$30,351,286
N-3b		Median - Telegraph Road to Hatchery Road	$2,365,457	$1,365,015	$3,730,472	$30,000,000	$2,370,000	1.6	$50,411,781
N-3c		Median - Walton Boulevard to Maybee Road	$3,338,879	$1,103,281	$4,442,160	$30,000,000	$2,370,000	1.9	$60,029,188
N-3d		Median - M-15 to I-75	$2,228,480	$169,578	$2,398,057	$25,000,000	$2,000,000	1.2	$32,406,178

Code	Location	Potential Solution	Safety Benefit	Operations Benefit	Total Benefit	Construction Cost	Amortized Cost	BCR	Breakeven Cost
N-4	Dixie Highway from I-75 (Exit 93) to I-75 (Exit 106)	Road diet (four lanes to three)	$99,835	$0	$99,835	$250,000	$23,638	4.2	$1,055,900
N-5	Grange Hall Road between I-75 and Fenton	Widening	-$969,804	$1,797,164	$827,360	$8,000,000	$856,400	1.0	$8,750,504
N-6	M-15 (Ortonville Road) from I-75 to Seymour Lake Road	Widening (two-lane undivided to five-lane with center left-turn lane)	$1,082,365	$3,833,459	$4,915,824	$20,000,000	$1,580,000	3.1	$66,430,057
N-7a	Hill Road between I-475 and US-23	Hill Road/Fenton Road intersection improvements	$798,536	$0	$798,536	$250,000	$123,638	6.5	$8,445,645
N-7b		Median - Torrey Road to US-23	$468,184	$0	$468,184	$5,000,000	$470,000	1.0	$6,326,817
N-8	M-24 from Brown Road to I-75 ramps	Widen from four lanes to six	-$300,625	-$446,906	-$747,530	$60,000,000	$4,540,000	-0.2	($10,101,763)

7.3 Evaluation Matrix

Table 10 presents a comparison of the solutions and strategies evaluated at this level. It summarizes the analysis based on key criteria established for the study, encompassing project goals and feedback from MDOT, the steering committee, the LAC, and public involvement activities. The criteria cover essential aspects of the study's objectives, such as active transportation, safety, reliability, multimodality, asset management, environmental considerations, right of way, and equity.

Quantitative data, including metrics for traffic operations and safety, were utilized where available. Some criteria are qualitative, applying ratings of increase/no change/decrease to gauge how well each alternative meets the study's goals or minimizes impacts on environmental resources. The table uses color coding to indicate the potential effects expected with each alternative, the meanings of which are detailed in Figure 3.

Figure 6: Evaluation Matrix Codes

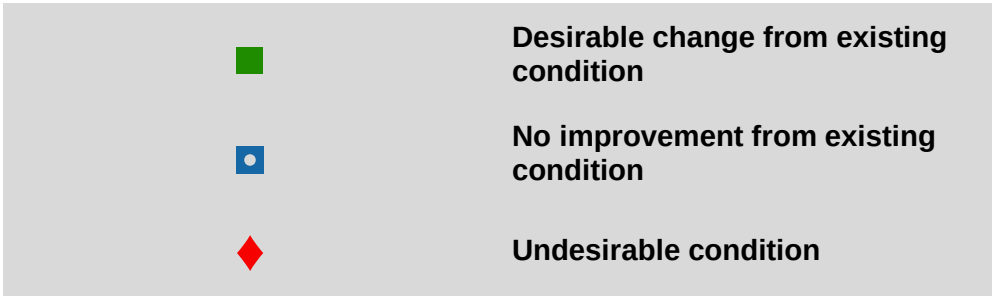


Table 11: Evaluation Matrix

Location	Solution Considered	Active Transportation	Safety	Reliability	Multi-modal	Asset Management	Environmental	Right of Way	Equity
Freeway									
I-75/M-59 interchange	Reconfigure interchange	◘	■	■	◘	■	♦	♦	◘
I-75/M-24 (Lapeer Road) interchange	Widen ramps	◘	■	■	◘	■	■	♦	◘
I-75/Joslyn Road interchange	DDI	■	■	■	◘	■	◘	◘	◘
I-75/Baldwin Road interchange	DDI	■	■	■	◘	■	◘	◘	◘
I-75 / Sashabaw Road interchange	DDI	■	■	■	◘	■	◘	◘	◘
I-75/M-15 (Ortonville Road) interchange	DDI	■	■	■	◘	■	◘	◘	◘
I-75/Dixie Highway interchange	DDI	■	■	■	◘	◘	◘	◘	◘
	Northbound ramp improvement	■	■	■	◘	◘	◘	◘	◘
I-75/Dixie Highway/ Saginaw Road	Flip to right-side ramps	◘	■	◘	◘	◘	♦	♦	◘

Location	Solution Considered	Active Transportation	Safety	Reliability	Multi-modal	Asset Management	Environmental	Right of Way	Equity
I-75/Holly Road interchange	DDI	■	■	■	◘	■	◘	◘	◘
Southbound I-475 ramp to southbound I-75	Flip southbound I-475 to right side	◘	■	◘	◘	■	♦	♦	◘
US-23/North Road interchange	Roundabouts	■	■	■	◘	■	◘	◘	◘
US-23/Silver Lake Road interchange	Roundabouts	■	■	■	◘	■	◘	◘	◘
US-23/Grand Blanc Road interchange	Roundabouts	■	■	■	◘	■	◘	◘	◘
US-23/Hill Road interchange	Roundabouts	■	■	■	◘	■	◘	◘	◘
Intersections									
US-24 (Telegraph Road) at US-24 (Dixie Highway)	Quadrant road	■	■	■	◘	♦	♦	♦	■
M-1/I-75 BL (Woodward Avenue) at Square Lake Road	Adaptive signal system	■	■	■	■	■	◘	◘	■
US-24 (Dixie Highway) at	Quadrant roads and	■	■	■	◘	■	◘	♦	■

Location	Solution Considered	Active Transportation	Safety	Reliability	Multi-modal	Asset Management	Environmental	Right of Way	Equity
Walton Boulevard/ Williams Lake Road	restrict left turns								
Network									
I-75 from Joslyn Road to Baldwin Road	Widen freeway mainline	⊙	■	■	■	♦	♦	♦	⊙
I-75 from Baldwin Road to Sashabaw Road	Widen freeway mainline	⊙	■	■	■	♦	♦	♦	⊙
US-24 (Dixie Highway) from US-24 (Telegraph Road) to I-75 (Exit 93)	Adaptive signal system	■	■	■	■	■	⊙	⊙	■
	Median - Telegraph Road to Hatchery Road	■	■	⊙	⊙	♦	♦	♦	■
	Median - Walton Boulevard to Maybee Road	■	■	⊙	⊙	♦	♦	♦	■
	Median - M-15 to I-75 (Exit 93)	■	■	⊙	⊙	♦	♦	♦	■
US-24 (Dixie Highway) from I-75 (Exit 93) to	Road diet (four lanes to three) (RCOC)	■	■	⊙	⊙	■	⊙	⊙	■

Location	Solution Considered	Active Transportation	Safety	Reliability	Multi-modal	Asset Management	Environmental	Right of Way	Equity
I-75 (Exit 106)									
Grange Hall Road	Widen from I-75 to Fenton (RCOC)	♦	■	■	◘	♦	♦	♦	◘
M-15	Widen from I-75 to Seymour Lake Road	♦	■	■	◘	♦	♦	♦	◘
Hill Road	Hill Road/Fenton Road intersection safety (GCRC)	◘	■	◘	◘	◘	◘	◘	◘
Hill Road	Median - Torrey Road to US-23 (GCRC)	■	■	■	◘	■	◘	◘	◘
M-24 from I-75 to Brown Road	Widen from four lanes to six	♦	■	■	◘	♦	♦	♦	◘
Grange Hall Road Park and Ride	Geometric improvements	◘	◘	◘	■	◘	◘	◘	■
NW Oakland County	Expand Transit Service	◘	◘	◘	■	◘	◘	◘	■
Active Transportation									
Featherstone Road		■	■	◘	◘	♦	◘	◘	■

Location	Solution Considered	Active Transportation	Safety	Reliability	Multi-modal	Asset Management	Environmental	Right of Way	Equity
Auburn Road	Enhance crossings across I-75	■	■	⊙	⊙	♦	♦	⊙	■
Pontiac Road		■	■	⊙	⊙	♦	⊙	♦	■
Giddings Road		■	■	⊙	⊙	♦	⊙	♦	■
I-75 BL (Lapeer Road)		■	■	⊙	⊙	♦	⊙	⊙	■
Joslyn Road		■	■	⊙	⊙	♦	♦	⊙	■
Baldwin Road	Enhance crossings across I-75	■	■	⊙	⊙	♦	⊙	⊙	■
Clintonville Road		■	■	⊙	⊙	♦	⊙	⊙	■
M-54 (Dort Highway)		■	■	⊙	⊙	♦	♦	⊙	■
Clarkston Road		■	■	⊙	⊙	♦	⊙	♦	■
Fenton Road		■	■	⊙	⊙	♦	♦	♦	■

7.4 Next Steps

The solutions and strategies identified in the plan are grouped based on their complexity and ease of implementation:

Group 1
Projects that are easier to implement. These include potential projects that could utilize Highway Safety Improvement Program (HSIP), Congestion Mitigation Air Quality (CMAQ), or MDOT Operations Template funding. Projects do not have funding identified and will need agency coordination.

Table 12: Group 1 Projects

Code	Location	Next Steps
F-4	I-75/Joslyn Road interchange (Exit 83)	Evaluate potential alternatives for the interchange that could be implemented as part of a future bridge replacement project for I-75 over Joslyn Road.
F-8b	I-75/US-24 (Dixie Highway) interchange (Exit 93)	Develop an HSIP project to enhance geometry of the northbound off ramp and evaluate the need for a signal at the northbound off ramp terminal and US-24 (Dixie Highway).
I-2	M-1/I-75 BL (Woodward Avenue) at Square Lake Road	Evaluate the feasibility of adding adaptive signal control in this area.
I-3	US-24 (Dixie Highway) at Walton Boulevard/Williams Lake Road	Develop an HSIP project to improve existing quadrant roads and evaluate the potential to restrict some of the left-turn movements at the intersection.
N-3a	US-24 (Dixie Highway) from US-24 (Telegraph Road) to I-75	Evaluate the feasibility of adding adaptive signal control.

Group 2
Moderately complex projects that could start construction within 10 years.

Table 13: Group 2 Projects

Code	Location	Next Steps
F-5	I-75/Baldwin Road interchange (Exit 84)	Conduct study to reconfigure interchange.
F-6	I-75/Sashabaw Road interchange (Exit 89)	Conduct study to reconfigure interchange.
F-7	I-75/M-15 (Ortonville Road) interchange (Exit 91)	Conduct study to reconfigure interchange.
F-8a	I-75/US-24 (Dixie Highway) interchange (Exit 93)	Conduct study to reconfigure interchange.
F-10	I-75/Holly Road interchange (Exit 108)	Conduct study to reconfigure interchange.
F-12	US-23/Hill Road interchange (Exit 90)	Roundabouts at ramp terminals.
F-13	US-23/Grand Blanc Road interchange (Exit 88)	Roundabouts at ramp terminals.
F-14	US-23/North Road interchange	Roundabouts at ramp terminals.
F-15	US-23/Silver Lake Road interchange	Roundabouts at ramp terminals.
I-1	US-24 (Telegraph Road) at US-24 (Dixie Highway)/US-24 BR (Cesar Chavez Avenue)	Quadrant road.
N-3b	US-24 (Dixie Highway) from US-24 (Telegraph Road) to I-75	Median: Telegraph Road to Hatchery Road.
N-3c		Median: Walton Boulevard to Maybee Road.
N-3d		Median: M-15 to I-75.
N-6	M-15 (Ortonville Road) from I-75 to Seymour Lake Road	Widening - two-lane undivided to five-lane with center left-turn lane.
N-7a	Hill Road between I-475 and US-23	Hill Road/Fenton Road intersection improvements.
N-7b		Median: Torrey Road to US-23.

Group 3
Projects that are more complex and may have major obstacles to completion. This includes those with anticipated environmental impacts.

Table 14: Group 3 Projects

Code	Location	Next Steps
F-9	I-75 at Dixie Highway/Saginaw Road (Exit 106)	Flip right ramps to left ramps.
F-11	Southbound I-475 to southbound I-75 (Exit 111)	Flip southbound left side on ramp to right side.
N-2	Northbound I-75 between Baldwin Road and Sashabaw Road	Widening (six lanes to eight lanes).

Additionally, the following projects have significant benefits but do not meet a positive BCR and are Group 3 projects that will need further evaluation.

- F-1: I-75/M-59 interchange (Exit 77)
- F-3: I-75/M-24 (Lapeer Road) interchange (Exit 81)

Group 4

Projects that directly impact the corridor but have local jurisdiction. Coordination and buy-in will be required.

Table 15: Group 4 Projects

Code	Location	Next Steps
N-4	Dixie Highway from I-75 (Exit 93) to I-75 (Exit 106)	RCOC should consider developing a local agency HSIP project to implement a four-lane to three-lane road diet. A microsimulation model should be developed to evaluate the operational impacts.
N-5	Grange Hall Road between I-75 and Fenton	RCOC should consider widening the roadway to alleviate congestion. Could include intermittent two-way center left-turn lane.
N-7a	Hill Road between I-475 and US-23	GCMC should consider developing a local agency HSIP project at the Hill Road/Fenton Road intersection. Guide sign enhancements should also be considered along the corridor.

Another strategy is to promote more transit opportunities. The current success of the MTA commuter bus service into Oakland and Livingston counties is a good indicator of the feasibility. However, since this initiative requires the involvement of local agencies, transit authorities and private businesses, MDOT's influence will be limited.

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