TRANSPORTATION ASSET MANAGEMENT PLAN

APRIL 2025

Prepared by:

HNTB Michigan, Inc.

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EXECUTIVE SUMMARY

Roads are essential for commerce and to provide service to the community. The success of Detroit's transportation network is closely tied to the road and bridge assets and their continued operation. The City of Detroit manages a diverse array of transportation infrastructure, which represent some of the most valuable public investments for taxpayers.

This Transportation Asset Management Plan (TAMP) outlines the processes the City utilizes to maintain their critical transportation assets. Required by Michigan Public Act 325 of 2018, this document fulfills the City's obligation to meet these requirements, and it demonstrates the responsible use of public funds to elected officials and the general public. It provides essential information for taxpayers to understand investment decisions for transportation infrastructure.

Based on the pavement data collected, 14% of Detroit's roadways are rated in good condition, 40% in fair condition, and 46% in poor condition. The City's ongoing aspirational goal is to reach a state of good repair where at least 90% of pavement is in good or fair condition and no more than 5% is in poor condition on the major network; and 85% of pavement is in good or fair condition and no more than 15% is in poor condition on the local network. This plan highlights the City's commitment to improve pavement conditions, acknowledging that additional investment is required to reach the defined pavement goals.

Furthermore, the data show that 53% of the City's 30 structures are in good condition, 37% are in fair condition, and 10% are in poor condition. No structures are currently closed and four have posted limits but are still open to traffic. The remaining 26 structures are open with no restrictions.

This plan also outlines the City's additional overall goals for asset management. See **Table 1** for a

brief outline of the City's goals or see the Performance Plan in Appendix A for more details. One major goal is enhancing project coordination with utility companies to minimize conflicts and prevent newly completed work from being disrupted by subsequent utility projects.

Table 1 - Outline of City's TAMP Goals

Goal	Priority
Create Single Source of Authoritative Data	High
Projects Delivered on Time and on Budget	High
Selecting Right Fix at the Right Time and Exploring New Fixes	Medium
Improve Coordination with Utility Organizations	Medium
Improve Safety Awareness Throughout City	Low
Reduce Number of Unreported Incidents and through Traffic on Residential Streets	Low

Over the next three years, The City is committed to investing in the Capital Improvement Program (CIP), including road and bridge projects. The CIP will outline the next few years of planned projects based on the mix-of-fixes described in this plan. The City will continue utilizing limited funds strategically, as outlined in this report. As a living document, the outlined priorities and projects are subject to change based on available funding, stakeholder feedback, system condition changes, new development, and other factors. The strategies and projects included in this plan will be reviewed regularly to ensure the City is using the 'right fix at the right time'.

1 INTRODUCTION

According to Public Act 325 of 2018, asset management is "an ongoing process of maintaining, preserving, upgrading, and operating physical assets cost effectively, based on a continuous physical inventory and condition assessment and investment to achieve established performance goals". This is a process that uses data to manage and track assets in a cost-effective manner using a combination of engineering, planning, and business principles. This process is endorsed by leaders in municipal planning and transportation infrastructure, including the Michigan Municipal League (MML), County Road Association of Michigan (CRA), the Michigan Department of Transportation (MDOT), and the Federal Highway Administration (FHWA). The Michigan Transportation Asset Management Council (TAMC) supports the use of asset management principles and processes.

In the context of this plan, asset management ensures public funds are spent effectively to maximize the condition of the road and bridge network. It also provides a transparent decision-making process that allows the public to understand the technical and financial challenges of managing road infrastructure with a limited budget.

The City of Detroit (City/Detroit) has adopted an asset management business process to overcome the challenges that arise from limited financial, staffing, and other resources while meeting road user expectations for their nearly 2,600 centerline miles of road.

This plan outlines how Detroit determines its strategy to maintain and upgrade road asset conditions. The City considers agency goals, priorities of its users, future development, utilities, and resources provided when deciding where to program funds. An updated plan is to be released approximately every three years to reflect changes in road and bridge conditions, finances, and overall priorities.

2 PAVEMENT ASSETS

The high cost of constructing road assets underlines the critical necessity of properly managing and maintaining investments on this vital infrastructure network. Determining the specific needs of each roadway within an agency's overall road network requires complex assessments, particularly considering the rapidly changing conditions and the varying expectations of road users.

In Michigan, who owns and maintains roads is not always clear to the general public, making it sometimes difficult to understand who is responsible for planning and funding construction projects, roadway repairs, traffic control, safety, and winter maintenance.

In cases where roads fall along jurisdictional borders, local and intergovernmental agreements dictate ownership and maintenance responsibility.

INVENTORY

The City of Detroit oversees nearly 2,600 centerline lane miles of public roadway. These roads are broken down into two categories: City Major and City Local. In Detroit, around 72% of the city's roads are City Local and the remaining 28% are City Major, as shown in **Figure 1** and **Figure 2**.

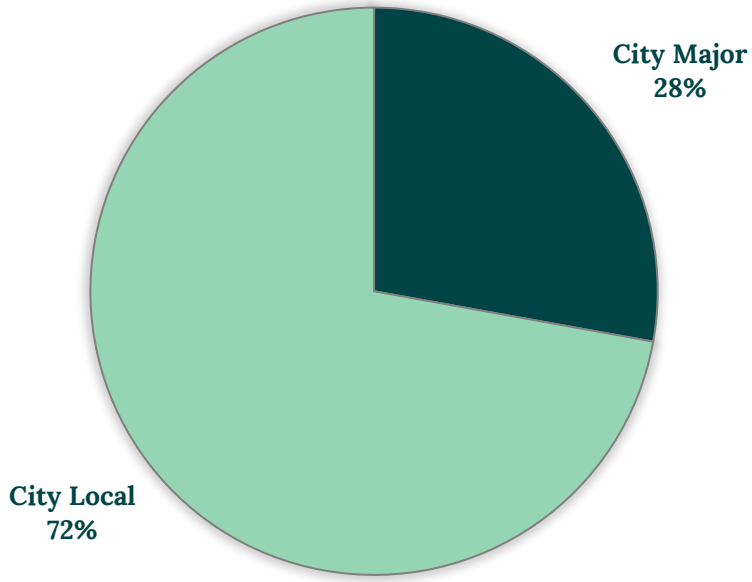

Figure 1 – City Local and City Major Network Breakdown

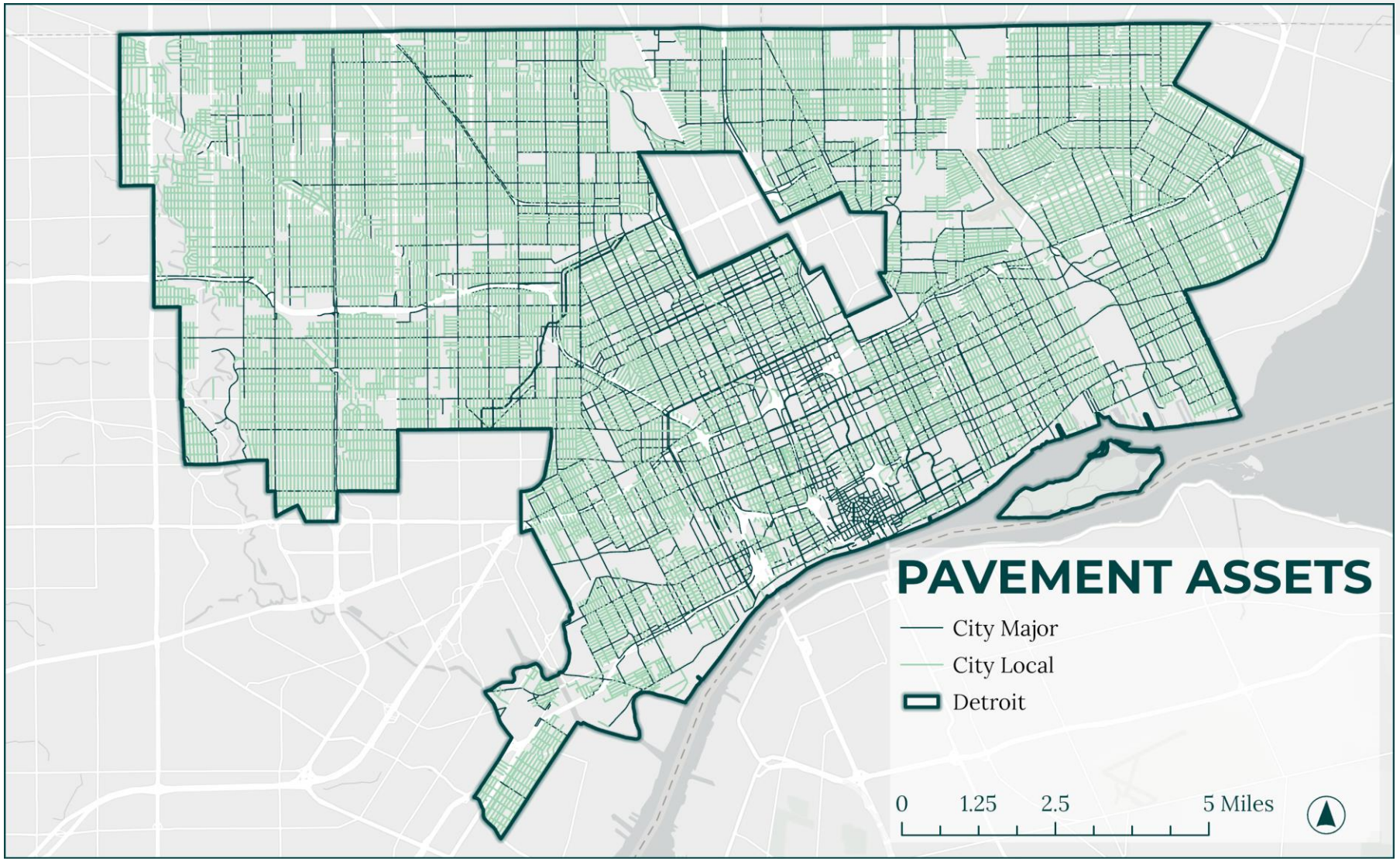

Figure 2 - City of Detroit Pavement Assets

Federal Aid System

Approximately 24% of Detroit's complete network is federal-aid eligible. When a roadway is eligible, it allows federal dollars to be invested for maintenance and construction. State and local funds must be utilized on roadways that are not eligible.

National Highway System

The city manages over 130 centerline miles of roads, approximately 5% of their network, that are included as part of the National Highway System (NHS). These roads are critical to the country's economy, defense, and mobility. There are special rules and regulations that apply to the NHS network that are dictated by the FHWA. Most NHS roadways in Michigan are managed by MDOT, but the City of Detroit manages a small percentage of those roads that are located within their jurisdiction.

Pavement Surface Types

The vast majority of the City's streets were originally constructed with concrete and have since been overlaid with asphalt, which are considered composite pavement. According to Roadsoft data, which analyzed the surface type rather than the full depth of pavement, the following are in the City's inventory: asphalt (89%), concrete (10%), composite (<1%), and brick/block or unpaved (<1%). See **Figure 3**. More information about pavement types and pavement surface types can be found in the Pavement Primer, located in Appendix A of this document.

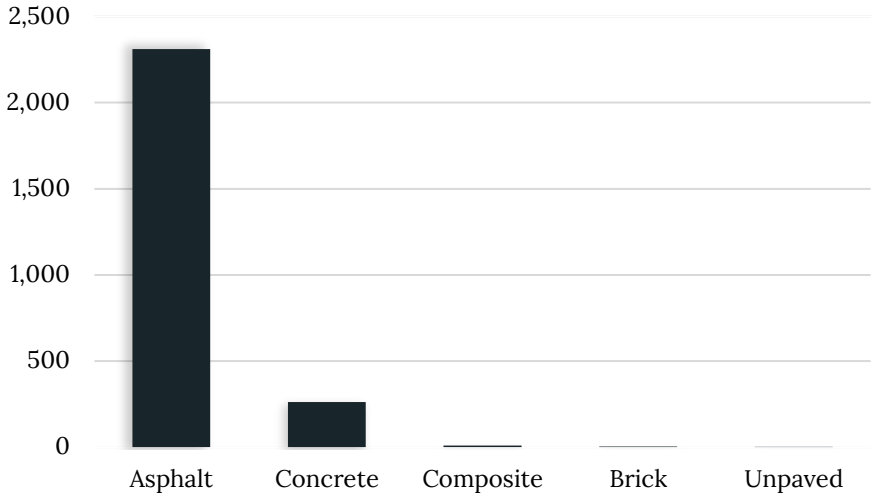

Figure 3 - Pavement Surface Type, in Centerline Miles

Condition

The City of Detroit utilizes the Pavement Surface Evaluation and Rating (PASER) system, which is a system to visually rate pavement's surface condition on a scale from 1 – Failed to 10 – New Roadway. Detroit's complete road network has been assessed and rated. As part of a pilot program with the Southeast Michigan Council of Governments (SEMCOG), City Local road condition data was collected. **Table 2** outlines the PASER rating scale, the corresponding condition, and the typical treatment for the roads in each condition.

Table 2 - PASER Rating Descriptions

PASER Rating	Condition	Treatment
9, 10	Excellent	No maintenance required
8	Very Good	Little or no maintenance
7	Good	Crack sealing and minor patching
5, 6	Fair-Good	Preservative treatments
3, 4	Poor-Fair	Structural improvements
1, 2	Failed	Reconstruction

Overall, 46% of Detroit's roadways are in poor condition, 40% are in fair condition, and only 14% are in good condition. A map of pavement condition for the city can be seen in **Figure 5**. City Major roadways are overall in better condition than the City Local roadways, as shown in **Figure 4**.

Figure 4 - Pavement Condition by Classification

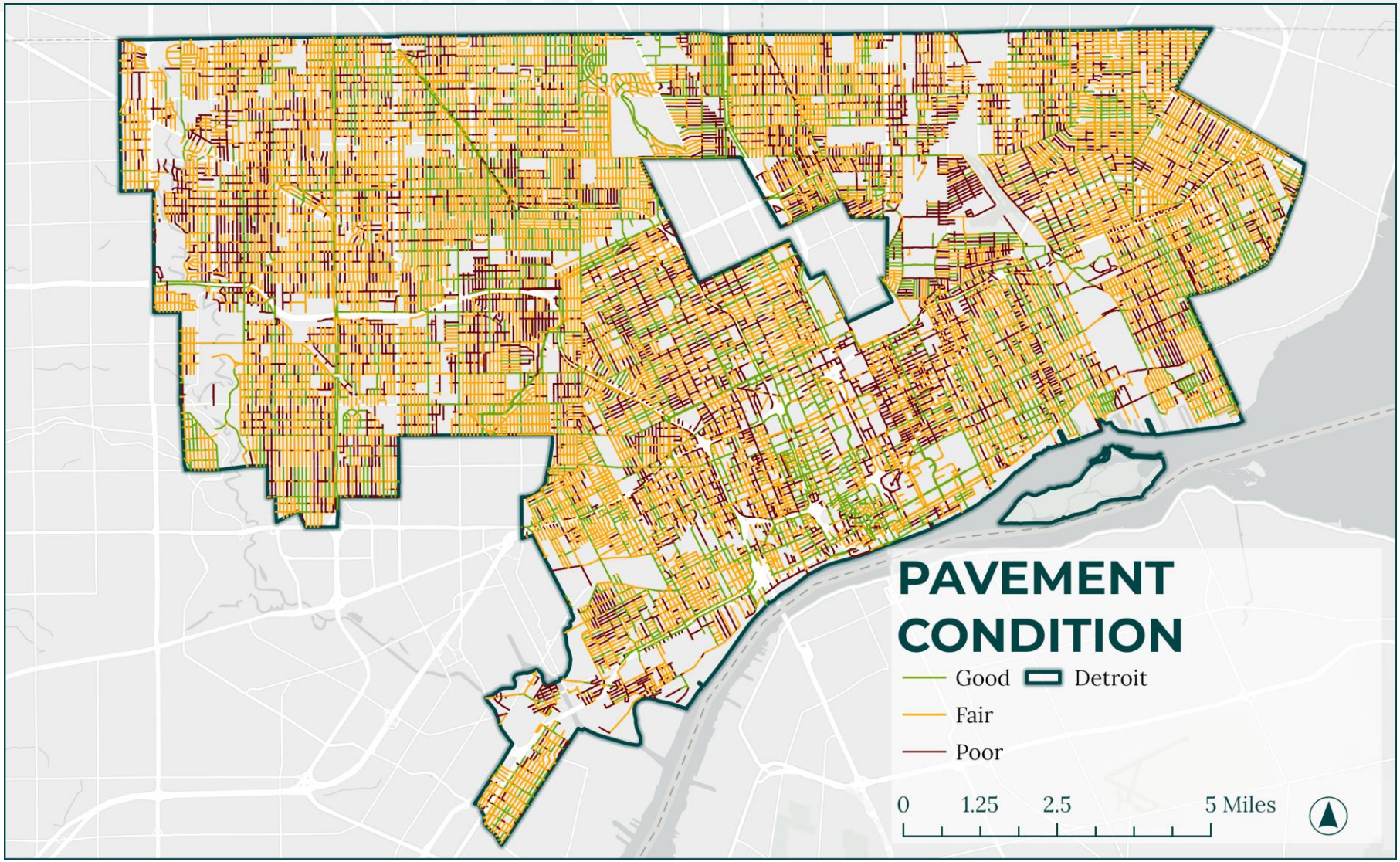

Figure 5 – Current Pavement Condition, October 2024

Unpaved Roads

The condition of unpaved roads can change rapidly, which makes it difficult to obtain consistent surface condition ratings over time. TAMC adopted the Inventory Based Rating (IBR) System™ for rating unpaved roads. More information about this system can be found in the pavement primer.

Detroit has just over two miles of unpaved roads, as shown in **Figure 7.** Of these two miles, nearly 45% has an overall rating of 1, or poor. Only 13.5% of the unpaved roads (0.3 miles) is rated 9, or good. **Figure 6** contains a breakdown of the different elements that are considered for overall IBR ratings for unpaved roads.

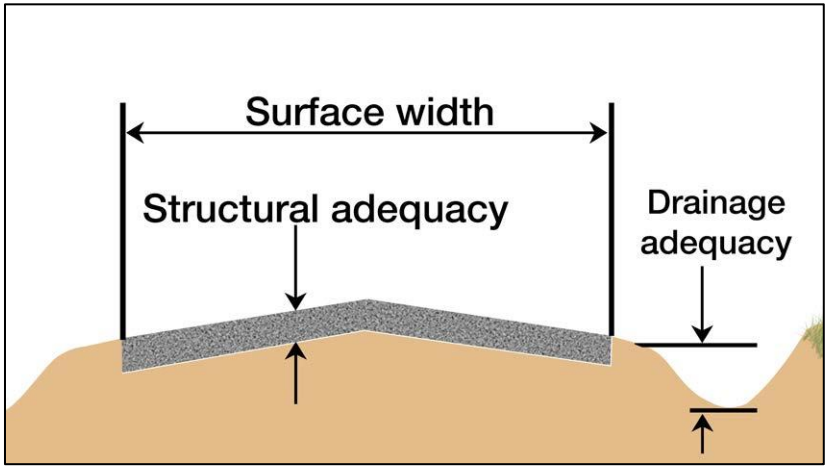

Figure 6 - Assessed IBR Elements[1]

[1] *Michigan Technological University Center for Technology & Training. 2024. "Inventory-based Rating System™ for Gravel Roads Training Manual".*

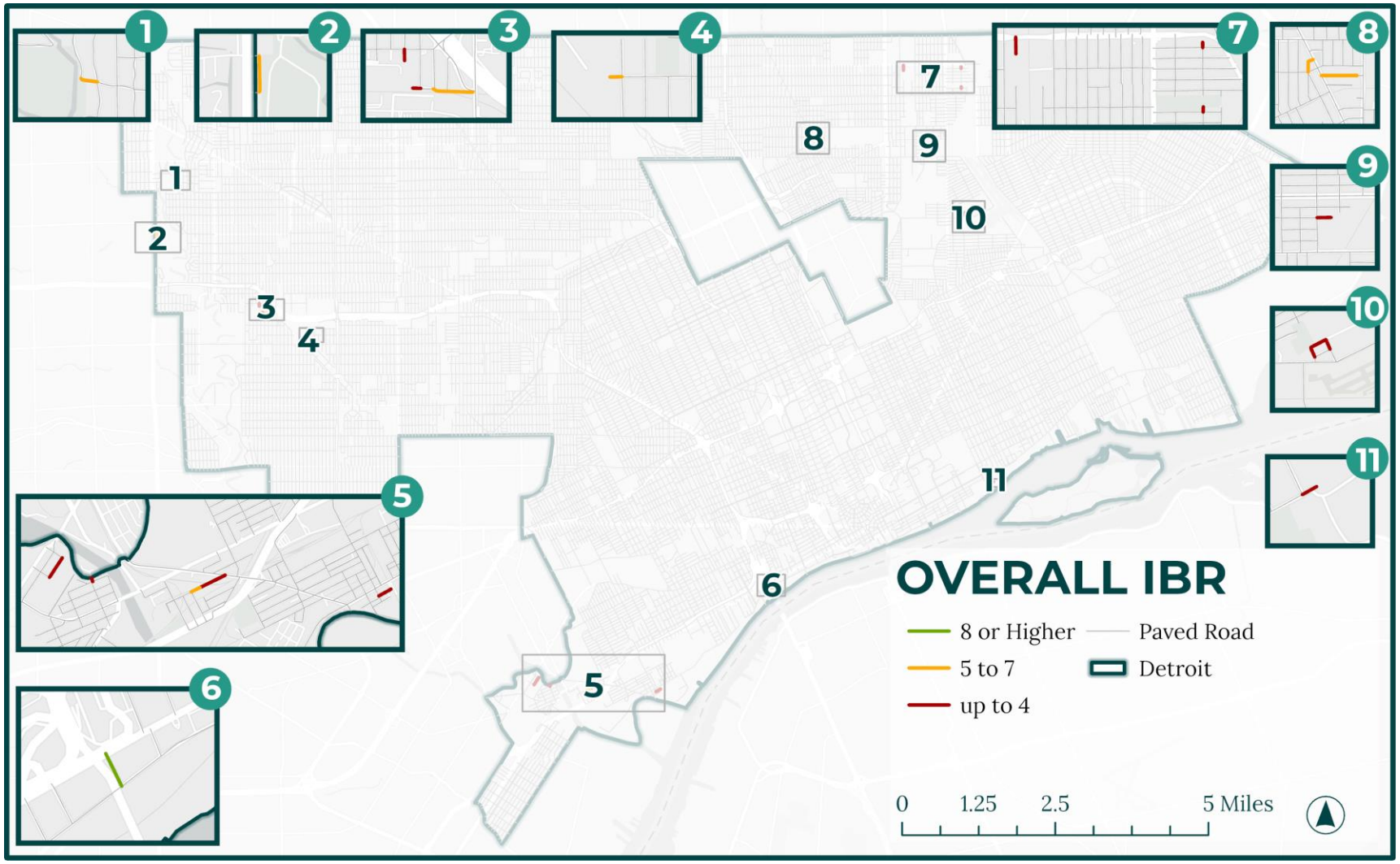

Figure 7 - Overall IBR

PROGRAM DEVELOPMENT

The City of Detroit has a robust set of tools and datasets that are utilized to develop project candidates and vet with other groups. This section outlines the available tools utilized and the process followed to select pavement projects.

Data Analysis and Tools

The City utilizes databases and maps to organize the information and inform decision making. Such tools include the City-developed Road Selector Tool, which hosts a variety of pavement inventory attributes and condition data; DOTMaps, a right-of-way management software adopted by the City in 2020 that is used to coordinate permitted projects, planned projects, and active projects; the City Engineering Division Permit Plan Review map; and Smart Sheets, which allow connections to other data sources and for users to filter and drill down into data.

The City Road Selector Tool

The City Road Selector Tool is a Geographic Information Systems (GIS) based application; see **Figure 8**. Developed by City Engineers and IT personnel, city staff have been using the interface to prioritize and select projects by analyzing data, such as:

- PASER
- Traffic Volume
- National Functional Classification
- High Injury Network (HIN)
- Paving work
- Vulnerable user crashes
- Roadbotics Rating
- City Council Districts
- Proximity to Schools
- Safe Routes to School
- Bike Lanes and Greenways
- Streetscape Projects
- “Connect 10” Bus Routes
- Service Drives
- Central Business District location
- Tactile Mobility Rating

This Road Selector Tool is primarily used to identify projects for major pavement resurfacing programs.

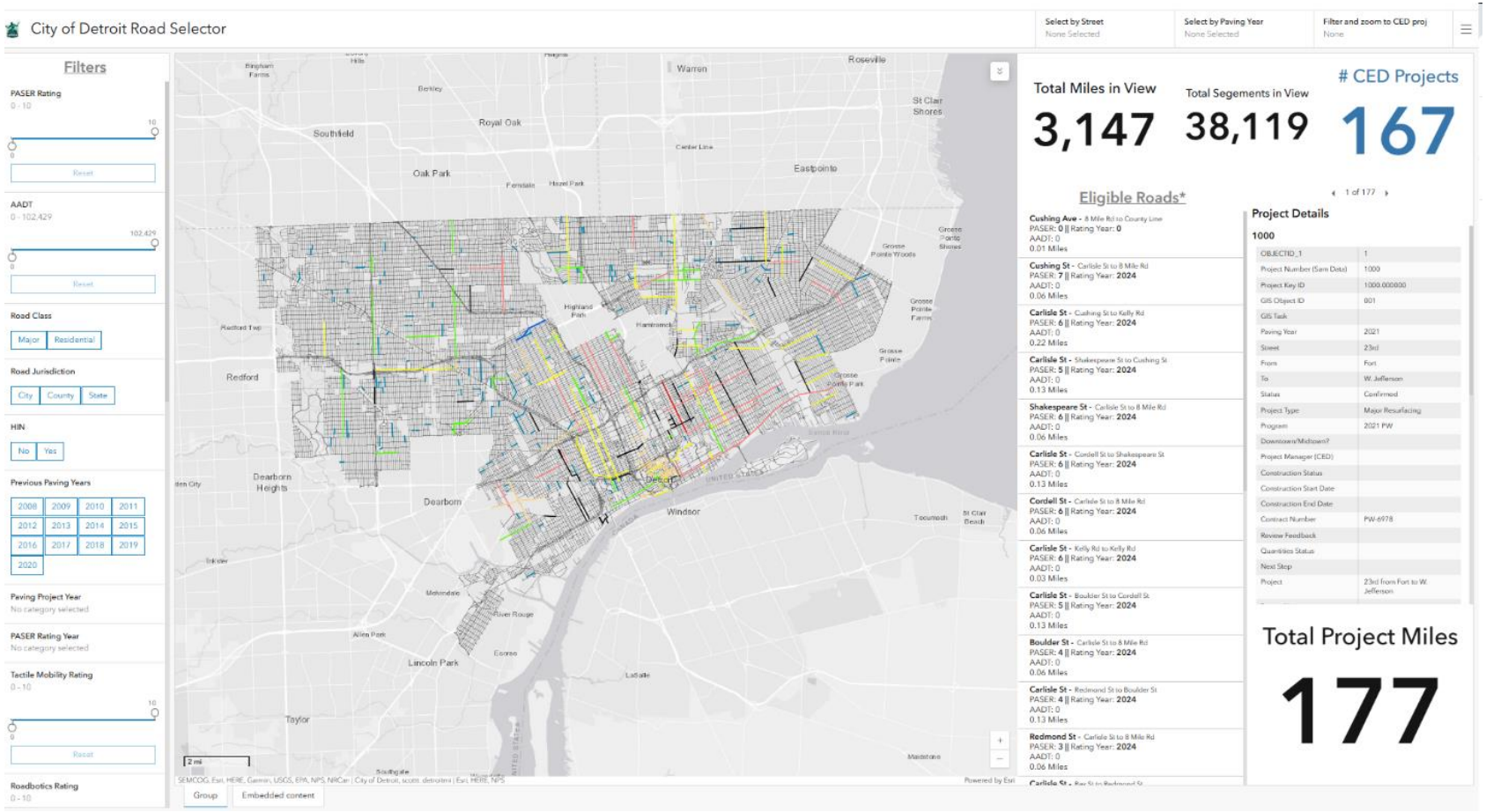

Figure 8 – Image Capture of the City Road Selector Tool

In addition to these data points, other reference information is utilized to further inform decision making, including current engineering department projects, permit and development projects, utility locations and projects (as shown in **Figure 9**), and transit facilities. For more information about how the City has worked to improve coordination with utilities see the Coordination with Other Entities section of this plan.

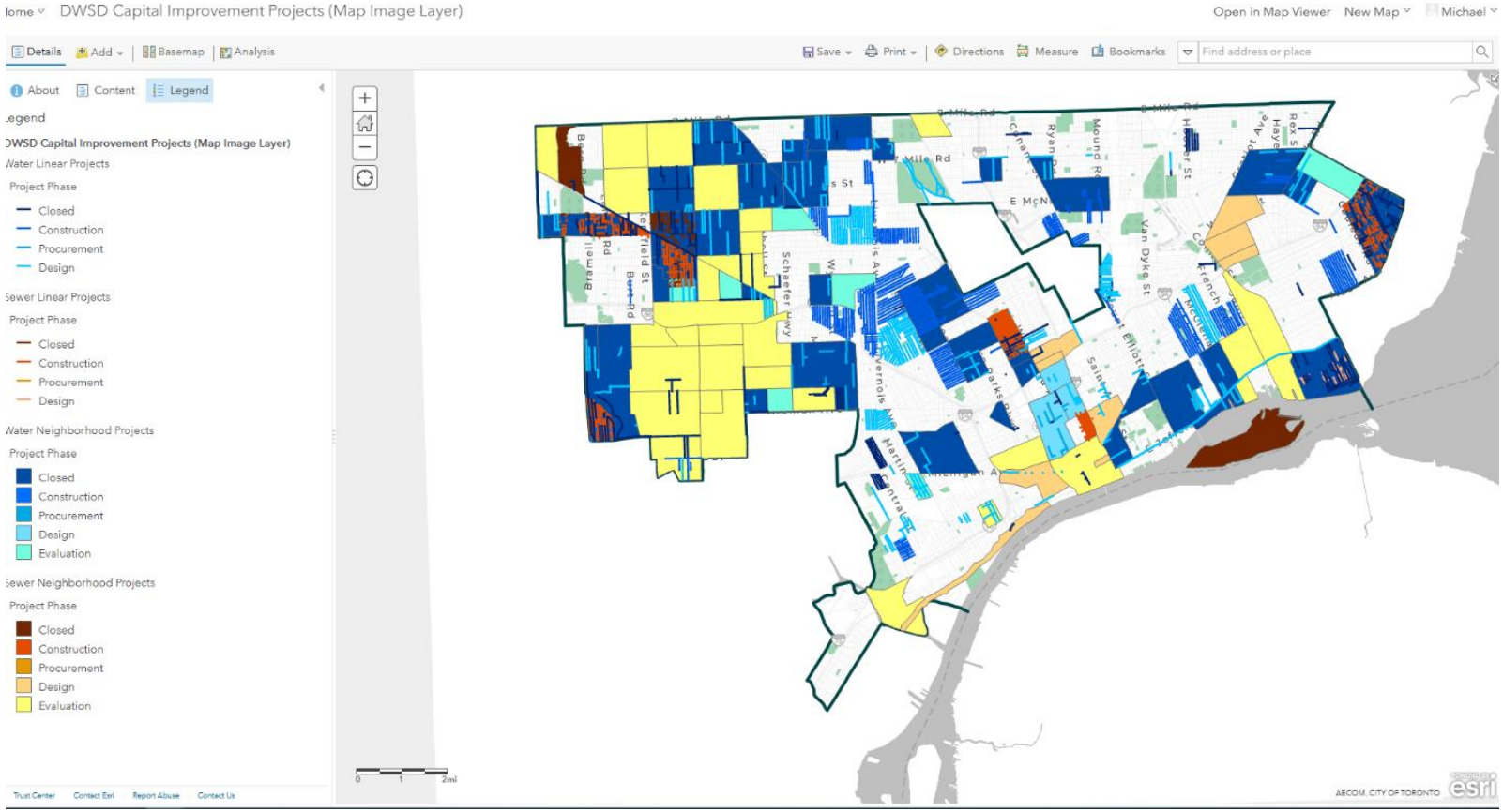

Figure 9 – Image Capture of the DWSD Capital Improvement Projects Map (Utility Project Map)

The Project Selection Process

This section outlines the methodology utilized by the City in selecting their projects.

City Major Road Projects

To develop a list of major projects for the next year, staff from multiple disciplines and divisions meet to develop an initial candidate list utilizing the Road Selector Tool through an iterative process. The City's Major Projects Program includes predominately HMA resurfacing projects, with repair of the underlying base pavements, on the City's federal-aid eligible road network. The process begins by mapping the roadway segments with the lowest conditions (usually PASER ratings 1-4) and the highest traffic volumes. The City then works to compare this list with ongoing and planned projects, including those performed by other groups within the City, such as the Complete Streets group. This group focuses on more robust multi-modal projects that are often performed in areas where economic development is driving the need for additional solutions, such as improved pedestrian access and bike lanes. During the selection process considerations such as large events (e.g. the National Football League Draft event in 2024) are discussed to assist in developing the list of candidates, and ensure alignment with the City's goals and aspirations. The group also considers known future developments, occupied corridors, primary detour routes, school routes, adjacent parks, and the high-injury network (HIN). A focus is also placed on ensuring that the program is geographically diverse, which can sometimes lead to roadways of lower traffic volumes being prioritized to ensure areas of the community are not left neglected for long periods of time. One successful aspect of the City's approach and coordination is the ability to quickly adapt the plan according to economic and regional priorities to support the City's goals as a whole. If a roadway needs treatment but there are conflicting large investments, such as a large utility project or development, the city will plan ahead to do a short-term solution, such as non-structural resurfacing, to carry the pavement

through the conflicting project and then implement a larger scale rehabilitation once the other work is finished. This works to reduce the potential for damage to recently rehabilitated pavement, while also addressing the pavement condition need in the short-term. By doing this, the City is able to strategize to maximize their limited funding and minimize disruption to the system.

The information from the City Road Selector tool and other data sources is compiled into a Smart Sheet, which is then used to pare down the candidate list. Approximately 200 to 300 candidate roadway projects are typically active on the master list, which is then pared down to around 50-60 miles worth of candidate projects for the annual program. The goal is to narrow the list down to the 20-30 miles of annual Major Roads projects while also providing a backlog of candidates in the event that additional funding is obtained. This candidate list is shared with the Infrastructure Coordination Team (ICT) for review and feedback. The ICT includes utility companies as well as neighboring agencies. This group provides information about their upcoming projects that may conflict with a candidate on the list, allowing the City or partner agency the opportunity to adjust their project(s) accordingly. This information is tracked in the Smart Sheet tool, as well as the ICT GIS maps. By creating a large candidate project pool, the City is able to be more flexible to work around potential conflicts. An ICT sub-group meets regularly to ensure that schedules and projects remain on track. Once a final annual project candidate list is compiled, the team conducts a final review of the recommended areas to verify candidates to be submitted to the Department of Public Works (DPW) Director for final project approval.

The City's long-term goals (see the Performance Plan in Appendix A) include the institution of a moratorium that would prohibit third parties from performing work that could damage or impact a roadway for a period of three to five years after the City performs an improvement project. This would

allow the City to continue their momentum to shift towards more proactive and sophisticated planning solutions.

The City Major roads projects program is typically divided into two projects annually. Federal Surface Transportation dollars received each year are divided between the City Engineering Division and the Traffic Engineering Division; the City Engineering Division portion is typically allocated in its entirety to the Major Roads program. The City will also perform additional repairs on Major Roads utilizing Act 51 allocations or funds from the City General Fund.

In 2020, the City proactively contracted with and launched the use of the DOTMaps system, a right-of-way management tool utilized to track project and permit data, which also includes a public facing component. This is now being recognized as a best practice by the Michigan Infrastructure Council, who encourages all agencies to utilize the tool.

Crack Sealing

In the past, crack sealing was driven by maintenance requests. Now, major pavement projects that were completed within the previous two to three years are inspected to determine the severity of deterioration and to assess the need for crack sealing work. City inspection staff review the location candidates in the field and collect block by block crack density data in a mobile application, which is stored in a GIS database (see **Figure 10**). This data is reviewed to develop the crack seal list annually and serves to provide anticipated quantities for budgeting purposes. The crack seal program is advertised on a biennial basis, with exact projects updated on an annual basis based on need and overall budget allocation. Recent years' programs included the completion of 60-70 centerline miles per year of crack sealing.

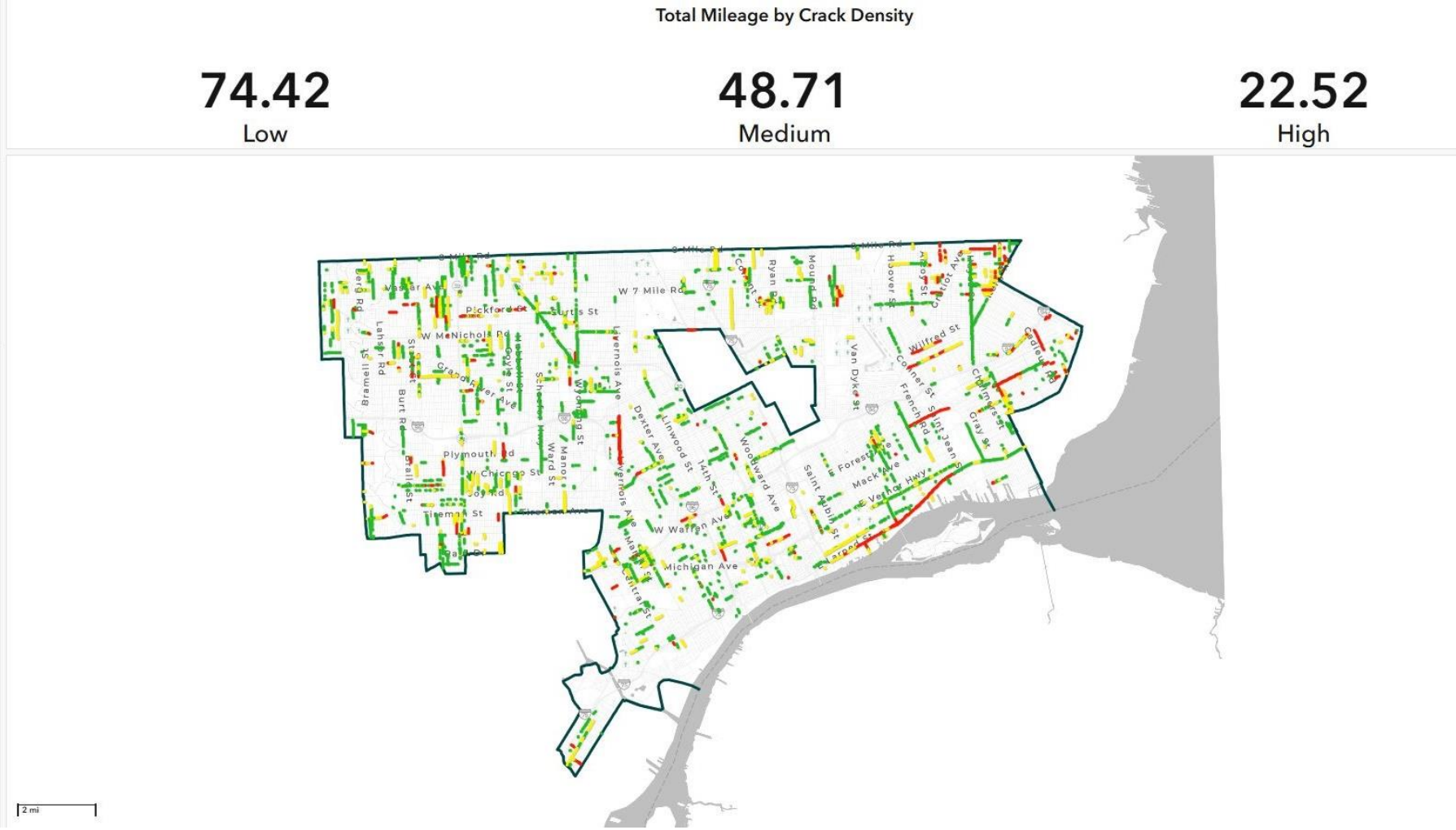

Figure 10 - Crack Seal Assessment Dashboard

City Local Streets

The City of Detroit has nearly 2,000 miles of City Local streets to maintain. These smaller roadways are categorized into two buckets: Class A streets, which are fully engineered roads with engineered base materials, drainage, curb and gutter, and sidewalks; and Class C, which are non-engineered, paved roadways which typically existed as dirt or unpaved streets until being overlaid with asphalt to provide stability and control dust. The candidate lists for all City Local roadway improvement projects are generated through a cooperative inspection effort between the Street Maintenance Division and the City Engineering Division and are predominantly based on roadway condition. On average, 30-35 centerline miles of City Local roadways are resurfaced annually. For Class A roadway resurfacing, the City uses external contractors for milling and concrete work, and performs paving with in-house resources. Class C roadway resurfacing is packaged into a single contract and advertised externally.

In the last year, the city participated in a pilot program through the Southeast Michigan Council of Governments (SEMCOG) to gather PASER data for all local roads. By doing so, the city now has baseline pavement condition for its complete network. It is the City's goal that by collecting this data, the Road Selector Tool may be used for future City Local streets programming.

Sidewalks

The City's sidewalk program includes sidewalk work done on adjacent roadway rehabilitation and maintenance projects as well as separate sidewalk-only repair contracts. There are two primary triggers that prompt sidewalk repair or replacement. The first being the repair or replacement of sidewalk damages by city-owned trees, through the Tree Guarantee Sidewalk Repair Program. The second is through the collection of public complaints and field observations. Complaints are logged in a GIS database and City staff investigate the areas and identify work needs. The City has exponentially grown their sidewalk program, with

$13M dedicated to sidewalk-only projects in the past year. Similar to pavement projects, sidewalk projects are also coordinated with the ICT to avoid re-work, address repair needs caused by permit or utility work, and to address concerns that may limit pedestrian access by having multiple sidewalk impacts in a condensed area. As a part of Major Roads projects, the City includes sidewalk repairs for Tree Guarantee inquiries and in recent years expanded to consider additional criteria to include slope, elevation and potential trip hazards, as funding allows. Further, the City upgrades all street corners that are adjacent to City roadway or sidewalk work to meet current Americans with Disabilities Act (ADA) standards. Since 2006, the City has replaced or upgraded over 60,000 ADA crossings, bringing them to meet current standards.

Pavement Fix Types

The City utilizes resurfacing and crack sealing as their primary work types on pavement to maintain road condition. Reconstruction projects are not regularly programmed and are often in response to economic development rather than pavement condition.

Table 3 shows the pavement fix types utilized by the City. The dollar amounts are an estimate for City Major roadways as averages per centerline mile.

Table 3 - Pavement Fix Types

Mix of Fix Work Type	Avg Cost/ Centerline	PASER Trigger	Reset PASER
Crack Seal	$6,000	7	7
Mill and Resurface	$850,000	4	9-10
Reconstruction [2]	$5.5M	1, 2	10

[2] *Reconstruction projects may come from economic development projects and/or grant funding for a specific use. This is an average cost of reconstruction projects between 2020 and 2024.*

Additionally, the City incorporates Complete Streets concepts into projects, which include non-motorized facilities such as sidewalks and bicycle lanes. The Streetscape Program is aimed at providing investment funding to upgrade streetscapes and commercial corridors, focusing on improving the safety and quality of life in the area and to encourage all modes of transportation while addressing deteriorating pavement conditions.

3 BRIDGE ASSETS

The City is seeking to continuously improve their bridge asset management planning and implementation. This program balances the decision to perform different types of fixes in order to maximize the useful service life of structures and ensure the safety of the local bridges under its jurisdiction utilizing the limited funding and resources available.

The National Bridge Inspection Standards (NBIS) set regulations for safety inspection and evaluation of bridges, which are applicable to all publicly owned bridges carrying vehicular traffic that are longer than 20 feet along the direction of the roadway between abutments, spring lines of arches, extreme ends of openings for multiple boxes, or extreme ends of openings for multiple pipes.

The National Bridge Inventory (NBI) scale is utilized to rate bridges in the City. Inspectors assign a rating ranging from zero to nine for the deck, superstructure, and substructure of the bridge. **Figure 11** displays the primary elements rated by the NBI and **Table 4** outlines the NBI ratings and their relevant descriptions.

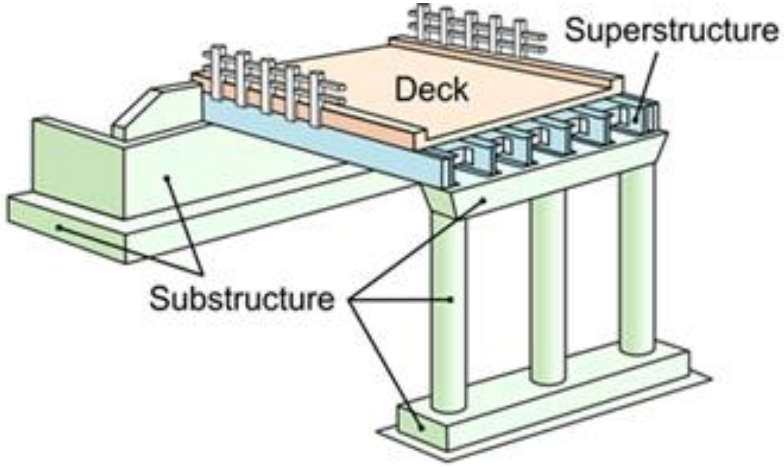

Figure 11 - Bridge Elements Rated for NBI

Table 4 - NBI Rating Descriptions

Rating	Condition	Description	Treatment
9	Excellent Condition	No problems noted	Routine maintenance
8	Very Good Condition	No problems noted	Routine maintenance
7	Good Condition	Some minor problems	Routine maintenance
6	Satisfactory Condition	Structural elements show minor deterioration	Preventative maintenance or minor rehabilitation
5	Fair Condition	All primary structural elements are sound but may have minor corrosion, cracking or chipping. May include minor erosion on bridge piers.	Preventative maintenance or minor rehabilitation
4	Poor Condition	Advanced corrosion, deterioration, cracking and chipping. Also, significant erosion of concrete bridge.	Major rehabilitation or replacement
3	Serious Condition	Corrosion, deterioration, cracking and chipping or erosion of concrete bridge piers have seriously affected deck, superstructure or substructure. Local failures are possible.	Emergency repair or high priority major rehabilitation or replacement. Unless closely monitored it may be necessary to close until corrective action can be taken.
2	Critical Condition	Advanced deterioration of deck, superstructure or substructure. May have cracks in steel or concrete or erosion may have removed substructure support. It may be necessary to close the bridge until corrective action is taken.	Emergency repair or high priority major rehabilitation or replacement. Unless closely monitored it may be necessary to close until corrective action can be taken.
1	“Imminent” Failure Condition	Major deterioration or corrosion in deck, superstructure or substructure or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but with corrective action it may be put back in light service.	Major rehabilitation or replacement. Bridge is closed.
0	Failed Condition	Out of service and beyond corrective action.	Major rehabilitation or replacement. Bridge is closed.

INVENTORY OF ASSETS

The City of Detroit's bridge inventory includes 30 bridges, as shown in the map in **Figure 13**, excluding pedestrian bridges and railroad crossings for the purposes of this TAMP. A full inventory can be found in Appendix D and details about the locations and sizes of each individual asset can be found in Detroit's MiBRIDGE database.

Types

Of the 30 bridges, 13 are steel, 10 are concrete, and seven are pre-stressed concrete. There are currently no timber bridges in the city's inventory; see **Figure 12**.

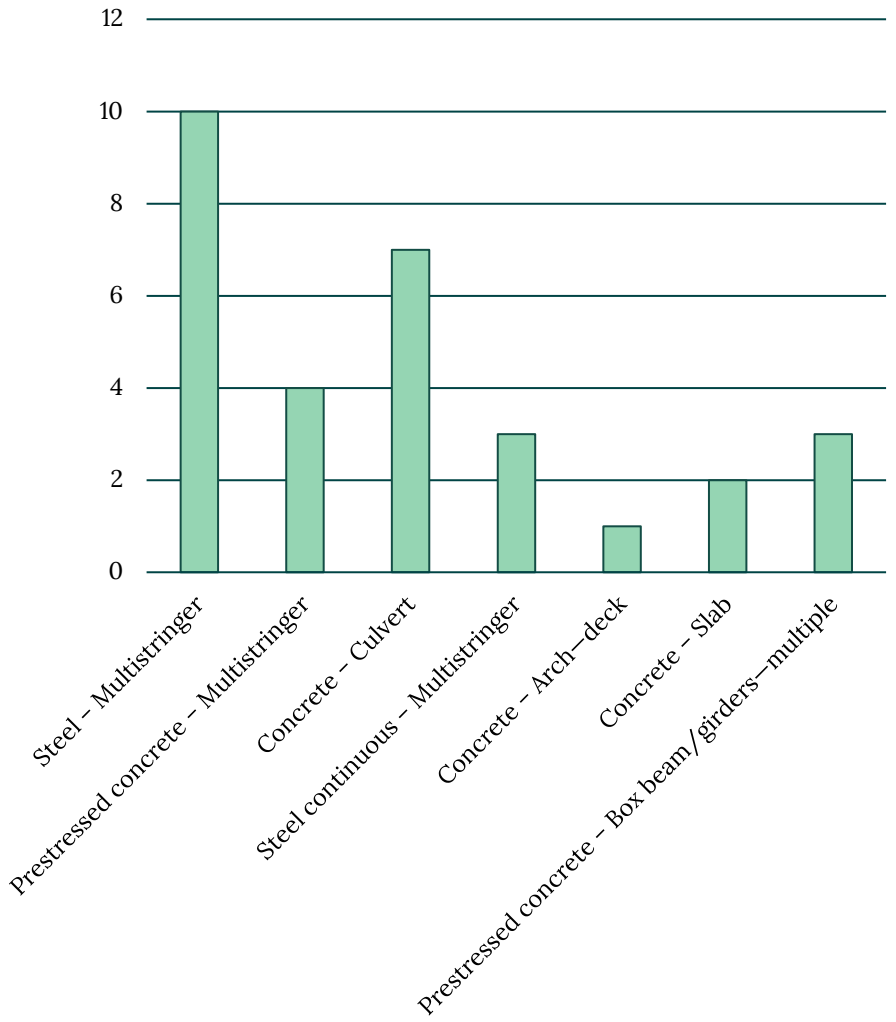

Figure 12 – Number of Bridges by Type

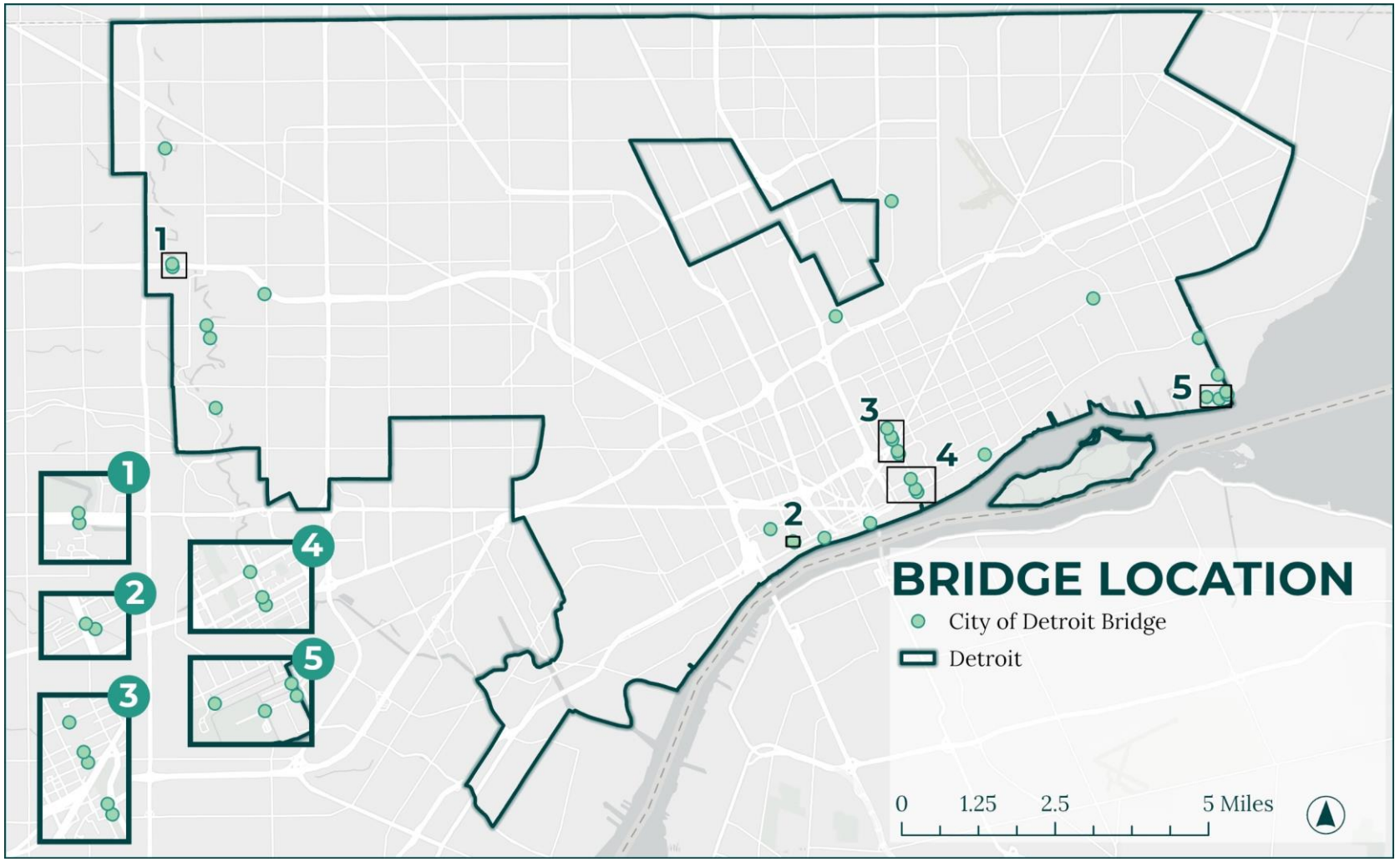

Figure 13 - City of Detroit Bridges

CONDITION

Condition ratings are a primary tool for transportation asset management because they identify maintenance needs and assist in determining funding requirements for the rehabilitation or replacement of these assets.

Table 5 – City of Detroit Bridge Condition

	Good	Fair	Poor	% of Inventory
Open	15	11	0	**87%**
Open/Posted	1	0	3	**13%**
Closed	0	0	0	**0%**
Total	**16**	**11**	**3**	
% of NBI Inventory	**53%**	**37%**	**10%**	

Source: MiBridge as of November 2024

As shown in **Table 5** and **Figure 14**, 53% (16) are in good condition, 37% (11) are in fair condition, and 10% (3) are in poor condition. A map showing bridge condition is shown in **Figure 15.**

The majority of the City's bridges, 87%, are open to traffic without restrictions whereas the remaining 13% are posted with load limits. There are currently no closed bridges in Detroit's inventory.

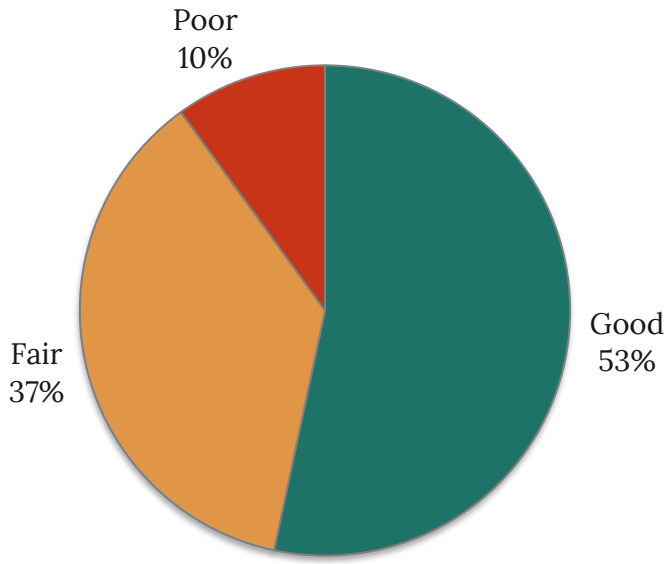

Figure 14 - Bridge Condition

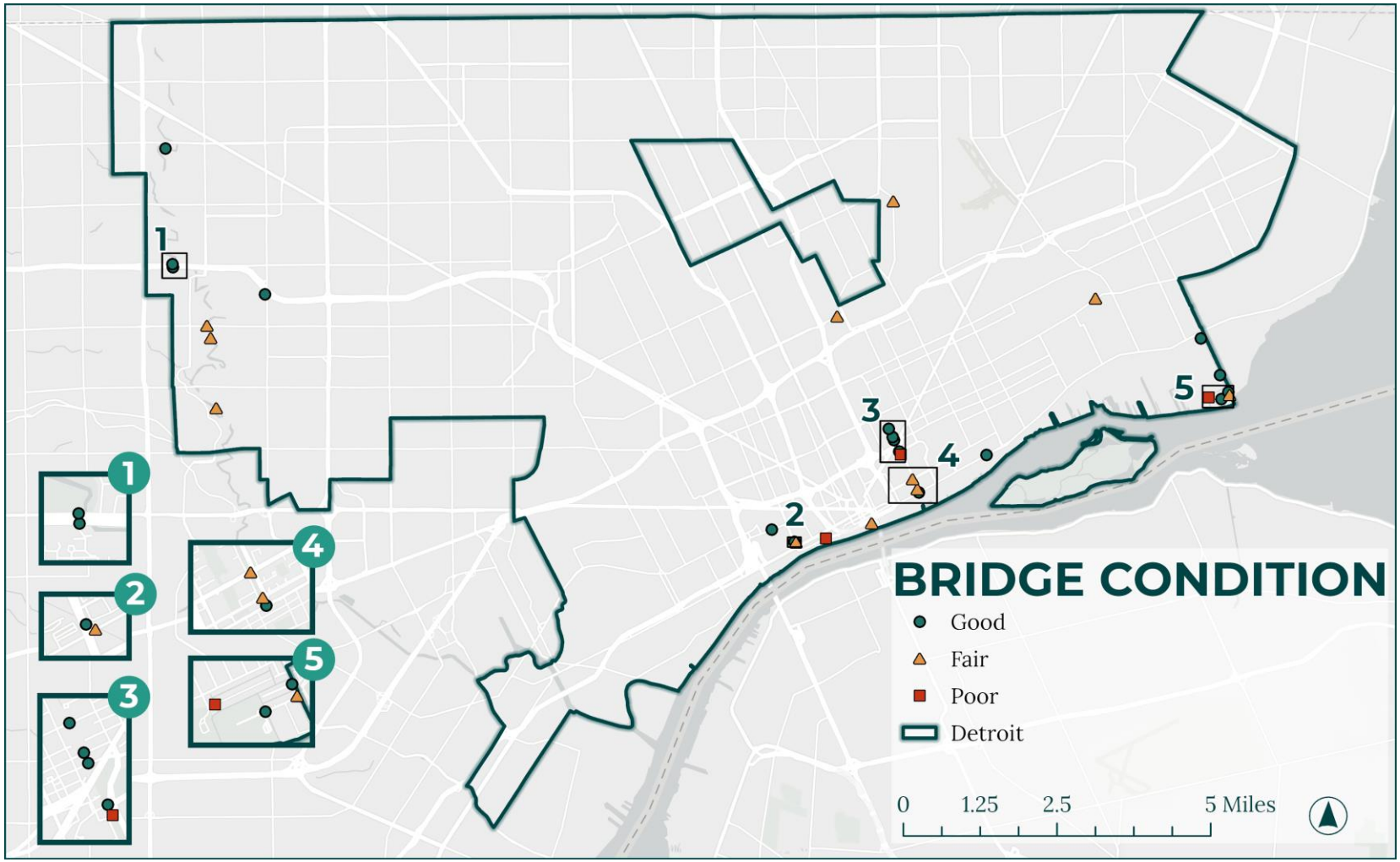

Figure 15 - Bridge Condition from MiBridge as of November 2024

Functional Status

Another classification of Detroit's bridge inventory is functional status, or the ability for a bridge to handle the traffic volume and load it was designed for safely and adequately. The following section defines functional statuses and outlines Detroit's current inventory condition. A map displaying the functional status of Detroit's bridges can be found in **Figure 17**.

Open, Posted, and Closed

Open bridges are operating as expected with no limitations. Posted bridges are those that have deteriorated in condition to a point where a restriction is necessary for what would be considered a safe vehicular or traffic load passing over the bridge; designating a bridge as 'posted' has no influence on its condition rating. Closed bridges are those that are closed to all traffic; closing a bridge is contingent upon its ability to carry a set minimum live load. **Table 5** shows the open, posted, and closed bridges in Detroit's inventory.

Scour Critical Bridges

Scour is the depletion of sediment from around the foundation elements for a bridge commonly caused by fast-moving water. According to MDOT's *Michigan Structure Inventory and Appraisal Coding Guide*, a scour critical bridge is one that has unstable abutment(s) and/or pier(s) due to observed or potential (based on an evaluation study) scour. Bridges receiving a scour rating of three or less are considered scour critical. The City schedules underwater inspections to monitor scour. There are currently no bridges that are considered scour critical in Detroit's inventory.

Structurally Deficient Bridges

Structurally deficient bridges are those with a deck, superstructure, substructure, and/or culvert rated as 'poor' according to the NBI rating scale, with a load-carrying capacity significantly below design

standards, or with a waterway that regularly overtops the bridge during floods. Of Detroit's inventory, 10% (three bridges) have been determined to be structurally deficient. See **Figure 16** and **Figure 17**. Two structures, SN 12427 Chestnut over Dequindre Cut Greenway and SN 12464 6th Street over Jefferson Avenue, are programmed to be removed in 2027. The third, SN 12470 Harbor Island Street over Canal, is programmed for rehabilitation also in 2027.

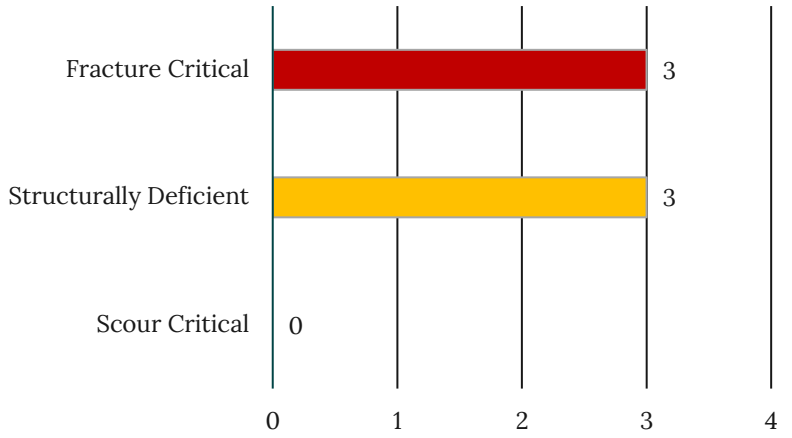

Figure 16 – Number of Bridges by Functional Status

Fracture Critical

A bridge with designed elements that are considered 'fracture critical' is at a higher risk of collapse. These fracture critical elements must be monitored closely and additional attention is given to their condition in inspection. Current design standards are more sensitive to these fracture critical elements than previous standards. Three bridges in Detroit's inventory are considered fracture critical. All three are also considered to be functionally obsolete. See **Figure 16** and **Figure 17**.

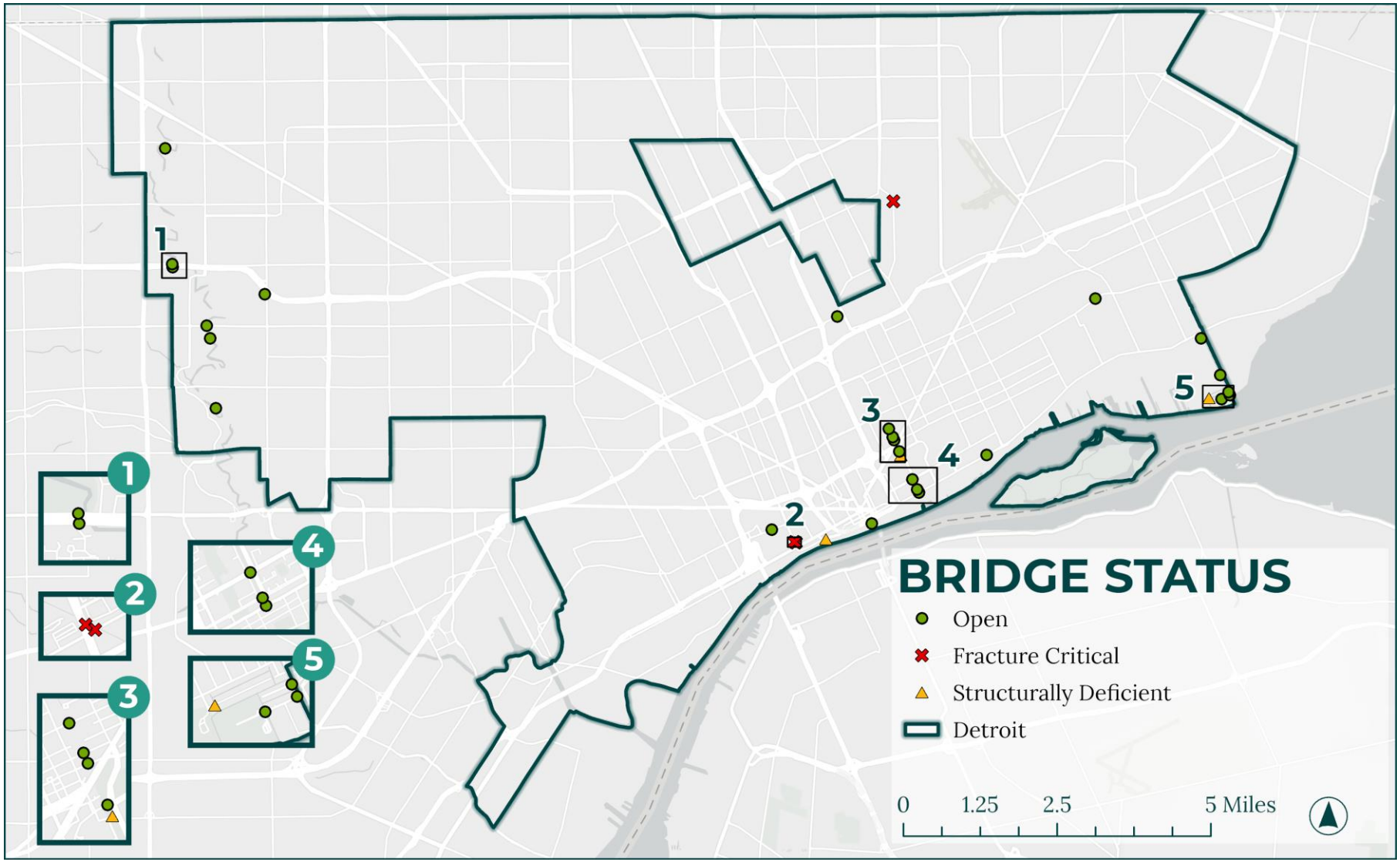

Figure 17 - Functional Bridge Status from MiBridge as of November 2024

PROGRAM DEVELOPMENT

The City's relatively small bridge inventory size allows for bridge programming to be determined through the implementation of their annual and biennial safety inspections. Further, the current condition of the bridge inventory is in a state of good repair. Deficiencies and work recommendations are noted within the MiBridge system and repair recommendations are determined based on a bridge-by-bridge basis. The City's bridge management consultant provides recommendations for preventative maintenance, rehabilitation, and replacements.

The City will maintain the current state of good repair by continuing their approach of addressing structure-specific needs.

Bridge Fix Types

Bridge fix types are routinely grouped into three categories as they relate to capital projects, not including routine and emergency maintenance measures: replacement, rehabilitation, and preventive maintenance. The City is utilizing the definitions of these work types as they are defined by the MDOT Local Bridge Program.[3]

- **Replacement:** Replacement of the entire "substructure, superstructure, deck and necessary approach work."
- **Rehabilitation:** "Major work required to restore the structural integrity of a bridge, as well as work necessary to correct major safety defects" such as full deck replacement, superstructure replacement, widening and complete removal of a structure (no replacement).

[3] *Doyle, L. (2020). Local Bridge Program. Retrieved September 4, 2020, from https://www.michigan.gov/documents/mdot/FY_2023_Local_Bridge_Program_Call_For_Applications_-_Due_June_1st_2020_685158_7.pdf*

- **Preventive Maintenance:** Preservation fix types including, but not limited to bridge deck overlays (shallow and deep), joint replacement, patching, sealing, temporary supports and scour countermeasures.

See the Local Bridge Program guidance for more details.

Bridge Preservation Strategies

Of the three structures currently in poor or serious condition, two structures, SN 12427 Chestnut over Dequindre Cut Greenway and SN 12464 6th Street over Jefferson Avenue, are under consideration for complete removal in 2027. The remaining structure, SN 12470 Harbor Island Street over Canal, will be programmed for rehabilitation in 2027. Funding for these bridges is from MDOT's Local Bridge Program.

Of the 10 structures currently in fair condition, only two require investments anticipated in excess of $1M. Through careful application of preventive maintenance repairs, such as joint repairs, substructure patching, and deck overlays, the useful life of the remaining eight structures can be extended for a relatively low investment compared to rehabilitation or replacement, should the structure condition be allowed to further deteriorate into poor condition.

The remainder of the City's inventory is in good condition and can be preserved through cost effective maintenance strategies.

The City is working with their bridge management consultant to expand the City's bridge inventory database to add the results of the biennial detailed bridge inspection and scoping, along with projected schedules and anticipated funding sources for the maintenance, rehabilitation, and replacement of the bridges.

4 RISK OF FAILURE

Resiliency is a cornerstone of a successful transportation system. If an unplanned disruption were to occur to a part of the network, there should be at least one alternate route in order to sufficiently support mobility. There are road and bridge assets that would cause significant disruption to network mobility if they were to close unexpectedly. In asset management, these facilities are called critical linkages. To determine a critical linkage, the following criteria and considerations were analyzed:

- **Geographic Divides:** where access to areas is limited by a geographic feature, including a river, mountain, or an area that has a limited access road.
- **Emergency access and alternative routes:** roadways and routes that are often used to access emergency services like a hospital, or as alternative routes for high traffic volume roads.
- **Limited access areas:** roadways that provide access to an area that, if the linkage were to be closed, would lead to long detours or be completely inaccessible.
- **Main access to key commercial and industrial districts**: areas with dense commercial and/or industrial businesses that would be impacted if a facility were closed.

A total of 34 road segments and 14 bridge structures have been identified as city-owned critical linkages in the City of Detroit, as outlined in **Table 6** and **Figure 18.** A Risk of Failure Analysis (RFA) was conducted on each critical linkage, which is explained in more detail in the coming sections.

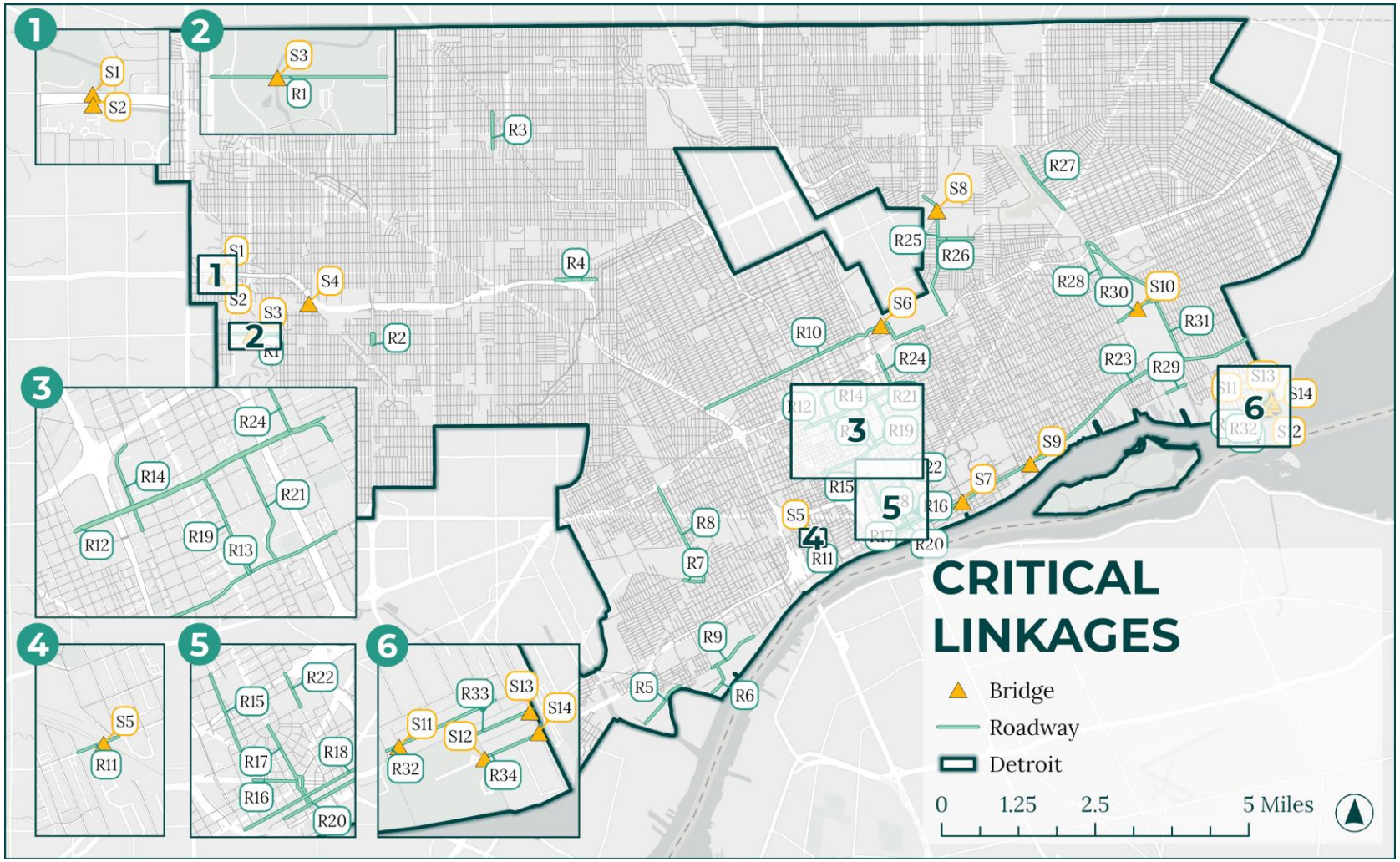

Figure 18 - City of Detroit Critical Linkages

Table 6 - City of Detroit Critical Linkages

ID	Critical Linkage
R1	Plymouth Road between Outer Drive and Burt Road
R2	Southfield Service Drive and Elmira Street, north to Plymouth Road, east to Southfield Service Drive south to Elmira Street
R3	Schaefer Highway from M-10 to McNichols Road
R4	Davison West from Wyoming Street to Ewald Circle
R5	Jefferson Avenue between Brennan Street and Dearborn Street
R6	Springwells Court from Jefferson Avenue to southwestern terminus
R7	Vernor Highway from Livernois Avenue to Waterman Street
R8	Livernois Avenue from Vernor Highway to I-94
R9	Jefferson Avenue from Harrington Street to Campbell Street
R10	Grand Boulevard from I-96 to I-94
R11	Bagley Street from 16th Street to 14th Street
R12	Warren Avenue from Trumbull Street to Dequindre Avenue
R13	Martin Luther King Jr Boulevard/ Mack Avenue from Russell Street to Trumbull Street
R14	Anthony Wayne Drive from Palmer Street to Forest Avenue
R15	Cass Avenue from Temple Street to Grand River Avenue
R16	Michigan Avenue from Woodward Avenue to Cass Avenue
R17	Woodward Avenue from Adams Avenue to Larned Street
R18	Congress Street from 3rd Street to Chrysler Drive
R19	John R Street from Warren Avenue to Mack Avenue
R20	Larned Street from Washington Boulevard to Chrysler Drive
R21	St Antoine Street from Warren Avenue to Mack Avenue
R22	Brush Street from I-75 Service Drive to Adams Avenue
R23	Jefferson Avenue from Beaubien Boulevard to Eastern City Limits
R24	Russell Street from Warren Avenue to I-94

ID	Critical Linkage
R25	Mount Elliott Street from Mound Road to I-94
R26	Huber Street from Mount Elliott Street to Saint Cyril Street
R27	Conner Street from McNichols Road to Gratiot Avenue
R28	Saint Jean from Hern Street to Warren Avenue
R29	Freud Street from Lycaste Street to Clairpointe Street
R30	Mack Avenue between Beniteau Street to Conner Street
R31	Conner Street from Harper Avenue to Jefferson Avenue
R32	Harbor Island Street from Lakewood Street to eastern terminus
R33	Klenk Island from western terminus to Alter Road
R34	Riverside Boulevard from park entrance to Alter Road
S1	SN 11481 – Schoolcraft Road (North) over Rouge River
S2	SN 11479 – Schoolcraft Road (South) over Rouge River
S3	SN 12343 – Plymouth Road over Rouge River
S4	SN 11486 – Schoolcraft Road over C&O Railroad
S5	SN 12393 – Bagley Street over Penn Central Railroad
S6	SN 12391 – E Grand Boulevard over GTW Railroad and Wetherbee Street
S7	SN 13343 – Jefferson Avenue over Dequindre Cut Greenway
S8	SN 12345 – Mount Elliott Street over Penn Central Railroad
S9	SN 12344 – Jefferson Avenue over Conrail
S10	SN 12474 – Mack Avenue over Canadian National Railroad
S11	SN 12470 – Harbor Island Street over Canal
S12	SN 12456 – Riverside Avenue over Canal
S13	SN 12475 – Klenk Avenue over Fox Creek
S14	SN 12457 – Riverside Avenue over Fox Creek

ANALYSIS APPROACH

The RFA was based on the Failure Modes Effects Analysis (FMEA) approach. FMEA is a common design and process analysis tool and closely aligns with the common risk management principles of identification, assessment, treatment, and monitor/control. Critical linkage evaluation focused the current condition of the asset and the overall functional importance of the facility, as described in **Table 7**. While critical linkages have already been deemed to be a network that needs to be prioritized, investigating the functional importance of each linkage compared to one another assists in further prioritizing these key facilities amongst each other.

For purposes of the RFA, "failure" is intended to mean "the inability of the asset to perform as intended, up to and including satisfactory achievement of the overall system goals." The detailed scoring methodology, scales, and results can be found in Appendix H.

Table 7 - Functional Importance Scale

Score	Description
1 – Least Critical	Closure would result in long detours and limit access, but would not result in dire situations
2 – Marginally Critical	Closure would result in long detours and major traffic disruptions, but likely does not result in dire situations
3 – Somewhat Critical	Provides access to neighborhoods or is a service drive; closure would likely lead to long detours, greatly limit access, and may result in dire situations
4 – Critical	Provides access to a large institution or area; closure would likely result in serious situations
5 – Most Critical	Provides access to emergency and municipal services like a hospital; provides the only access to an area; closure would be disastrous

ANALYSIS RESULTS

The following table, **Table 8**, presents the highest risk critical linkages. The two highest risk critical linkages are Davison Avenue from Wyoming Street to Ewald Circle and SN 12470 – Harbor Island Street over Canal, both with 'severe' level risk scores.

Table 8 - Highest Risk Critical Linkages

CL #	Location	CL Criteria	Severity	Score
R4	Davison West from Wyoming Street to Ewald Circle	Commercial access	Severe	5
S11	SN 12470 - Harbor Island Street over Canal	Geographic boundary	Severe	5
R16	Michigan Avenue from Woodward Avenue to Cass Avenue	High traffic	Major	4
R24	Russell Street from Warren Avenue to I-94	Commercial access	Major	4
S8	SN 12345 - Mount Elliott Street over Penn Central Railroad	Geographic boundary	Major	4
S10	SN 12474 - Mack Avenue over Canadian National Railroad	Geographic boundary	Major	4
S14	SN 12457 - Riverside Avenue over Fox Creek	Geographic boundary	Major	4
R6	Springwells Court from Jefferson Avenue to road terminus	Commercial access	Moderate	3
R9	Jefferson Avenue from Harrington Street to Campbell Street	Commercial access	Moderate	3
R12	Warren Avenue from Trumbull Street to Dequindre Avenue	Commercial access	Moderate	3
R19	John R Street from Warren Avenue to Mack Avenue	Commercial access	Moderate	3
R20	Larned Street from Washington Boulevard to Chrysler Drive	Commercial access	Moderate	3
R23	Jefferson Avenue from Beaubien Street to eastern city limits	Commercial access	Moderate	3
S3	SN 12443 - Plymouth Road over Rouge River	Geographic boundary	Moderate	3
S6	SN 12391 - Grand Boulevard over GTW RR & Wetherbee Street	Geographic boundary	Moderate	3

5 PROGRAM GOALS

In asset management, goals help to align agency aspirations with what their road and bridge program can achieve. It is important to set realistic network condition goals that aim to efficiently use budget resources to build and maintain roads that meet taxpayer expectations.

The city's full Performance Plan, included in Appendix A, outlines several goals the city is striving towards and relevant performance measures for each. A brief outline of Detroit's TAMP goals can be found in **Table 9.**

In future asset management plans, the City will document their progress towards these goals and update them as needed. The following sections of the TAMP outline how the city anticipates planning, developing, and delivering their programs in order to achieve these goals.

Table 9 - Detroit TAMP Goals

Goal	Priority
Create Single Source of Authoritative Data	High
Projects Delivered on Time and on Budget	High
Selecting Right Fix at the Right Time and Exploring New Fixes	Medium
Improve Coordination with Utility Organizations	Medium
Improve Safety Awareness Throughout City	Low
Reduce Number of Unreported Incidents and through Traffic on Residential Streets	Low

PAVEMENT ASSETS

Pavement condition is influenced by water infiltration, soil conditions, sunlight exposure, and traffic loading, over which the city has little to no control. Further, seasonal weather changes, traffic pattern changes, and a limited budget constrain what the city can realistically program.

Overall, the City's pavement goal is to align with the statewide goal to achieve a state of good repair,

where at least 90% of the pavement is in good or fair condition and no more than 5% of pavement is in poor condition on the Major network; and at least 85% of the pavement is in good or fair condition and no more than 15% of pavement is in poor condition on the Local network.[4] For tracking and comparison, the City also takes into account SEMCOG's goal of having at least 50% of the pavement in good condition, no more than 40% in fair condition, and no more than 10% in poor condition[5]. The Gap Analysis section outlines what is needed to meet the City's pavement goals.

Southwest Detroit Truck Routes

The City is aiming to upgrade their Southwest Detroit Truck Route roadways (see **Table 10** and **Figure 19**) to meet minimum all-season condition requirements. All-season roads typically have thicker pavement and a stronger base than other roadways to allow them to withstand the weight from heavy trucks even when the ground is soft.[6]

Table 10 - Southwest Detroit Truck Routes

Roadway	Limits
Dearborn Street	Fort Street to I-75
Jefferson Avenue	21st Street to Scotten Street, Clark Street to boundary
John Kronk Street	Dearborn to Livernois Avenue
Livernois Avenue	Vernor Highway to I-94
Dix Street	Waterman Street to Livernois Avenue
22nd Street	Michigan Avenue to Fisher Service Drive
Federal Street	Entirety
McGraw Street	Wyoming Avenue to Addison Street
Addison Street	McGraw Street to Service Drive

[4] *MDOT. July 2022.* State of Michigan Transportation Asset Management Plan.

[5] *SEMCOG. 2025.* Vision 2050: Regional Transportation Plan for Southeast Michigan.

[6] *Van Buren County Road Commission. 2020.* Frost Laws and Seasonal Permits.

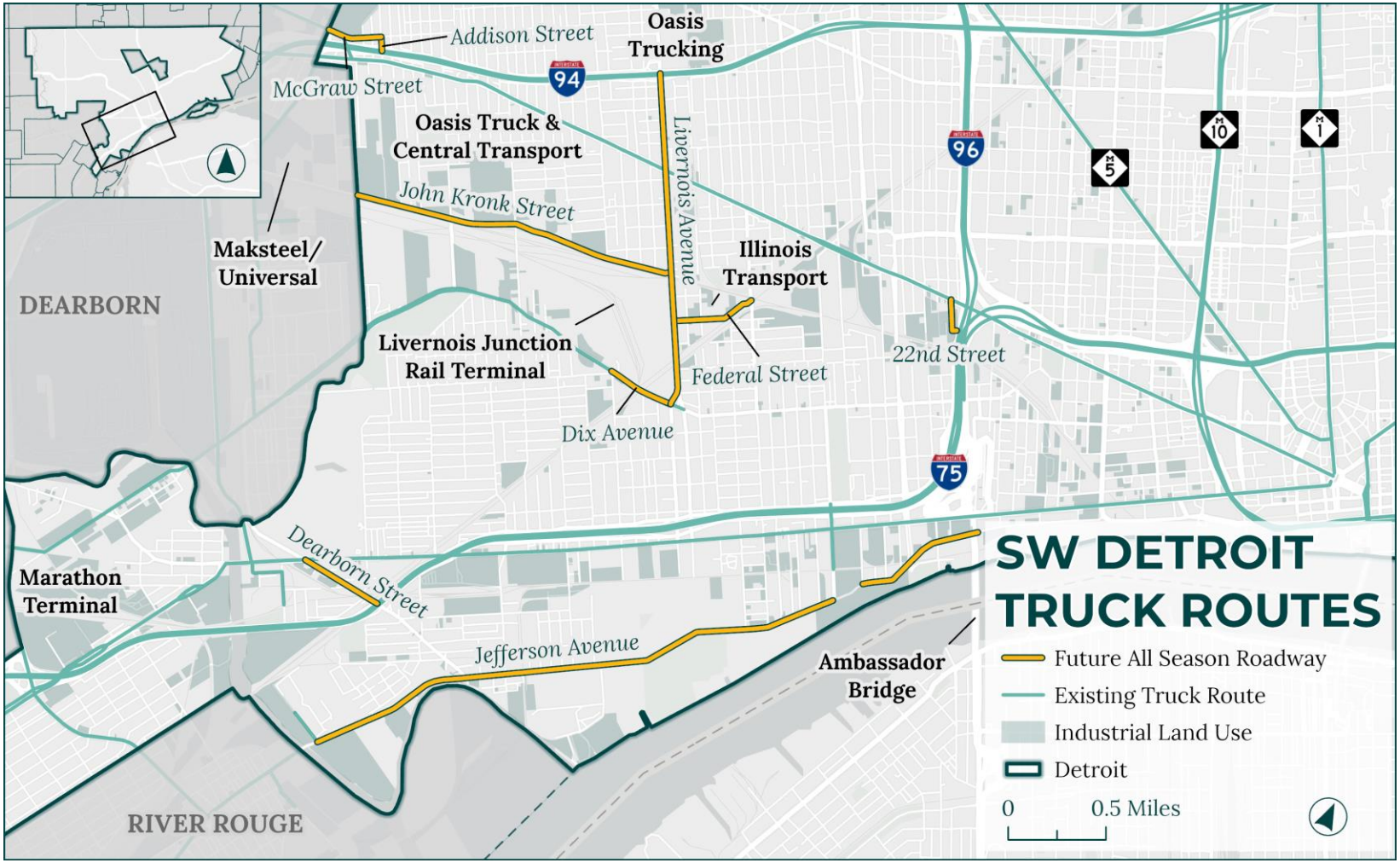

Figure 19 - Southwest Detroit Truck Routes

BRIDGE ASSETS

The City's bridge goal is also aligned with the statewide and regional goal of at least 90% of bridges being in good or fair condition and no more than 10% in poor condition.[4, 5]

OTHER ASSETS

In future iterations of the TAMP, the City will verify its inventory and conduct condition inspections and analysis on additional assets, including culverts and traffic lights. See **Table 11** for a breakdown of traffic signal allocations from previous years.

Table 11 - Previous Allocations for Traffic Signals

Year	Traffic Signal Allocations
2022	$3.8M
2023	$6.6M
2024	$1.6M
2025	$5.4M

6 FINANCIAL RESOURCES

A key aspect of asset management is balancing network quality and the extent of services with the financial resources available, all while maximizing how efficiently funds are used. This section provides an overview of Detroit's general expenditures and financial resources currently devoted to asset maintenance and construction. This is not intended to be a full financial disclosure. A detailed financial report that outlines revenues and expenditures can be requested from the City, which are required reports through Act 51.

HISTORIC EXPENDITURES

In recent years, Detroit has spent an average of $35 million on pavement fixes per year, around 80% of which goes to City Major roadways and the remaining 20% goes to the City Local roadways.

FUNDING SOURCES AND REVENUES

The City of Detroit leverages several funding sources for the various pavement work throughout the city. Sources include revenue from the Michigan Transportation Fund (MTF), federal and state programs, and other discretionary grants. Historic distribution of MTF funds is outlined in **Table 12.** The City of Detroit does not currently have local tax millages in its road funding budget.

Table 12 - Historic Act 51 MTF Distributions[7]

2020	2021	2022	2023	2024
$109.5M	$98.5M	$95.5M	$100.3M	$102.5M

Federal funds are distributed by SEMCOG based on different allocation formulas and programs from

[7] *Michigan Department of Transportation. 2025. From https://mdotnetpublic.state.mi.us/act51public/PaymentHistoryReport.aspx*

various funding templates. The Detroit Federal Aid Committee (FAC) is charged with deciding where to allocate those federal funds for projects in the City on roadways that are federal-aid eligible. Representatives and members from local units of government, transit agencies, and MDOT make up FAC membership. Members evaluate available funding and the needs of the system to recommend projects that meet regional transportation goals and address local needs.

Detroit often uses economic development opportunities to spur road and bridge upgrades, such as through their Streetscape Program. For example, the Department of Public Works received $8.1M in Transportation Economic Development Funds (TEDF) from MDOT to conduct road and bridge repairs for West Grand Boulevard and Holden Street near a new Henry Ford Hospital. More specifically, the project includes the reconstruction of the intersection at Grand Boulevard and Lincoln Street, as well as coordination with MDOT for reconstructing the pedestrian bridge to the south of the project.[8] This also exemplifies how the City works and coordinates with other agencies to provide a robust transportation system and to achieve their goals.

GAP ANALYSIS

This section compares the City's goals to their current funding for both the City Major and City Local networks.

City Major Roads

The City is on track to achieve their pavement condition goal on their City Major Network by the next TAMP update if a similar level of investment to recent years is continued. Overall, the City strives to have at least 90% of pavement in good or fair condition while 5% or less of pavement is in poor

[8] *City of Detroit. 2025 4 February.* "City receives $8.1M from MDOT for road and bridge upgrades near new Henry Ford Hospital."

condition. If the City continues to invest in their network as they have in the last few years, it is predicted the pavement condition of the City Major network would be approximately 60% pavement in good condition, 36% in fair condition, and 4% in poor condition in 2027. See **Figure 20**.

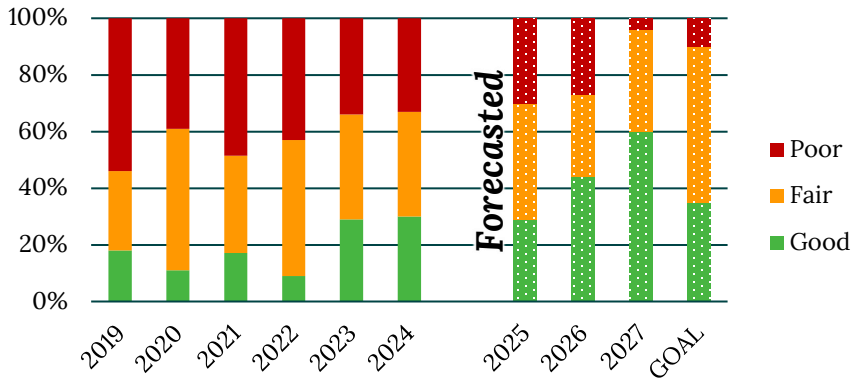

Figure 20 - Forecasted Pavement Condition

City Local Roads

According to the forecasts from the TAMC tools, the City Local network in Detroit would need additional investment to achieve a state of good repair. As outlined in the Program Goals section, the City strives to have at least 85% of their City Local network in good or fair condition and no more than 15% of pavement in poor condition. Based on recent investments, pavement condition on City Local roads is predicted to be approximately 19% in good condition, 38% in fair condition, and 42% in poor condition in 2027. This leaves 32% of pavement on the City Local network, around 230 lane miles, in need of additional investment to achieve the City's goal. For the purposes of this gap analysis, reconstruction and crack seal were not considered, as the City rarely fully reconstructs roadways without extenuating circumstances and crack seal projects are identified based on previously completed projects from the City. Only mill and resurface was considered, with the average cost for the City Local network at

approximately $500,000 per centerline mile (compared to $850,000 per centerline mile for City Major roadways). Based on this analysis, approximately $115M in additional funding is needed. This would equate to approximately $23M per year over the next five years in additional funds needed.

Reconstruction Needs

Based on the latest PASER ratings, approximately 200 centerline miles are rated 1 or 2 (poor) and are in need of reconstruction. 182 of these miles are City Local roads and 18 miles are City Major, as shown in **Figure 21**. Using recent projects as a basis for estimating project cost, reconstructing the City Major roads would cost approximately $6M per centerline mile and for City Local, approximately $5M per centerline mile. To reconstruct the 182 City Local miles, it would cost nearly $907M; to reconstruct the 18 miles of City Major centerline miles, it would cost nearly $110M. In total, it would cost the City $1B. In order to address these failing pavements, significant additional investment is needed. A map of the poor pavement in the City is shown in **Figure 22**.

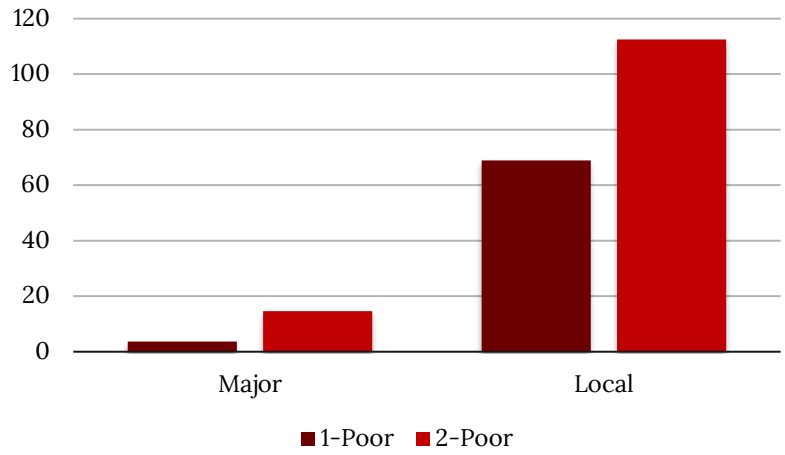

Figure 21 - Centerline Miles of Poor Pavement

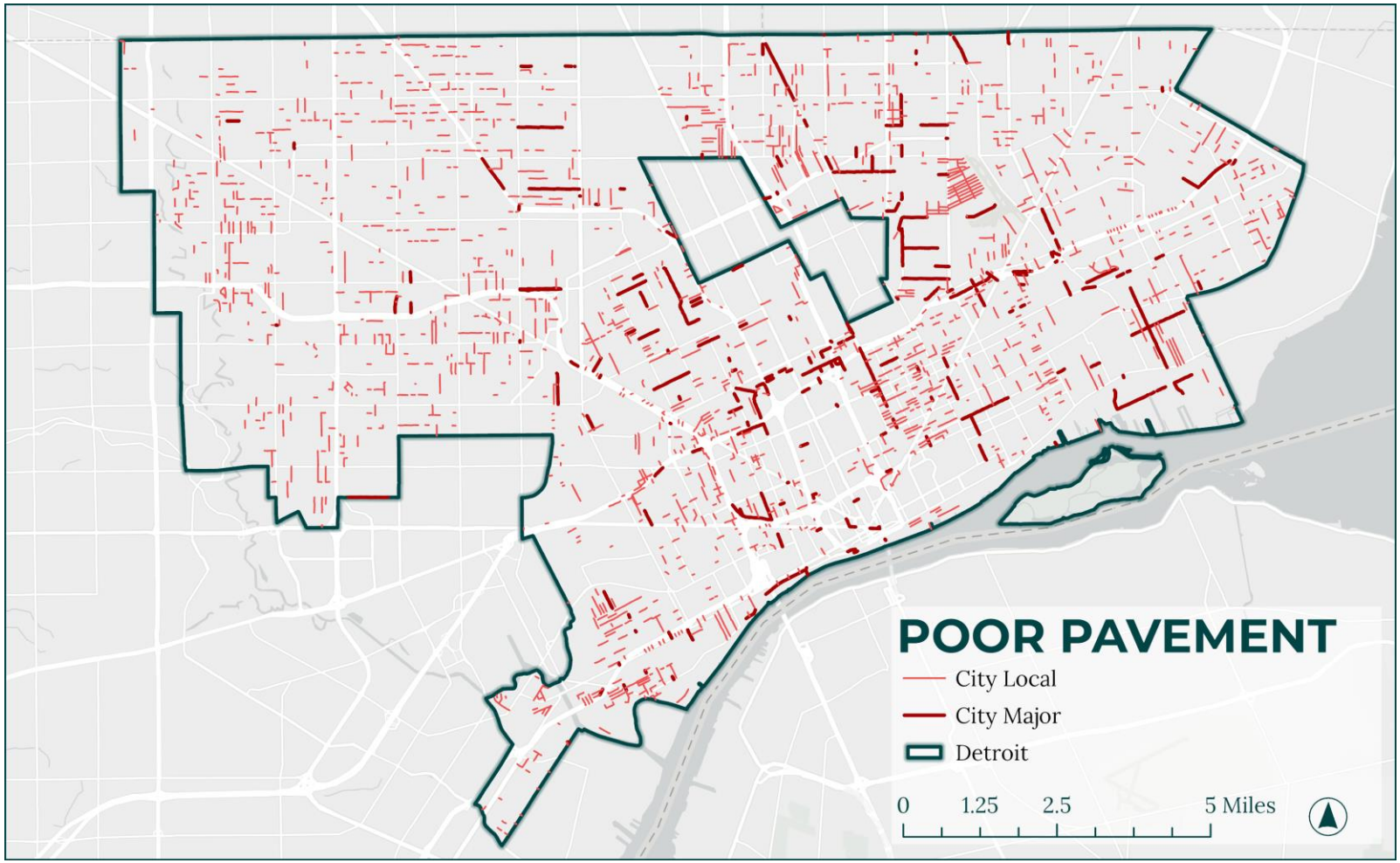

Figure 22 – Map of Detroit's Poor Pavement

7 CAPITAL IMPROVEMENT PROGRAM

The following program investments in **Table 13** outline anticipated investments for each investment program for the next five years. This information is compiled based on existing federal aid committee data, and planned projects. As stated before, the City of Detroit takes an agile approach to project programming in order to best respond to scheduled events, utility work, and other major impacts that can negatively impact road and bridge project schedules and budgets. These are estimates of investments and are subject to change.

Table 13 – Estimated Program Investments

Program Investments	FY 25	FY 26	FY 27	FY 28	FY 29	5-Year Total	*Average*
Road – Federal Aid Committee	$15.1M	$14.9M	$13.4M	$13.7M	$13.9M	**$71M**	$14.2M
Road – Michigan Transportation Fund*	$101.3M	$101.3M	$101.3M	$101.3M	$101.3M	**$506.3M**	$101.3M
Bridge	$1.3M	$1.9M	$4M	TBD	TBD	**$7.2M**	$2.4M
Traffic and Safety	$21.4M	$9.5M	$4M	$4M	$4M	**$42.9M**	$8.6M
Sidewalks	$8M	$8M	$8M	$8M	$8M	**$40M**	$8M
Total Estimated Capital Program	**$147.1M**	**$135.56M**	**$130.7M**	**$127M**	**$127M**	**$667.4M**	$134.5M

**estimated based on five-year average*

PLANNED PROJECTS

This TAMP outlines a plan for the construction, maintenance, and strategies to guide Detroit's asset management program. The City aims to be agile in their project planning in order to be able to pivot based on the needs of the community, upcoming events, planned utility work, and other factors. Because TAMPs are living documents, projects may need to be altered due to changes in design, funding, and/or permitting. Detailed lists of the planned projects can be found in Appendix G.

The City typically revisits previously completed resurfacing projects after two to three years to inspect and assess whether crack sealing is appropriate to maintain pavement quality.

For resurfacing treatments, the City maintains an on-going project candidate list **(Table 28).** For additional projects, critical linkages in poor quality were prioritized, as these roadways are key connections to the network and provide access to various vital operations, including emergency and city services.

Another focus is to improve the pavement condition on the City Local roadways. The current trajectory for pavement condition on City Local roadways indicate that the City will not meet its condition goals on the City Local network without additional funding being identified. On average, the city has resurfaced approximately 60 miles of roadway in the last five years. The breakdown of work types by percentage of total funding over the past five years can be found in **Figure 23**.

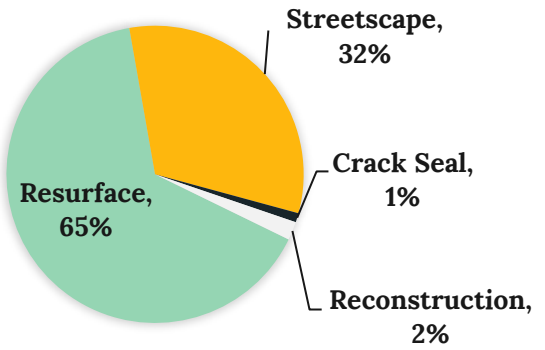

Figure 23 - Average Mix of Fix (2020-2024)

This section outlines the planned projects for 2025, 2026, and 2027, shown in **Table 14, Table 15, Table 16, Table 17**, and **Table 18**. The City maintains a road candidate list, as shown in Appendix G in **Table 28** and in the map in **Figure 24**, to choose projects from when additional funding becomes available and to plan projects further out.

Table 14 - FY 2025 Detroit FAC Planned Bridge Projects

Structure Number	Facility Carried	Intersecting Feature	Work Type	Estimated Cost
SN 12363	Lafayette Street	Conrail	Bridge CPM	$392,000
SN 12370	12th Street	Conrail	Bridge CPM	$430,000
SN 12381	Larned Street	Dequindre Cut Greenway	Bridge CPM	$510,000

Table 15 - FY 2025 Detroit FAC Planned Pavement and Safety Projects

Fiscal Year	GPA Type	Project Location	Limits	Primary Work Type	Project Description	Total Estimated Amount
2025	Local Traffic Operations and Safety	Citywide	Various Locations - City of Detroit	Traffic Safety	Signal retiming, interconnect and actuation	$2,238,000
2025	Local Traffic Operations and Safety	Citywide	Traffic Signal upgrade at selected locations- City wide	Traffic Safety	Upgrading of traffic signals	$1,221,494

Fiscal Year	GPA Type	Project Location	Limits	Primary Work Type	Project Description	Total Estimated Amount
2025	Local Traffic Operations and Safety	Citywide	Installation of pavement markings- City wide	Traffic Safety	Installation of pavement markings- City wide	$1,700,000
2025	S/TIP Line items	Virginia Park Street	Virginia Park Street	Reconstruction	Brick Road Reconstruction	$4,231,930
2025	Local Traffic Operations and Safety	Citywide	Various Locations - City of Detroit	Traffic Safety	Traffic Signal Improvements	$824,931
2025	Local Traffic Operations and Safety	Citywide	Various Locations - City of Detroit	Traffic Safety	Signal modernization	$803,651
2025	Local Road	Citywide	Citywide	Road Rehabilitation	Milling and resurfacing	$6,207,110*
2025	Local Road	Citywide	Citywide	Road Rehabilitation	Milling and resurfacing	$1,876,589*
2025	Local Road	Citywide	Citywide	Road Rehabilitation	Milling and resurfacing	$6,207,110*
2025	Local Traffic Operations and Safety	Central Street	At Conrail in the City of Detroit, Wayne County	Railroad	install pre-signal for northwest bound traffic	$46,000*

Fiscal Year	GPA Type	Project Location	Limits	Primary Work Type	Project Description	Total Estimated Amount
2025	Local Traffic Operations and Safety	Central Street	At Conrail in the City of Detroit, Wayne County	Railroad	install pre-signal for northwest bound traffic	$290,000*
2025	Local Traffic Operations and Safety	Central Street	At Conrail in the City of Detroit, Wayne County	Railroad	install pre-signal for northwest bound traffic	$53,000*
2025	Local Traffic Operations and Safety	Plum Street	Citywide	ITS Applications	FY26 Operations and Maintenance of City of Detroit Traffic Management Center	$937,500
2025	S/TIP Line items	Selkirk Street	At Conrail in the City of Detroit, Wayne County	Railroad	Crossing Closure Incentive Payment - State	$125,000
2025	Local Traffic Operations and Safety	Selkirk Street	At Conrail in the City of Detroit, Wayne County	Railroad	Crossing Closure Incentive Payment - Federal	$50,000

** Denotes projects that are split between different FAC job numbers and/or funding templates.*

Table 16 - FY 2026 Detroit FAC Planned Bridge Projects

Structure Number	Facility Carried	Intersecting Feature	Work Type	Estimated Cost
SN 12483	Ridge Road	Rouge River	Bridge CPM	$103,000
SN 11479	I-96 EB Service Road	Rouge River	Bridge CPM	$249,000
SN 11481	I-96 WB Service Road	Rouge River	Bridge CPM	$249,000
SN 11486	S Service Road	Land	Bridge CPM	$394,000
SN 12343	Jefferson Avenue	Dequindre Cut Greenway	Bridge CPM	$206,000
SN 12393	Bagley Avenue	Conrail	Bridge CPM	$287,000
SN 12457	Riverside Avenue	Fox Creek	Bridge CPM	$279,000
SN 12475	Klenk Street	Fox Creek	Bridge CPM	$143,000

Table 17 - FY 2026 Detroit FAC Planned Pavement and Safety Projects

Fiscal Year	GPA Type	Project Location	Limits	Primary Work Type	Project Description	Total Estimated Amount
2026	Local Traffic Operations and Safety	Citywide	Traffic Signal upgrade at selected locations-City wide	Traffic Safety	Upgrading of traffic signals	$1,279,911

Fiscal Year	GPA Type	Project Location	Limits	Primary Work Type	Project Description	Total Estimated Amount
2026	Local Traffic Operations and Safety	Citywide	Installation of pavement markings- City wide	Traffic Safety	Installation of pavement markings- City wide	$1,700,000
2026	Local Road	Citywide	Citywide	Road Rehabilitation	Milling and resurfacing	$6,366,255*
2026	Local Road	Citywide	Citywide	Road Rehabilitation	Milling and resurfacing	$1,920,551*
2026	Local Road	Citywide	Citywide	Road Rehabilitation	Milling and resurfacing	$6,366,255*
2026	Local Traffic Operations and Safety	Citywide	Pavement marking project, City wide	Traffic Safety	Pavement marking project, City wide	$1,800,000
2026	Local Traffic Operations and Safety	Citywide	Interconnecting traffic signals to Detroit Traffic Management Center	Traffic Safety	Interconnecting traffic signals to Detroit Traffic Management Center	$864,681

** Denotes projects that are split between different FAC job numbers and/or funding templates.*

Table 18 - FY 2027 MDOT Local Bridge Program Projects

Structure Number	Facility Carried	Intersecting Feature	Work Type	Estimated Cost
SN 12391	East Grand Boulevard	GTW RR & Wetherbee Street	Bridge CPM	$476,000
SN 12464	6th Street	Jefferson Avenue	Bridge Removal	$1,500,000
SN 12427	Chestnut Street	Dequindre Cut Greenway	Bridge Removal	$626,000
SN 12470	Harbor Island Street	Canal	Bridge Rehabilitation	$1,403,000

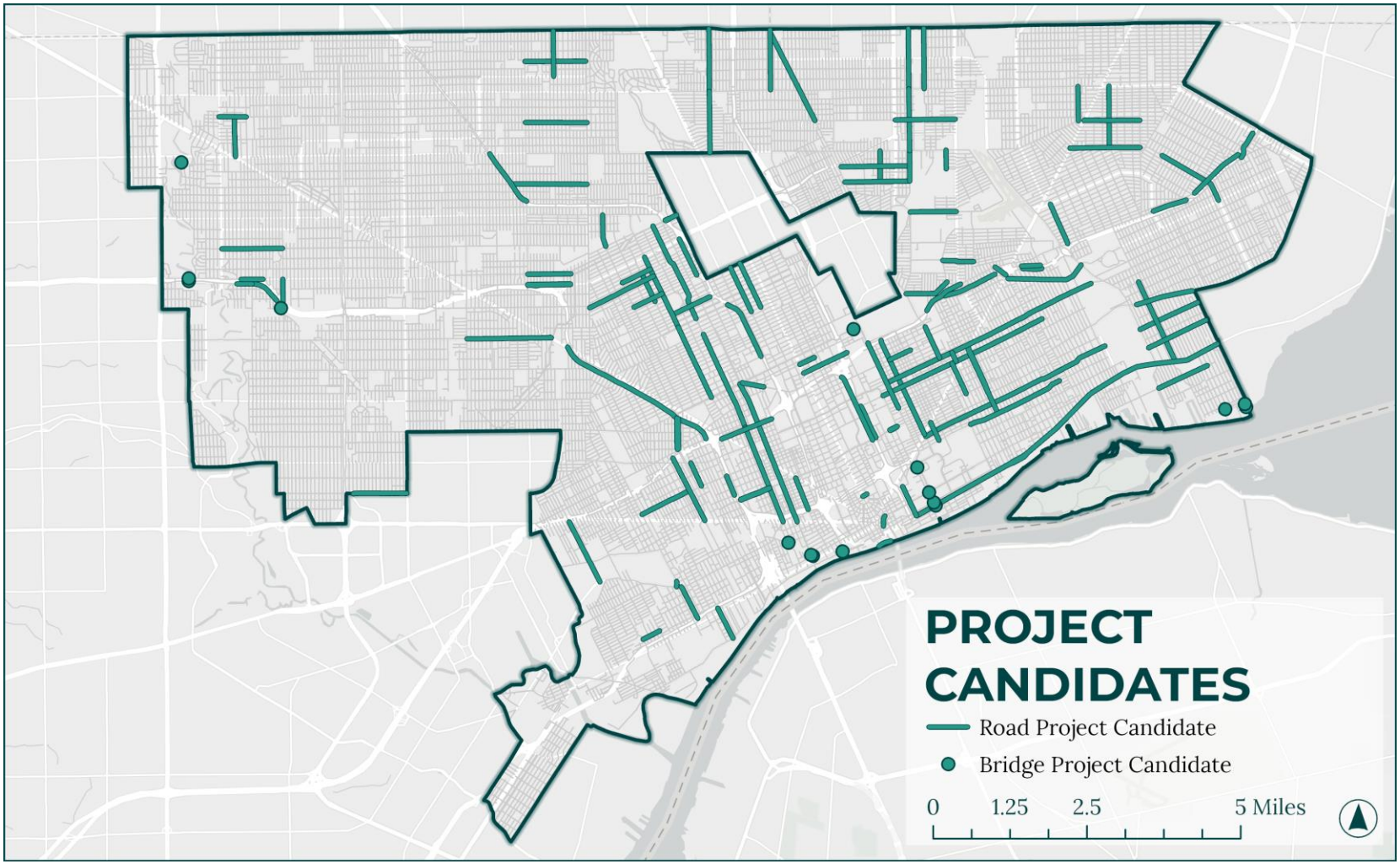

Figure 24 - Project Candidates

8 COORDINATION WITH OTHER ENTITIES

Maintaining the transportation network includes coordinating with other entities, including utility companies. The City coordinates their pavement and bridge work internally within the municipality divisions and externally with other organizations, taking a risk-based approach to this effort. It is a top priority of the City to continue working with utility companies, private developers, and other entities to coordinate their work with planned and programmed transportation projects.

The ICT is a prime example of the efforts the City is undertaking to improve coordination with other entities. This group includes utility companies and other necessary agencies and involves sharing information about planned projects that may conflict with the City's project candidate(s). By coordinating ahead of time through the ICT, the agencies are able to work together to determine the best path forward. An ICT sub-group regularly meets to ensure projects are developing as anticipated.

Considerations such as large events (e.g. the National Football League Draft in 2024) are discussed to assist in developing the list of project candidates. If a roadway is in need of treatment but there is a larger investment in the works, such as a large utility project, the city will plan ahead to do a short-term solution, such as a mill and resurface, to carry the pavement through the larger project and then implement a larger scale rehabilitation once the other work is finished. The City also works closely with MDOT, SEMCOG, and Wayne County to coordinate projects and work towards common goals, including safety.

9 PROOF OF ACCEPTANCE

PUBLIC ACT 325 – CERTIFICATION OF TRANSPORTATION ASSET MANAGEMENT PLAN

Certification Year: 2025

Agency Name: City of Detroit

The City of Detroit (City) hereby certifies that the agency has developed and approved a Transportation Asset Management Plan, which meets the requirements as outlined in Public Act 325 of 2018. Furthermore, the City certifies that this TAMP includes all required elements, including agency-defined goals and objectives, and a Capital Improvement Program for roads and bridges.

DocuSigned by:
Ron Brundidge
213AF2B3C7EE448...
Signature

Signed by:
Richard Doherty
8FA875B0A41542A...
Signature

NAME 1	Ron Brundidge	NAME 2	Richard Doherty
Title	DPW Director	Title	City Engineer
Date	4/24/2025	Date	4/24/2025

Due every three years based on agency submission schedule.

Submittal Date: April 24th, 2025

APPENDIX A. PAVEMENT PRIMER

Roads come in two basic forms—paved and unpaved. Paved roads have hard surfaces, which can be constructed from asphalt, concrete, composite (both asphalt and concrete), sealcoat, and brick and block materials. On the other hand, unpaved roads have no hard surfaces and include gravel and unimproved earth roads.

Deciding whether to pave a roadway and which material is most appropriate allows road-owning agencies to tailor the road to a particular purpose, environment, and budget. Thus, selecting a pavement type or leaving a road unpaved depends upon purpose, materials available, and budget. Each choice represents a trade-off between budget and costs for construction and maintenance.

Maintenance enables the road to continue to fulfill its particular purpose over time, addressing normal wear and tear that occurs. To achieve the maximum service life for a pavement or an unpaved road, continual monitoring of a road's pavement condition is essential for choosing the right time to apply the right fix in the right place.

The following is a brief overview of the different types of pavements, how condition is assessed, and treatment options that can lengthen a road's service life.

SURFACING

The pavement type used on a roadway is influenced by several factors, such as cost of construction, cost of maintenance, frequency of maintenance, and type of maintenance. These factors can have benefits affecting asset life and road user experience.

Paved Surfacing

Typical benefits and tradeoffs for hard surface types include:

- **Concrete pavement:** Concrete pavement, which is sometimes called a rigid pavement, is durable and has a long service life when properly constructed and maintained. Concrete

pavement can have longer periods of time between maintenance activities, which can help reduce maintenance-related traffic disruptions; however, concrete pavements have a high initial cost and can be challenging to rehabilitate and maintain at the end of their service life. A typical concrete pavement design life will provide service for 30 years before major rehabilitation is necessary.

- **Hot-mix asphalt pavement (HMA):** HMA pavement, sometimes known as asphalt or flexible pavement, is currently less expensive to construct than concrete pavement (this is, in some part, due to the closer link between HMA material costs and oil prices that HMA pavements have in comparison with other pavement types). However, they require frequent maintenance activities to maximize their service life. A typical HMA pavement design life will provide service for 18 years before major rehabilitation is necessary. The vast majority of local-agency-owned pavements are HMA pavements.
- **Composite pavement:** Composite pavement is a combination of concrete and asphalt layers. Typically, composite pavements are old concrete pavements exhibiting ride-related issues that were overlaid by several inches of HMA in order to gain more service life from the pavement before it would need reconstruction. Converting a concrete pavement to a composite pavement is typically used as a "holding pattern" treatment to maintain the road in usable condition until reconstruction funds become available.
- **Sealcoat pavement:** Sealcoat pavement is a gravel road that has been sealed with a thin asphalt binder coating that has stone chips spread on top (not to be confused with a chip seal treatment over HMA pavement). This type of a pavement relies on the gravel layer to provide structure to support traffic, and the asphalt binder coating and stone chips shed water and eliminate the need for maintenance grading. Nonetheless, sealcoat pavement does require additional maintenance steps that asphalt and gravel do not require and does not

last as long as HMA pavement, but it provides a low-cost alternative for lightly-trafficked areas and competes with asphalt for ride quality when properly constructed and maintained. Sealcoat pavement can provide service for ten or more years before the surface layer deteriorates and needs to be replaced.

Unpaved Surfacing

Typical benefits and tradeoffs for non-hard surfacing include:

- **Gravel:** Gravel is a low-cost, easy-to-maintain road surface made from layers of soil and aggregate (gravel). However, there are several potential drawbacks such as dust, mud, and ride smoothness when maintenance is delayed or traffic volume exceeds design expectations. Gravel roads require frequent low-cost maintenance activities. Gravel can be very cost effective for lower-volume, lower-speed roads. In the right conditions, a properly constructed and maintained gravel road can provide a service life comparable to an HMA pavement and can be significantly less expensive than the other pavement types.

PAVEMENT CONDITION

Besides traffic congestion, pavement condition is what road users typically notice most about the quality of the roads that they regularly use—the better the pavement condition, the more satisfied users are with the service provided by the roadwork performed by road-owning agencies. Pavement condition is also a major factor in determining the most cost-effective treatment—that is, routine maintenance, capital preventive maintenance, or structural improvement—for a given section of pavement. As pavements age, they transition between “windows” of opportunity when a specific type of treatment can be applied to gain an increase in quality and extension of service life. Routine maintenance is day-to-day, regularly-scheduled, low-cost activity applied to “good” roads to prevent water or debris intrusion. Capital preventive maintenance (CPM) is a planned set of cost-effective treatments for “fair” roads that corrects pavement defects, slows further deterioration, and maintains the

functional condition without increasing structural capacity. The City uses pavement condition and age to anticipate when a specific section of pavement will be a potential candidate for preventive maintenance. More detail on this topic is included in the *Pavement Treatment* section of this primer.

Pavement condition data is also important because it allows road owners to evaluate the benefits of preventive maintenance projects. This data helps road owners to identify the most cost-effective use of road construction and maintenance dollars. Further, historic pavement condition data can enable road owners to predict future road conditions based on budget constraints and to determine if a road network's condition will improve, stay the same, or degrade at the current or planned investment level. This analysis can help determine how much additional funding is necessary to meet a network's condition improvement goals.

Paved Road Condition Rating

Detroit is committed to monitoring the condition of its road network and using pavement condition data to drive cost-effective decision-making and preservation of valuable road assets. The City uses the Pavement Surface Evaluation and Rating (PASER) system to assess its paved roads. PASER was developed by the University of Wisconsin Transportation Information Center to provide a simple, efficient, and consistent method for evaluating road condition through visual inspection. The widely-used PASER system has specific criteria for assessing asphalt, concrete, sealcoat, and brick and block pavements.

The TAMC has adopted the PASER system for measuring statewide pavement conditions in Michigan for asphalt, concrete, composite, sealcoat, and brick-and-block paved roads. Broad use of the PASER system means that data collected at the City is consistent with data collected statewide. PASER data is collected using trained inspectors in a slow-moving vehicle using GPS-enabled data collection software provided to road-owning agencies at no cost to them. The method does not require extensive training or specialized equipment, and data can be collected rapidly, which minimizes the expense for collecting and maintaining this data.

The PASER system rates surface condition using a 1-10 scale where 10 is a brand new road with no defects that can be treated with routine maintenance, 5 is a road with distresses but is structurally sound that can be treated with preventive maintenance, and 1 is a road with extensive surface and structural distresses that is in need of total reconstruction.

Roads with lower PASER scores generally require costlier treatments to restore their quality than roads with higher PASER scores. The cost effectiveness of treatments generally decreases the as the PASER number decreases. In other words, as a road deteriorates, it costs more dollars per mile to fix it, and the dollars spent are less efficient in increasing the road's service life. Nationwide experience and asset management principles tell us that a road that has deteriorated to a PASER 4 or less will cost more to improve and the dollars spent are less efficient. Understanding this cost principle helps to draw meaning from the current PASER condition assessment.

The TAMC has developed statewide definitions of road condition by creating three simplified condition categories—"good", "fair", and "poor"—that represent bin ranges of PASER scores having similar contexts with regard to maintenance and/or reconstruction. The definitions of these rating conditions are:

"Good" roads, according to the TAMC, have PASER scores of 8, 9, or 10. Roads in this category have very few, if any, defects and only require minimal maintenance; they may be kept in this category longer using CPM. These roads may include those that have been recently seal coated or newly constructed. "Fair" roads according to the TAMC have PASER scores of 5, 6, or 7. These roads are structurally sound but are starting to wear.

CPM can be cost effective for maintaining the road's "fair" condition or even raising it to "good" condition before the structural integrity of the pavement has been severely impacted. CPM treatments can be likened to shingles on a roof of a house: while the shingles add no structural value, they protect the house from structural damage by maintaining the protective function of a roof covering. "Poor" roads, according to the TAMC, have PASER

scores of 1, 2, 3, or 4. These roads exhibit evidence that the underlying structure is failing, such as alligator cracking and rutting. These roads must be rehabilitated with treatments like a heavy overlay, crush and shape, or total reconstruction.

The TAMC's good, fair, and poor categories are based solely on the definitions above. Therefore, caution should be exercised when comparing other condition assessments with these categories because other condition assessments may have "good", "fair", or "poor" designations similar to the TAMC condition categories but may not share the same definition. Often, other condition assessment systems define the "good", "fair", and "poor" categories differently, thus rendering the data of little use for cross-system comparison. The TAMC's definitions provide a statewide standard for all of Michigan's road-owning agencies to use for comparison purposes.

PASER data is collected every two years on all federal-aid-eligible roads in Michigan. The TAMC dictates and funds the required training and the format for this collection, and it shares the data regionally and statewide. Additionally, the City participated in a pilot program with SEMCOG to collect PASER ratings for all local roads, setting a baseline for 2024.

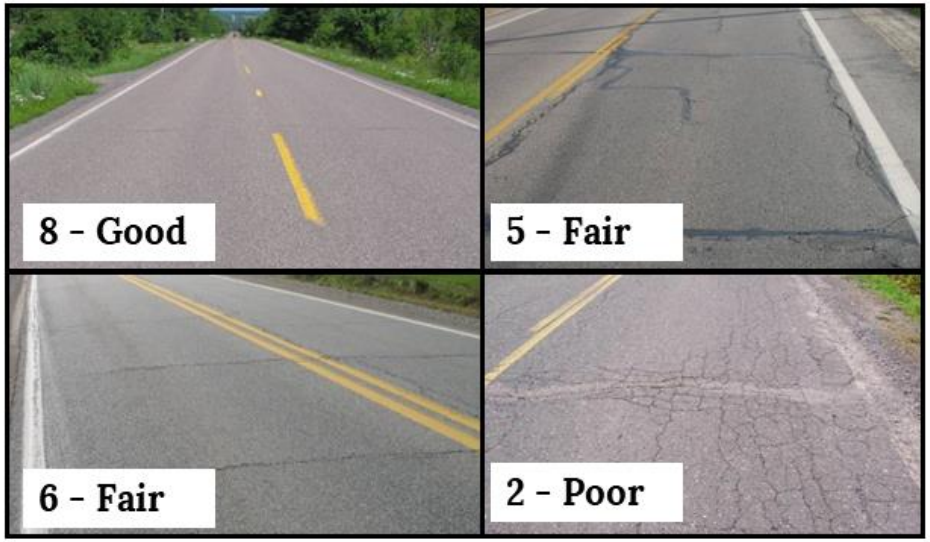

Figure 25 - Visual Representations of PASER Ratings

Unpaved Road Condition Rating

The condition of unpaved roads can be rapidly changing, which makes it difficult to obtain a consistent surface condition rating over the course of weeks or even days. The PASER system works well on most paved roads, which have a relatively-stable surface condition over several months, but it is difficult to adapt to unpaved roads. To address the need for a reliable condition assessment system for unpaved roads, the TAMC adopted the Inventory Based Rating (IBR) System™, and Detroit also uses the IBR System™ for rating its unpaved roads. Information about the IBR System™ can be found on Michigan Tech's website at http://ctt.mtu.edu/inventory-based-rating-system.

The IBR System™ gathers reliable condition assessment data for unpaved roads by evaluating three features—surface width, drainage adequacy, and structural adequacy—in comparison to a baseline, or generally considered "good", road. These three assessments come together to generate an overall 1-10 IBR number. A high IBR number reflects a road with wide surface width, good drainage, and a well-designed and well-constructed base, whereas a low IBR number reflects a narrow road with no ditches and little gravel. A good, fair, or poor assessment of each feature is not an endorsement or indictment of a road's suitability for use but simply provides context on how these road elements compare to a baseline condition.

Figure 26 – Visual Representations of IBR Ratings

Unpaved roads are constructed and used differently throughout Michigan. A narrow, unpaved road with no ditches and very little gravel (low IBR number) may be perfectly acceptable in a short, terminal end of the road network, for example, on a road segment that ends at a lake or serves a limited number of unoccupied private properties. However, high-volume unpaved roads that serve agricultural or other industrial activities with heavy trucks and equipment will require wide surface width, good drainage, and a well-designed and well-constructed base structure (high IBR number). Where the unpaved road is and how it is used determines how the road must be constructed and maintained: just because a road has a low IBR number does not necessarily mean that it needs to be upgraded. The IBR number is not an endorsement or indictment of the road's suitability for use but rather, an indication of a road's capabilities to support different traffic volumes and types in all weather.

PAVEMENT TREATMENTS

Selection of repair treatments for roads aims to balance costs, benefits, and road life expectancy. All pavements are damaged by water, traffic weight, freeze/thaw cycles, and sunlight. Reconstruction, structural improvements, capital preventive maintenance, and other fixes used by the City counter these pavement-damaging forces.

Reconstruction

Pavement reconstruction treats failing or failed pavements by completely removing the old pavement and base and constructing an entirely new road. Every pavement has to eventually be reconstructed and it is usually done as a last resort after more cost-effective treatments are done, or if the road requires significant changes to road geometry, base, or buried utilities. Reconstruction is the most extensive rehabilitation of the roadway and therefore, also the most expensive per mile and most disruptive to regular traffic patterns. Reconstructed pavement will subsequently require one or more maintenance treatments to maximize service life and performance. Reconstruction projects are rare in Detroit and often come from an economic development project as opposed to pavement condition alone.

Ditching (for Unpaved Roads)

Water needs to drain away from any roadway to delay softening of the pavement structure, and proper drainage is critical for unpaved roads where there is no hard surface on top to stop water infiltration into the road surface and base. To improve drainage, new ditches are dug or old ones are cleaned out. Unpaved roads typically need to be re-ditched every 15 years.

Gravel Overlay (for Unpaved Roads)

Unpaved roads will exhibit gravel loss over time due to traffic, wind, and rain. Gravel on an unpaved road provides a wear surface and contributes to the structure of the entire road. Unpaved roads typically need to be overlaid with four inches of new gravel every 15 years at a cost of $25,000 per mile.

Structural Improvement

Roads requiring structural improvements exhibit alligator cracking and rutting and are rated poor in the TAMC scale. Road rutting is evidence that the underlying structure is beginning to fail and it must be rehabilitated with a structural treatment. Examples of structural improvement treatments include HMA overlay with or without milling and crush and shape. The following descriptions outline the main structural improvement treatments used by Detroit.

Hot-mix Asphalt (HMA) Overlay with/without Milling

An HMA overlay is a layer of new asphalt (liquid asphalt and stones) placed on an existing pavement. Depending on the overlay thickness, this treatment can add significant structural strength. This treatment also creates a new wearing surface for traffic and seals the pavement from water, debris, and sunlight damage. An HMA overlay lasts approximately five to ten years and costs $50,000 to $100,000 per lane mile. The top layer of severely damaged pavement can be removed by the milling, a technique that helps prevent structural problems from being quickly reflected up to the new surface. Milling is also done to keep roads at the same height of curb and gutter that is not being raised or reinstalled in the project. Milling can add upwards of $10,000 per lane mile to the HMA overlay cost.

Crush and Shape

During a crush and shape treatment, the existing pavement and base are pulverized and then the road surface is reshaped to correct imperfections in the road's profile. An additional layer of gravel is often added along with a new wearing surface such as an HMA overlay or chip seal. Additional gravel and an HMA overlay give an increase in the pavement's structural capacity. This treatment is usually done on rural roads with severe structural distress; Adding gravel and a wearing surface makes it more prohibitive for urban roads if the curb and gutter is not raised up. Crush and shape treatments last approximately 14 years and can cost around $150,000 per lane mile.

Capital Preventive Maintenance

Capital preventive maintenance (CPM) addresses pavement problems of fair-rated roads before the structural integrity of the pavement has been severely impacted. CPM is a planned set of cost-effective treatments applied to an existing roadway that slows further deterioration and that maintains or improves the functional condition of the system without significantly increasing the structural capacity. Examples of such treatments include crack seal, fog seal, chip seal, slurry seal, and microsurface.

The purpose of the following CPM treatments is to protect the pavement structure, slow the rate of deterioration, and/or correct pavement surface deficiencies.

Crack Seal

Water that infiltrates the pavement surface softens the pavement structure and allows traffic loads to cause more damage to the pavement than in normal dry conditions. Crack sealing helps prevent water infiltration by sealing cracks in the pavement with asphalt sealant.

Detroit seals pavement cracks early in the life of the pavement to keep it functioning as strong as it can and for as long as it can. The City is intentional about going out to projects completed in the previous three years and crack sealing them to help maintain the integrity of the pavement. Crack sealing lasts approximately two years and costs $6,000 per lane mile. Even though it does not last very long compared to other treatments, it does not cost very much compared to other treatments. This makes it a very

cost effective treatment when the City looks at what crack sealing costs per year of the treatment's life.

Maintenance Grading (Unpaved Roads)

Maintenance grading involves regrading an unpaved road to remove isolated potholes, washboarding, and ruts then restoring the compacted crust layer.

Crust on an unpaved road is a very tightly compacted surface that sheds water with ease but takes time to be created, so destroying a crusted surface with maintenance grading requires a plan to restore the crust. Maintenance grading often needs to be performed three to five times per year and each grading costs $300 per mile.

Dust Control (Unpaved Roads)

Dust control typically involves spraying chloride or other chemicals on a gravel surface to reduce dust loss, aggregate loss, and maintenance.

This is a relatively short-term fix that helps create a crusted surface. Chlorides work by attracting moisture from the air and existing gravel. This fix is not effective if the surface is too dry or heavy rain is imminent, so timing is very important. Dust control is done two to four times per year and each application costs $700 per mile.

APPENDIX B. BRIDGE PRIMER

BRIDGE TYPES

Bridges are structures that span 20 feet or more and can extend across one or multiple spans. If culvert structures are placed side-by-side and form a span of 20 feet or more, this culvert system would then be designated as a bridge. Bridge types are classified based on two features: design and material.

Bridge Design

The most common bridge design is the girder system where the bridge deck transfers vehicle loads to girders or beams that then transfer the load to the piers or abutments.

A similar design without girders or beams is a slab bridge. A slab bridge transfers the vehicle load directly to the abutments and, if necessary, piers.

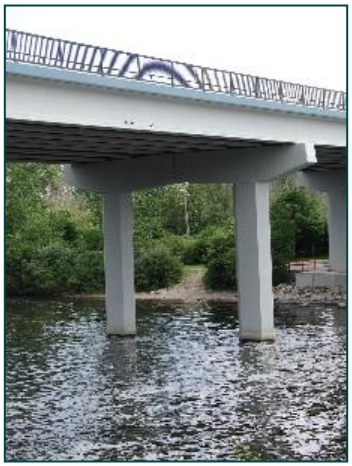

Figure 29 - Girder

Truss bridges consist of a support structure that is created when structural members are connected at joints to form interconnected triangles. Structural members may consist of steel tubes or angles connected at joints with gusset plates.

Figure 28 - Slab

Figure 27 - Truss

Another common bridge design in Michigan is the three-sided pre-cast box or arch bridge. Michigan is home to several other unique bridge designs not mentioned in this primer, as well.

Figure 30 – Three-sided Box

Bridge Material

Adding another layer of complexity to bridge typing is the primary construction material(s) used. Generally, bridges are constructed from concrete, steel, pre-stressed concrete, or timber.

Some other historical bridges or specific bridge components in Michigan bridges may be constructed from masonry or stone, as well.

Figure 31 – Concrete Bridge

Figure 32 – Steel Bridge

Figure 33 – Timber Bridge

BRIDGE CONDITION

Bridge condition is determined through inspections conducted based on the National Bridge Inventory (NBI) rating scale, as shown in **Table 19**. A complete guide for bridge condition ratings according to the NBI can be found in the *Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges.* [9]

Table 19 - NBI Condition Descriptions

NBI Rating	General Condition Description
7-9	Like New/Good
5-6	Fair
3-4	Poor/Serious
0-2	Critical/Failed

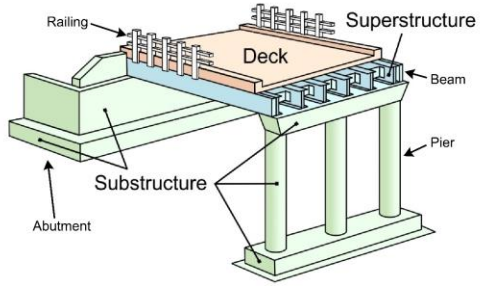

Figure 34 – Diagram of Bridge Elements

[9] *Federal Highway Administration. December 1995. From: https://www.fhwa.dot.gov/bridge/mtguide.pdf*

BRIDGE TREATMENTS

There are various options to treat bridges on the network, depending on several factors. The following sections outline the different options and considerations for bridge treatments.

Replacement

Replacement work is typically performed when a bridge is in poor condition (rated 4 or less) and will bring the bridge condition into good, or 7 or higher. The Local Bridge Program, a part of MDOT's Local Agency Program, defines bridge replacement as a full replacement, removing the entire bridge (superstructure, deck, and substructure) before re-building the bridge at the same location. **Figure 34** shows the different bridge elements considered when deciding what work to perform on a bridge. The decision to perform a total replacement or a rehabilitation of a bridge (described later in this section) should be made based on life-cycle cost analysis. In general, a replacement is deemed the

appropriate fix if the rehabilitation costs more than two-thirds (2/3) of the cost of replacement. Replacement is typically the most expensive treatment option.

Rehabilitation

Rehabilitation involves repairs that improve the existing condition while extending the service life of the structure and the riding surface. Rehabilitation is usually chosen when preventive maintenance is not enough to address the degradation of the bridge and is typically performed on poor-rated elements (rated 4 or less) to improve them to fair or good condition (rated 5 or better). Rehabilitation can include superstructure replacement, or the removal and replacement of beams and deck, or deck replacement. Rehabilitation treatments can often be more cost-effective than replacing the entire structure even though these actions are more expensive than general maintenance, and can include the following:

Railing Retrofit or Replacement

A railing retrofit or replacement either reinforces the existing railing or replaces it entirely. This rehabilitation fix is driven by a need for safety improvements on poor-rated railings or barriers (rated 4 or below).

Beam Repair

Beam repair corrects damage that has reduced beam strength. With steel beams, repair occurs when there is 25% or more of section loss in an area of the beam that affects load-carrying capacity. With concrete beams, repair occurs when there is 50% or more spalling (i.e., loss of material) at the ends of the beam.

Substructure Concrete Patching and Repair

Patching and repairing the substructure is essential to keep a bridge in service. These rehabilitation actions are performed when the abutments or piers are fair or poor (rated 4 or 5), or if spalling and delamination affect less than 30% of the bridge surface.

Preventive Maintenance

According to the Federal Highway Administration (FHWA), preventive maintenance is the means of applying cost-effective treatments to bridge

elements and features in order to extend the service life and avoid further deterioration of the bridge. By doing so, agencies can avoid large expenses related to bridge rehabilitation or replacement in the future. Preventive maintenance is typically applied to bridges that are rated fair (rated 5 or 6) in order to slow the rate of deterioration and avoid the structure falling into poor condition.

Concrete Deck Overlay

A concrete deck overlay involves removing and replacing the driving surface of a bridge. This is typically done when the deck surface is poor (rated 4 or less) and the portion underneath of the deck is at least fair (5 or higher). A shallow or deep concrete overlay may be performed depending on the condition of the bottom of the deck. More detail about bridge deck preservation can be viewed through MDOT's *Bridge Deck Preservation Matrix.* [10]

Deck Repairs

There are a few common techniques utilized for deck repair: HMA overlay with or without waterproof membranes, concrete patching, deck sealing, crack sealing, and joint repair or replacement. An HMA overlay with an underlying waterproof membrane can be placed on bridge decks with a surface rating of fair or lower (rated 5 or less) and with deficiencies that cover between 15% and 30% of the deck surface and deck bottom. An HMA overlay without a waterproof membrane should be used on a bridge deck with deck surface and bottom ratings of serious or lower (rated 3 or less) and with deficiencies that cover more than 30% of the deck surface and bottom. This is a temporary solution to improve ride quality when a bridge deck is scheduled to undergo major rehabilitation within five (5) years. All HMA overlays must be accompanied by an updated load rating. Patching concrete on a bridge deck is done in response to an inspector's work recommendation or when the deck surface is rated good (7), satisfactory

[10] *MDOT. Jaqnuary 2021. From: https://www.michigan.gov/mdot/-/media/Project/Websites/MDOT/Programs/Bridges-and-Structures/Mgmt-and-Scoping/Bridge-Deck-Preservation-Matrix-Decks-Uncoated-Black-Rebar.pdf*

(6), or fair (5) with minor delamination and spalling. Deck sealer can also be used to preserve a bridge deck in good condition.

Deck sealing should only be used when the bridge deck has a surface rating of fair or better (rated 5 or higher). Similarly, concrete sealers should only be used when the top and bottom surfaces of the deck are free from major deficiencies, cracks, and spalling. An epoxy overlay may also be used to repair an existing epoxy overlay. Concrete crack sealing can be used to maintain concrete that is in good condition but may have visible cracks with potential to reach the steel reinforcement.

Steel Bearing Repair and Replacement

A bridge superstructure is separated from the piers by bearings rather than the structure sitting directly on them. These bearings allow a certain degree of movement caused by temperature changes or other forces. Bridges with girders and a deck in fair condition or better (rated 5 or higher) with bearings in poor condition (rated 4 or less) are candidates for this work.

Painting

Bridge structures can be completely repainted or only parts of it at a time. When paint condition is in serious condition, or rated a 3 or less, a bridge likely needs to be completely repainted. Partial repainting consists of zone repainting, which is a preventive maintenance technique, or spot repainting, which is scheduled maintenance. Zone repainting is done when less than 15% of the paint in a smaller area, or zone, has failed while the rest of the bridge is in good or fair condition or if the paint condition is fair or poor, an NBI rating of 5 or 4.

Channel Improvements

Channel improvements, or improvements done to the waterway that flows underneath the bridge, are based on an inspector's hydraulic analysis or to remove vegetation, debris, or sediment from the channel and bank.

Scour Countermeasures

Scour countermeasures are done when a structure is categorized as scour critical and is not scheduled for replacement. This is also done when an

inspection indicates the presence of scour holes in an abutment and/or pier.

Approach Repaving

A bridge's approach is the transition area between the roadway leading up to and away from the bridge and bridge deck. Repaving the approach areas is done in response to an inspector's work recommendation when the pavement surface is in poor condition (an NBI rating of 4 or less), or when the bridge deck is replaced or rehabilitated (e.g., concrete overlay).

Guardrail Repair or Replacement

A guardrail is a safety feature on many roads and bridges that prevents or minimizes the effects of lane departure incidents, making their maintenance paramount. Repair or replacement of a guardrail should be done when a guardrail is missing or damaged, or when it needs a safety improvement.

Scheduled Maintenance

Scheduled maintenance activities are done on a regular schedule and are intended to maintain serviceability while reducing the rate of deterioration.

Superstructure Washing

Washing the superstructure, or the main structure supporting the bridge, typically occurs in response to a work recommendation or when salt-contaminated dirt and debris collected on the superstructure is causing corrosion or deterioration by trapping moisture.

Drainage System Cleanout/Repair

In order for a bridge to shed water effectively, the drainage system must remain clean and in good working order. Signs a drainage system may need to be cleaned or repaired includes clogs and broken, deteriorated, or damaged drainage elements.

Spot Painting

Spot painting is a scheduled maintenance action that involves painting a small portion of a bridge, typically done in response to a work recommendation and is used for zinc-based paint systems only.

Slope Repair/Reinforcement

The slope refers to the terrain on either side of the bridge that angles down toward the channel. This may need repair work when the slope has degraded, it

has significant areas of distress or failure, when the slope has settled, or if the slope is in fair or poor condition (an NBI rating of 5 or lower). Other times, the slope may need to be reinforced. This can be done by installing riprap, a side-slope covering made of stones that protects the stability of side slopes of channel banks when erosion threatens the surface.

Vegetation Control and Debris Removal

Keeping the area around the bridge structure free from vegetation and debris can help to safeguard the bridge structure from potentially damaging forces. Removing or restricting vegetation around bridges prevents damage to the structure. Vegetation control occurs when an inspector submits a work recommendation or when vegetation traps moisture on structural elements or is growing from joints or cracks. Debris in the water channel or in the bridge can also cause damage to the structure. Removing this debris is typically done in response to a work recommendation or when vegetation, debris, or sediment accumulates on the structure or the channel.

Miscellaneous Repairs

These are uncategorized repairs and are usually in response to a work recommendation from an inspector.

APPENDIX C. ROADSOFT DATA EXPORTS

This section includes the raw outputs from RoadSoft that were imported and utilized in the TAMC template to inform condition summaries and forecasts. All values are centerline miles and data are from 2024.

Table 20 - Act 51 Road Classifications for Detroit

Code	Description	Undefined	StateTrunk	CoPrimary	CoLocal	CityMajor	CityMinor	NonCert
22000	Detroit	0	0	0	0	719.4	1867.1	0

Table 21 - Act 51 Road Classifications for Detroit NHS Routes

Code	Description	Undefined	StateTrunk	CoPrimary	CoLocal	CityMajor	CityMinor	NonCert
22000	Detroit	0	0	0	0	131.2	1.2	0

Table 22 - Latest PASER Condition Summary for Detroit by Legal Status

Description	Code	0-Not Rated	1-Poor	2-Poor	3-Poor	4-Poor	5-Fair	6-Fair	7-Fair	8-Good	9-Good	10-Good
City Major	4	0	5.8	39.3	79.5	117.6	74.3	87.6	101.9	98.1	61.9	53.6
City Local	5	0	69.1	112.9	305.4	489.8	406.5	228.3	137.9	86.3	22.5	6.3

Table 23 - Latest PASER Condition Summary for Detroit

Description	Code	0-Not Rated	1-Poor	2-Poor	3-Poor	4-Poor	5-Fair	6-Fair	7-Fair	8-Good	9-Good	10-Good
Detroit	22000	0	74.9	152.2	384.8	607.4	480.8	316.0	239.7	184.4	84.4	59.9

Table 24 - Latest PASER Condition Summary for Detroit NHS Routes by Legal Status

Description	Code	0-Not Rated	1-Poor	2-Poor	3-Poor	4-Poor	5-Fair	6-Fair	7-Fair	8-Good	9-Good	10-Good
City Major	4	0	0.3	2.5	12.0	21.0	15.6	21.6	23.4	19.1	8.2	7.7
City Local	5	0	0.2	0.2	0.0	0.0	0.2	0.2	0.0	0.3	0.0	0.1

Table 25 - Lastest PASER Condition Summary for Detroit by Legal Status for Last Five Years

RatingYear	Description	Code	0-Not Rated	1-Poor	2-Poor	3-Poor	4-Poor	5-Fair	6-Fair	7-Fair	8-Good	9-Good	10-Good
2015	City Local	5		0.0	0.3	1.4	1.0	1.6	1.7	1.4	0.6	0.0	0.0
2015	City Major	4		0.3	9.7	63.4	79.7	67.0	37.0	31.0	13.0	8.8	0.2
2016	City Local	5		0.0	0.0	0.6	0.4	0.9	0.8	0.1	0.3	0.0	0.0
2016	City Major	4		0.3	4.9	54.5	70.7	54.4	32.3	27.4	19.0	18.3	1.0
2017	City Local	5		0.0	0.3	1.0	1.7	1.1	1.5	1.3	0.7	0.4	0.0
2017	City Major	4		1.8	44.0	79.1	78.1	117.8	35.9	23.9	20.2	27.8	1.2
2018	City Local	5		0.0	0.3	0.7	1.9	1.0	0.7	0.2	0.4	0.0	0.0
2018	City Major	4		2.2	79.2	81.4	26.0	16.6	23.8	17.1	28.6	7.7	0.3
2019	City Local	5		0.1	1.3	1.4	2.0	0.5	1.2	1.1	0.3	0.0	0.0
2019	City Major	4		4.1	45.3	66.8	51.6	40.1	25.2	20.1	24.0	31.3	1.5
2020	City Major	4		0.0	0.8	1.0	2.3	2.0	2.4	0.9	1.2	0.0	0.0
2021	City Local	5		0.3	1.5	1.4	3.3	3.0	0.7	0.6	0.1	0.3	0.0
2021	City Major	4		5.6	89.0	109.3	83.1	78.0	58.0	67.9	64.4	31.7	6.8
2022	City Local	5		0.0	0.4	1.3	0.9	2.1	0.4	0.5	0.6	0.0	0.0
2022	City Major	4		0.6	24.5	62.2	45.2	64.0	46.7	37.0	12.5	9.3	5.0
2023	City Local	5		0.0	0.2	1.3	2.3	1.2	0.5	0.4	0.1	0.1	1.0
2023	City Major	4		2.2	24.6	32.3	40.3	29.8	33.1	43.4	44.6	21.8	16.5
2024	City Local	5		69.1	112.7	304.4	489.3	405.3	227.8	137.5	86.2	22.4	5.3
2024	City Major	4		3.6	14.7	47.2	77.3	44.5	54.6	58.5	53.5	40.1	37.0

Table 26 - Latest IBR Ratings for Detroit

Description	Code	0-Not Rated	1-Poor	2-Poor	3-Poor	4-Poor	5-Fair	6-Fair	7-Fair	8-Good	9-Good	10-Good
Detroit	22000	0	0.9	0.3	0.0	0.1	0.4	0.1	0.0	0.0	0.3	0.0

APPENDIX D. BRIDGE INVENTORY

Bridge Type	Structure Number	Bridge ID	Facility Carried	Features Intersected	Primary or Secondary Route	Structure Type Main Span (Item 43A - Material)	Structure Type Main Span (Item 43B)	Number of Main Span (Item 45)	Total Str Length (Item 49)	Year Built (Item 27)	Year Recon (Item 106)	ADT	Year of ADT
Steel – Multistringer	**11479**	824180882122B01	I-96 EB SERV RD	ROUGE RIVER	Primary	3	2	3	270	1970	2011	3265	2010
Steel – Multistringer	**11481**	824180882122B03	I-96 WB SERV RD	ROUGE RIVER	Primary	3	2	3	270	1970	2011	1087	2010
Steel – Multistringer	**11486**	824180882122R01	S SERVICE RD	LAND	Primary	3	2	5	250	1971		2181	2008
Prestressed concrete – Multistringer	**12343**	824180800064R01	JEFFERSON AVE	DEQUINDRE CUT GREENWAY	Primary	5	2	1	94.8	1923	2006	24127	2008
Concrete – Culvert	**12344**	824180800066R01	JEFFERSON AVENUE	CONRAIL (ABN)	Primary	1	19	1	24.3	2016		24850	2013
Steel – Multistringer	**12345**	824180800092R01	MT ELLIOTT - MOUND	GTW RR AND CANIFF	Primary	3	2	16	1575.5	1969	1996	12856	2008
Steel – Multistringer	**12363**	824180800164R01	LAFAYETTE STREET	CONRAIL	Primary	3	2	2	125.3	1984	2016	3500	2015
Steel – Multistringer	**12370**	824180800319R01	TWELFTH STREET	CONRAIL	Primary	3	2	2	160.7	1984		8000	2015
Steel continuous – Multistringer	**12380**	824180800400R01	LARNED STREET	DEQUINDRE CUT GREENWAY	Primary	4	2	3	82.2	1923	2010	15014	2009
Steel continuous – Multistringer	**12381**	824180800405R01	LAFAYETTE STREET	DEQUINDRE CUT GREENWAY	Primary	4	2	2	66.1	1924	2009	13709	2009
Steel continuous – Multistringer	**12391**	824180800502R01	E GRAND BOULEVARD	GTW RR & RIVARD ST	Primary	4	2	6	488	1973	2008	3729	2005
Steel – Multistringer	**12393**	824180800620R01	BAGLEY	CONRAIL	Primary	3	2	4	277.9	1978		3539	2008
Concrete – Culvert	**12426**	824180801086B01	KORTE AVE	FOX CREEK	Primary	1	19	1	38	2004		1536	2005
Steel – Multistringer	**12427**	824180801105R01	CHESTNUT	DEQUINDRE CUT GREENWAY	Primary	3	2	2	65.9	1929		1100	2023
Concrete – Culvert	**12428**	824180801106R01	ANTIETAM AVE	DEQUINDRE CUT GREENWAY	Primary	1	19	2	90.6	2007		1433	1997
Prestressed concrete – Multistringer	**12442**	824180801531B01	TIREMAN AVE	ROUGE RIVER	Primary	5	2	2	89.9	1930	1998	2558	2008
Prestressed concrete – Multistringer	**12443**	824180801666B01	PLYMOUTH ROAD	ROUGE RIVER	Primary	5	2	3	119.4	1959	1983	12696	2020
Concrete – Culvert	**12446**	825180800031R01	ADELAIDE	DEQUINDRE CUT PATHWAY	Secondary	1	19	2	68.5	2014		335	2008
Concrete – Arch—deck	**12448**	825180800244B01	ASHLAND AVE	FOX CREEK	Secondary	1	11	1	42.3	2006		594	2008
Concrete – Culvert	**12456**	825180801083B01	RIVERSIDE AVE	CANAL	Secondary	1	19	1	41	2001		148	2003
Concrete – Slab	**12457**	825180801083B02	RIVERSIDE AVE	FOX CREEK	Secondary	1	1	3	64	1991		473	2008
Prestressed concrete – Multistringer	**12458**	825180801218B01	SPINOZA DRIVE	ROUGE RIVER	Secondary	5	2	2	83	1930	1998	1317	2008
Steel – Multistringer	**12464**	825180801676S01	SIXTH ST	JEFFERSON AVE	Secondary	3	2	7	400	1984		1136	2008
Concrete – Culvert	**12467**	825180803125R01	DIVISION	DEQUINDRE CUT PATHWAY	Secondary	1	19	2	68.5	2014		335	2008

Bridge Type	Structure Number	Bridge ID	Facility Carried	Features Intersected	Primary or Secondary Route	Structure Type Main Span (Item 43A - Material)	Structure Type Main Span (Item 43B)	Number of Main Span (Item 45)	Total Str Length (Item 49)	Year Built (Item 27)	Year Recon (Item 106)	ADT	Year of ADT
Prestressed concrete – Box beam/girders—multiple	**12470**	825180807047B01	HARBOR AVE	CANAL	Secondary	5	5	2	40	1984		313	2008
Steel – Multistringer	**12474**	825180808001R01	MACK AVE	CONRAIL	Secondary	3	2	5	499.3	1989		9682	2008
Concrete – Slab	**12475**	825180810107B01	KLENK AVE	FOX CREEK	Secondary	1	1	3	35	1981		116	2008
Prestressed concrete – Box beam/girders—multiple	**12483**	825180817076B01	RIDGE RD	ROUGE RIVER	Secondary	5	5	1	74	2009		612	2008
Concrete – Culvert	**12493**	825180822234R01	WILKINS	DEQUINDRE CUT PATHWAY	Secondary	1	19	2	68.5	2015		3532	2008
Prestressed concrete – Box beam/girders—multiple	**14638**	824180899999S01	BATES STREET	PARKING LOT	Primary	5	5	19	294.3	2000		2021	1900

APPENDIX E. BRIDGE INSPECTION AND APPRAISAL FINDINGS

SN	Bridge ID	Inspection Date	Oper. Status (Item 41)	Deck Rating (Item 58)	Deck Bottom Rating (Item XX)	Super Str Rating (Item 59)	Substr Rating (Item 60)	Channel Rating (Item 61)	Culvert Rating (Item 62)	Surface Rating (Item 58A)	Paint Rtg	Exp Joint Rating (Item XX)	Other Joints	Structure Evaluation	Structurally Deficient	Sufficiency Rating	Section Loss	Scour Critical (Item 113)
11479	824180882122B01	6/5/2024	A	7	7	7	7	5	N	7	6	7	7	G	Funct Obs	80.4	3	7
11481	824180882122B03	6/5/2024	A	7	7	7	7	5	N	7	7	7	6	G	Funct Obs	80.8	2	7
11486	824180882122R01	6/5/2024	A	7	7	8	7	N	N	8	8	8	8	G	Funct Obs	89.8	3	N
12343	824180800064R01	12/2/2022	A	8	8	8	7	N	N	8	N	7	N	G	Funct Obs	72.3	3	N
12344	824180800066R01	11/8/2022	A	N		N	N	N	8					G		99		N
12345	824180800092R01	7/25/2024	A	6	6	6	5	N	N	6	6	5	6	F	Funct Obs		2	N
12363	824180800164R01	12/13/2023	A	6	6	7	7	N	N	6	5	8	7	F	Funct Obs	94.4	3	N
12370	824180800319R01	12/13/2023	A	7	7	7	7	N	N	7	6	8	6	G	Funct Obs	94.7	2	N
12380	824180800400R01	11/30/2023	A	7	7	8	6	N	N	7	7	7	6	F	Funct Obs	77	3	N
12381	824180800405R01	11/30/2023	A	7	7	7	6	N	N	7	7	7	6	F	Funct Obs	81	3	N
12391	824180800502R01	11/30/2023	A	7	7	6	6	N	N	7	7	4	5	F	Funct Obs	91	2	N
12393	824180800620R01	3/27/2024	A	7	7	7	7	N	N	7	8	8	7	G	Funct Obs	81.4	3	N
12426	824180801086B01	12/13/2023	A	N		N	N	6	8					G		89.3		8
12427	824180801105R01	6/5/2024	P	3	3	4	3	N	N	5	N	N	3	P	Struct Def	42.8	N	N
12428	824180801106R01	11/14/2023	A	N		N	N	N	7					G	Funct Obs	89		N
12442	824180801531B01	11/30/2023	A	7	7	7	5	7	N	7	N	7	7	F	Funct Obs	68.6	3	7
12443	824180801666B01	11/21/2023	A	7	6	7	5	5	N	7	N	7	7	F		79.6	3	7
12446	825180800031R01	11/16/2022	A	N		N	N	N	8					G		100		N
12448	825180800244B01	6/27/2024	P	7		7	7	7	N	7	N	7	6	G		94.9	N	8
12456	825180801083B01	12/13/2023	A	N		N	N	7	8					G		89.6		8
12457	825180801083B02	6/27/2024	A	6	6	6	7	7	N	5	N	6	6	F		90.6	3	8
12458	825180801218B01	11/30/2023	A	7	7	7	6	5	N	7	N	6	6	F	Funct Obs	86.3	3	7
12464	825180801676S01	12/13/2023	P	5	5	4	4	N	N	5	4	2	4	P	Struct Def	55		N
12467	825180803125R01	11/16/2022	A	N		N	N	N	8					G		99		N
12470	825180807047B01	11/14/2023	P	5	N	4	7	6	N	5	N	4	5	P	Struct Def	61	2	8
12474	825180808001R01	6/27/2024	A	5	6	7	6	N	N	4	6	7	7	F	Funct Obs	76	2	N
12475	825180810107B01	6/27/2024	A	7	7	8	7	8	N	7	N	6	6	G		94.5	N	8
12483	825180817076B01	11/30/2023	A	7	N	8	8	8	N	7	N	7	8	G		97.9	3	8
12493	825180822234R01	11/14/2023	A	N		N	N	N	8					G		98.7		N
14638	824180899999S01	7/25/2023	A	7	8	7	6	N	N	7	N	6	7	F		84.5	N	N

APPENDIX F. PERFORMANCE PLAN

Goal	Performance Measure(s)	Priority
Create a Single Source of Authoritative Data	• 90% of plans, cross sections, and prior year project data for roadway segments will be integrated into the city's centralized tool by the end of 2025. • All data will be transferred into the tool, including lifecycle data such as automated condition surveys, repairs, and maintenance history. • Create an automated reporting tool that updates internal and external users on what has been completed.	High
Deliver Projects on Time and on Budget	• Establish a procedure for root-cause analysis to be conducted on projects that exceed the scheduled completion date or are completed with +10% over the approved budget to develop lessons learned and best practices for future projects. • Complete at least 85% of projects on or before the scheduled completion date *and* no more than 10% over the approved budget.	High
Utilize the Right Fix at the Right Time	• Create a formal program to assess and analyze pavement condition and determine the best fix for locations of concern. • Develop training for internal staff to identify the cause of pavement issues and to determine the responsible party to complete repairs. • Hire a Pavement Engineer to lead the program by 2026. • Explore additional fix types and repair programs to address areas where repairs are the responsibility of the department. • Upgrade the southwest Detroit truck route roadways to be all-season status.	Medium
Improve Coordination with Utility Organizations	• Continue to develop tools for use by the Infrastructure Coordination Team to reduce the number of projects impacted (budget, schedule) by utility organizations. • In 2025, develop a three to five-year plan to allow utilities to plan repairs in advance of projects and reduce the potential of project delays or damage to newly repaired roadways. • Implement moratoriums following roadway improvement projects for non-emergency utility work in the roadway right-of-way by 2026.	Medium
Improve Safety Awareness throughout the City	• Update the Safety Action Plan by 2027, with a focus on safety and enforcement to achieve zero fatalities. Increase work zone awareness within the department and local motorists by promoting and marketing safety practices.	Low
Reduce the number of Unreported Incidents and Through Traffic on Residential Streets	• Continue to support and develop a community call for action for the speed bump program to reduce speeds on residential roadways. • Explore new traffic calming solutions through industry outreach and Safe Streets for All implementation projects to improve safety and reduce the presence of commercial and through traffic on residential roadways.	Low

APPENDIX G. CANDIDATE PROJECTS

In addition to the federal aid program, **Table 27** shows roadways that were resurfaced in 2022 and are likely able to be treated with crack seal to further maintain the integrity of the pavement.

Table 27 - Previously Resurfaced in 2022 Crack Seal Candidates

Street Name	From	To	Lane Miles
Vernor	Livernois	Dix	1.86
Elmhurst	WB I-96 Serv Dr	Livernois	0.34
W. Warren	Southfield (M-39)	Greenfield	0.99
Rosa Parks Blvd	Atkinson	West Grand	1.60
Oakland	Caniff	Woodland	0.47
Caniff	Oakland	City Limit	0.70
Lafayette	Shelby	NB M-10 Serv Dr	0.41
State	Woodward	Washington Blvd	0.18
W. Grand Blvd	W. Jefferson	Fort	0.41
15th	Warren	Edsel Ford Fwy	0.26
Andover	Eight Mile	Seven Mile	0.99
Ash	14th	Wabash	0.07
Bedford	McKinney	King Richard	0.14
Bloom	E. Outer Dr	Eight Mile	0.47
Cardoni	Emery	Seven Mile	0.17
Carmel	Woodward	Bauman	0.22
Chatham	Florence	Verne	0.12
Crane	Jefferson	Kercheval	0.42
Derby	Penrose	Dead End (N)	0.11
Edsel Ford	Gunston	Norcross	0.30
Evanston	Berkshire	Devonshire	0.21
Gilchrist	Outer Dr	Curtis	0.24
Greydale	Curtis	Pickford	0.12
Hanover	Lasalle Garden	W. Grand Blvd	0.27
Hazel	Wabash	Vermont	0.08
Mapleridge	Gratiot	Hayes	0.84
Moenart	E. Outer Dr	Eight Mile	0.47
Parker	Palmer	Hendrie	0.12
Payton	Morang	Dean End (W)	0.11
Redford	Lahser	Grand River	0.08
Selden	Vermont	14th	0.15
Stanton	Grand River	Edsel Ford Fwy	0.20
Yacama	Eight Mile	Seven Mile	0.98
E. Warren	3 Mile Dr	Cadieux	0.58

Street Name	From	To	Lane Miles
14th	Pine	Dalzelle	0.27
Evergreen	Tireman	I-96	2.04
Glendale	14th	M-10	0.36
Griswold	E. Jefferson	Clifford	0.49
Lyndon	Greenfield	Schaefer	1.00
Meyers	I-96	McNichols	2.13
Mt. Elliott	E. Jefferson	Gratiot	1.63
Nevada	I-75	Woodward	0.79
Pine	14th	Fisher	0.03
Puritan	M-10	Meyers	0.22
Almont	Van Dyke	French	0.45
Ardmore	Seven Mile	Vassar	0.24
Artesian	Sawyer	W. Warren	0.25
Artesian	Cathedral	Joy	0.25
Auburn	Whitlock	W. Warren	0.25
Balfour	Morang	Grayton	0.34
Bentler	Pilgrim	Fenkell	0.37
Braile	Chicago	Joy	0.49
Bramell	Fenkell	Midland	0.25
Brooklyn	Spruce	Temple	0.11
Burlingame	Woodrow Wilson	John C Lodge Fwy	0.04
Canterbury	Wakefield	Sheffield	0.05
Chalfonte	Birwood	Griggs	0.05
Chippewa	Cantebury	Warrington	0.05
Clayburn	Tireman	W. Warren	0.50
Courville	McKinney	King Richard	0.14
Doris	Dexter	Linwood	0.49
Doris	Livernois	Dexter	0.31
Elm	Grand River	Trumbull	0.15
Eureka	Seven Mile	E Outer Dr	0.50
Fairmount	Hoover	Annott	0.13
Faust	Whitlock	Paul	0.25
Forest	Hurbut	Cadillac	0.07
Glendale	Rosa Parks	14th	0.16
Glenwood	Salter	Morang	0.08
Glynn Ct	Linwood	14th	0.32
Goethe	Van Dyke	Crane	0.47
Greenlawn	Norfolk	Eight Mile	0.17
Greenlawn	Norfolk	Chippewa	0.16
Griggs	Puritan	Florence	0.17
Hurlbut	E. Warren	Moffat	0.18
Ilene	Puritan	Florence	0.17
Indiana	Pembroke	Chippewa	0.17
Indiana	Chippewa	Eight Mile	0.33
Kensington	McKinney	King Richard	0.14
Kentucky	Puritan	Pilgrim	0.13

Street Name	From	To	Lane Miles
La Salle	Boston	Tuxedo	0.51
LakePointe	E. Warren	Voight	0.19
Lauder	Fullerton	Tyler	0.25
Lawton	Chicago	Tuxedo	0.54
Leland	Joseph Campau	Mitchell	0.05
Lemay	Shoemaker	E. Warren	0.29
Lillibridge	Shoemaker	E. Warren	0.24
Littlefield	Lyndon	Eaton	0.17
Lodge Service Dr	Glynn	Boston	0.08
Marne	Morang	Cadieux	0.09
Mettetal	Schoolcraft	Acacia	0.33
Minock	Whitlock	W. Warren	0.25
Minock	Plymouth	Chicago	0.50
Minock	Cathedral	Chicago	0.25
Monica	Puritan	Florence	0.17
Monica	Norfolk	Chippewa	0.16
Montclair	Mack	Canfield	0.33
Montrose	Diversey	W. Warren	0.33
Newark	Vernor	17th	0.09
Parkgrove	Hayes	Chalmers	0.50
Pelkey	Lappin	Pinewood	0.11
Pelkey	State Fair	Eight Mile	0.49
Penrod	Whitlock	Paul	0.25
Perry	Brooklyn	Trumbull	0.15
Phillip	E. Warren	Frankfort	0.13
Pierson	Orangelawn	Chicago	0.17
Pierson	Elmira	Orangelawn	0.17
Pierson	Plymouth	Elmira	0.16
Plainview	Lyndon	Schoolcraft	0.50
Promenade	Hayes	Chalmers	0.29
Riad	Morang	Dead End	0.11
Richton	John C Lodge	Woodrow Wilson	0.08
Saratoga	MacCrary	Chalmers	0.25
Savannah	John R	Brush	0.23
Sawyer	Plainview	Auburn	0.06
Somerset	Evanston	Berkshire	0.10
Springfield	Edsel Ford	Shoemaker	0.27
St Patrick	Gunston	Berkshire	0.18
St. Paul	Mt. Elliott	Concord	0.30
Stansbury	McNichols	Grove	0.15
Stoepel	Pembroke	Norfolk	0.34
Stout	W. Warren	Sawyer	0.25
Strasburg	Eight Mile	Collingham	0.11
Temple	Grand River	Trumbull	0.25
Thompson	Glendale	240 ft North of Glendale	0.05

Street Name	From	To	Lane Miles
Traverse	French	Raymond	0.40
Victor	Dequindre	Riopelle	0.10
Warwick	Cambridge	Saint Martins	0.25
Warwick	Westfield	Chicago	0.13
Warwick	Dover	Joy	0.12
Washburn	McNichols	Santa Maria	0.13
Wildemere	W. Grand Blvd	Lothrop	0.08
Winchster	Hull	Greeley	0.05
Young	Queen	Hayes	0.13
Alcoy	Manning	State Fair	0.11
Balfour	Kingsville	McCormick	0.05
Beaverland	Santa Maria	McNichols	0.17
Bringard	Barlow	Annott	0.32
Bringard	Rowe	Hoover	0.06
Bringard	Schoenherr	Joann	0.25
Capitol	Schaefer	Meyers	0.50
Chippewa	Meyers	Alley (East of Mendota)	0.25
Collingham	Goulburn	Alcoy	0.25
Collingham	Pelkey	Schoenherr	0.06
Fairmount	Annott	Dresden	0.12
Glendale	St Marys	Asbury Park	0.12
Grove	Linwood	Fairfield	0.37
Healy	Stockton	Hilldale	0.13
Lantz	Andover	John R	0.17
Lappin	Goulburn	Westphalia	0.06
Lappin	Fairport	Schoenherr	0.31
Lappin	Hoover	Dresden	0.25
Lappin	Strasburg	Hamburg	0.06
Manning	Hoover	Bradford	0.19
Midland	Livernois	Belden	0.25
Midland	Princeton	Linwood	0.06
Norfolk	Mendota	Pinehurst	0.06
Norfolk	Monte Vista	Meyers	0.11
Norfolk	Livernois	Gardendale	0.16
Norfolk	Prairie	Monica	0.06
Norfolk	Santa Barbara	San Juan	0.08
Peerless	Moross	Kingsville	0.11
Pembroke	Evergreen	Shaftbury	0.38
Pinehurst	Pembroke	St Martins	0.12
Pinewood	Rowe	Hoover	0.06
Sanilac	McCormick	Kingsville	0.05
St Martins	Greenlawn	San Juan	0.25
St Martins	Prairie	Monica	0.06
St Martins	Santa Rosa	Livernois	0.10
Stockton	Ryan	Mound	0.98

Street Name	From	To	Lane Miles
Stoepel	Norfolk	8 Mile	0.17
St Cyril	Grinnell	Van Dyke	0.02
WB I-96 Service Dr	Grand River	Oakman	0.46
Lafayette W	St Anne	Lodge SD SB	1.15

Table 28 contains the projects the City has on their candidate list for 2026 and beyond or if additional funding becomes available sooner.

Table 28 - Candidate Projects for Resurfacing

Paving Year	Street	From	To
2025+	14th	I-94	Clairmount
2025+	14th	Michigan	I-94
2025+	14th	Oakman	Chicago
2025+	2nd	Clairmount	Highland Park City Limits (n of Webb)
2025+	3rd	Clairmount	Highland Park City Limits (n of Webb)
2025+	Atwater	Steve Yzerman Drive	Bates
2025+	Baltimore	W Milwaukee	Brush
2025+	Bates	Congress	Randolph
2025+	Beaufait	E Forest	Mack
2025+	Bellevue	E Warren	E Forest
2025+	Bentler	W McNichols	Pickford
2025+	Buchanan	Livernois	Scotten
2025+	Buffalo	McNichols	Charles
2025+	Calvert	Linwood	Woodrow Wilson
2025+	Chalmers	Houston-Whittier	7 Mile
2025+	Charles	Conant	Mt. Elliott
2025+	Charlevoix	Conner	Alter
2025+	Charlevoix	St. Jean	Gratiot
2025+	Chene	I-94	Gratiot
2025+	Conant	Nevada	8 Mile

Paving Year	Street	From	To
2025+	Curtis	Livernois	Wyoming
2025+	Davison W	Wyoming	Ewald
2025+	Dequindre	7 Mile	8 Mile
2025+	Dexter	Doris	Fenkell
2025+	Dickerson	E Jefferson	E Canfield
2025+	Dragoon	I-75	Vernor
2025+	Dragoon	Vernor	W Jefferson
2025+	E. Forest	Dequindre	Cadillac
2025+	E. Grand Blvd	E. Vernor	Gratiot
2025+	E. Grand Blvd	Mt. Elliott	Gratiot
2025+	E. Jefferson	Rivard	Alter
2025+	E. Vernor	Mt. Elliott	McClellan
2025+	E. Warren	St. Aubin	RR Tracks
2025+	EB I-94 Service Drive	Hurlbut	French
2025+	EB I-94 Service Drive	Lawton	Trumbull
2025+	EB I-96 Service Drive	Buchanan	Magnolia
2025+	EB I-96 Service Drive	Burt	Heyden
2025+	EB I-96 Service Drive	Grand River	Hudson
2025+	EB I-96 Service Drive	Joy	Tireman
2025+	EB Schoolcraft	Bentler	Burt
2025+	Eldon	McNichols	Mount Olivet
2025+	Elizabeth	Woodward	Witherell
2025+	Elmhurst	Linwood	Dexter

Paving Year	Street	From	To
2025+	Evergreen	I-96	Schoolcraft
2025+	Ferry	Chene	Elmwood
2025+	Freud	Chalmers	Clairepointe
2025+	Fullerton	Linwood	Livernois
2025+	Georgia	Saint Cyril	Erwin
2025+	Glendale	Dexter	Linwood
2025+	Greenlawn	Outer	8 Mile
2025+	Gunston	Outer Drive E	Harper
2025+	Harper	Van Dyke	E Edsel Ford Service Drive
2025+	Harper	Berkshire	Outer Drive E
2025+	Holden	W Grand Blvd	Lincoln
2025+	Houston Whittier	Gratiot	Hayes
2025+	John Kronk	Livernois	Conrail RR
2025+	John R	7 Mile	8 Mile
2025+	John R	McNichols	7 Mile
2025+	Jos Campau	Vernor	Gratiot
2025+	Kercheval	Conner	Alter
2025+	Lawton	Glendale	Tuxedo
2025+	Linwood	Chicago	Davison
2025+	Linwood	Grand Blvd.	Chicago
2025+	Livernois	Dragoon	Vernor
2025+	Livernois	I-75	Vernor
2025+	Lonyo	Michigan	Dix

Paving Year	Street	From	To
2025+	Luce	Ryan	Mt. Elliott
2025+	Lynch	Mt. Elliott	Van Dyke
2025+	Lyndon	W Outer Dr	Evergreen
2025+	Mack	Dequindre	Riopelle
2025+	Mack Ave	Algonquin	Alter
2025+	Martin Luther King Jr	14th	I-96
2025+	McClellan	Harper	Gratiot
2025+	Milwaukee	E Grand Blvd	M-10
2025+	Mt. Elliott	7 Mile	8 Mile
2025+	Mt. Elliott	Charles	McNichols
2025+	Mt. Elliott	E. Warren	Medbury
2025+	Mt. Elliott	McNichols	7 Mile
2025+	NB Chrysler Service Drive	Mack	Forest
2025+	NB M-10 Service Drive	Wyoming	W McNichols
2025+	Nevada	Mound	Van Dyke
2025+	Oakland	Clay	Caniff
2025+	Oakman	M-10	Hamilton
2025+	Orleans	Fisher E	Mack
2025+	Paul	Longacre	Greenfield
2025+	Pembroke	Wyoming	Livernois
2025+	Pickford	Lasher	Trinity
2025+	Piquette	Russell	Woodward
2025+	Plymouth	Schaefer	Grand River

Paving Year	Street	From	To
2025+	Puritan	M-10	Livernois
2025+	Rivard	Antietam	Jefferson
2025+	Rosa Parks	Michigan Ave.	Grand Blvd.
2025+	Saint Aubin	E Grand Blvd	Superior
2025+	SB Chrysler Drive	E Palmer	Mack
2025+	SB M-10 Service Drive	Chicago	Pallister
2025+	Schoenherr	7 Mile	6 Mile
2025+	Scotten	Michigan	I-94
2025+	Seymour	Gratiot	Hayes
2025+	Sherwood	7 Mile	8 Mile
2025+	Shoemaker	Conner	McClellan
2025+	St Antoine	E Canfield	E Warren
2025+	Steve Yzerman	3rd	Atwater
2025+	Strong	Saint Cyril	Mt. Elliott
2025+	Trumbull	I-75	Martin Luther King Jr Blvd
2025+	Vinewood	Buchanan	Warren
2025+	W Grand Blvd	W Vernor	Lafayette
2025+	W Grand Blvd	I-96	McGraw
2025+	W. Lafayette	Cavalry	Waterman
2025+	W. Lafayette	Springwells	Green
2025+	WB Edsel Ford Service Drive	Frontenac	Holcomb
2025+	WB Edsel Ford Service Drive E	Duncan	Frontenac

Paving Year	Street	From	To
2025+	WB Edsel Ford Service Drive E	Morang	Devonshire
2025+	WB I-94 Service Drive	Cadieux	Whittier
2025+	WB I-94 Service Drive	French	Hurlbut
2025+	WB I-94 Service Drive / I-94 Service Road	Moross	Morang
2025+	WB Schoolcraft	Patton	Westbrook
2025+	Whittier	Whitehill	Chandler Park
2025+	Woodrow Wilson	Davison	Elmhurst
2025+	Woodrow Wilson	Webb	Virginia Park
2026+	Junction	W Jefferson	I-75
	Schoolcraft	Wyoming	Ewald

In addition to the candidate projects already identified, the critical linkages were analyzed to determine those with the highest need for pavement treatment, as shown in **Table 29.**

Table 29 - Critical Linkages with Poor Pavement

Critical Linkage Roadway	Limits	Avg Rating	Lane Miles
Springwells Court	from Jefferson Avenue to terminus	1 - Poor	0.5
I-94 Service Drive	from 14th Street to Trumbull Street	1 - Poor	0.45
Freud Street	from Lycaste Street to Clairpointe Street	2 - Poor	0.4
Huber Street	from Mount Elliott Street to Saint Cyril Street	2 - Poor	1
Mount Elliott	from Georgia Street to Huber Street	2 - Poor	.25
Davison	from Wyoming Street to Ewald Circle	2 - Poor	1.3
Michigan Avenue	from Cass Avenue to Woodward Avenue	3 - Poor	0.3
Russell Street	from I-94 to Warren Avenue	3 - Poor	0.6
Conner Street	from McNichols Road to Gratiot Avenue	3 - Poor	1.2
John R Street	from Hancock Street to Mack Avenue	3 - Poor	0.7
Saint Jean Street	from Warren Avenue to Hern Street	4 - Poor	0.6
Mack Avenue	from Benitau Street to Conner Street	4 - Poor	0.75
Warren Avenue	from Trumbull Street to Dequindre Avenue	4 - Poor	4.2
Harbor Island Street	from Lakewood Street to eastern terminus	4 - Poor	0.3
Martin Luther King Jr Boulevard	from Trumbull Street to Russell Street	5 - Fair	3.2
Mount Elliott	from Mound Road to Harper Avenue	5 - Fair	2

Critical Linkage Roadway	Limits	Avg Rating	Lane Miles
Jefferson Avenue	from western city jurisdiction POB to eastern city limits	5 - Fair	6.7
Larned Street	from 3rd Street to Chrysler Drive	6 - Fair	0.72

APPENDIX H. RISK OF FAILURE METHODOLOGY

The risk of failure analysis was conducted to score identified critical linkages based on their current condition and functional importance. Concepts from the Failure Mode and Effects Analysis (FMEA) approach[11] were utilized in the analysis and evaluation of the critical linkages.

Condition was evaluated utilizing existing condition data, including PASER ratings for pavement and NBI ratings for structures. Functional importance was considered, looking at why the linkage was identified as critical and prioritizing them. **Table 30** outlines the approach for functional importance.

Table 30 - Risk of Failure Criticality Descriptions

Score	Description
1 – Least Critical	Closure would result in long detours and limit access, but would not result in dire situations
2 – Marginally Critical	Closure would result in long detours and major traffic disruptions, but likely does not result in dire situations
3 – Somewhat Critical	Provides access to neighborhoods or is a service drive; closure would likely lead to long detours, greatly limit access, and may result in dire situations
4 – Critical	Provides access to a large institution or area; closure would likely result in serious situations
5 – Most Critical	Provides access to emergency and municipal services like a hospital; provides the only access to an area; closure would be disastrous

[11] *Failure Modes and Effects Analysis (FMEA) is an analysis approach used to evaluate assets to determine the loss of function that would constitute a failure, according to Federal Highway Administration's* Handbook for Including Ancillary Assets in Transportation Asset Management Programs *(2019).*

Once condition and functional importance were determined, they were considered together to determine a criticality score, as outlined in **Table 31** for pavement and **Table 32** for bridges.

Table 31 – Pavement Critical Linkage Severity Rating

Severity Rating - Pavement	Risk Score	Current PASER Rating	Functional Importance
Severe/Critical	5	Very Poor/ Critical	Any
Major	4	Poor	High
Moderate	3	Poor	Low
Moderate	3	Fair	High
Minor	2	Fair	Low
Minor	2	Good	High
Minimal	1	Good	Low
Minimal	1	Excellent	Any

Table 32 - Bridge Critical Linkage Severity Rating

Severity Rating - Structure	Score	Current NBI Rating	Functional Importance
Severe/ Critical	5	Poor	Any
Major	4	Fair	High
Moderate	3	Fair	Low
Minor	2	Good	High
Minimal	1	Good	Low

APPENDIX I. RISK OF FAILURE ANALYSIS RISK REGISTER

CL #	Location	CL Criteria	Current Condition	Functional Importance Rating	Functional Importance Description	Criticality Score	Criticality Description
R26	Huber from Mount Elliott to terminus	Commercial access	Very Poor	3	Low	5	Severe/Critical
R4	Davison Avenue from Wyoming to Ewald	Commercial access	Very Poor	3	Low	5	Severe/Critical
S11	SN 12470 - Harbor Island Street over Canal	Geographic boundary	Poor	5	High	5	Severe/Critical
R16	Michigan Avenue from Woodward Avenue to Cass Avenue	High traffic	Poor	5	High	4	Major
R27	Conner Street from McNichols to Gratiot Avenue	Commercial access	Poor	5	High	4	Major
R24	Russell Street from Warren Avenue to I-94	Commercial access	Poor	4	High	4	Major
S8	SN 12345 - Mount Elliott St over Penn Central Railroad	Geographic boundary	Fair	4	High	4	Major
S10	SN 12474 - Mack Avenue over Canadian National Railroad	Geographic boundary	Fair	4	High	4	Major
S14	SN 12457 - Riverside Avenue over Fox Creek	Geographic boundary	Fair	5	High	4	Major

CL #	Location	CL Criteria	Current Condition	Functional Importance Rating	Functional Importance Description	Criticality Score	Criticality Description
R29	Freud Street from Lycaste Street to Clairpointe Street	Commercial access	Poor	2	Low	3	Moderate
R28	Saint Jean Street from I-94 to Warren Avenue	Commercial access	Poor	3	Low	3	Moderate
R19	John R Street from Warren Avenue to Mack Avenue	Commercial access	Fair	5	High	3	Moderate
R30	Mack Avenue from Beniteau Street to Conner Street	Commercial access	Fair	4	High	3	Moderate
R32	Harbor Island Street from Lakewood Street to the eastern terminus	Geographic boundary	Fair	5	High	3	Moderate
R6	Springwells Court from Jefferson to road terminus	Commercial access	Fair	4	High	3	Moderate
R9	Jefferson Avenue from Harrington Street to Campbell Street	Commercial access	Fair	5	High	3	Moderate
R23	Jefferson Avenue from Beaubien Street to eastern city limits	Commercial access	Fair	5	High	3	Moderate
R12	Warren Avenue from Trumbull to Dequindre	Commercial access	Fair	5	High	3	Moderate
R34	Riverside Boulevard from Park to Alter Road	Geographic boundary	Fair	5	High	3	Moderate
R20	Larned Street from Washington Boulevard to Chrysler Drive	Commercial access	Fair	4	High	3	Moderate

CL #	Location	CL Criteria	Current Condition	Functional Importance Rating	Functional Importance Description	Criticality Score	Criticality Description
S3	SN 12443 - Plymouth Rd over Rouge River	Geographic boundary	Fair	3	Low	3	Moderate
S6	SN 12391 - E Grand Boulevard over GTW RR & Wetherbee Street	Geographic boundary	Fair	3	Low	3	Moderate
R1	Plymouth Road from Outer Drive to Burt Road	Commercial access	Fair	2	Low	2	Minor
R25	Mount Elliott Street from Mound Road to I-94	Commercial access	Good	4	High	2	Minor
R5	Jefferson Avenue from Brennan Street to Dearborn Street	Commercial access	Good	5	High	2	Minor
R13	Martin Luther King Jr Boulevard/Mack Avenue from Russell Street to Trumbull Street	Commercial access	Good	5	High	2	Minor
R21	St Antoine Street from Warren Avenue to Mack Avenue	Commercial access	Good	5	High	2	Minor
R31	Conner Street from I-94 to Jefferson Avenue	Commercial access	Good	4	High	2	Minor
R18	Congress Street from 3rd Street to Chrysler Drive	Commercial access	Good	4	High	2	Minor
R10	Grand Boulevard from I-96 to I-94	Commercial access	Good	4	High	2	Minor

CL #	Location	CL Criteria	Current Condition	Functional Importance Rating	Functional Importance Description	Criticality Score	Criticality Description
R15	Cass Avenue from Temple Street to Grand River Avenue	Commercial access	Good	4	High	2	Minor
R33	Klenk Street (entire roadway)	Geographic boundary	Good	5	High	2	Minor
R17	Woodward Avenue from Adams Avenue to Larned Street	High traffic	Good	5	High	2	Minor
S1	SN 11481 - Schoolcraft Rd (North) over Rouge River	Geographic boundary	Good	3	Low	2	Minor
S2	SN 11479 - Schoolcraft Rd (South) over Rouge River	Geographic boundary	Good	3	Low	2	Minor
S5	SN 12393 - Bagley St over Penn Central Railroad	Geographic boundary	Good	3	Low	2	Minor
S7	SN 13343 - Jefferson Avenue over Dequindre Cut Greenway	Geographic boundary	Good	3	Low	2	Minor
S9	SN 12344 - Jefferson Avenue over Conrail	Geographic boundary	Good	3	Low	2	Minor
S12	SN 12456 - Riverside Avenue over Canal	Geographic boundary	Good	5	High	2	Minor
S13	SN 12475 - Klenk Avenue over Fox Creek	Geographic boundary	Good	5	High	2	Minor
R8	Livernois Avenue from Vernor Highway to I-94	Commercial access	Good	3	Low	1	Minimal

CL #	Location	CL Criteria	Current Condition	Functional Importance Rating	Functional Importance Description	Criticality Score	Criticality Description
R14	Anthony Wayne Drive from Palmer Street to Warren Avenue	Commercial access	Excellent	4	High	1	Minimal
R3	Schaefer Highway from M-10 to McNichols	Commercial access	Excellent	5	High	1	Minimal
R2	Southfield Service drive from Elmira north to Plymouth Road, east to the other service drive and south to Elmira	Commercial access	Excellent	2	Low	1	Minimal
R7	Vernor Highway from Livernois Avenue to Waterman Street	Geographic boundary	Excellent	3	Low	1	Minimal
R11	Bagley Street from 16th Street to 14th Street	Geographic boundary	Excellent	3	Low	1	Minimal
R22	Brush Street from I-75 Service Drive to Adams Avenue	Commercial access	Excellent	3	Low	1	Minimal
S4	SN 11486 - Schoolcraft St over C and O Railroad	Geographic boundary	Good	2	Low	1	Minimal