

# FEDERAL AID ROAD CONDITION REPORT FOR BRANCH COUNTY

# 2022

Prepared by the Kalamazoo Area Transportation Study | (269) 343-0766 | info@KATSmpo.org | www.KATSmpo.org

# TABLE OF CONTENTS

#### Contents

What is Asset Management?	4
PASER Rating System	6
Summary of 2022 Ratings	10
Federal Aid Conditions History and Trends	15
Pavement Condition Summary	28
Contact Information	34
Tables	
Table 1: PASER Rating Scale	7
Table 2: Treatment Options	8
PASER Maps	
Branch County	31-32
City of Coldwater	33

#### **Executive Summary**

The Kalamazoo Area Transportation Study assisted in the data collection of road inventory for Branch County in 2022. The data collection efforts took place on Federal-Aid roads in the county. According to 23 USC 101, "Federal-aid eligible" roads are "highways on the Federal-aid highway systems and all other public roads not classified as local roads or rural minor collectors."

Within Branch County, there are:

- **443 miles of Federal-aid roads**. This includes roads that are maintained by the Michigan Department of Transportation, the Branch County Road Commission, and the cities and villages within the county. Of the 442 Federal-Aid miles in Branch County, there are:
- **103 miles of Trunkline roads** maintained by the Michigan Department of Transportation.
- **309 miles of County roads** maintained by the Branch County Road Commission
- **31 miles of City streets** maintained by the incorporated cities and villages in the county

Traditionally, federal aid ratings have been completed over two years, roughly half of the county one year, the remainder the next. Due to restrictions imposed in response to the onset of the COVID 19 pandemic, no federal aid ratings were completed in 2020. To start bringing the schedule back in line with the historical breakdown, the entire federal aid system in Branch County was rated in 2021. In 2022 the rating effort was generally expended in those areas traditionally done in even-numbered years with some minor changes to increase efficiency. This report takes the results of the most recent ratings for the entire county federal aid system and compares them with those from 2012 through 2021 to analyze the current status and discern any trends.

#### What is Asset Management?

"An ongoing process of maintaining, upgrading, and operating physical assets cost effectively, based on a continuous physical inventory and condition assessment." - Act 499 of the Public Acts of 2002.

The State of Michigan defines asset management as "an ongoing process of maintaining, upgrading, and operating physical assets cost effectively, based on a continuous physical inventory and condition assessment." Asset management consists of a set of business principles and practices used to meet the goals of good ownership and effective, responsible management. The process allows transportation agencies to monitor the current condition of all federal aid eligible pavements, while also taking an inventory of potential preventative measures, to ensure the quality of the roads in the future. Implementation of asset management principles requires a shift from "Worst First" system management to one that considers the long-range view of how the system functions.

#### **Principles of Asset Management**

Asset management follows five core principles. They are:

- **Performance-Based**-Allows policy objectives to be broken down into daily operations decisions and strategic maintenance decisions.
- **Decisions Based on Quality Information**-Accurate information regarding the inventory, condition, and available funding of any of the assets involved.
- **Policy-Driven**-Resource allocation decisions are based on well-defined performance goals and objectives. Alternatives are examined, and often level of service, system conditions, and community goals are reflected.
- Analysis of Mix of Fixes, Options and Tradeoffs-A system-wide assessment is made to determine the most valuable alternatives to invest in current and future system performance.
- **Monitoring to Provide Clear Accountability and Feedback**-The system needs to be consistently monitored to ensure that the chosen investments are meeting the predetermined goals and policy objectives.

All agencies currently apply some form of these principles, and for that reason, existing principles can be easily built upon in order to implement a successful asset management plan.



**Benefits of Asset Management** 

Asset management provides public agencies with a better understanding of the relationship between cost and performance. This understanding allows for better management, which is often directly reflected in the improvement of performance. In addition to the overall improvement of an agency's performance, there are many benefits of implementing asset management principles and practices. These benefits include:

- Improved service to customers.
- Improved cost-effectiveness and use of available resources.
- Improved communication with elected officials and the public about level of service vs. cost of service; and
- Improved credibility and accountability for decision-making process and results.

In order to gain these benefits, an agency must evaluate its current business practices, establish where significant improvements can be made, and develop a plan to institute changes.

#### PASER Rating System

PASER (Pavement Surface Evaluation and Rating) is a simple "windshield" survey of road surface quality, which was developed by the University of Wisconsin-Madison to be used as the state's standard road rating system. The system uses manuals that provide visual aids for identifying types and extents of various defects that may be visually present in any given section of road. This information is used to assign values from the ten-point PASER scale to rate their condition. On the PASER rating scale, one represents a failed road and ten a new road. The time that it takes a road to cycle from good to poor on the PASER scale is largely dependent on traffic volume and construction quality.

Regularly recording and charting the PASER rating over time on paved surfaces aids in predicting deterioration rates of surfaces. This information is important to the creation of a plan of maintenance and replacement that is both efficient and cost effective.

#### **PASER Categories**

When surveying a paved surface for defects, there are four main categories to keep in mind. These categories are:

- **Surface Defects-** These include raveling (loss of aggregate from the pavement surface), flushing (excess asphalt binder on pavement surface), or polishing (worn down and smoothed aggregate on pavement surface)
- Surface Deformation- Includes rutting of wheel paths and pavement distortion
- Cracks- Can be transverse, longitudinal, reflective, slippage, alligator, and block cracks
- **Patches and Potholes-** Patches are when previous damage has been filled by new material, and potholes are isolated surface damage caused by traffic, fatigue, and poor drainage.

#### How Data is Collected

Data is collected by three-person teams that consist of one MDOT employee, one member of the local road agency, and one member from the regional planning agency. Together, this team is responsible for evaluating pavement and recording information about each road segment using a laptop and a GPS receiver. This information includes the road surface type, number of lanes, and condition (PASER rating). Each segment of federal aid road in the county must be rated at least every two years. In most counties, half of the county is collected every other year.

#### Treatments

Applying a rating system like PASER to a paved network of roads allows for an efficient way to inventory and evaluate those transportation assets. These evaluations can then be used to create a prioritized arrangement of projects and select from any of the treatment alternatives. Effective management of pavement keeps the condition of the road ahead of rapid deterioration with treatments that are lower cost.

There are several treatment options that directly correlate to the PASER score of a paved surface. The better the road is rated, the less intensive the treatment it requires. For example, roads with a PASER rating 8-10 only require routine maintenance through scheduled activities like sweeping, drainage clearing, shoulder clearing/grading, and crack seal/slurry coat to prevent water infiltration. Roads rated 5 - 7 require capital preventative maintenance such as chip seal or non-structural overlay. If the roadway deteriorates past a 4 on the PASER scale, capital preventative maintenance methods of treatment are not effective. A road rated 1-4 on the PASER scale requires some form of structural improvement or full reconstruction.

The following table illustrates PASER ratings for asphalt pavements, which constitute the majority of roads in Branch County.

Table 1						
Rating	Visible Distress	General Treatment & Conditions				
10 Good	None	New Construction less than one year old				
<b>9</b> Good	None	Recent Overlay or newly constructed more than 1 year ago				
8 Good	Few if any longitudinal cracks and then only on paving joints. Occasional transverse cracks, widely spaced (40' or greater). All cracks sealed or tight	Recent sealcoat on pavement over a year old or new cold mix. Little or no maintenance required				
<b>7</b> Fair	Very slight or no raveling, surface shows some traffic wear. Transverse cracks open less than 1/4", spaced 10' to 40' apart, little or no crack erosion. Few if any patches in good condition.	First signs of aging. Maintain with routine crack filling.				
6 Fair	Slight raveling, polishing or flushing. Transvers cracks, open 1/4"–1/2", spaced six to ten feet apart. First sign of block cracking – blocks are large and stable. Occasional patching in good condition.	Shows signs of aging. Sound structural condition. Could extend life with sealcoat.				
5 Fair	Moderate to severe raveling. Longitudinal and transverse cracks open greater than $1/2^{"}$ . Secondary cracking. First signs of longitudinal cracks near pavement edge. Moderate block cracking (1' – 5' blocks). Extensive to severe flushing or polishing. Some patching or edge wedging in good condition.	Surface aging. Sound structural condition. Needs sealcoat or thin non-structural overlay (less than 2")				
<b>4</b> Poor	Severe surface raveling. Multiple longitudinal and transverse cracking with slight raveling. Longitudinal cracking in wheel path. Block cracking (over 50% of surface). Patching in fair condition. Slight rutting or distortions $(1/2)$ deep or less).	Significant aging and first signs of need for strengthening. Would benefit from a structural overlay (2" or more).				
<b>3</b> Poor	Closely spaced longitudinal and transverse cracks often showing raveling and crack erosion. Severe block cracking. Some alligator cracking (less than 25% of surface). Patches in fair to poor condition. Moderate rutting or distortion (1" or 2" deep). Occasional potholes.	Needs patching and repair prior to major overlay. Milling and removal of deterioration extends the life of overlay.				
2 Poor	Alligator cracking (over 25% of surface). Severe distortions (over 2" deep) Extensive patching in poor condition. Potholes.	Severe deterioration. Needs reconstruction with extensive base repair. Pulverization of old pavement is effective				
1 Poor	Severe distress with extensive loss of surface integrity.	Failed. Needs total reconstruction.				

#### Capital Preventative Maintenance and Reconstructive Treatments

Table 2						
Treatment	Life Extension (Average Years)	PASER Rating	Cost per Mile	Average Cost per Additional Year		
Hot Mix Asphalt Crack Treatment	2	6 to 8	\$10,000	\$5,000		
Overband Crack Filling	4	6 to 7	\$7,000	\$1,750		
One Course Non- Structural Overlay	7	5 to 6	\$60,000	\$8,571		
Milling and One Course Non- Structural Overlay	8	4 to 5	\$92,000	\$13,000		
Single Course Chip Seal	6	5 to 7	\$15,000	\$2,500		
Double Course Chip Seal	7.5	5 to 7	\$25,000	\$3,333		
Single Course MicroSurface	5	4 to 6	\$22,500	\$4,500		
Multiple Course MicroSurface	7	4 to 6	\$41,000	\$6,000		
Ultra-Thin HMA Overlay	8.5	4 to 6	\$63,000	\$7,875		
Hot In-Place Recycling	15	4 to 6	\$175,000	\$11,667		
Cold In-Place Recycling	20	3 to 5	\$200,000	\$10,000		
Full-Depth Reconstruction	30	1 to 2	\$1,500,000	\$50,000		

Table 2 details historical cost, lifespan, and rating of pavement treatment types that have been used in Branch County. These treatments range from the minimal (overband crack filling) to major construction. As noted, these treatments and costs are historical. The costs do not reflect recent steep inflation but adequately demonstrate the magnitude of differences between various treatment options. As new technologies emerge and become adopted some of the treatments may be amended or superseded. The following list provides a brief overview of each treatment:

- Hot Mix Asphalt Crack Treatment is a standard method of crack filling. It is primarily used on cracks caused by expanding or contracting asphalt that has lost flexibility over time. It is accomplished by cleaning dirt and debris from cracks and placing hot asphalt material seal them from water intrusion.
- Overband Crack Filling is used on cracks that are up to 1" wide and are moving or unmoving. The process is done by pouring hot rubber material into and over cracks to seal them from water intrusion.
- Non-Structural Overlays do not contribute to a pavement's structural capacity. These treatments use thin layers of asphalt (½ 1 ½ inches) applied on top of existing pavement, with or without milling prior to placement. They improve surface ride quality and drainage and help seal the surface from water permeation and oxidation.
- Chip Seals consist of a thin layer of emulsified asphalt applied to the road surface, which is topped with an aggregate usually consisting of crushed stone or slag. The treatment seals the underlying asphalt from water permeation and oxidation, and provides a renewed, high friction driving surface.
- Microsurfacing is a very thin application of cold mixture of emulsified asphalt and aggregate. Additives can be included to alter the final properties of the binder and/or decrease curing time to allow earlier opening of the treated roadway to traffic. The treatment seals the underlying pavement from water permeation and oxidation and provides a renewed high-friction driving surface. It can also be used to fill in pavement ruts, restoring an even driving surface.
- Ultra-Thin Hot Mix Asphalt Overlays are similar to microsurfacing but utilize hot asphalt binder. They are typically more expensive to place than microsurfacing.
- Hot In-Place Asphalt Recycling heats up existing pavement to soften the binder. The heated material is then removed and mixed with additional virgin asphalt binder and used to repave the roadway.
- Cold In-Place Recycling does not involve the use of heat. Instead, the surface is pulverized and mixed with an asphalt emulsion and then used to repave the same road.
- Full-Depth Reconstruction is the replacement of the entire roadway structure, including the base and subbase, with new material. It is used only when there is no salvage value to any of the existing components.

#### Summary of 2022 Ratings



#### Summary of 2022 Ratings



#### Summary of 2022 Ratings









#### Federal Aid Conditions History and Trends







The charts above reflect the progression of the three PASER rating conditions for Branch County's federal-aid roads over an 11-year period. After a steady decrease from 2012 to 2016, there was a slight increase in the number of miles of Poor rated roads until 2019 when a significant decrease occurred. The mileage of Good rated roads has generally inversely mirrored the poor rated mileage, though it has held basically steady from the 2019 period through 2022. Fair rated miles have decreased slightly each year since 2016 until 2021 when it showed a significant increase. For the 2022 it appears some previously poor rated roads were improved to Good, while Fair rated road mileage remained essentially steady. An increase in Good rated non-trunkline road mileage for 2022 was mirrored by a corresponding decrease in Poor mileage. The overall decrease in Poor rated mileage for 2022 was driven non-trunkline roads, offsetting the lack of change in trunkline mileage.

When looking at township breakdowns from 2022 on the succeeding pages of this document, it can be seen that in most jurisdictions Fair or Poor rated mileage make up the highest percentage. Only in Quincy, which recently resurfaced many of its federal aid roads, is the mileage of Good rated roads highest, though in Coldwater County Good mileage is almost equal to Fair.

#### 2012-2022 Federal Aid Road Condition Trends





#### 2012-2022 Federal Aid Road Condition Trends





#### 2012-2022 Federal Aid Road Condition Trends





19

#### 2012-2022 Federal Aid Road Condition Trends





20

#### 2012-2022 Federal Aid Road Condition Trends





#### 2012-2022 Federal Aid Road Condition Trends











#### 2012-2022 Federal Aid Road Condition Trends





2012-2022 Federal Aid Road Condition Trends





#### 2012-2022 Federal Aid Road Condition Trends





26

#### ROAD CONDITION REPORT FOR BRANCH COUNTY 2012-2022 Federal Aid Road Condition Trends





27

# ROAD CONDITION REPORT FOR BRANCH COUNTY Pavement Condition Summary

Of the 443 miles of federal-aid roads rated in 2022, approximately 131 are rated as being in "Poor" condition, 222 rated "Fair", and 91 "Good." This distribution means that currently, almost exactly half of all federal aid roads in Branch County are rated Fair. The remaining half are split with the ratio of Poor to Fair at 3:2. The chart below illustrates the percentage distribution of road ratings.



#### Condition Trends of Federal-Aid Roads







The bar graphs above illustrate the history of the rated quality of roads in Branch County over the course of 11 years. It should be noted that due to slight discrepancies in total mileage reported from 2010 to 2013 in previous years, definite trends can only be inferred for the last seven rating periods. Generally, though the amount of road mileage in Good condition decreased until the 2018 rating period. Mileage of Poor rated roads has been generally decreasing, while Fair rated mileage has been generally increasing. This would be consistent with the application of better asset management practice. If current funding levels remain unchanged, focus should continue to be placed on maintenance of roads in Fair and Good condition to minimize any increase in the number of Poor roads. This should be balanced by the county's road agencies investing in replacement of the worst roads as funding permits in order to decrease the amount of Poor road mileage countywide to improve the overall state of their roads.

The following maps show the location and condition of federal aid roads in Branch County.

# Branch County Non-Trunkline Federal Aid Road Conditions 2022



#### **PASER Road Conditions**



# Branch County Trunkline Federal Aid Road Conditions 2022



#### **PASER Road Conditions**



# City of Coldwater Federal Aid Road Conditions 2022



#### PASER Road Conditions



#### **Contact Information**

For more information regarding the Branch County Road Condition report, contact:

- Branch County Road Commission 23 East Garfield Avenue • Coldwater, Michigan • 49036 • (517) 278-2022
- Kalamazoo Area Transportation Study 5220 Lovers Lane • Suite 110 • Portage, Michigan • 49002 • (269)343-0766 • info@katsmpo.org