



Condition Needs Assessment

Overview of Needs/Deficiencies Analysis

Every summer, GVMC staff uses a specially equipped data collection vehicle to rate approximately 1,600 federal aid miles and 800 miles on the local network using the Pavement Surface and Evaluation Rating (PASER) system. PASER allows staff to evaluate every road segment and assign it a score. This determines whether a road segment qualifies for federal funding and the type of fix it is eligible to receive, according to GVMC's Policies and Practices for Programming Projects document.

Existing conditions are reviewed closely when selecting projects for funding during the Transportation Improvement Program (TIP). For the MTP (Metropolitan Transportation Plan) the focus is less on specific roads and more on the larger picture, to see how different funding levels might impact overall conditions for the region at various year increments over time.

Process for Determining and Addressing Needs

The GVMC needs for pavement condition were assessed by comparing five scenarios, looking at how the amount of money invested in improving pavement condition could impact our overall regional pavement condition level out to 2050.

The network used for this analysis includes all MPO Federal Aid Roads with the omission of MDOT facilities. MDOT facilities were omitted as budgets vastly change annually depending on the scope of projects selected for our region. This amounts to almost 3000 lane miles for this analysis.

Quality pavement management requires a "mix of fixes." Road width and improvements made in the right of way vary depending on the facility's location and whether it is an urban or rural setting. Therefore, input was provided at the State, County, and City level to determine a reasonable estimated cost for various treatments.

The budget for this analysis includes federal, state, and local dollars. The average annual investment in the MPO for reconstruction, rehabilitation, and maintenance on the federal aid network is about \$45.8 Million dollars. This was derived by combining an annual TIP investment of \$25.8M, and \$20M in additional funds from local jurisdictions used to improve the roads outside of the TIP. Some of these local revenues come from millages or other sources that have end dates that will need to be addressed within the horizon year of this plan. However, for the sake of this analysis, it was assumed that they will continue.

Cost Assumptions & Improvement Trigger Settings:

Roadsoft software is used to perform asset management and address needs as an industry standard for Michigan and is provided by Michigan Technological University. Within this software, PASER ratings determine at what point a fix will be applied and at what cost specified by the user. Below is an outline of fixes, costs, and PASER triggers used to apply to our scenario analysis of different funding levels.

Table 1- Working Pavement Management Strategies

Asphalt Standard Cost Per Lane-Mile	Cost Per Lane-Mile
Reconstruct - (down to dirt)	\$1,500,000
Mill and Fill - 3"	\$375,000
Mill and Fill - 1 ½"	\$325,000
Cape/Fog/Chip Seal	\$50,000
Crack Sealing	\$5,000
Asphalt Composite	
Reconstruct - (down to dirt)	\$1,875,000
Heavy Overlay - w/ milling and basework	\$475,000
Capeseal	\$35,000

Crack Sealing	\$5,000
Concrete	
Reconstruct - (down to dirt)	\$3,200,000
Heavy CPM (joint repair and slab replacement)	\$200,000
Sealcoat Standard	
Reconstruct	\$600,000
Sealcoat	\$35,000

Table 2 - Analysis Improvement PASER Trigger Settings

Asphalt & Composite (2,840 lane-miles)	Min Rating	Max Rating	Reset
Crack Sealing	6	7	7
Sealcoat	5	6	8
Overlay	4	5	9
Reconstruct	1	3	10
Concrete (110 lane-miles)			
Heavy CPM	5	5	8
Reconstruct	1	4	10
Sealcoat - Standard (14 lane-miles)			
Sealcoat	5	6	8
Reconstruct	1	4	10

System Deterioration Curves:

All pavement from the day it is placed will deteriorate at a given pace depending upon the fix that was applied to the deficient roadway, construction methods, materials, weather, traffic load, etc. These curves allow for the tracking of pavement deterioration over time and are controlled by preset variables assigned by the user. It was determined that Roadsoft default deterioration curves performed and represented GVMC's area sufficiently enough for this needs analysis.

Identified Needs/Deficiencies

As mentioned above, \$48.5 million was the baseline used to determine how changing the investment level could affect the condition of the regional road network.

Growth rates supplied by MDOT were also applied by fiscal year out to 2050 with a construction cost inflation increase of 4% annually. These growth rates by fiscal years are as follows:

FY23-FY26: 2% Annual Growth
FY27-FY31: 1.9% Annual Growth
FY32 & Beyond: 1.0% Annual Growth

The results of the five funding scenarios are summarized in the figures below, showing the average PASER rating that could be expected based on the amount of money spent on pavement condition projects. Each alternative is organized by year for Good, Fair, and Poor conditions, as identified by the PASER system. The starting 2022 PASER average for this network is defined as "Fair", at 5.02.

Table 3 - PASER Condition and Maintenance Categories

PASER Maintenance Defined

Good (PASER Rating 10-8) - no maintenance necessary
Fair (PASER Rating 7-5) - in need of preventative maintenance
Poor (PASER Rating 4-1) - in need of reconstruction

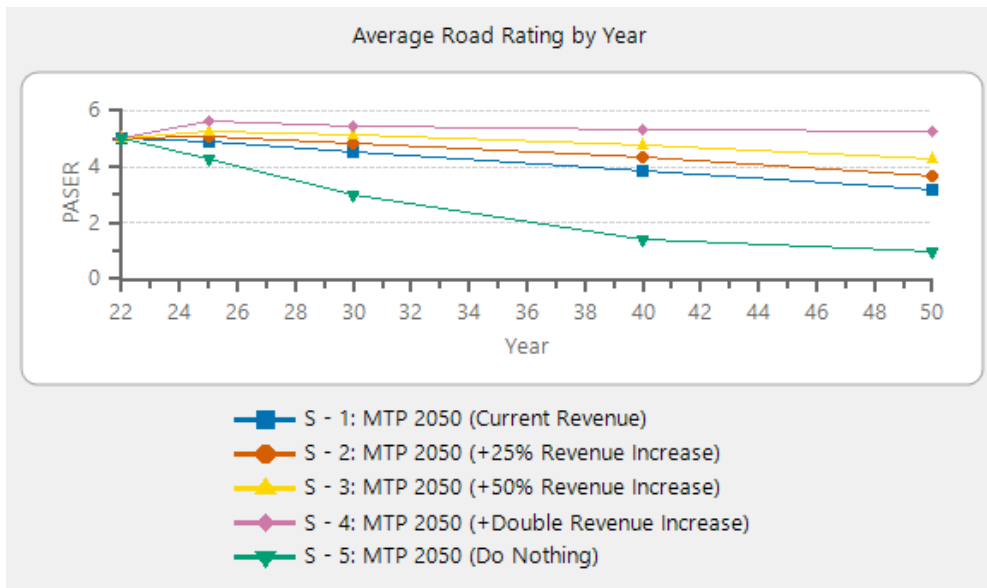


Figure 1 - Investment Scenarios and Average PASER Rating

Scenario 1 - At the current revenue of \$48.5 million with the inflation and growth rates previously discussed, the 2050 condition would result in an average PASER value of 3.17 (Poor) and have the following distribution of Good, Fair, and Poor.

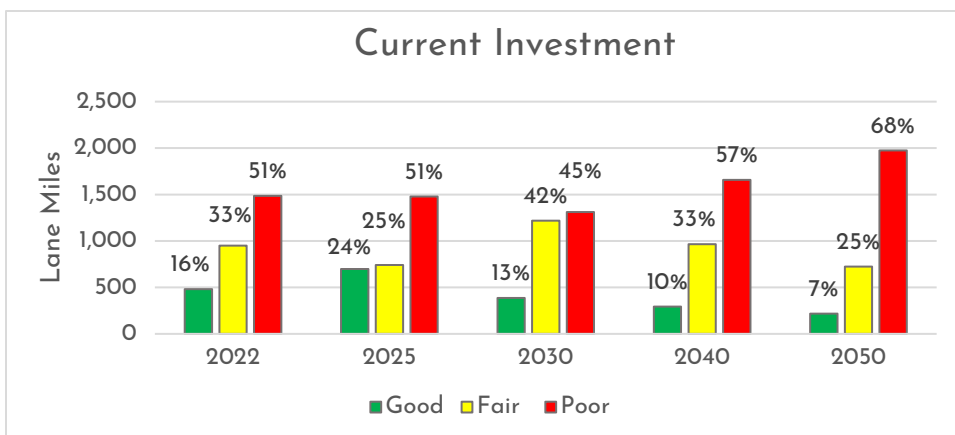


Figure 2 - Scenario 1 Good, Fair, Poor Distribution by Year

Scenario 2 - Adding 25% to the current revenue of \$48.5 million with the inflation and growth rates previously discussed, the 2050 condition would result in an average PASER value of 3.70 (Poor) and have the following distribution of Good, Fair, and Poor.

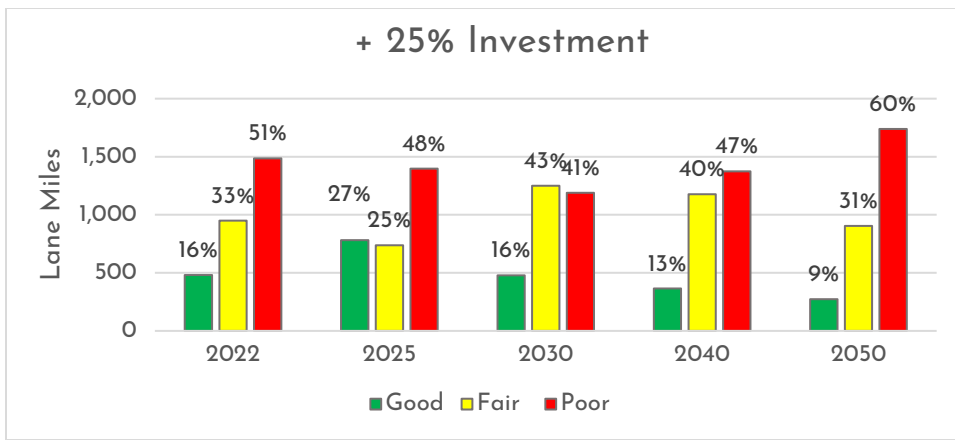


Figure 3 - Scenario 2 Good, Fair, Poor Distribution by Year

Scenario 3 - Adding 50% to the current revenue of \$48.5 million with the inflation and growth rates previously discussed, the 2050 condition would result in an average PASER value of 4.28 (Poor) and have the following distribution of Good, Fair, and Poor.

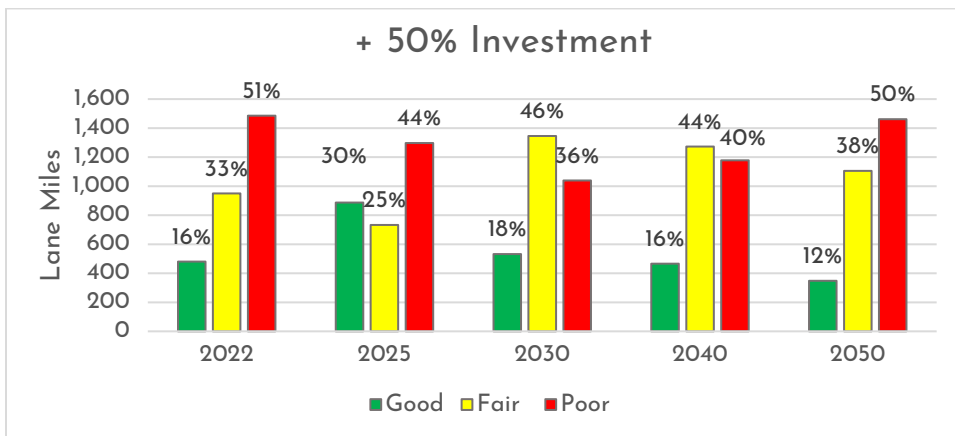


Figure 4 - Scenario 3 Good, Fair, Poor Distribution by Year

Scenario 4 - Doubling the current revenue of \$48.5 million with the inflation and growth rates previously discussed, the 2050 condition would result in an average PASER value of 5.25 (Fair) and have the following distribution of Good, Fair, and Poor.

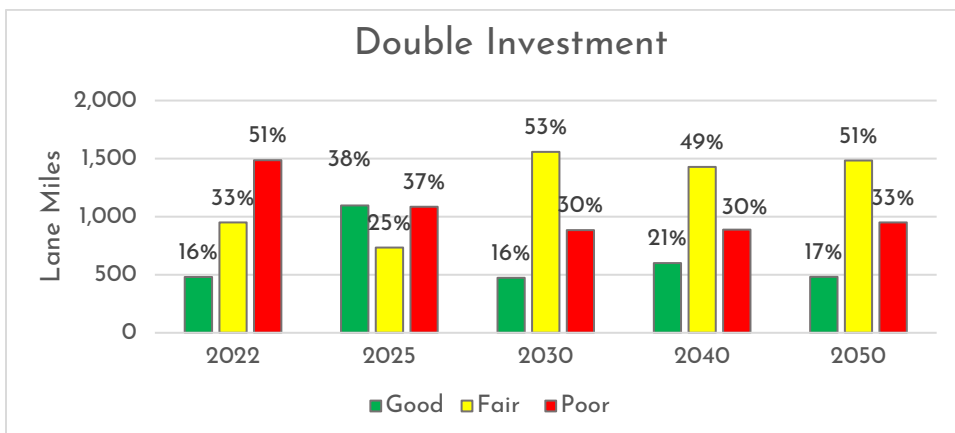


Figure 5 - Scenario 4 Good, Fair, Poor Distribution by Year

Scenario 5 - Removing the current revenue of \$48.5 million with the inflation and no financial growth previously discussed, the 2050 condition would result in an average PASER value of 1.00 (Poor) and have the following distribution of Good, Fair, and Poor.

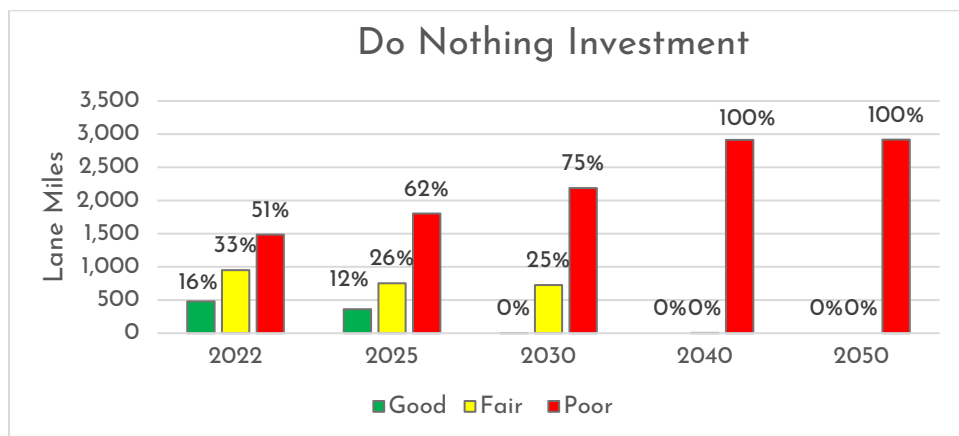


Figure 6 - Scenario 5 Good, Fair, Poor Distribution by Year

Costs to Address the Recommendations

Of the compared scenarios the most attractive is that of doubling the investment to keep the current average PASER rating in the “Fair” category. Without a significant increase of funds and based on our current “mix of fixes” strategy we would be stuck in a slow decline when we look to the later years of the MTP. With the “Do Nothing” scenario being the worst case, our network would move to the “Poor” category very quickly.

Our current strategy in “Scenario 1” assumes annual revenue increases through the life of the MTP, but it will not keep up with the 4% inflation of construction costs. This presents a challenge to both the MPO and its jurisdiction members to continue to levy financial support by any means possible. Following these results, it is the recommendation that all parties stay aggressive in improving asset management practices and find additional sources of funding.