



# Pavement Asset Management Plan

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*This pavement asset management plan was developed by the Boone County Highway Department in accordance with the requirements outlined by the Indiana LTAP. The Indiana LTAP Pavement Asset Management Plan was developed by representatives from LTAP, ICC, AIC, IACHES, AIM, and INDOT and is to be used to satisfy requirements for funding approval from FHWA, INDOT, or Indiana legislation mandates. The Plan requires local agencies to provide the following information on road and bridge assets, and a description of asset management and planning.*

Document Prepared by:

Signed: Nicholas D. Parr

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## Road Asset Inventory

The Boone County Highway Department is responsible for the maintenance of nearly 735 miles of roadways. Of those 735 miles of roadways, 425 miles are paved; the remaining 310 miles are gravel roads. Since 2016, the County Highway Department has performed an annual PASER condition rating on all of Boone County's paved roads and developed an inventory system that can be maintained and utilized to make future decisions in regards to pavement preservation and capital improvements. The results of the 2023 pavement condition ratings of Boone County's paved roadways are illustrated in and itemized, by segment, in Table 1 of the **Appendix**. 2023 is the third year we have added our gravel road system, to our PASER inventory. We have 5 grader operators with territories in various parts of the county. Each operator maintains approximately 62 miles in their territory regularly.

## Pavement Preservation Surface Treatments

There are several different preventative maintenance treatments that can (and should) be used to extend the life of pavements. The selection of treatment is based on several different factors including, but not limited to treatment cost, pavement condition, traffic volume, facility type (rural or urban), road material (chip & seal, cold-mix asphalt, hot-mix asphalt) and age of the roadway.

The following table outlines the various treatments considered for each PASER condition rating and the programming costs used for the development of our 5 year work plan shown in **Table 2** of the Appendix.

PASER Rating	Proposed Treatment	Cost / Mile
10	No treatment necessary	\$0
9	Rejuvenator	\$16,426
8	Crack Fill	\$7,100
7	Crack Fill	\$7,100
	Rejuvenator	\$16,500
	Seal Coat (Microsurface – Single Course)	\$52,213
6	Seal Coat (Microsurface – Single Course)	\$52,213
	Crack Fill	\$7,100
	Chip & Seal (Single)	\$19,125
	Chip & Seal (Double)	\$25,696
5	Seal Coat (Microsurface – Double Course)	\$59,840
	Seal Coat (Microsurface – Single Course)	\$52,213
	Chip & Seal (Double)	\$25,696
	Non-Structural Overlay	\$218,122
4	CMA Structural Overlay (3")	\$92,458
	HMA Structural Overlay (4")	\$315,626
3	Full Depth Patching and CMA Overlay (4")	\$144,320
2	Full Depth Patching and HMA Overlay (4")	\$489,632
1	Reconstruction	\$600,000

## Objectives and Measures

### Performance goals and expected level of service for pavements.

*In 2016, the Boone County roadway network had an average PASER condition rating of 4.757. The goal of the Boone County Highway Department is to maintain or improve the average condition rating of our paved road system. In 2017, the average PASER rating was 5.375, in 2018 it went up to 5.908, and in 2019 it increased to 6.083. Our average PASER rating for 2020 had a 5% increase from 2019 which led to an increased PASER rating of 6.39. In 2021 our PASER rating dropped by 3%, which resulted in our average PASER rating to fall to 6.18. Our current average PASER rating for our asphalt inventory in 2023 is 6.8, which identifies no increase or decrease from our 6.8 rating from 2022.*

*In 2019, we were able to implement using PASER condition rating for our gravel road inventory. In 2020 we were able to conduct our first PASER ratings of our gravel road inventory and found that our average PASER rating was 3.12. In doing so, we were able to identify areas of immediate improvement, and in 2021, our PASER rating for our gravel road inventory increased by 29% and is currently at an average of 4.01. In 2022, we experienced labor shortfalls as well as retirement from experienced grader operators. We worked towards training new operators and restructuring the territories that our operators maintained. Although our current PASER condition rating shows a 17% decrease with a rating of 3.4, 55% of our gravel road inventory is fair with 41% in good condition. Gravel road conditions can change rapidly depending on many factors which cause our condition ratings to fluctuate.*

### Development of work plan.

*The 2023-2027 work plan updated our previous work plans utilizing the PASER condition ratings acquired in the Spring of 2023. The department considered numerous surface treatments and identified the best surface treatment based on a combination of PASER condition, facility type, treatment cost and institutional knowledge of the highway system. The effect on PASER rating and life-expectancy of each treatment type was estimated based on industry knowledge to determine the overall change to the road network's conditions. Annual expenditures for each treatment type were chosen with the goal to improve the average condition rating of our paved road system. Our first established work plans, developed in 2016, focused efforts on maintaining roadways having a condition rating of 4-7 in order to prevent additional roadways from deteriorating to a level where reconstruction is necessary. Since our preservation program has successfully kept our ratings in the good category, we are now able to fund structural repair projects that improve roadways already at or below a rating of 3 rating on the PASER scale.*

### Monitoring program and plan for making updates and adjustments.

*Our staff has been trained to perform PASER analysis and we re-evaluate our paved roads annually and documented in a GIS database system. In addition to pavement conditions, any work performed on a roadway will be maintained in this system, providing Highway Staff the ability to analyze the increased service life of many different surface*

*treatments and forecast the deterioration of pavements based on a number of conditions. Every year, the Highway Department will provide a report which identifies the annual rating of each paved roadway and summarizes the overall change of condition of our paved road network. This additional information we collect and maintain will provide us long-term benefits and allow us to refine our annual work plans and make data-driven pavement management decisions. At some point, the Highway Department expects it will be necessary to integrate a specialized pavement asset management database system to assist the department in developing a holistic asset management program. The table below summarizes our PASER information in the past 3-years of our pavement asset management program. The benefits of our County's strategic investments to highway infrastructure in 2020 and 2021 are evidenced in the improvement of roadway conditions.*

PASER Score		Pavement Miles of Roadway		
		2021	2022	2023
10	Excellent	16.053	53.86	18.71
9	Excellent	28.287	35.68	76.63
8	Very Good	44.615	56.74	59.19
7	Good	95.983	80.48	79.39
6	Good	91.594	83.86	103.62
5	Fair	61.223	47.31	37.04
4	Fair	40.493	35.20	30.31
3	Poor	26.708	17.66	16.62
2	Very Poor	18.34	0	4.22
1	Failed	0	0	0
PASER Score		Gravel Miles of Roadway		
		2021	2022	2023
5	Excellent	84.455	120.68	1
4	Very Good	165.275	127.73	127.21
3	Good	66.378	64.71	171.08
2	Fair	5.568	7.28	9.95
1	Poor	1.092	.48	0

### **Drainage and ROW conditions.**

*The vast majority of Boone County roads have shoulders and roadway drainage is generally achieved by way of open side ditches. These side ditches are often the only feature identifying the apparent road right-of-way. In addition to the side ditches, the Highway Department is responsible for the maintenance of 339 Small Structures (48" to 20'-0") and thousands more small culverts. The Small Structures are inspected and a report is completed regularly, identifying the condition and outlining the necessary*

*maintenance for each culvert. The Boone County Highway Department has an entire crew dedicated to the maintenance of our drainage system; every day, they are replacing culverts, improving side ditches and repairing broken field tiles. The estimated expenditure on culvert materials alone in the next 5 years (2023 – 2027) is \$1,500,000. For the last several years we have been collecting information regarding drainage needs during the PASER analysis. Any road segment requiring ditching is noted and incorporated into our GIS database system. This additional information will be useful in guiding our decisions on where to focus our resources on additional drainage ditching.*

## **Brush**

*Maintaining and managing vegetation along our roads and bridges plays a major role in the longevity and safety of the County's infrastructure. As vegetation grows, it can inhibit drainage in roadside ditches, prevent pavements from drying, and intrude in the visibility for motorists. All of these can cause significant issues in infrastructure safety and longevity. Information is gathered while the PASER analysis is being performed. Any road segment requiring brush cutting is noted and incorporated into our GIS database system. This additional information will be useful in guiding our decisions on the locations we need to focus our resources on additional brush cutting and clearing. During 2022's PASER data collection, we added a category that noted which Plan of Action for vegetation control would be best suited for each segment of roadway where brush work was needed. This could come in different work types such as, brush crew, mulcher, bush hog mowing, brush mower, or herbicide crew.*

## **Roadway Safety**

*Although pavement condition plays a major role in the overall safety of the Boone County Highway road network, there are many other factors that can affect the safety of overall system. Two systemic initiatives that Boone County plans to implement in the upcoming years are upgrades to traffic control devices such as signs and pavement markings. The Boone County Highway Department has recently completed, and continue to maintain, a countywide inventory and condition rating for our traffic control assets. This inventory helps us develop and maintain a plan that outlines necessary improvements and identifies the capital investments necessary to make those improvements. Secondly, the vast majority of Boone County roads have no pavement markings to identify road centerlines or pavement edges. In 2019, a NPZ (No Passing Zone) Study was performed so the Boone County Highway Department can include pavement markings to all resurfacing projects in the future. Future annual budgets will include funding to maintain pavement markings on our roadways for our system, improving the safety of our roads. Boone County adopted a LRSP (Local Road Safety Plan) in 2020 to help us achieve our vision, of helping all users of Boone County's transportation system to reach their destination safely.*