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E-360A-2	CR 1850 N	CR 1950 W	CR 1900 W	2,499	20	-2	Asphalt	Pavement	7	03/20/2020	Minor Collector			Chip Seal Double
E-360B-2	CR 1850 W	CR 1900 W	CR 1900 W	1,862	20	-2	Asphalt	Pavement	6	03/20/2020	Minor Collector			Chip Seal Double
E-360C-2	CR 1850 S	CR 1900 W	CR 1900 W	1,000	20	-2	Asphalt	Pavement	6	03/20/2020	Minor Collector			Chip Seal Double
E-360D-4	CR 1850 E	BR 70 S	CR 1700 W	1,073	20	-2	Asphalt	Pavement	6	04/18/2020	Minor Collector			Chip Seal Double
E-400M-2	400 W	SR 5	CR 1700 W	1,066	20	-2	Gravel	Pavement	6	01/16/2020	Local			
E-400N-2	400 W	SR 5	CR 1700 W	0,777	18	-2	Gravel	Pavement	4	01/16/2020	Local			
E-400S-2	400 W	SR 5	CR 1700 W	1,262	20	-2	Gravel	Pavement	4	01/16/2020	Local			
E-400E-4	400 W	SR 32	CR 1700 W	1,267	18	-2	Gravel	Pavement	3	12/24/2019	Local			
E-400W-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400X-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400Y-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400Z-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400AA-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400AB-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400AC-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400AD-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400AE-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400AF-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400AG-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400AH-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400AI-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400AJ-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400AK-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400AL-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400AM-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400AN-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400AO-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400AP-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400AQ-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400AR-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400AS-2	CR 1800 W	CR 1800 W	CR 1800 W	1,066	20	-2	Asphalt	Pavement	7	04/18/2020	Minor Collector			Crack Seal
E-400AT-2	CR 18													

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Pavement Asset Management Plan

Agency Name: Boone County Highway Department

Contact Name: Nick Parr

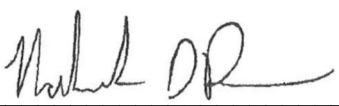
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This pavement asset management plan was developed by the Boone County Highway Department in accordance with the requirements outlined by the Indiana LTAP. The Indiana LTAP Pavement Asset Management Plan was developed by representatives from LTAP, IACC, AIC, IACHES, ISC, Indiana City Engineers, 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: 

Date: November 9, 2020

Road Asset Inventory

The Boone County Highway Department is responsible for the maintenance of nearly 740 miles of roadways. Of those 740 miles of roadways, 416 miles are paved; the remaining 324 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 2020 pavement condition ratings of Boone County's paved roadways are illustrated in and itemized, by segment, in Table 1 of the **Appendix**. 2020 is this first 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 75 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	No treatment necessary	\$0
8	Crack Fill	\$6,200
7	Crack Fill	\$6,200
	Rejuvenator	\$14,000
	Seal Coat (Microsurface – Single Course)	\$35,200
6	Seal Coat (Microsurface – Single Course)	\$35,200
	Crack Fill	\$6,200
	Chip & Seal (Single)	\$16,100
	Chip & Seal (Double)	\$29,600
5	Seal Coat (Microsurface – Double Course)	\$47,000
	Seal Coat (Microsurface – Single Course)	\$35,200
	Chip & Seal (Double)	\$29,600
	Non-Structural Overlay	\$155,000
4	CMA Structural Overlay (3")	\$125,000
	HMA Structural Overlay (4")	\$295,000
3	Full Depth Patching and CMA Overlay (4")	\$125,000
2	Full Depth Patching and CMA Overlay (4")	\$125,000
1	Reconstruction	\$500,000

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 and is now up to 6.39. That is a 34% increase from our 2016 PASER rating. During 2019, we were able to design our PASER condition rating for our gravel road inventory. In 2020 we were able to get our first PASER ratings of our gravel road inventory and found that our average PASER rating was 3.12.

Development of work plan.

The 2020-2024 work plan updated our previous work plans utilizing the PASER condition ratings acquired in the Spring of 2020. 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. In the later years of the plan, which we are now in, additional funding was identified for 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 2018 and 2019 are evidenced in the improvement of roadway conditions.

PASER Score		Pavement Miles of Roadway		
		2018	2019	2020
10	Excellent	20.112	25.703	21.911
9	Excellent	2.443	7.89	19.594
8	Very Good	62.944	57.508	68.789
7	Good	80.118	67.521	97.803
6	Good	76.277	115.401	98.383
5	Fair	75.08	50.852	39.237
4	Fair	65.717	55.306	40.4
3	Poor	26.65	25.221	20.767
2	Very Poor	9.409	8.769	9.28
1	Failed	1.698	0.504	0
PASER Score		Gravel Miles of Roadway		
		2018	2019	2020
5	Excellent	Not Rated	Not Rated	10.647
4	Very Good	Not Rated	Not Rated	23.948
3	Good	Not Rated	Not Rated	186.199
2	Fair	Not Rated	Not Rated	48.297
1	Poor	Not Rated	Not Rated	4.513

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 large culverts (48" to 20'-0") and thousands more small culverts. Large culverts are inspected and an inspection 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 (2020 – 2024) is \$1,500,000. In 2018, an additional category of information regarding drainage needs was gathered during the PASER analysis. Any road segment requiring ditching was 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. Therefore, in 2019, an additional category of information was gathered while the PASER analysis was being performed. Any road segment requiring brush cutting was 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 2020's PASER data collection, we were also able to categorize which Plan of Action would be best suited for each segment of roadway where brush work was needed. This could come in different forms of action 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 sign 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 has recently adopted a LRSP (Local Road Safety Plan) to help us achieve our vision, to help all Boone County's transportation system to reach their destination safely.

