ROADWAY PAVEMENT MAINTENANCE REPORT

NOACA will STRENGTHEN regional cohesion, PRESERVE existing infrastructure and BUILD a sustainable multimodal transportation system to SUPPORT economic development and ENHANCE the quality of life in Northeast Ohio

NORTHEAST OHIO AREAWIDE COORDINATING AGENCY
Lake, Geauga, Cuyahoga, Lorain, Medina
NOACA: Planning For Greater Cleveland

CITY OF WICKLIFFE

The Northeast Ohio Areawide Coordinating Agency (NOACA) is a public organization serving the counties of and municipalities and townships within Cuyahoga, Geauga, Lake, Lorain and Medina (covering an area with 2.1 million people). NOACA is the agency designated or recognized to perform the following functions:

- Serve as the Metropolitan Planning Organization (MPO), with responsibility for comprehensive, cooperative and continuous planning for highways, public transit, and bikeways, as defined in the current transportation law.
- Perform continuous water quality, transportation-related air quality and other environmental planning functions.
- Administer the area clearinghouse function, which includes providing local government with the opportunity to review a wide variety of local or state applications for federal funds.
- Conduct transportation and environmental planning and related demographic, economic and land use research.
- Serve as an information center for transportation and environmental and related planning.
- As directed by the Board, provide transportation and environmental planning assistance to the 172 units of local, general purpose government.

The NOACA Board of Directors is composed of 45 local public officials. The Board convenes quartery to provide a forum for members to present, discuss and develop solutions to local and areawide issues and make recommendations regarding implementation strategies. As the area clearinghouse for the region, the Board makes comments and recommendations on applications for state and federal grants, with the purpose of enhancing the region's social, physical, environmental and land use/transportation fabric. NOACA invites you to take part in its planning process. Feel free to participate, to ask questions and to learn more about areawide planning.

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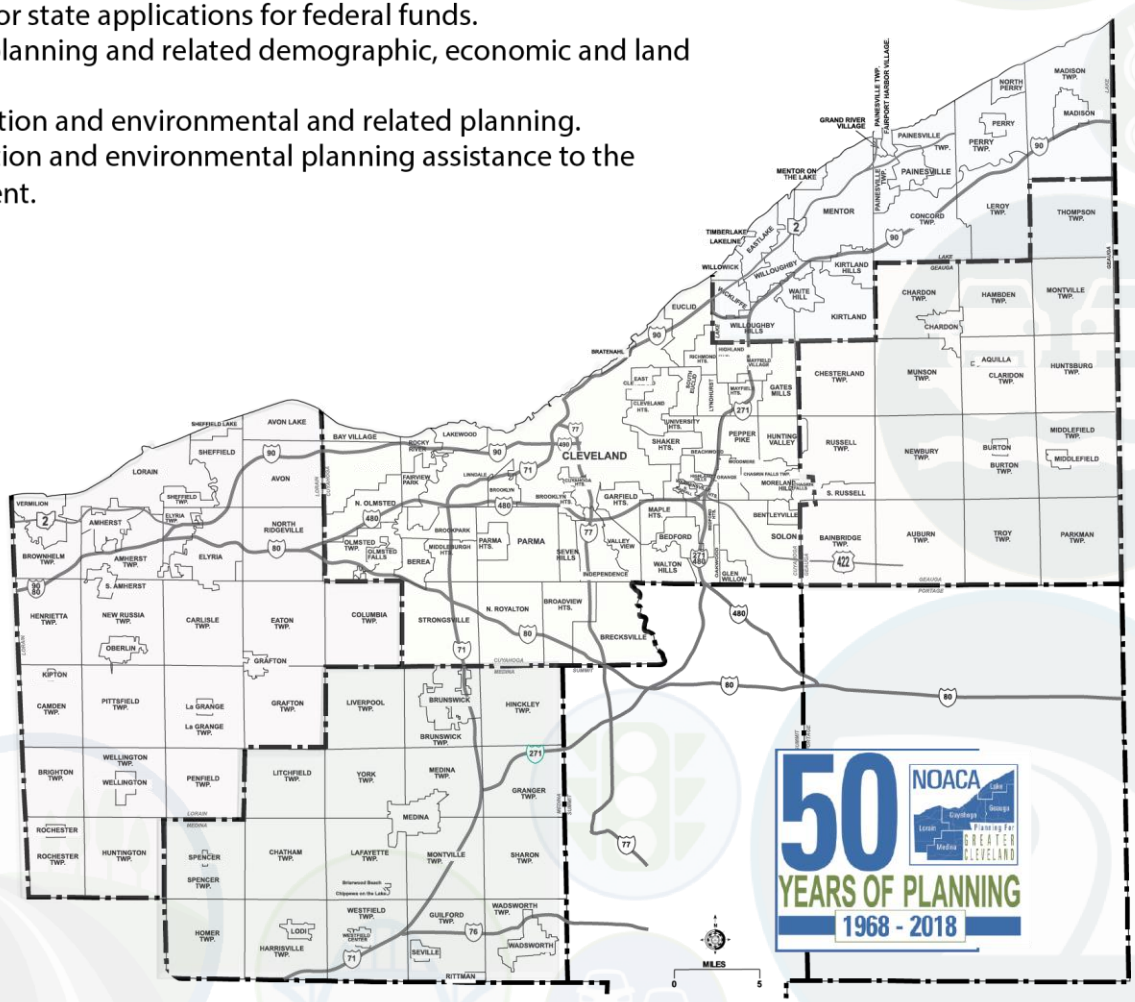

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EXECUTIVE SUMMARY

The 2016 Ohio Department of Transportation (ODOT) pavement database has 3,626 segment records for the Northeast Ohio Areawide Coordinating Agency (NOACA) region. The NOACA region has a total of 3,330 centerline miles of roadways including freeways and federal-aid highways which is equivalent to 8,561 lane-miles. The regional segment average Pavement Condition Ratings (PCR) is about 77.

In the City of Wickliffe there are 11.05 centerline miles of federal-aid roads, which are equivalent to 32.16 lane-miles within the city boundary that include Interstate 90 (I 90), U. S. Route 20 (US 20), State Route 2 (SR 2), State Route 84 (SR 84), and State Route 633 (SR 633). The 2016 ODOT pavement database has 10 segment records for the City of Wickliffe roadway system. Each record comprises of several fields of various information and measures such as Street name, Length (miles), Lane-miles length, Number of Lanes, Function Class, Pavement Condition Ratings (PCR), etc.

According to the PCR measure, about 67 percent of the pavement lane-miles are currently in the “Good” to “Very Good” condition and only a small percent of pavement is in the “Poor” status and demands some kind of immediate preventive maintenance and /or rehabilitation treatments.

This pavement study includes four parts:

- Part I: The 2016 pavement network condition,
- Part II: The 2018 backlog,
- Part III: The Maintenance and Rehabilitation (M&R) program,
- Part IV: The Comparative analysis.

Considering the five-year study period of 2018 - 2022, this pavement study focuses on the required preventive maintenance treatments and some rehabilitation techniques rather than reconstruction.

Part I of this study analyzes the 2016 pavement network condition and tabulates the important information of all the 10 road segments in the City of Wickliffe.

In Part II, the backlog is defined as the cost of pavement rehabilitation of all roads within one year (2018) and bringing the average network PCR to 80. Backlog is a “snapshot” or relative measure of outstanding rehabilitation work.

Part III introduces the optimal preventive maintenance and rehabilitation strategy for each segment and its recommended implementation year based on the NOACA maintenance decision tree.

Finally, Part IV compares the backlog and the “M&R” program with the NOACA transportation asset management strategies. All these strategies were compared regarding their costs, the average network PCR and percent of the lane-miles below the acceptable level.

BACKGROUND

The city of Wickliffe in Lake County. The city was named after Charles A. Wickliffe, 11th United States Postmaster General. A post office called Wickliffe has been in operation since 1843.

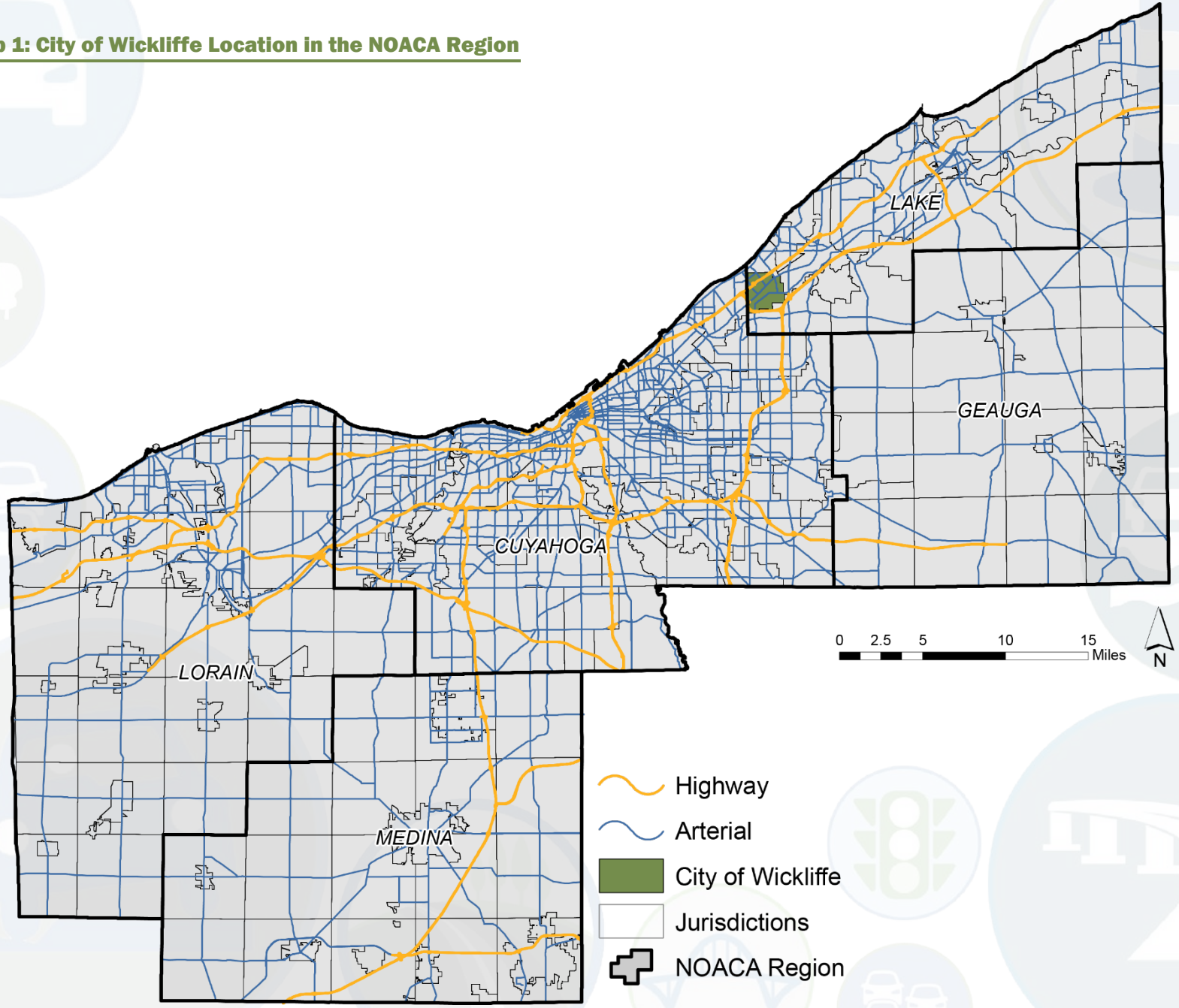
In 1817 the settlers are families whose names are familiar to the city: Jones, Tarbell, Lloyd, and Taylor. They came to Wickliffe to join the Freemans, Strongs, Davises and Clarks, who were the earliest settlers.

For its first 100 years, Wickliffe was a precinct in Willoughby Township. In 1916, a petition was filed requesting that Wickliffe be permitted to incorporate as a village. When the election was held in 1916, a majority of those voting approved for incorporation. The incorporation of the Village of Wickliffe was recorded in Painesville on April 10, 1916.

As of the Northeast Ohio Areawide Coordinating Agency (NOACA) 2015 estimates, the city had a population of 12,527 and employment of 8,312. The City of Wickliffe highways include Interstate 90 (I 90), U. S. Route 20 (US 20), State Route 2 (SR 2), State Route 84 (SR 84), and State Route 633 (SR 633). Cleveland-Hopkins International Airport is the nearest airport.

Map 1 illustrates the City of Wickliffe location in the NOACA region.

Map 1: City of Wickliffe Location in the NOACA Region



For the purpose of this study:

Pavement Reconstruction is defined as the replacement or reestablishment of the original pavement structural capacity by the placement of the equivalent or increased pavement structure. Reconstruction may utilize either new or recycle materials for the reconstruction of the complete pavement structure.

Pavement Rehabilitation is defined as resurfacing, restoration, and rehabilitation (3R) work consisting of structural enhancements that extend the service life of an existing pavement and/or improve its structural capacity. Rehabilitation techniques include restoration treatments and/or structural overlays. This may include partial recycling of the existing pavement, placement of additional surface materials, and/or other work necessary to return an existing pavement to a condition of structural or functional adequacy.

Preventive Maintenance is considered as cost effective treatments to an existing roadway system and its appurtenances that preserves the system, delays future deterioration, and maintains or improves the functionality condition of the system without increasing structural capacity. Projects that address deficiencies in the pavement structure or increase the structural capacity of the facility are not considered preventive maintenance.

Maintaining the roadways in a state of good repair is essential and experience has shown that, over time it is less expensive to invest in preventive maintenance and/or rehabilitation in an ongoing basis rather than in reconstruction of pavement that has deteriorated to a poor condition.

This pavement study analyzes the current status of the Wickliffe pavement network condition and considers the five-year study period of 2018-2022. It mainly focuses on the required roadway pavement preventive maintenance treatments and some rehabilitation techniques rather than reconstruction. The 2016 Ohio Department of Transportation (ODOT) pavement database was used as the input data and RoadMatrix software was utilized as the NOACA Pavement Management platform.

Seven roadway pavement preventive maintenance and rehabilitation treatments were considered in the Wickliffe pavement network analysis for the study period and Table 1 illustrates the selected treatment and their associated planning level costs.

Table 1: Selected Pavement Treatments and Their Planning Level Costs

Maintenance Treatment Type	Cost per SQ FT (2016$)	Estimated Cost per 12-FT lane-Mile (2016$)
Crack Fill	0.08	5,100
Joint Repair	0.24	15,200
Crack Fill and Slurry	0.4	25,300
Preventive Maintenance Minor	0.5	31,700
Micro – Pave Type || Surface Treatment	0.722	45,700
Selective Patch, Mill and 1.5" O/L	1.5	95,000
2.0 inch Hot Mix Mill and Overlay	1.9	120,400

Pavement Maintenance Treatment Definitions

Crack Fill: it is the placement of asphalt emulsion into non-working cracks to reduce water infiltration and to reinforce the adjacent pavement.

Slurry Seal: a mixture of fine aggregate, asphalt emulsion, water, and mineral filler, used when the primary problem is excessive oxidation and hardening of the existing surface. Slurry seals are used to retard surface raveling, and improve surface friction.

Joint Repair: used to remove deteriorated concrete pavement long joint/crack repairs. It minimizes infiltration of surface water and incompressible material into the joint system.

Preventive Maintenance (Minor): typically applied to pavements in good condition having significant remaining service life. Examples of minor preventive treatments include asphalt crack sealing, chip sealing, slurry or micro-surfacing, thin and ultra-thin hot-mix asphalt overlay, and concrete joint sealing.

Micro – Pave (Type II Surface Treatment): consist of the application of a mixture of water, asphalt emulsion, aggregate (very small crushed rock), and chemical additives. It is used to treat surfacing and rut filling on roads that get moderate to heavy levels of traffic.

2.0in Hot Mix Mill & Overlay: applied as a maintenance treatment. Thin overlays should only be placed on structurally sound pavements. That is because they offer little structural improvement, but they can renew the surface in terms of functional performance (i.e., ride quality).

Selective Patching, Mill & 1.5 O/L: it is primarily done to extend the life of a roadway. Patch mill and overlay projects are designed to remove damaged portions of the roadway and replace it with new smooth pavement.

This report includes the following four parts:

I. The 2016 status of the Wickliffe pavement network condition,
II. The 2018 “backlog” treatment list,
III. The optimal preventive maintenance and rehabilitation strategies, and
IV. The comparative analysis.

PART I: 2016 PAVEMENT CONDITION

In order to provide an accurate assessment of the current status and further pavement analyses, the pavement network is required to be divided into homogeneous discrete sections in terms of surface distress, traffic volumes, pavement structure, etc. The 2016 ODOT pavement database has 10 segment records for the City of Wickliffe roadway system. Each record comprises of several fields of various information and measures such as Street name, Length (miles), Lane-miles length, Number of Lanes, Function Class, Pavement Condition Ratings (PCR), etc.

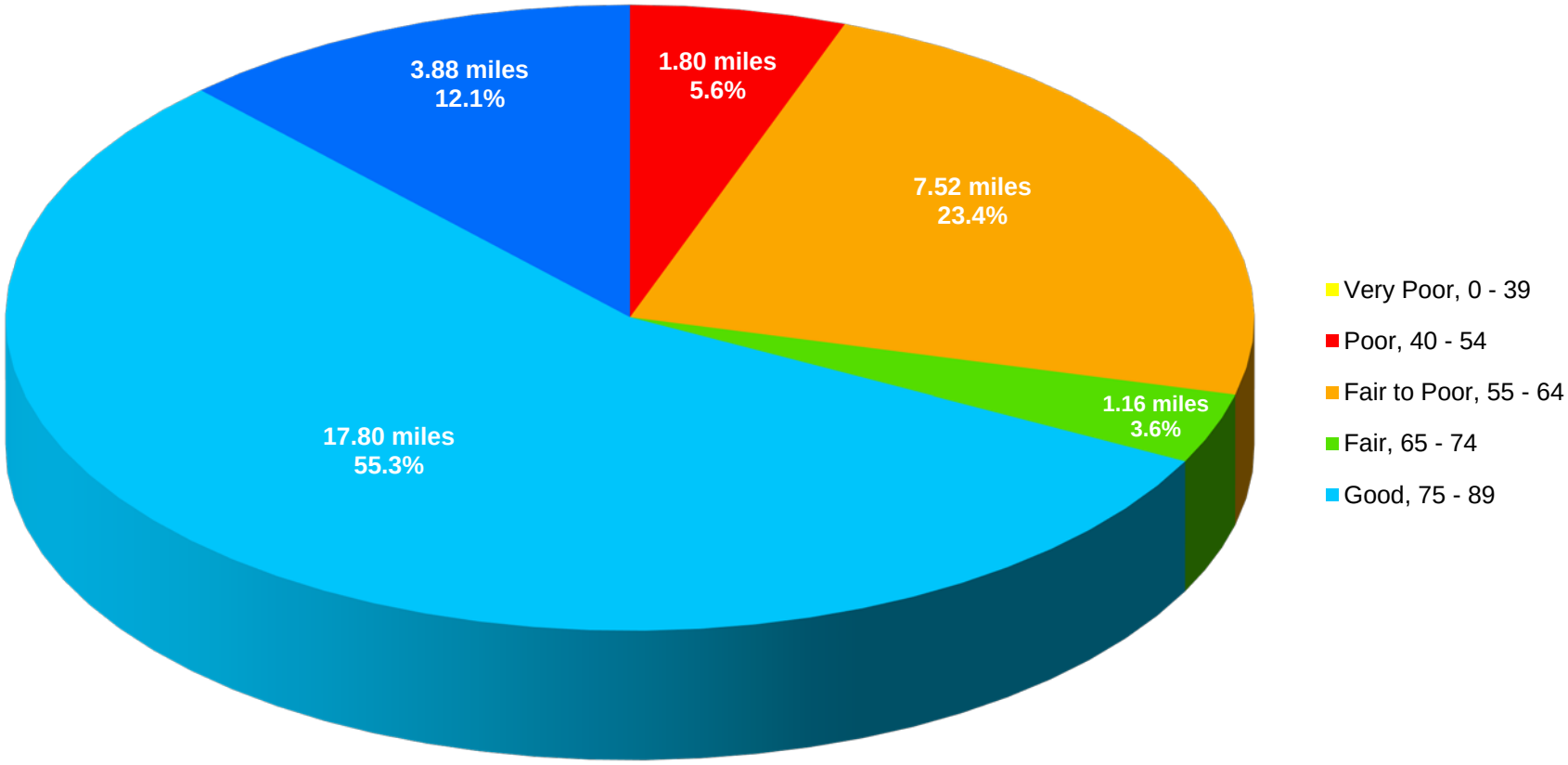
Based on the utilized ODOT database, there are 11.05 centerline miles of federal-aid eligible roads which are equivalent to 32.16 lane-miles in the City of Wickliffe. The total area of roadway is 2,107,036 Sq. Ft.

The PCR measure is a qualitative description of the structural state of the pavement. The PCR values span a spectrum of descriptive narrative ranging from “Very Good” to “Very Poor”. Each roadway segment is scored from 0 to 100 with 0 representing completely distressed pavement and 100 indicating perfect pavement condition. The lane-mile weighted average of the City of Wickliffe segment PCRs is about 72. Table 2 and Figure 1 summarize the 2016 Wickliffe pavement network conditions by percentages of roadway lane-miles length.

Table 2: 2016 Wickliffe Pavement Network Condition

Pavement Condition	PCR Range	Lane-Miles	Percent of Lane-Miles
Very Poor	0 - 39	0	0%
Poor	40 - 54	1.80	5.6%
Fair to Poor	55 - 64	7.52	23.4%
Fair	65 - 74	1.16	3.6%
Good	75 - 89	17.8	55.3%
Very Good	90 - 100	3.88	12.1%

Figure 1: 2016 Wickliffe Pavement Network Condition Chart by Lane-Miles



As indicated, about 67 percent of the pavement lane-miles are currently in the "Good" to "Very Good" condition and the lane-mile weighted average PCR represents a "Fair" condition. A small percent of pavement is in the "Poor" status and demands some kind of immediate maintenance and rehabilitation treatments.

Map 2 illustrates the 2016 Wickliffe roadway pavement condition for each segment record and Table 3 tabulates the 2016 Wickliffe pavement condition listing.

Map 2: 2016 City of Wickliffe Pavement Condition

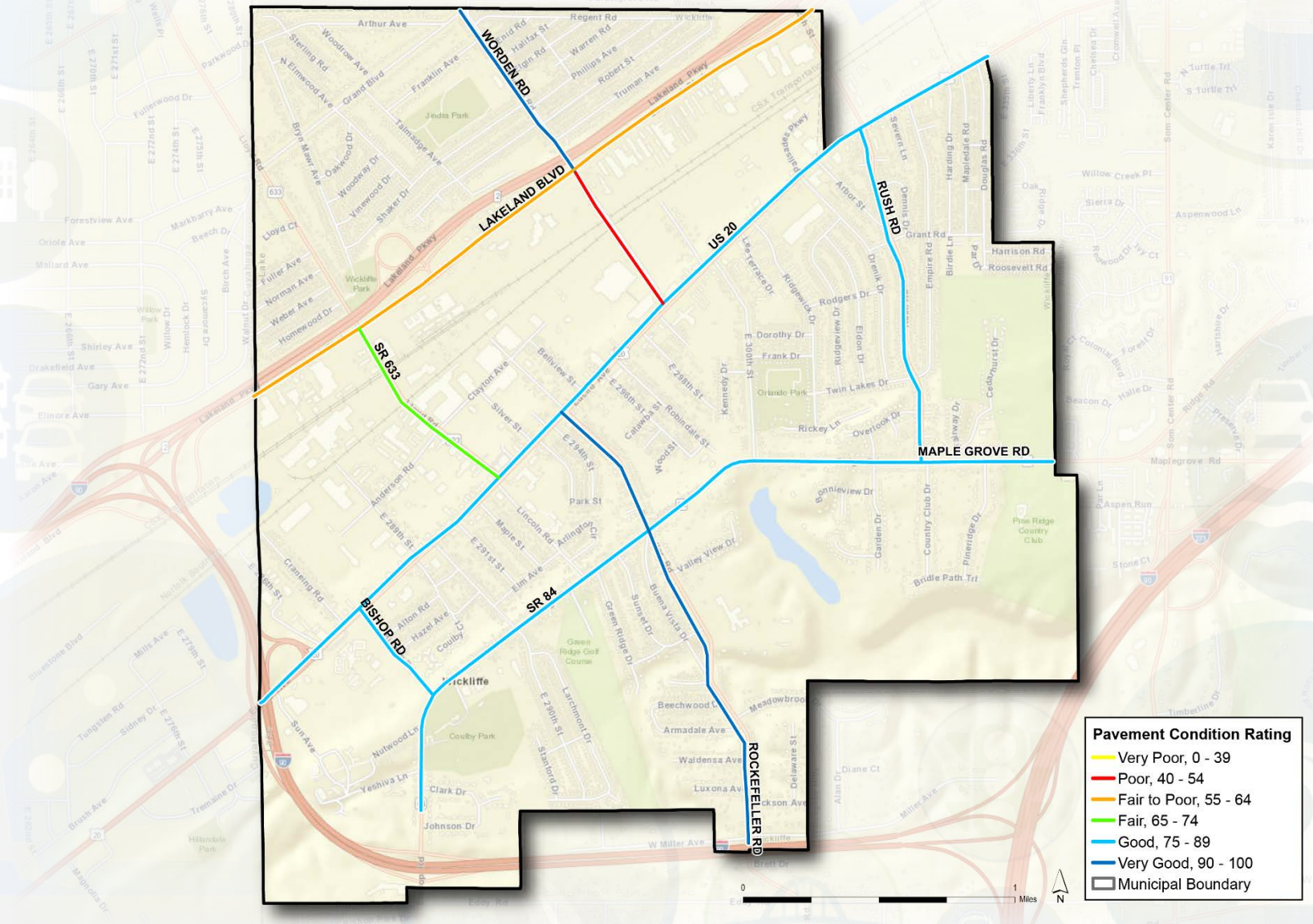


Table 3: 2016 City of Wickliffe Pavement Condition Listing

ROAD NAME	FROM	TO	FUNCTION CLASS	LANE-MILES	PCR
BISHOP RD	EUCLID AVE	RIDGE RD	MAJOR COLLECTOR	0.60	76
LAKELAND BLVD	LAKE COUNTY WCL	E 305TH ST	MAJOR COLLECTOR	7.52	55
ROCKEFELLER RD	W MILLER RD	US 20	MAJOR COLLECTOR	2.74	91
RUSH RD	RIDGE RD	EUCLID AVE	MAJOR COLLECTOR	1.90	76
SR 633	LAKESHORE BLVD	EUCLID AVE	MAJOR COLLECTOR	1.16	65
SR 84	JOHNSON DR	NUTWOOD LANE	MINOR ARTERIAL	0.46	87
SR 84	NUTWOOD LANE	CITY OF WICKLIFFE ECL	MINOR ARTERIAL	4.04	76
US 20	LAKE COUNTY WCL	OAK RIDGE DR	MINOR ARTERIAL	10.80	77
WORDEN RD	EUCLID AVE	LAKELAND BLVD	MINOR ARTERIAL	1.80	50
WORDEN RD	LAKELAND BLVD	GRAND BLVD	MINOR ARTERIAL	1.14	96

PART II: 2018 CURRENT BACKLOG

The backlog is defined as the cost of pavement rehabilitation of all roads within the current year (2018) and bringing the average network PCR to 80. Backlog is a "snapshot" or relative measure of outstanding rehabilitation work. The backlog not only represents how far behind the pavement network is in terms of its present physical condition, but also its cost value serves as a benchmark to measure the impact of various funding strategies. Additionally, the current backlog offers a basis for comparison to future and/or past year's backlogs.

The backlog strategy does not utilize any pavement preventive maintenance treatments, but instead considers rehabilitation or reconstruction treatments. This strategy achieves the average network PCR 80, and also maintains all the pavement conditions above the minimum acceptable level. In this study, the minimum acceptable PCR for the arterial roadway function class is 55 and for the major and minor collector is 50.

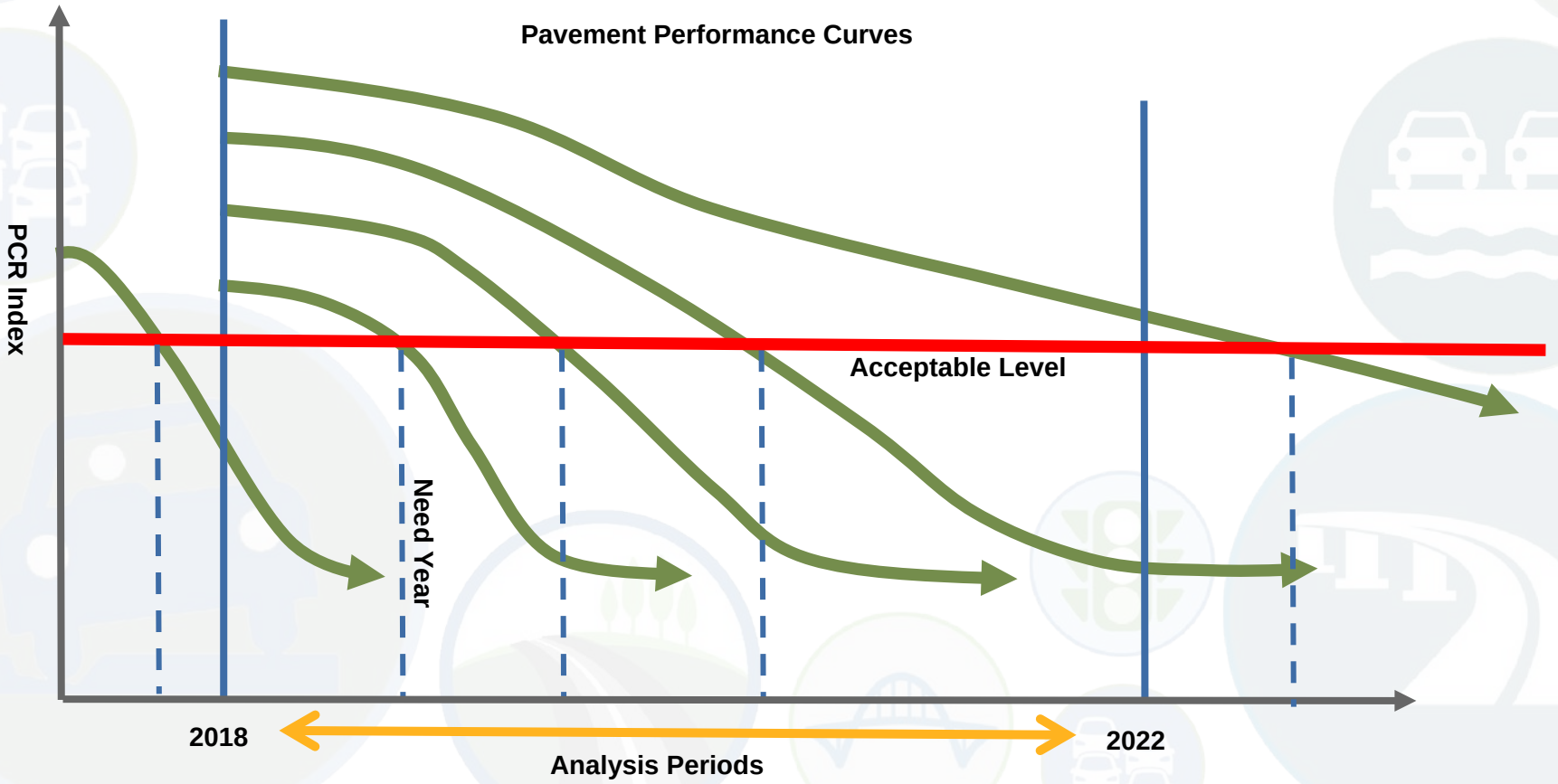
The Appendix includes all the backlog pavement treatments. As illustrated, the 2018 backlog treatment list includes segments which their 2018 PCRs are below the minimum acceptable level and are recommended with various reconstruction treatments. There are five segments in the 2018 backlog list with the total of 25.32 lane-miles. The 2018 backlog cost of the recommended treatments is over 10 million dollars.

PART III: MAINTENANCE & REHABILITATION (M&R) PROGRAM

In order to estimate the preventive maintenance and rehabilitation requirements of a pavement network over a period of time, the first step is to determine the "Need Year" or when a pavement segment requires rehabilitation. The "Need Year" of a pavement is defined as the year in which the pavement condition falls below a critical level. Pavement condition of a road segment deteriorates under traffic, climate, etc. and consequently its PCR value is reduced. Without any treatments and depending on the deteriorating factors, pavements perform differently and Figure 2 depicts the typical acceptable level and "Need Year" relation for several road segments. As shown, the definition of the acceptable level is a critical factor in determining the "Need Year" for any road segment.

In this study, the critical level is set by the minimum acceptable PCR. As mentioned earlier, In the NOACA region, the minimum acceptable PCR for the arterial roadway function class is 55 and for the major and minor collector is 50.

Figure 2: The PCR Acceptable Level and "Need Year" Relation



The second step is to determine any feasible preventive maintenance and/or rehabilitation strategies based on a decision tree approach. The “M&R” program determines the optimal preventive maintenance and rehabilitation strategy for each segment and its recommended implementation year based on the considered decision tree. The Appendix includes all the “M&R” treatments for the identified segments with the implementation year in the period of 2018 to 2022 and the “M&R” program cost includes all the deferred maintenance cost.

PART IV: COMPARATIVE ANALYSIS

The current NOACA transportation asset management policy includes two strategies

- Maintain 15% Deficiency: this strategy attempts to maintain the total lane-miles with PCR below the acceptable level no more than 15%.
- Maintain an Average Network PCR of 80: applies a set of maintenance treatments in order to keep the roadway network average PCR more than, or equal to 80 over the study period.

This section compares the discussed backlog and the "M&R" program treatments with the NOACA transportation asset management strategies.

In addition to the above strategies, this comparative analysis considers another scenario as the minimum benchmark. The "Maintain Lowest Standard PCR" treatment strategy is based on the minimum PCR thresholds of 55 for arterials and 50 for collectors and a set of annual budget constraints. The annual budget constraints are calculated in three steps: First, the segments with the "M&R" recommended implementation in each specific analysis year are selected. Second, a subset of the selected segments which their "Need Years" are in the analysis period are identified. It should be noted that the selected segments with the "Need Year" beyond the analysis period are excluded from the budget constraint calculation. Third, the "M&R" treatment costs for the identified segments in the second step, are added together to provide an annual budget constraint for this scenario.

As discussed, all the above scenarios apply a decision tree approach to determine technically feasible maintenance and rehabilitation strategies for each segment requiring rehabilitation during the five-year period.

Table 4 summarizes the comparison results of all the above scenarios over the five-year period for the City of Wickliffe. In this table, the "5-Year Total Required Dollars" column shows the accumulation of the annual costs over five years calculated based on inflation-adjusted dollars for each strategy. Also, the Network average PCR is the lane-mile weighted average.

Table 4: Performance Comparison of the Constraint Scenarios

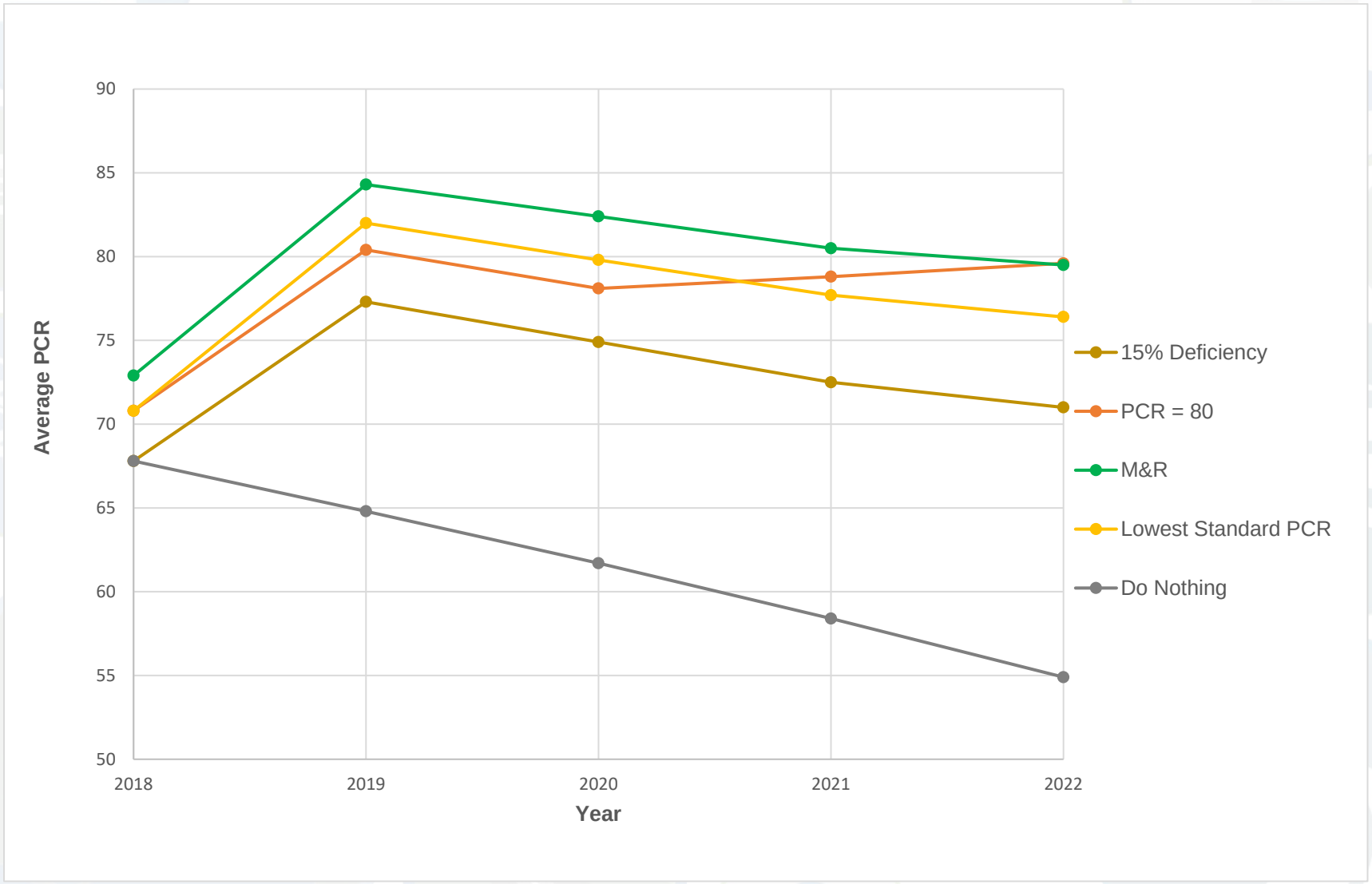
Maintenance Strategy	Strategy Group	5-Year Total Required Dollars	Network Average PCR	Network PCR at the End of the 5-Year Period	Percent of Pavement below the Minimum PCR
2018 Current Backlog	2018 Backlog	10,290,656	84.4	-	0%
Maintain 15% Deficiency	NOACA Transportation Asset Management Targets	813,357	72.7	71	9.2%
Maintain an Average Network PCR of 80		1,264,428	77.5	79.6	0%
M&R Program	Scenarios	1,257,265	79.9	79.5	0%
Maintain Lowest Standard PCR		1,207,359	77.3	76.4	0%

Note: The backlog required budget is for the year of 2018 only.

The Appendix lists all the treatments with their implementation years in the period of 2018 to 2022 for the above maintenance strategies.

Figure 3 illustrates the annual network average PCR for the discussed maintenance and rehabilitation strategies. It should be noted that the backlog scenario has only one value of 84.4 for 2018.

Figure 3: Average PCR Comparison by the Constraint Scenarios and by Year



As expected, the treatments of the “M&R” program maintain the pavement network condition with the highest network average PCR. This strategy requires a budget of over 1.2 million dollars during the analysis period.

The “Maintain an Average Network PCR of 80” and the “Maintain Lowest Standard PCR” scenarios provide almost the same level of condition with required budgets similar to that of the “M&R” program. The “Maintain 15% deficiency” strategy provides lower network PCR at the end of five-year period, but its required budget is about three quarters of the other three scenarios.

It should be noted that the backlog cost as the benchmark is eight times more than the “M&R” program cost and its network average PCR is only a few points higher than that of “M&R” program. This comparison indicates that the annual maintenance investment provides a better pavement management policy with much smaller budget than the reconstruction treatments with high costs.

APPENDIX

2018 Current Backlog

Pavement Treatment List

ROAD NAME	FROM	TO	RECOMMENDATION TREATMENT	LANE-MILES	TREATMENT COST
LAKELAND BLVD	LAKE COUNTY WCL	E 305TH ST	MINOR REHAB WITHOUT REPAIRS (AC)	7.52	4,003,142
SR 633	LAKESHORE BLVD	EUCLID AVE	FUNCTIONAL CPR (MINOR CONCRETE REPAIR)	1.16	810,474
SR 84	NUTWOOD LANE	CITY OF WICKLIFFE ECL	PREVENTATIVE MAINTENANCE MAJOR	4.04	1,075,311
US 20	LAKE COUNTY WCL	OAK RIDGE DR	PREVENTATIVE MAINTENANCE MAJOR	10.80	2,455,386
WORDEN RD	US 20	LAKELAND BLVD	MAJOR REHAB/RECONSTRUCTION	1.80	1,946,343
REQUIRED BACKLOG BUDGET (2018$)					**$10,290,656**

Maintain 15% Deficiency

Pavement Treatment List

ROAD NAME	FROM	TO	RECOMMENDED TREATMENT	LANE-MILES	IMPLEMENTATION	
					COST (2019$)	YEAR
LAKELAND BLVD	LAKE COUNTY WCL	E 305TH ST	SELECTIVE PATCH, MILL & 1.5" O/L	7.52	769,204	2019
THE 2019 REQUIRED BUDGET FOR THE "MAINTAIN 15% DEFICIENCY" STRATEGY					**$769,204**	

ROAD NAME	FROM	TO	RECOMMENDED TREATMENT	LANE-MILES	IMPLEMENTATION	
					COST (2022$)	YEAR
LAKELAND BLVD	LAKE COUNTY WCL	E 305TH ST	CRACK FILL	7.52	44,153	2022
THE 2022 REQUIRED BUDGET FOR THE "MAINTAIN 15% DEFICIENCY" STRATEGY					**$44,153**	

Note: The "Maintain 15% Deficiency" strategy does not have any pavement maintenance treatments with the recommended implementation years of 2018, 2020 and 2021.

Maintain an Average Network PCR of 80

Pavement Treatment List

ROAD NAME	FROM	TO	RECOMMENDED TREATMENT	LANE-MILES	IMPLEMENTATION	
					COST (2018$)	YEAR
WORDEN RD	EUCLID AVE / US 20	LAKELAND BLVD	SELECTIVE PATCH, MILL & 1.5" O/L	1.80	194,634	2018
THE 2018 REQUIRED BUDGET FOR THE "MAINTAIN AN AVERAGE NETWORK PCR OF 80" STRATEGY					**$194,634**	
ROAD NAME	**FROM**	**TO**	**RECOMMENDED TREATMENT**	**LANE-MILES**	**IMPLEMENTATION**	
					COST (2019$)	**YEAR**
LAKELAND BLVD	LAKE COUNTY WCL	E 305TH ST	SELECTIVE PATCH, MILL & 1.5" O/L	7.52	769,204	2019
THE 2019 REQUIRED BUDGET FOR THE "MAINTAIN AN AVERAGE NETWORK PCR OF 80" STRATEGY					**$769,204**	
ROAD NAME	**FROM**	**TO**	**RECOMMENDED TREATMENT**	**LANE-MILES**	**IMPLEMENTATION**	
					COST (2021$)	**YEAR**
BISHOP RD	EUCLID AVE	RIDGE RD	JOINT REPAIR	0.60	12,891	2021
RUSH RD	RIDGE RD	EUCLID AVE / US 20	JOINT REPAIR	1.90	40,821	2021
WORDEN RD	EUCLID AVE / US 20	LAKELAND BLVD	CRACK FILL	1.80	11,172	2021
THE 2021 REQUIRED BUDGET FOR THE "MAINTAIN AN AVERAGE NETWORK PCR OF 80" STRATEGY					**$64,884**	
ROAD NAME	**FROM**	**TO**	**RECOMMENDED TREATMENT**	**LANE-MILES**	**IMPLEMENTATION**	
					COST (2022$)	**YEAR**
LAKELAND BLVD	LAKE COUNTY WCL	E 305TH ST	CRACK FILL	7.52	44,153	2022
SR 633	LAKESHORE BLVD	EUCLID AVE	SELECTIVE PATCH, MILL & 1.5" O/L	1.16	191,553	2022
THE 2022 REQUIRED BUDGET FOR THE "MAINTAIN AN AVERAGE NETWORK PCR OF 80" STRATEGY					**$235,706**	

Note: The "Maintain an Average Network PCR of 80" strategy does not have any pavement maintenance treatments with the recommended implementation year of 2020.

M&R Program

Pavement Treatment List

ROAD NAME	FROM	TO	RECOMMENDED TREATMENT	LANE-MILES	IMPLEMENTATION	
					COST (2018$)	YEAR
BISHOP RD	EUCLID AVE	RIDGE RD	JOINT REPAIR	0.60	11,977	2018
RUSH RD	RIDGE RD	EUCLID AVE / US 20	JOINT REPAIR	1.90	37,929	2018
WORDEN RD	EUCLID AVE / US 20	LAKELAND BLVD	SELECTIVE PATCH, MILL & 1.5" O/L	1.80	194,634	2018
THE 2018 REQUIRED BUDGET FOR THE "M&R" PROGRAM					**$244,540**	
ROAD NAME	**FROM**	**TO**	**RECOMMENDED TREATMENT**	**LANE-MILES**	**IMPLEMENTATION**	
					COST (2019$)	**YEAR**
LAKELAND BLVD	LAKE COUNTY WCL	E 305TH ST	SELECTIVE PATCH, MILL & 1.5" O/L	7.52	769,204	2019
SR 633	LAKESHORE BLVD	EUCLID AVE	SELECTIVE PATCH, MILL & 1.5" O/L	1.16	177,980	2019
THE 2019 REQUIRED BUDGET FOR THE "M&R" PROGRAM					**$947,184**	
ROAD NAME	**FROM**	**TO**	**RECOMMENDED TREATMENT**	**LANE-MILES**	**IMPLEMENTATION**	
					COST (2021$)	**YEAR**
WORDEN RD	EUCLID AVE / US 20	LAKELAND BLVD	CRACK FILL	1.80	11,172	2021
THE 202 REQUIRED BUDGET FOR THE "M&R" PROGRAM					**$11,172**	
ROAD NAME	**FROM**	**TO**	**RECOMMENDED TREATMENT**	**LANE-MILES**	**IMPLEMENTATION**	
					COST (2022$)	**YEAR**
LAKELAND BLVD	LAKE COUNTY WCL	E 305TH ST	CRACK FILL	7.52	44,153	2022
SR 633	LAKESHORE BLVD	EUCLID AVE	CRACK FILL	1.16	10,216	2022
THE 2022 REQUIRED BUDGET FOR THE "M&R" PROGRAM					**$54,369**	

Note: The "M&R" program does not have any pavement maintenance treatments with the recommended implementation year of 2020.

Maintain Lowest Standard PCR

Pavement Treatment List

ROAD NAME	FROM	TO	RECOMMENDED TREATMENT	LANE-MILES	IMPLEMENTATION	
					COST (2018$)	YEAR
WORDEN RD	EUCLID AVE / US 20	LAKELAND BLVD	SELECTIVE PATCH, MILL & 1.5" O/L	1.80	194,634	2018
THE 2018 REQUIRED BUDGET FOR THE "MAINTAIN LOWEST STANDARD PCR" STRATEGY					**$194,634**	
ROAD NAME	**FROM**	**TO**	**RECOMMENDED TREATMENT**	**LANE-MILES**	**IMPLEMENTATION**	
					COST (2019$)	**YEAR**
LAKELAND BLVD	LAKE COUNTY WCL	E 305TH ST	SELECTIVE PATCH, MILL & 1.5" O/L	7.52	769,204	2019
SR 633	LAKESHORE BLVD	EUCLID AVE	SELECTIVE PATCH, MILL & 1.5" O/L	1.16	177,980	2019
THE 2019 REQUIRED BUDGET FOR THE "MAINTAIN LOWEST STANDARD PCR" STRATEGY					**$947,184**	
ROAD NAME	**FROM**	**TO**	**RECOMMENDED TREATMENT**	**LANE-MILES**	**IMPLEMENTATION**	
					COST (2021$)	**YEAR**
WORDEN RD	EUCLID AVE / US 20	LAKELAND BLVD	CRACK FILL	1.80	11,172	2021
THE 2021 REQUIRED BUDGET FOR THE "MAINTAIN LOWEST STANDARD PCR" STRATEGY					**$11,172**	
ROAD NAME	**FROM**	**TO**	**RECOMMENDED TREATMENT**	**LANE-MILES**	**IMPLEMENTATION**	
					COST (2022$)	**YEAR**
LAKELAND BLVD	LAKE COUNTY WCL	E 305TH ST	CRACK FILL	7.52	44,153	2022
SR 633	LAKESHORE BLVD	EUCLID AVE	CRACK FILL	1.16	10,216	2022
THE 2022 REQUIRED BUDGET FOR THE "MAINTAIN LOWEST STANDARD PCR" STRATEGY					**$54,369**	

Note: The "Maintain Lowest Standard PCR" strategy does not have any pavement maintenance treatments with the recommended implementation year of 2020.

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NORTHEAST OHIO
AREAWIDE
COORDINATING
AGENCY

1299 Superior Ave.
Cleveland, Ohio 44114

Phone: 216·241·2414 FAX: 216·621·3024
www.noaca.org
noaca.org @noaca_mpo

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NOACA will STRENGTHEN regional cohesion, PRESERVE existing infrastructure, and BUILD a sustainable multimodal transportation system to SUPPORT economic development and ENHANCE the quality of life in Northeast Ohio NOACA will STRENGTHEN regional cohesion, PRESERVE existing infrastructure, and BUILD a sustainable multimodal transportation system to SUPPORT economic development and ENHANCE the quality of life in Northeast Ohio