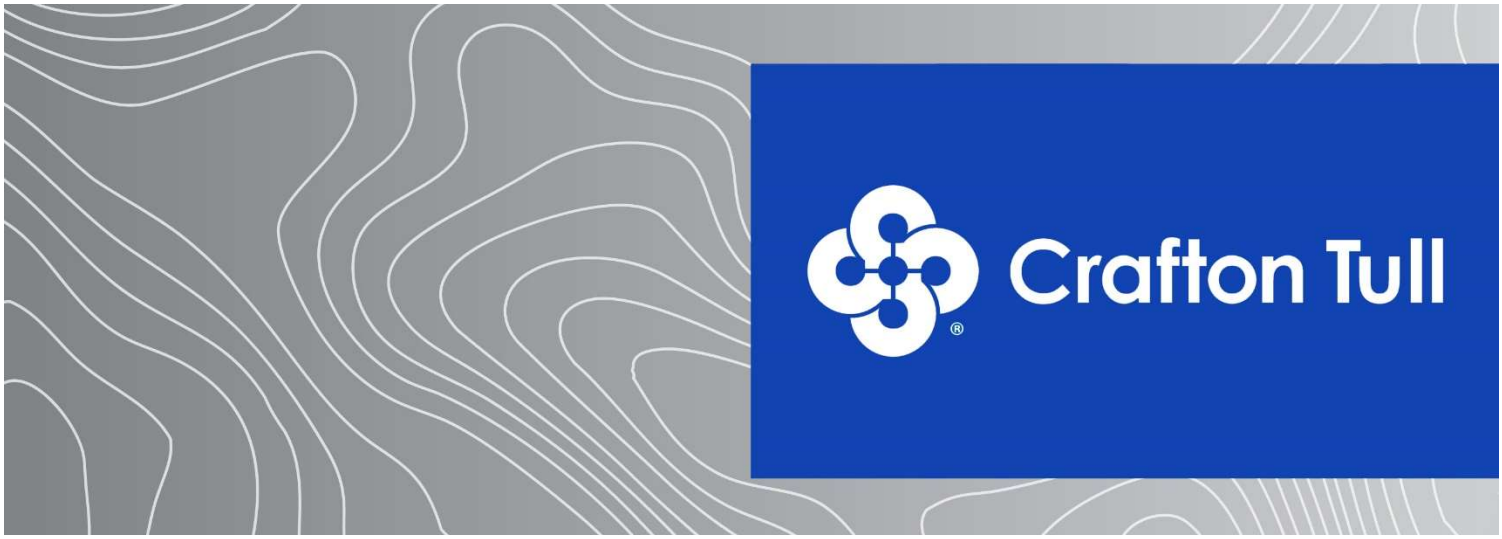
APRIL 2024

TONTITOWN PAVEMENT MAINTENANCE REPORT

Prepared for:
CITY OF TONTITOWN

Submitted to:
Tontitown Public Works
235 East Henri De Tonti
Tontitown, AR 72762

CT JOB NO. 24100800



Prepared by: Crafton Tull

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Crafton Tull

PAVEMENT MAINTENANCE LETTER

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PROJECT DESCRIPTION:
The primary purpose of this project is to identify the most effective use of the City of Tontitown's Street Maintenance budget to preserve the existing infrastructure. The secondary aim is to help the City understand what investment is necessary to maintain or improve its roadway network.

EXISTING CONDITIONS:
The City of Townitown's road network is comprised of approximately 110 lane miles of paved streets (55 miles of road) which the city maintains. The City had previously contracted First Step to do a pavement inventory and condition assessment in 2020. The First Step study indicates that as of 2020, approximately 6 miles of roadway are in excellent condition, nearly 20 miles in good condition, 25.7 miles in fair condition, 1.7 miles in critical condition, and the remaining miles have been constructed since the study was performed. In reviewing potential projects for 2024, we acknowledge that some roads have deteriorated since the First Step study in 2020.

ANALYSIS PARAMETERS:
The following parameters were considered in preparation of a program for 2024:

- Existing road conditions: Analysis is based on the First Step Report and visual comparisons where possible. In the years since the inspections occurred, some deterioration in condition is anticipated. Several roadways have also received some improvements due to adjacent developments or city projects since the study was conducted.
- Population Served (ADT): Higher priority is assigned to roadways serving a greater number of users. Where available, average daily traffic values published by ArDOT were considered. In other areas, traffic was estimated based on the functional classification and the number of residences served by a roadway.
- Rehabilitation Strategies: Different methods or strategies for rehabilitation were considered and are outlined on the following pages. While it is imperative to rehabilitate roadways failing roadways, it is also essential and fiscally beneficial to perform routine maintenance in roadways earlier in their lifecycle. This will ultimately extend the lifecycle of these pavements and save the city on costs due to less frequent full-depth replacement projects.
- Budget: City officials estimated the current street maintenance budget to range from $300,000 to $400,000 and is dependent on tax revenue and other maintenance costs.
- Future Projects: Roadways identified for replacement on the 10-year plan were not identified as a priority for maintenance.

COST & EFFECTIVENESS METHODS:
Costs used for this analysis and estimate were gathered from several local contacts within the construction and asphalt paving businesses. Effectiveness of maintenance treatments varies based on the condition of the existing pavement structure. The following list of pavement rehabilitation and maintenance treatments was considered for this report.

- Fog Seal/Rejuvenating Fog Seal
- Crack Seal
- Chip Seal
- Slurry Seal
- Micro Surfacing
- Ultra-Thin Bonded Wearing Course (UTBWC)
- Mill & Overlay (1.5”-2”)
- Overlay (1.5”-2”)

The lowest cost method is the fog seal; however, this method should not be utilized for pavements with structural stresses such as widespread cracking, rutting, and a high occurrence of potholes. Surface stresses such as minor cracking and oxidation are more applicable uses for fog seal. When used on pavements in good condition, the extension in life cycle is approximately three to four years. This should be used in conjunction with other methods over the course of the pavement’s useful life to maximize the life of the roadway before a full replacement is required.

Chip seals and slurry seals are also potential options which were considered; however, they are primarily used on rural roads due to the need to keep traffic off the treatment until it has fully cured. One consideration for the development of the maintenance plan was what would best benefit the most Tontitown citizens. Given these factors, chip and slurry seals are not being utilized in the proposed projects. Micro Surfacing can be used for similar situations as chip and slurry seals but allows for a faster return to traffic.

The Ultra-Thin Bonded Wearing Course (UTBWC) is often used in similar situations as the fog seal but creates a better seal with the existing roadway and helps facilitate drainage through the gap graded asphalt layer. This treatment also extends the service life of asphalt in good condition approximately 8-15 years compared to fog seal’s 3-4 years. This method is not sufficient to repair pavement with structural stresses due to the asphalt layer being less than 1.5” thick.

The final options considered are the Overlay, either with or without Milling. These are the most applicable methods for structural stresses as the new pavement layer is 1.5” to 2” thick which is sufficient to positively affect structural capacity. When no overhead clearances or drainage patterns are affected, then mill is often not required before an asphalt overlay can be conducted on a roadway. Adding a structural fill to a roadway can increase the life span of the road by up to 15 years. If there are significant subgrade issues or other structural distresses, this value could be significantly reduced.

Estimated life extension for several of these options is shown in the table below.

	Good Condition	Fair Condition	Critical Condition
Fog Seal	3-4 years	1-4 years	Not Recommended
Chip Seal	6-8 years	4-6 years	3-4 years
Micro Surfacing	6-8 years	5-7 years	2-5 years
UTBWC	8-15 years	5-10 years	2-5 years
2” Overlay	6-17 years	5-10 years	2-4 years

A full road replacement, with a healthy maintenance schedule of the various treatments and constructed with good material, subgrade, and with proper drainage, could last more than 25 years.

Estimated costs per square yard used for this analysis are given in the table below.

Treatment	Cost/ Sq. Yd.	Cost/Sq. Yd./ Avg. Life Extension
Rejuvenating Fog Seal	$0.90	$0.30 (3 years)
Chip Seal	$4.50	$0.75 (6 years)
UTBWC	$9.50	$1.19 (8 years)
Micro Surfacing	$4.75	$0.79 (6 years)
2” ACHM Overlay	$17.65	$1.77 (10 years)
1.5” ACHM Overlay	$15.15	$1.68 (9 years)
Mill & Overlay (2“)	$20.15	$2.02 (10 years)
Mill & Overlay (1.5”)	$17.50	$1.94 (9 years)
*Full Road Replacement	$161.00	$6.44 (25 years)

*Does not include maintenance treatment cost to get full 25-year life-cycle.

CONCLUSIONS:

For pavements in good condition a cycle of maintenance treatments are recommended to preserve the existing pavement for the maximum possible length of time. Pavements in fair or critical condition can have their life cycle extended through the use of maintenance treatments, however the cause of structural distresses should be investigated to determine if the roadway should be reconstructed. The appropriate treatment for each condition should be carefully evaluated against the cost and life extension to determine the best course of action for each roadway. Based on the proposed projects and approximated costs provided in Appendix C, the current maintenance budget will not preserve all of the existing fifty-three miles of roadway that Tontitown maintains. Based on an approximation of the needs of the Tontitown road network, the estimated yearly budget needed is $700,000. See Appendix C for more information. This difference in need versus capacity will cause roadways within the network to fall behind and fall into critical condition or be lost entirely.

APPENDIX A:
2024 PROPOSED PROJECTS MAP

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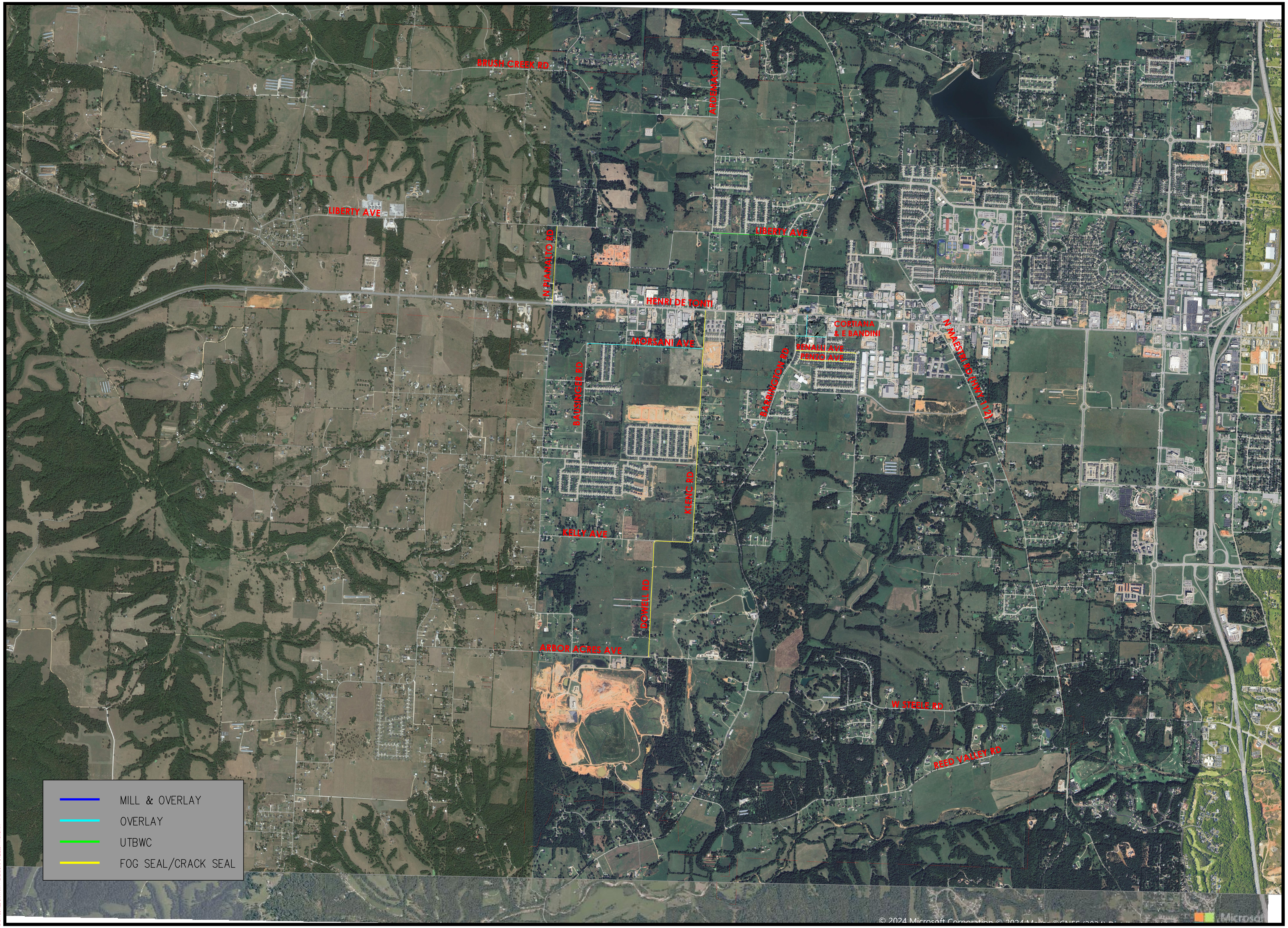

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CERTIFICATE OF AUTHORIZATION:

CERTIFICATE OF AUTHORIZATION
CRAFTON, TULL & ASSOCIATES, INC.
No. 109
ARKANSAS ENGINEER

GRAPHIC SCALE IN FEET
1500' 0 1500'

TONTITOWN PAVEMENT MAINTENANCE

TONTITOWN, AR

Key Plan

No.	Description	Date

PROJECT NO: 24100800
ISSUE DATE: 04/11/2024
CONTACT: L. JOST
QC by:
QC Date:

PRELIMINARY PLANS

NOT FOR CONSTRUCTION ... REVIEW SET ... NOT FOR CONSTRUCTION ... REVIEW SET
THIS DOCUMENT IS PRELIMINARY IN NATURE AND IS NOT A FINAL, SIGNED AND SEALED DOCUMENT

TONTITOWN ROAD MAINTENANCE MAP

APPENDIX B:
SITE PHOTOS

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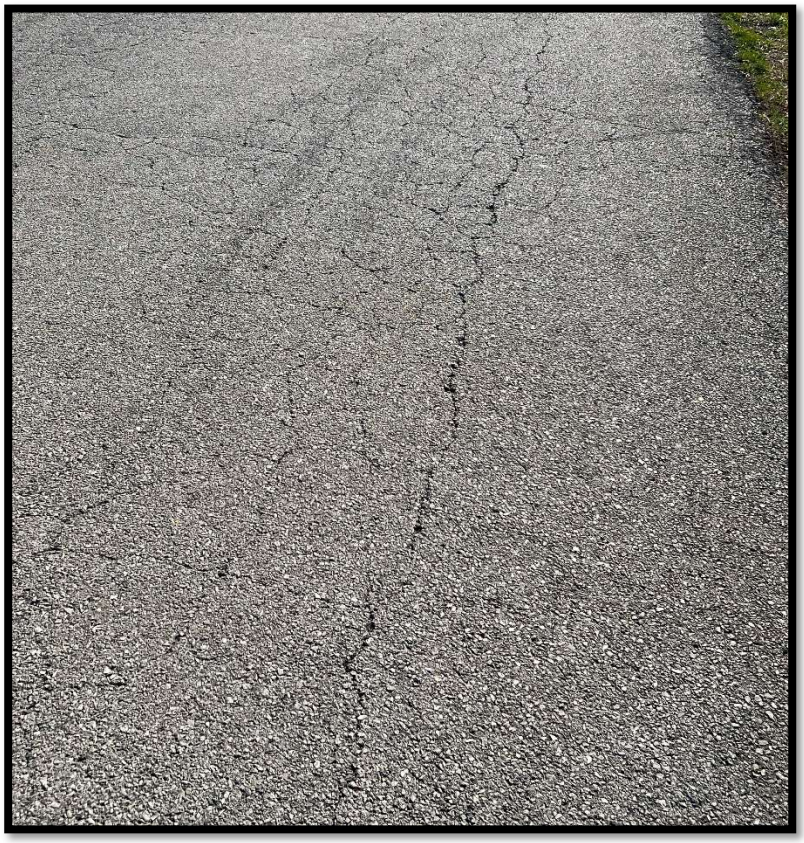
1: Liberty Ave, west of Brush Creek Road. Signs of Pavement distress and cracking.



2: Liberty Ave, east of Brush Creek Road. Signs of Pavement distresses and cracking.

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3: Liberty Ave, near Foster Lane. Signs of raveling.

4: Liberty Ave and N Barrington. Signs of Pavement distresses and failures.

5: N Pianalto Road. Signs of Pavement edge distress and raveling.

6: E Bandini Parking. Signs of Pavement distresses and failure.

7: Cortiana Street. Signs of Pavement distresses.

8: Ranalli Ave. Signs of Pavement distresses and raveling.

9: Penzo Ave. Signs of Pavement distresses and raveling.

10: Morsani Ave at S Mantegani Road. Signs of Pavement distresses and failure.

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11: Bausinger Road. Signs of Pavement distresses.

12: Arbor Acres Ave, near Dowell Road. Signs of Pavement distresses.

13: Klenc Road. Fair Condition with early signs of raveling.

14: Dowell Road. Localized pavement distresses and raveling.

APPENDIX C:
BUDGETING ANALYSIS

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Proposed Projects 2024

Road Name	Treatment	Length (miles)	Width (ft)	Sq Yd	$/Sq Yd	Total Cost
Morsani Ave	ACHM Overlay (2")	0.75	20	8,836	$17.65	$155,947.56
E Bandini	ACHM Overlay (2")	0.19	20	2,472	$17.65	$43,634.72
Cortiana St	ACHM Overlay (2")	0.13	20	1,774	$17.65	$31,318.94
Dowell	Rejuvenating Fog Seal + Crack Seal	0.76	20	8,862	$1.58	$14,002.31
Klenc	Rejuvenating Fog Seal + Crack Seal	1.47	20	17,216	$1.58	$27,200.58
Liberty Ave	___	-	-	-	-	-
(Ardemagni to Barrington)	UTBWC	0.64	20	7,556	$9.50	$71,777.78
Pianalto N	Rejuvenating Fog Seal + Crack Seal	0.49	20	5,778	$1.58	$9,128.89
Ranalli	Rejuvenating Fog Seal + Crack Seal	0.38	20	4,489	$1.58	$7,092.44
Penzo	Rejuvenating Fog Seal + Crack Seal	0.36	20	4,269	$1.58	$6,744.84

Treatment	Quantity Major	$/Major	Quantity Minor	$/Minor	Total Cost
Pothole Repair	60	$250.00	100	$100.00	$25,000.00
	5.17		**61,251**		**$391,848.07**

	Road Length (feet)	Approx. Cost
Mussino Ln	1609	$ 68,762.81
Fantinel Dr	661	$ 31,913.59
Jean Mary Dr	1516	$ 73,199.78
Morsani Ave	3976	$ 253,850.83
Arbor Acres Ave	8964	$ 888,152.63
Reed Valley Rd	13634	$ 582,620.07
N Mantegani Rd	3708	$ 146,673.34
N Brush Creek Rd	1770	$ 75,652.64
Industrial Dr	1526	$ 4,612.09
Asbury Ave	1194	$ 29,395.45
E Bandini Ave	991	$ 62,927.30
Sheffield St	865	$ 21,295.96
Via De Tonti Ln	638	$ 30,786.84
Jerome Dr	523	$ 25,250.59
W Brush Creek Ave	8111	$ 346,621.63
Penzo Ave	1921	$ 47,301.91
S Barrington Rd	18773	$ 681,559.49
N Barrington Rd	6120	$ 30,737.94
Grapevine Dr	1318	$ 32,461.67
Old Highway 68	4573	$ 160,851.52
Brush Creek Dr	664	$ 28,380.44
SE Zulpo St	626	$ 26,527.31
Sabatini Rd	2996	$ 73,763.36
Carmel Cir	176	$ 4,332.43
W Baker Ave	4064	$ 100,070.88
Ranalli Ave	2020	$ 49,739.85
Correnti Ct	633	$ 15,585.81
Lazzari St	576	$ 14,183.27
W Bandini Ave	828	$ 40,005.54
Harmon	1404	$ 34,563.02
W Fletcher Ave	1632	$ 69,757.83
Bausinger Rd	4571	$ 195,318.51
W Washington Ave	1089	$ 26,807.61
Industrial Cir	2407	$ 59,264.85
Steele Rd	11500	$ 491,444.77
Liberty Ave	16328	$ 2,866,045.69
Cortiana St	677	$ 42,976.30
Javello Rd	7178	$ 176,744.02
Tuscan Sun Ln	1773	$ 43,650.70
Piazza Rd	4917	$ 121,074.44
Sbanotto Ave	4632	$ 1,657,114.36
Bariola St	2476	$ 60,967.87
Westminster Ln	1234	$ 30,394.43
S Mantegani Rd	1292	$ 55,200.52
SW 1st	730	$ 17,964.20
Wildcat Creek Blvd	2600	$ 64,027.35
Agnes Dr	1883	$ 46,374.49
Belmont Way	1581	$ 38,932.04
Albano Dr	1879	$ 46,275.91
Arlington Way	2079	$ 51,200.28
Kensington Cv	951	$ 23,418.22
S Pianalto Rd	13263	$ 46,567.97
Taldo Loop	5391	$ 132,734.06
Florence Ave	801	$ 19,733.66
N Pianalto Rd	2659	$ 65,481.19
Kissinger Ave	4171	$ 121,519.56
Fiori St	897	$ 22,085.08
Pocco Ln	1066	$ 26,242.42
Gaiche St	1103	$ 27,156.70
Toby Ln	1036	$ 25,497.99
Apple Blossom Ln	4407	$ 108,510.66
Tessaro St	1339	$ 57,239.19
Vincenza Dr	1307	$ 9,177.89
Carmel Pl	200	$ 4,922.46
Georges Ave	578	$ 14,230.88
Laura Ln	633	$ 15,581.81
Pozza Ln	716	$ 17,629.28
Kenneth Price Rd	1756	$ 43,237.34
Frizzo St	1098	$ 27,036.94
Kelly Ave	5146	$ 126,694.15
Leelynjean Ln	1191	$ 29,323.62
Ardemagni Rd	7963	$ 196,074.83

	Road Length (feet)	Approx. Cost
E Fletcher Ave	2785	$ 49,857.78
Kevin Ln	864	$ 21,270.54
Dale Rouse Rd	3103	$ 21,788.13
Forza Ln	1132	$ 7,951.24
Towne Park Rd	1140	$ 8,006.63
Tartaglia Ave	1373	$ 9,638.73
Romano Ave	1347	$ 9,455.90
Ceola Ave	1275	$ 8,952.97
Naples St	809	$ 5,681.65
Rossi St	625	$ 4,387.69
Arborside Rd	502	$ 3,523.70
Dutchess Pl	206	$ 5,070.85
Sandalwood Pl	197	$ 1,380.59
Corso Pl	237	$ 1,667.77
Dutchess Cir	229	$ 5,630.23
West Side Village St	218	$ 1,529.44
Jones Rd	294	$ 2,067.08
Garden Ln	466	$ 3,269.83
Valle Ln	1278	$ 8,972.55
Brooke St	1283	$ 9,012.74
Klenc Rd	7747	$ 27,201.51
Via Perona Rd	1149	$ 8,068.64
Via Linosa Ave	705	$ 4,951.12
Ruscello Dr	1154	$ 8,102.49
Malbec Rd	1194	$ 8,382.57
Via Stelvio Ave	334	$ 2,344.04
Via Siena Rd	579	$ 4,066.79
Nandina Ln	300	$ 2,109.12
Via Sangro Rd	801	$ 5,626.36
Callihan Loop	4331	$ 30,413.70
Dowell St	3988	$ 14,001.54
Millsap Rd	2153	$ 7,560.68
Saffron Ave	1211	$ 4,251.18
Brinley St	1259	$ 4,418.79
Via Firenze Ave	1287	$ 4,519.00
Verona Ave	1123	$ 3,942.54
Marcello Dr	1124	$ 3,946.93
Via Silva Ave	693	$ 2,433.98
Via Torre Ave	698	$ 2,451.34
Via Drago Ave	696	$ 2,445.14
Bella Toscana Rd	441	$ 1,546.98
Merlot St	470	$ 1,651.96
Via Lucca Ave	424	$ 1,488.03
Via Campo Rd	304	$ 1,068.82
Via Pisa Rd	328	$ 1,153.39
Durante St	356	$ 1,250.90
Bella Toscana St	164	$ 576.56

*TOTAL	$ 11,652,502.00
YEARLY COST (INCLUDING REPLACEMENT)	$ 1,165,250.00 /YR
YEARLY COST (EXCLUDING REPLACEMENT)	$ 693,094.00 /YR

*ESTIMATED REPLACEMENTS IS $4,721,560 OF TOTAL.

110 LN/MILES	TREATMENT	COST PER LN/MILE	TOTAL	YEAR
	FOG SEAL/CRACK SEAL	$ 9,269.33	$ 1,019,626.67	YEAR 1*
	FOG SEAL/CRACK SEAL	$ 9,269.33	$ 1,019,626.67	YEAR 5
	UTBWC	$ 55,733.33	$ 6,130,666.67	YEAR 8
	FOG SEAL/CRACK SEAL	$ 9,269.33	$ 1,019,626.67	YEAR 14
	FOG SEAL/CRACK SEAL	$ 9,269.33	$ 1,019,626.67	YEAR 18
	FOG SEAL/CRACK SEAL	$ 9,269.33	$ 1,019,626.67	YEAR 21
	2" OVERLAY	$ 103,546.67	$ 11,390,133.33	YEAR 24
	FOG SEAL/CRACK SEAL	$ 9,269.33	$ 1,019,626.67	YEAR 28
	FOG SEAL/CRACK SEAL	$ 9,269.33	$ 1,019,626.67	YEAR 32
	FOG SEAL/CRACK SEAL	$ 9,269.33	$ 1,019,626.67	YEAR 36
	FOG SEAL/CRACK SEAL	$ 9,269.33	$ 1,019,626.67	YEAR 39
	REMOVE/REPLACE	$ 944,533.33	$ 103,898,666.67	YEAR 42

TOTAL	**$ 130,596,106.67**	
	$ 3,109,431.11	**/YR INCLUDING REPLACEMENT**
	$ 651,157.07	**/YR EXCLUDING REPLACEMENT**

*ASSUMING ALL PAVEMENTS AT LEAST 3 YEARS OLD, FOR NEW PAVEMENTS BEGIN AT 3-4 YEARS AFTER CONSTRUCTION

**LENGTH OF TIME BETWEEN TREATMENTS ASSUMES ROADS IN GOOD CONDITION, WITH GOOD QUALITY OF CONSTRUCTION AND MATERIALS. ASSUMES AVERAGE TRAFFIC LEVELS.