Milton Road Surface Management System Report

This report was completed by the Town of Milton in collaboration with the Strafford Regional Planning Commission. Road Surface Management System assessments were completed in the town in July 2022, and the forecasting report was finalized in April 2023.

AUTHOR

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The Road Surface Management System

In partnership with the New Hampshire Department of Transportation (NHDOT) and the University of New Hampshire Technology Transfer Center (UNH T2), the Strafford Regional Planning Commission (SRPC) conducts the Road Surface Management Systems (RSMS) assessments and forecasting. As part of the Statewide Asset Data Exchange System (SADES), the RSMS tool is used to assist municipalities in asset management planning by providing current road conditions, predicting future road conditions, and developing a maintenance schedule and budget for future years. Training is conducted by UNH T2 and held annually at the NHDOT offices in Concord, NH or remotely. The RSMS program is broken up into the two-phases found below.

Phase One

In Phase One, current road conditions are assessed and scored. Local roads are identified and divided into quarter mile segments and each segment is driven and assessed via a windshield survey. The segment conditions are recorded with tablets using the Esri ArcCollector application and scored according to road surface distresses and severity. The road condition is represented by a score called the Pavement Condition Index, also known as a PCI score. This score runs on a scale from one to 100 and gives the staff a measurable value to gauge improvements, maintenance, and deteriorations. A perfect road with no distresses would receive a PCI score of 100, with the score at the time of assessment referred to as the Initial PCI score. Quality Assurance/Quality Control (QAQC) measures are taken to ensure all roads segments are assessed consistently and conditions are accurately represented. Each segment is then sent to municipal staff for approval and a local knowledge review ratings. These ratings consist of frost heaving, importance, and relative traffic volume. Once the QAQC is complete and local knowledge ratings are assigned the data is

loaded into the SADES Forecasting software where the PCI scores are then generated. For more information on the assessment parameters please see the RSMS Assessment handbook.

Phase Two

Phase Two uses the PCI scores, derived from Phase One, to guide the maintenance planning and budgeting. During this phase, SRPC works very closely with municipal staff to find the best treatment options for the town's road network needs. When the data is uploaded to the SADES software, the segments are analyzed individually. Each segment is given treatment options and model showing how the PCI score will deteriorate over time. The PCI score is broken down by year and given a steady degradation rate to account for annual wear and tear of the road surface. By visualizing road deterioration, the team can estimate when treatments will be needed, how much it will cost, and how long it will be effective for.

PCI by Color Key		
	PCI >80	These roads are in great shape. They probably don't need any work at this time.
	PCI <80 and >75	These roads are in good shape. They might need some minor preservation treatments.
	PCI <75 and >65	These roads are starting to get bad. They need some preservation treatments.
	PCI <65	These roads are in bad shape. They need rehabilitation treatments.

Town of Milton

Phase 1 road surveys were conducted in July of 2022, with forecasting taking place during the Winter/Spring months of 2023. This was the first round of RSMS surveying that SRPC has done with Milton that was done at no cost to the town. The town worked diligently with SRPC to ensure that a meaningful product was the result of this project. DPW Director Pat Smith, Public Works Foreman Clarence Nason, and Public Works Secretary Jenny Carter worked closely with SRPC staff to update the road condition changes that took place during the project and create a forecasting schedule that worked best for the Town of Milton.

Existing Road Conditions and Forecasting Analysis

After the initial PCI scores were generated, the condition rating had to be adjusted to reflect current day conditions. From here, the scores were used to generate an online condition map that was reviewed by town staff. After all the condition updates and roads had accurate PCI ratings, town staff met with SRPC for a series of forecasting meetings. The town met with SRPC staff five times over the course of November and April 2022/2023 to ensure accuracy of current road conditions.

Road Conditions in 2022 and Projected Road Conditions in 2032

Interactive maps of the of the initial 2022 conditions and the 2032 conditions are available here:

https://srpc.maps.arcgis.com/apps/mapviewer/index.html?webmap=29e68ac27feb4fa0a5644787b445f5e2

Toggle to the layer tab on the top left of the map viewer. Then proceed to toggle the visibility icon (eyeball) to turn on and off the 2 layers.

Final Maintenance Schedule and Budgeting Information

See Appendix C for more detailed information regarding the yearly schedule/maintenance. For more detailed information by road, see Appendix A.

It is recommended by SRPC for Milton to put aside a section of their budget primarily for crack sealing as seen in several towns. Due to the repairs typically being done on a "worse-first" basis, many other roads are often left behind and fall into disrepair quickly. By crack sealing as a preservation strategy across town from year-to-year, the town would be able to focus on smaller pockets of the town which have fallen below 65 PCI.

It is also recommended to set aside a budget for anticipatory washouts of roads as this is seen a major problem in Milton.

Next Steps

SADES RSMS plan updates and assessments are recommended to take place every five years. SRPC staff encourage municipal staff to keep detailed digital records of past road maintenance as well as future needs to be incorporated into and documented in report updates. Summer/Fall 2028 will likely need another assessment done due to fluctuating pricing and to better reflect efforts done by preservation techniques across town.

SRPC staff has trained Milton staff to be able to build their own RSMS scenarios to better keep up with fluctuating costs and to change around the forecasting if they need to push a road's repair back or forward a year.

Appendices

a) Appendix A – Analysis Detail Report *(Alphabetized)*

b) Appendix B – Analysis Detail Report *(Priority)*

c) Appendix C – Annual Maps

d) Appendix D – RSMS protocol

Appendix A – Analysis Detail Report *(Alphabetized)*

Priority	PCI	Street	Order	Length (ft)	Width (ft)	Lanes	Surface Type	Year	Repair	Cost
45	40	Briar Ridge Rd	1	1317.934	24	2	Paved	2028	FDR & HMA (3")	$94,040
43.5	46	Briar Ridge Rd	2	1715.793	22	2	Paved	2028	FDR & HMA (3")	$112,227
41.5	86	Charles St	1	1321.794	24	2	Paved	2026	HMA Overlay (1")	$22,389
41.5	86	Charles St	1	1321.794	24	2	Paved	2026	HMA Shim (3/4" avg)	$20,990
46	68	Charles St	2	1297.049	24	2	Paved	2026	HMA Overlay (1")	$21,970
46	68	Charles St	2	1297.049	24	2	Paved	2026	HMA Shim (3/4" avg)	$20,597
70.25	59	Church St	1	1319.965	21	2	Paved	2025	FDR & HMA (4")	$82,598
67.75	69	Church St	2	791.2309	21	2	Paved	2025	FDR & HMA (4")	$49,512
78.5	86	Dawson St	1	1315.49	24	2	Paved	2032	HMA Overlay (1")	$26,918
78.5	86	Dawson St	1	1315.49	24	2	Paved	2032	HMA Shim (3/4" avg)	$25,236
82.25	71	Dawson St	2	1621.201	24	2	Paved	2032	HMA Overlay (1")	$33,173
82.25	71	Dawson St	2	1621.201	24	2	Paved	2032	HMA Shim (3/4" avg)	$31,100
33.25	59	Depot Pond Rd	1	1191.04	21	2	Paved	2025	HMA Overlay (1")	$17,105
33.25	59	Depot Pond Rd	1	1191.04	21	2	Paved	2025	HMA Shim (3/4" avg)	$16,036
84.25	63	Elm St	1	1319.459	35	2	Paved	2032	FDR & HMA (3")	$155,737
78.25	87	Elm St	2	1318.939	24	2	Paved	2032	FDR & HMA (3")	$106,749
78.75	85	Elm St	3	1320.183	24	2	Paved	2031	FDR & HMA (3")	$103,537
81	76	Elm St	4	1365.481	24	2	Paved	2031	FDR & HMA (3")	$107,089
82.25	71	Governors Rd	7	1319.451	21	2	Paved	2027	HMA Overlay (1")	$20,182
82.25	71	Governors Rd	7	1319.451	21	2	Paved	2027	HMA Shim (3/4" avg)	$18,920
80.75	77	Governors Rd	8	1319.61	21	2	Paved	2027	HMA Overlay (1")	$20,184
80.75	77	Governors Rd	8	1319.61	21	2	Paved	2027	HMA Shim (3/4" avg)	$18,923
79.5	82	Governors Rd	9	1319.374	21	2	Paved	2027	HMA Overlay (1")	$20,180
79.5	82	Governors Rd	9	1319.374	21	2	Paved	2027	HMA Shim (3/4" avg)	$18,919
82.5	70	Governors Rd	10	1320.722	21	2	Paved	2027	HMA Overlay (1")	$20,201
82.5	70	Governors Rd	10	1320.722	21	2	Paved	2027	HMA Shim (3/4" avg)	$18,939
84.25	63	Governors Rd	11	1320.401	21	2	Paved	2027	HMA Overlay (1")	$20,196

Priority	PCI	Street	Order	Length (ft)	Width (ft)	Lanes	Surface Type	Year	Repair	Cost
84.25	63	Governors Rd	11	1320.401	21	2	Paved	2027	HMA Shim (3/4" avg)	$18,934
81.75	73	Governors Rd	12	1319.26	21	2	Paved	2027	HMA Overlay (1")	$20,179
81.75	73	Governors Rd	12	1319.26	21	2	Paved	2027	HMA Shim (3/4" avg)	$18,918
82.25	71	Governors Rd	13	1320.755	21	2	Paved	2027	HMA Overlay (1")	$20,202
82.25	71	Governors Rd	13	1320.755	21	2	Paved	2027	HMA Shim (3/4" avg)	$18,939
83.5	66	Governors Rd	14	1632.369	21	2	Paved	2027	HMA Overlay (1")	$24,968
83.5	66	Governors Rd	14	1632.369	21	2	Paved	2027	HMA Shim (3/4" avg)	$23,407
47.75	89	Heron Cir	1	1320.386	22	2	Paved	2029	HMA Shim (3/4" avg)	$21,125
47.75	89	Heron Cir	1	1320.386	22	2	Paved	2029	HMA Overlay (1")	$22,533
54.25	63	Heron Cir	2	1681.979	22	2	Paved	2029	FDR & HMA (3")	$113,536
39.5	62	Highland Ave	1	1175.525	20	2	Paved	2026	HMA Overlay (1")	$16,593
39.5	62	Highland Ave	1	1175.525	20	2	Paved	2026	HMA Shim (3/4" avg)	$15,556
38.25	67	Jennifer Ln	1	811.0533	21	2	Paved	2028	FDR & HMA (3")	$50,638
21.75	73	Kimball St	1	115.9815	21	2	Paved	2026	HMA Shim (3/4" avg)	$1,612
21.75	73	Kimball St	1	115.9815	21	2	Paved	2026	HMA Overlay (1")	$1,719
29	76	Liberty Cir	1	701.2319	20	2	Paved	2030	HMA Overlay (1")	$11,227
29	76	Liberty Cir	1	701.2319	20	2	Paved	2030	HMA Shim (3/4" avg)	$10,526
23.25	67	Lydia Ln	1	530.9814	18	2	Paved	2030	FDR & HMA (3")	$30,264
58	48	Mason Rd	13	933.0467	22	2	Paved	2024	FDR & HMA (3")	$53,804
56.5	54	Mason Rd	14	1319.978	22	2	Paved	2024	FDR & HMA (3")	$76,117
57.5	50	Mason Rd	15	1319.79	22	2	Paved	2024	FDR & HMA (3")	$76,106
57.75	49	Mason Rd	16	1319.939	22	2	Paved	2024	HMA Overlay (1")	$19,243
57.75	49	Mason Rd	16	1319.939	22	2	Paved	2024	HMA Shim (3/4" avg)	$18,041
54	64	Mason Rd	17	1768.821	22	2	Paved	2024	HMA Overlay (1")	$25,788
54	64	Mason Rd	17	1768.821	22	2	Paved	2024	HMA Shim (3/4" avg)	$24,176
54.5	66	Micah Ter	3	1319.839	21	2	Paved	2024	Double Chip Seal	$17,219
54.5	66	Micah Ter	3	1319.839	21	2	Paved	2024	HMA Shim (3/4" avg)	$17,219
54	68	Micah Ter	4	1768.816	21	2	Paved	2024	Double Chip Seal	$23,077
54	68	Micah Ter	4	1768.816	21	2	Paved	2024	HMA Shim (3/4" avg)	$23,077

Priority	PCI	Street	Order	Length (ft)	Width (ft)	Lanes	Surface Type	Year	Repair	Cost
83.5	66	Nutes Rd	1	1320.916	22	2	Paved	2026	HMA Overlay (1")	$20,510
83.5	66	Nutes Rd	1	1320.916	22	2	Paved	2026	HMA Shim (3/4" avg)	$19,228
84	64	Nutes Rd	2	1319.172	22	2	Paved	2026	HMA Overlay (1")	$20,483
84	64	Nutes Rd	2	1319.172	22	2	Paved	2026	HMA Shim (3/4" avg)	$19,203
82.5	70	Nutes Rd	3	1319.418	22	2	Paved	2026	HMA Overlay (1")	$20,487
82.5	70	Nutes Rd	3	1319.418	22	2	Paved	2026	HMA Shim (3/4" avg)	$19,206
85	60	Nutes Rd	4	1319.628	22	2	Paved	2026	HMA Overlay (1")	$20,490
85	60	Nutes Rd	4	1319.628	22	2	Paved	2026	HMA Shim (3/4" avg)	$19,209
91.25	35	Nutes Rd	5	1319.639	22	2	Paved	2023	HMA Overlay (1")	$18,642
91.25	35	Nutes Rd	5	1319.639	22	2	Paved	2023	HMA Shim (3/4" avg)	$17,477
88.75	45	Nutes Rd	6	1319.453	22	2	Paved	2023	HMA Overlay (1")	$18,640
88.75	45	Nutes Rd	6	1319.453	22	2	Paved	2023	HMA Shim (3/4" avg)	$17,475
87.75	49	Nutes Rd	7	1319.592	22	2	Paved	2023	HMA Overlay (1")	$18,642
87.75	49	Nutes Rd	7	1319.592	22	2	Paved	2023	HMA Shim (3/4" avg)	$17,477
90	40	Nutes Rd	8	758.2264	22	2	Paved	2023	HMA Shim (3/4" avg)	$10,042
90	40	Nutes Rd	8	758.2264	22	2	Paved	2023	HMA Overlay (1")	$10,711
77.25	31	Park Pl	3	1320.572	22	2	Paved	2023	FDR & HMA (3")	$73,790
51.25	23	Park Pl	4	1320.628	22	2	Paved	2023	FDR & HMA (3")	$73,793
73.75	45	Park Pl	5	1320.657	22	2	Paved	2023	HMA Overlay (1")	$18,657
73.75	45	Park Pl	5	1320.657	22	2	Paved	2023	HMA Shim (3/4" avg)	$17,491
53.25	39	Ridgeview Dr	1	1658.199	20	2	Paved	2030	FDR & HMA (3")	$105,011
38.5	38	Rookery Rd	1	847.9485	22	2	Paved	2029	FDR & HMA (3")	$57,238
79.25	83	School St	1	858.2297	21	2	Paved	2031	HMA Shim (3/4" avg)	$13,959
79.25	83	School St	1	858.2297	21	2	Paved	2031	HMA Overlay (1")	$14,890
55.25	31	Sleeping Bear Dr	1	1907.231	20	2	Paved	2028	FDR & HMA (3")	$113,408
36.75	77	Spring Brook Dr	1	1122.446	22	2	Paved	2030	HMA Overlay (1")	$19,768
36.75	77	Spring Brook Dr	1	1122.446	22	2	Paved	2030	HMA Shim (3/4" avg)	$18,533
86.75	53	Steeple St	1	1189.672	23	2	Paved	2031	FDR & HMA (3")	$89,414
27.5	50	Tappan Ct	1	180.7948	17	2	Paved	2026	HMA Overlay (1")	$2,169

Priority	PCI	Street	Order	Length (ft)	Width (ft)	Lanes	Surface Type	Year	Repair	Cost
27.5	50	Tappan Ct	1	180.7948	17	2	Paved	2026	HMA Shim (3/4" avg)	$2,034
57	52	Thurston Rd	6	1320.604	22	2	Paved	2023	HMA Overlay (1")	$18,656
57	52	Thurston Rd	6	1320.604	22	2	Paved	2023	HMA Shim (3/4" avg)	$17,490
60.25	39	Thurston Rd	7	670.8475	22	2	Paved	2023	HMA Overlay (1")	$9,477
60.25	39	Thurston Rd	7	670.8475	22	2	Paved	2023	HMA Shim (3/4" avg)	$8,885
26.5	54	Tierra Dr	1	759.6877	22	2	Paved	2030	FDR & HMA (3")	$52,921
80	52	Willey Rd	1	1318.84	20	2	Paved	2025	HMA Overlay (1")	$18,039
80	52	Willey Rd	1	1318.84	20	2	Paved	2025	HMA Shim (3/4" avg)	$16,911
74.5	74	Willey Rd	2	1320.92	20	2	Paved	2025	Chip Seal	$10,001
74.5	74	Willey Rd	2	1320.92	20	2	Paved	2025	HMA Shim (3/4" avg)	$16,938
84.5	34	Willey Rd	3	1320.919	20	2	Paved	2025	Chip Seal	$10,001
84.5	34	Willey Rd	3	1320.919	20	2	Paved	2025	HMA Shim (3/4" avg)	$16,938
75	72	Willey Rd	4	1319.758	20	2	Paved	2025	Chip Seal	$9,993
75	72	Willey Rd	4	1319.758	20	2	Paved	2025	HMA Shim (3/4" avg)	$16,923
80.5	78	Winding Rd	1	1649.826	23	2	Paved	2029	HMA Overlay (1")	$29,435
80.5	78	Winding Rd	1	1649.826	23	2	Paved	2029	HMA Shim (3/4" avg)	$27,596
81.5	74	Winding Rd	2	1039.95	23	2	Paved	2029	HMA Overlay (1")	$18,554
81.5	74	Winding Rd	2	1039.95	23	2	Paved	2029	HMA Shim (3/4" avg)	$17,395
80	80	Winding Rd	3	1083.402	23	2	Paved	2029	HMA Overlay (1")	$19,330
80	80	Winding Rd	3	1083.402	23	2	Paved	2029	HMA Shim (3/4" avg)	$18,121

Appendix B – Analysis Detail Report *(Priority)*

Priority	PCI	Street	Order	Length (ft)	Width (ft)	Lanes	Surface Type	Year	Repair	Cost
91.25	35	Nutes Rd	5	1319.639	22	2	Paved	2023	HMA Overlay (1")	$18,642
91.25	35	Nutes Rd	5	1319.639	22	2	Paved	2023	HMA Shim (3/4" avg)	$17,477
90	40	Nutes Rd	8	758.2264	22	2	Paved	2023	HMA Shim (3/4" avg)	$10,042
90	40	Nutes Rd	8	758.2264	22	2	Paved	2023	HMA Overlay (1")	$10,711
88.75	45	Nutes Rd	6	1319.453	22	2	Paved	2023	HMA Overlay (1")	$18,640
88.75	45	Nutes Rd	6	1319.453	22	2	Paved	2023	HMA Shim (3/4" avg)	$17,475
87.75	49	Nutes Rd	7	1319.592	22	2	Paved	2023	HMA Overlay (1")	$18,642
87.75	49	Nutes Rd	7	1319.592	22	2	Paved	2023	HMA Shim (3/4" avg)	$17,477
86.75	53	Steeple St	1	1189.672	23	2	Paved	2031	FDR & HMA (3")	$89,414
85	60	Nutes Rd	4	1319.628	22	2	Paved	2026	HMA Overlay (1")	$20,490
85	60	Nutes Rd	4	1319.628	22	2	Paved	2026	HMA Shim (3/4" avg)	$19,209
84.5	34	Willey Rd	3	1320.919	20	2	Paved	2025	Chip Seal	$10,001
84.5	34	Willey Rd	3	1320.919	20	2	Paved	2025	HMA Shim (3/4" avg)	$16,938
84.25	63	Elm St	1	1319.459	35	2	Paved	2032	FDR & HMA (3")	$155,737
84.25	63	Governors Rd	11	1320.401	21	2	Paved	2027	HMA Overlay (1")	$20,196
84.25	63	Governors Rd	11	1320.401	21	2	Paved	2027	HMA Shim (3/4" avg)	$18,934
84	64	Nutes Rd	2	1319.172	22	2	Paved	2026	HMA Overlay (1")	$20,483
84	64	Nutes Rd	2	1319.172	22	2	Paved	2026	HMA Shim (3/4" avg)	$19,203
83.5	66	Governors Rd	14	1632.369	21	2	Paved	2027	HMA Overlay (1")	$24,968
83.5	66	Governors Rd	14	1632.369	21	2	Paved	2027	HMA Shim (3/4" avg)	$23,407
83.5	66	Nutes Rd	1	1320.916	22	2	Paved	2026	HMA Overlay (1")	$20,510
83.5	66	Nutes Rd	1	1320.916	22	2	Paved	2026	HMA Shim (3/4" avg)	$19,228
82.5	70	Governors Rd	10	1320.722	21	2	Paved	2027	HMA Overlay (1")	$20,201
82.5	70	Governors Rd	10	1320.722	21	2	Paved	2027	HMA Shim (3/4" avg)	$18,939
82.5	70	Nutes Rd	3	1319.418	22	2	Paved	2026	HMA Overlay (1")	$20,487
82.5	70	Nutes Rd	3	1319.418	22	2	Paved	2026	HMA Shim (3/4" avg)	$19,206
82.25	71	Dawson St	2	1621.201	24	2	Paved	2032	HMA Overlay (1")	$33,173
82.25	71	Dawson St	2	1621.201	24	2	Paved	2032	HMA Shim (3/4" avg)	$31,100

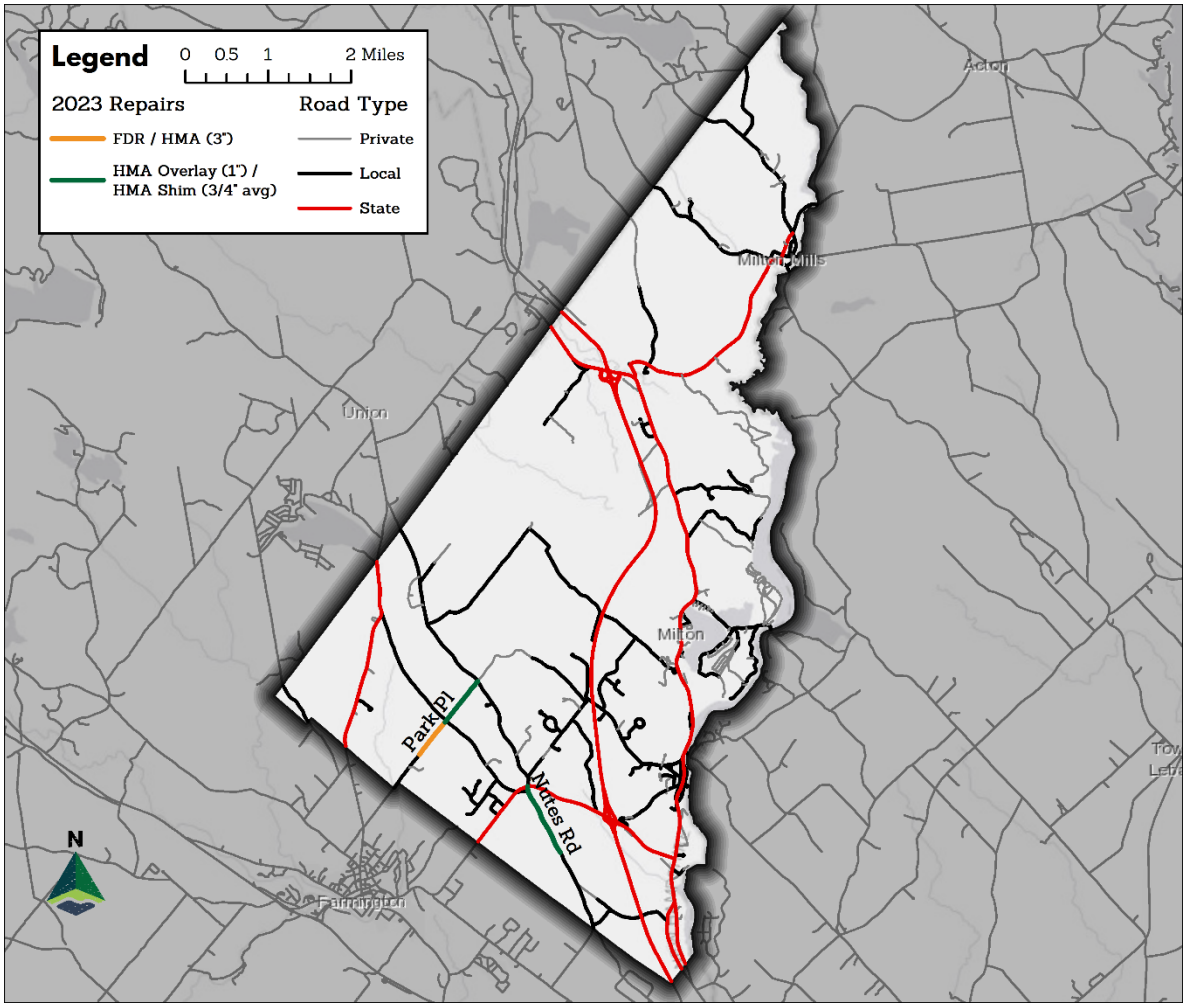
Priority	PCI	Street	Order	Length (ft)	Width (ft)	Lanes	Surface Type	Year	Repair	Cost
82.25	71	Governors Rd	7	1319.451	21	2	Paved	2027	HMA Overlay (1")	$20,182
82.25	71	Governors Rd	7	1319.451	21	2	Paved	2027	HMA Shim (3/4" avg)	$18,920
82.25	71	Governors Rd	13	1320.755	21	2	Paved	2027	HMA Overlay (1")	$20,202
82.25	71	Governors Rd	13	1320.755	21	2	Paved	2027	HMA Shim (3/4" avg)	$18,939
81.75	73	Governors Rd	12	1319.26	21	2	Paved	2027	HMA Overlay (1")	$20,179
81.75	73	Governors Rd	12	1319.26	21	2	Paved	2027	HMA Shim (3/4" avg)	$18,918
81.5	74	Winding Rd	2	1039.95	23	2	Paved	2029	HMA Overlay (1")	$18,554
81.5	74	Winding Rd	2	1039.95	23	2	Paved	2029	HMA Shim (3/4" avg)	$17,395
81	76	Elm St	4	1365.481	24	2	Paved	2031	FDR & HMA (3")	$107,089
80.75	77	Governors Rd	8	1319.61	21	2	Paved	2027	HMA Overlay (1")	$20,184
80.75	77	Governors Rd	8	1319.61	21	2	Paved	2027	HMA Shim (3/4" avg)	$18,923
80.5	78	Winding Rd	1	1649.826	23	2	Paved	2029	HMA Overlay (1")	$29,435
80.5	78	Winding Rd	1	1649.826	23	2	Paved	2029	HMA Shim (3/4" avg)	$27,596
80	52	Willey Rd	1	1318.84	20	2	Paved	2025	HMA Overlay (1")	$18,039
80	52	Willey Rd	1	1318.84	20	2	Paved	2025	HMA Shim (3/4" avg)	$16,911
80	80	Winding Rd	3	1083.402	23	2	Paved	2029	HMA Overlay (1")	$19,330
80	80	Winding Rd	3	1083.402	23	2	Paved	2029	HMA Shim (3/4" avg)	$18,121
79.5	82	Governors Rd	9	1319.374	21	2	Paved	2027	HMA Overlay (1")	$20,180
79.5	82	Governors Rd	9	1319.374	21	2	Paved	2027	HMA Shim (3/4" avg)	$18,919
79.25	83	School St	1	858.2297	21	2	Paved	2031	HMA Shim (3/4" avg)	$13,959
79.25	83	School St	1	858.2297	21	2	Paved	2031	HMA Overlay (1")	$14,890
78.75	85	Elm St	3	1320.183	24	2	Paved	2031	FDR & HMA (3")	$103,537
78.5	86	Dawson St	1	1315.49	24	2	Paved	2032	HMA Overlay (1")	$26,918
78.5	86	Dawson St	1	1315.49	24	2	Paved	2032	HMA Shim (3/4" avg)	$25,236
78.25	87	Elm St	2	1318.939	24	2	Paved	2032	FDR & HMA (3")	$106,749
77.25	31	Park Pl	3	1320.572	22	2	Paved	2023	FDR & HMA (3")	$73,790
75	72	Willey Rd	4	1319.758	20	2	Paved	2025	Chip Seal	$9,993
75	72	Willey Rd	4	1319.758	20	2	Paved	2025	HMA Shim (3/4" avg)	$16,923
74.5	74	Willey Rd	2	1320.92	20	2	Paved	2025	Chip Seal	$10,001

Priority	PCI	Street	Order	Length (ft)	Width (ft)	Lanes	Surface Type	Year	Repair	Cost
74.5	74	Willey Rd	2	1320.92	20	2	Paved	2025	HMA Shim (3/4" avg)	$16,938
73.75	45	Park Pl	5	1320.657	22	2	Paved	2023	HMA Overlay (1")	$18,657
73.75	45	Park Pl	5	1320.657	22	2	Paved	2023	HMA Shim (3/4" avg)	$17,491
70.25	59	Church St	1	1319.965	21	2	Paved	2025	FDR & HMA (4")	$82,598
67.75	69	Church St	2	791.2309	21	2	Paved	2025	FDR & HMA (4")	$49,512
60.25	39	Thurston Rd	7	670.8475	22	2	Paved	2023	HMA Overlay (1")	$9,477
60.25	39	Thurston Rd	7	670.8475	22	2	Paved	2023	HMA Shim (3/4" avg)	$8,885
58	48	Mason Rd	13	933.0467	22	2	Paved	2024	FDR & HMA (3")	$53,804
57.75	49	Mason Rd	16	1319.939	22	2	Paved	2024	HMA Overlay (1")	$19,243
57.75	49	Mason Rd	16	1319.939	22	2	Paved	2024	HMA Shim (3/4" avg)	$18,041
57.5	50	Mason Rd	15	1319.79	22	2	Paved	2024	FDR & HMA (3")	$76,106
57	52	Thurston Rd	6	1320.604	22	2	Paved	2023	HMA Overlay (1")	$18,656
57	52	Thurston Rd	6	1320.604	22	2	Paved	2023	HMA Shim (3/4" avg)	$17,490
56.5	54	Mason Rd	14	1319.978	22	2	Paved	2024	FDR & HMA (3")	$76,117
55.25	31	Sleeping Bear Dr	1	1907.231	20	2	Paved	2028	FDR & HMA (3")	$113,408
54.5	66	Micah Ter	3	1319.839	21	2	Paved	2024	Double Chip Seal	$17,219
54.5	66	Micah Ter	3	1319.839	21	2	Paved	2024	HMA Shim (3/4" avg)	$17,219
54.25	63	Heron Cir	2	1681.979	22	2	Paved	2029	FDR & HMA (3")	$113,536
54	64	Mason Rd	17	1768.821	22	2	Paved	2024	HMA Overlay (1")	$25,788
54	64	Mason Rd	17	1768.821	22	2	Paved	2024	HMA Shim (3/4" avg)	$24,176
54	68	Micah Ter	4	1768.816	21	2	Paved	2024	Double Chip Seal	$23,077
54	68	Micah Ter	4	1768.816	21	2	Paved	2024	HMA Shim (3/4" avg)	$23,077
53.25	39	Ridgeview Dr	1	1658.199	20	2	Paved	2030	FDR & HMA (3")	$105,011
51.25	23	Park Pl	4	1320.628	22	2	Paved	2023	FDR & HMA (3")	$73,793
47.75	89	Heron Cir	1	1320.386	22	2	Paved	2029	HMA Shim (3/4" avg)	$21,125
47.75	89	Heron Cir	1	1320.386	22	2	Paved	2029	HMA Overlay (1")	$22,533
46	68	Charles St	2	1297.049	24	2	Paved	2026	HMA Overlay (1")	$21,970
46	68	Charles St	2	1297.049	24	2	Paved	2026	HMA Shim (3/4" avg)	$20,597
45	40	Briar Ridge Rd	1	1317.934	24	2	Paved	2028	FDR & HMA (3")	$94,040

Priority	PCI	Street	Order	Length (ft)	Width (ft)	Lanes	Surface Type	Year	Repair	Cost
43.5	46	Briar Ridge Rd	2	1715.793	22	2	Paved	2028	FDR & HMA (3")	$112,227
41.5	86	Charles St	1	1321.794	24	2	Paved	2026	HMA Overlay (1")	$22,389
41.5	86	Charles St	1	1321.794	24	2	Paved	2026	HMA Shim (3/4" avg)	$20,990
39.5	62	Highland Ave	1	1175.525	20	2	Paved	2026	HMA Overlay (1")	$16,593
39.5	62	Highland Ave	1	1175.525	20	2	Paved	2026	HMA Shim (3/4" avg)	$15,556
38.5	38	Rookery Rd	1	847.9485	22	2	Paved	2029	FDR & HMA (3")	$57,238
38.25	67	Jennifer Ln	1	811.0533	21	2	Paved	2028	FDR & HMA (3")	$50,638
36.75	77	Spring Brook Dr	1	1122.446	22	2	Paved	2030	HMA Overlay (1")	$19,768
36.75	77	Spring Brook Dr	1	1122.446	22	2	Paved	2030	HMA Shim (3/4" avg)	$18,533
33.25	59	Depot Pond Rd	1	1191.04	21	2	Paved	2025	HMA Overlay (1")	$17,105
33.25	59	Depot Pond Rd	1	1191.04	21	2	Paved	2025	HMA Shim (3/4" avg)	$16,036
29	76	Liberty Cir	1	701.2319	20	2	Paved	2030	HMA Overlay (1")	$11,227
29	76	Liberty Cir	1	701.2319	20	2	Paved	2030	HMA Shim (3/4" avg)	$10,526
27.5	50	Tappan Ct	1	180.7948	17	2	Paved	2026	HMA Overlay (1")	$2,169
27.5	50	Tappan Ct	1	180.7948	17	2	Paved	2026	HMA Shim (3/4" avg)	$2,034
26.5	54	Tierra Dr	1	759.6877	22	2	Paved	2030	FDR & HMA (3")	$52,921
23.25	67	Lydia Ln	1	530.9814	18	2	Paved	2030	FDR & HMA (3")	$30,264
21.75	73	Kimball St	1	115.9815	21	2	Paved	2026	HMA Shim (3/4" avg)	$1,612
21.75	73	Kimball St	1	115.9815	21	2	Paved	2026	HMA Overlay (1")	$1,719

Appendix C – Annual Map

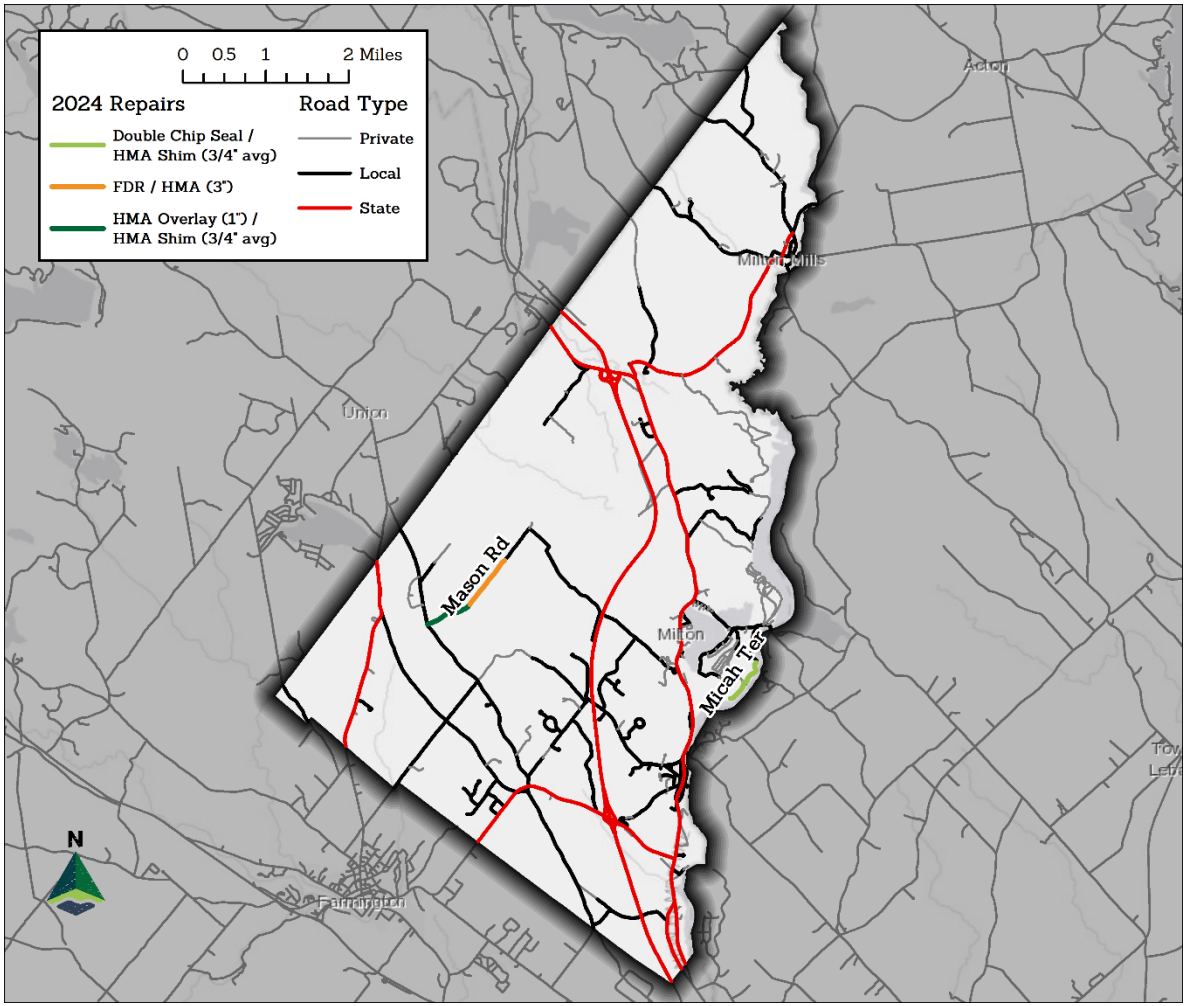
2023 Treatments



Average PCI After Repairs	69.09
Average PCI Without Repairs	66.82
Total Miles Treated	2.02
Total Repair Cost	$367,344
FDR & HMA (3")	*$147,582*
FDR & HMA (4")	*$0*
HMA Overlay (1")	*$113,425*

Roads Treated: Nutes Road, Park Place, Thurston Road

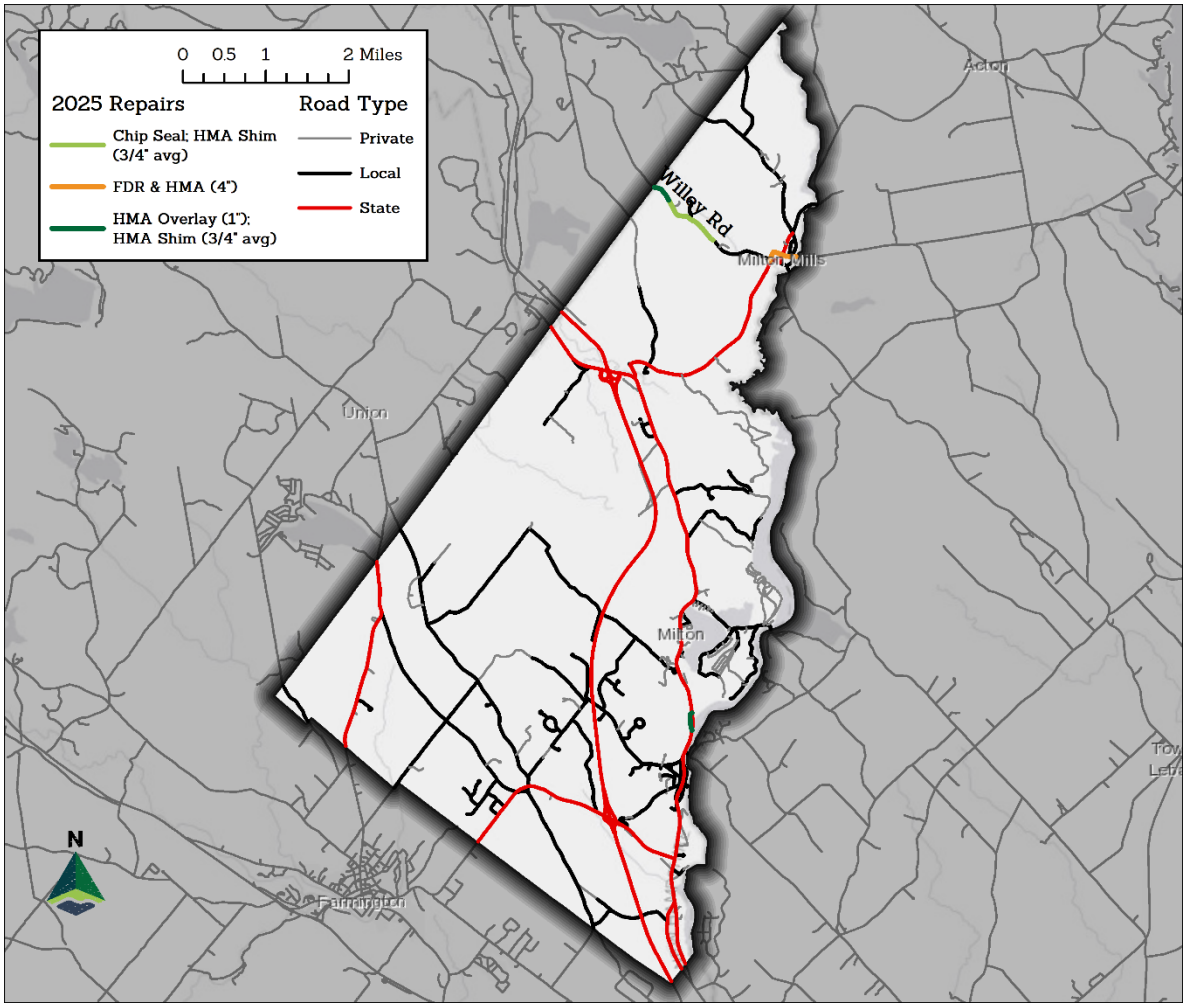
2024 Treatments



Average PCI After Repairs	67.39
Average PCI Without Repairs	63.82
Total Miles Treated	1.85
Total Repair Cost	$280,996
Double Chip Seal	*$40,296*
FDR & HMA (3")	*$206,027*
FDR & HMA (4")	*$0*
HMA Overlay (1")	*$45,031*

Roads Treated: Mason Road, Micah Terrace

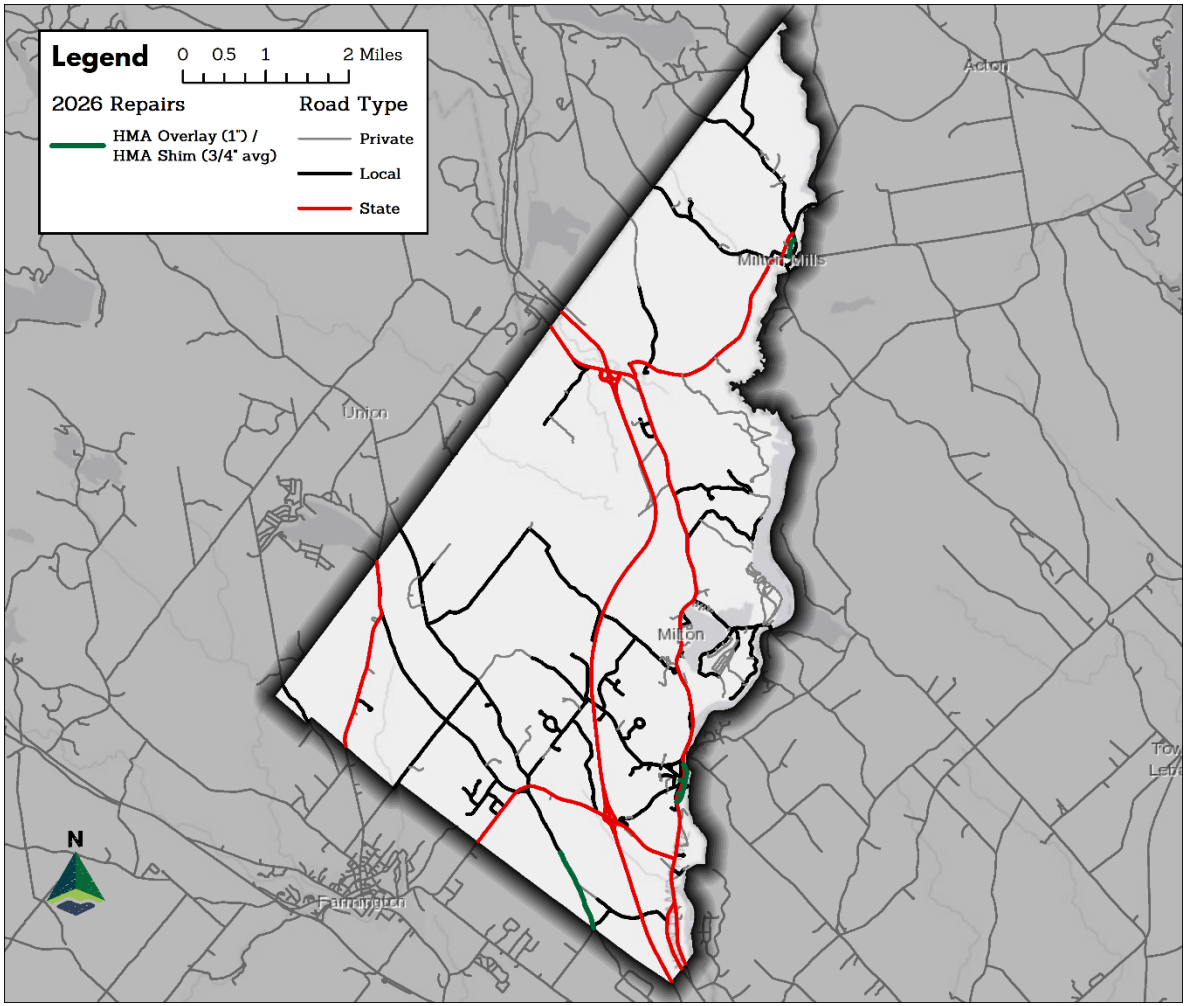
2025 Treatments



Average PCI After Repairs	65.82
Average PCI Without Repairs	60.95
Total Miles Treated	1.63
Total Repair Cost	$280,996
Chip Seal	*$29,996*
Double Chip Seal	*$132,110*
FDR & HMA (3")	*$35,144*
FDR & HMA (4")	*$83,747*

Roads Treated: Church Street, Depot Pond Road, Willey Road

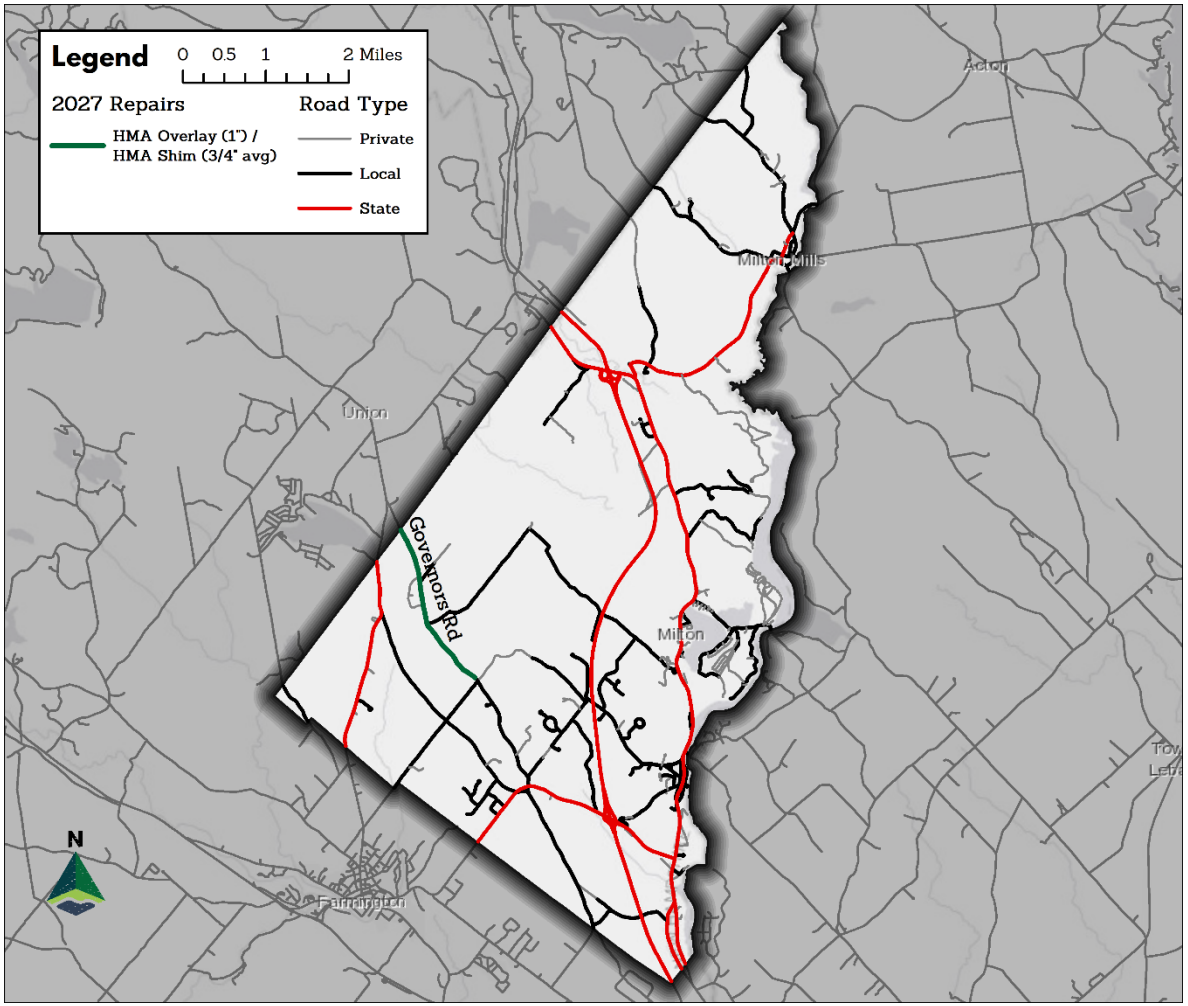
2026 Treatments



Average PCI After Repairs	64.42
Average PCI Without Repairs	58.21
Total Miles Treated	1.77
Total Repair Cost	$284,443
HMA Overlay (1")	*$146,810*
HMA Shim (3/4" avg)	*$137,634*

Roads Treated: Charles St, Highland Ave, Kimball St, Nutes Road, Tappan Court

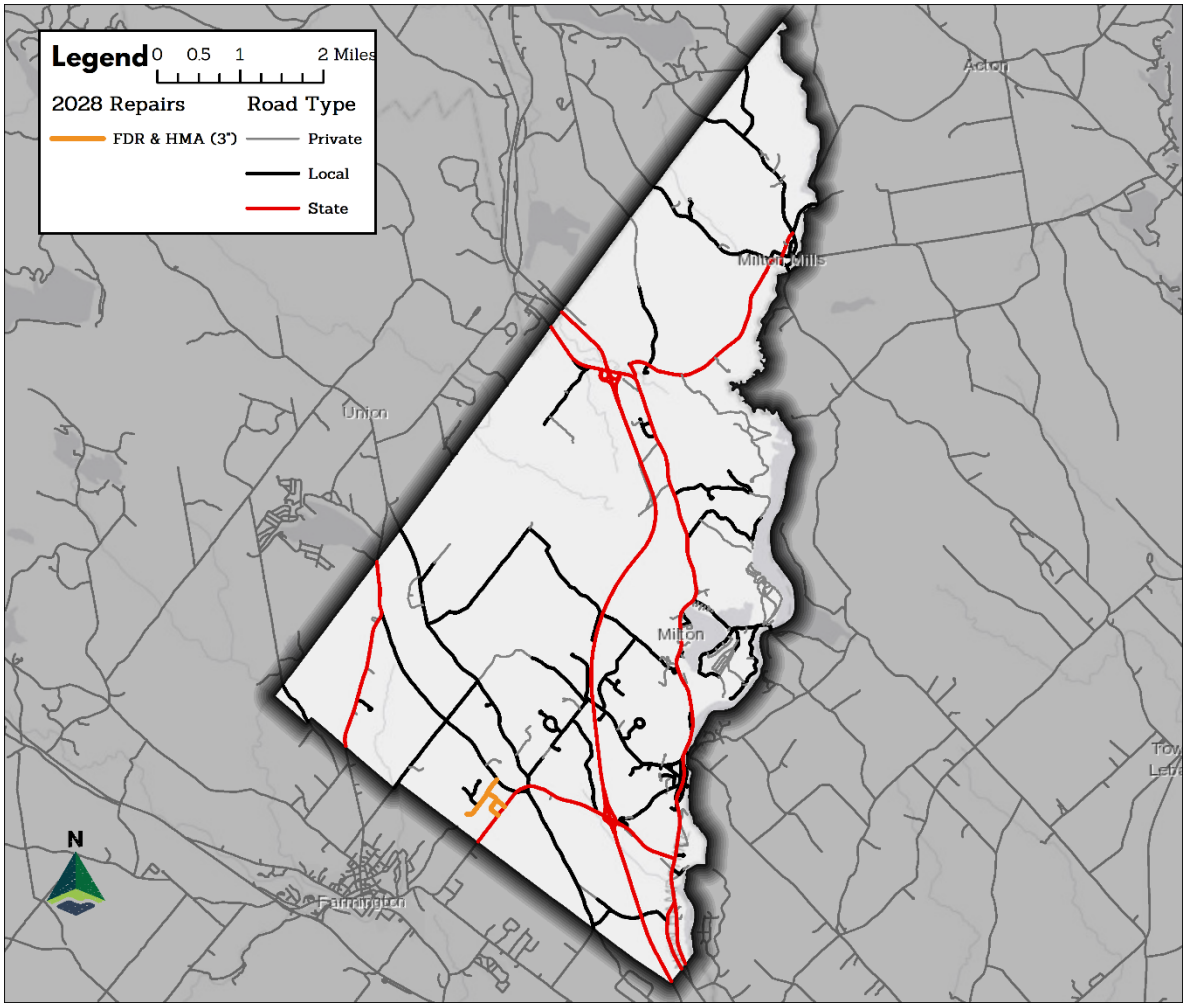
2027 Treatments



Average PCI After Repairs	62.86
Average PCI Without Repairs	55.6
Total Miles Treated	2.06
Total Repair Cost	$322,190
HMA Overlay (1")	*$166,292*
HMA Shim (3/4" avg)	*$155,898*

Roads Treated: Governors Road

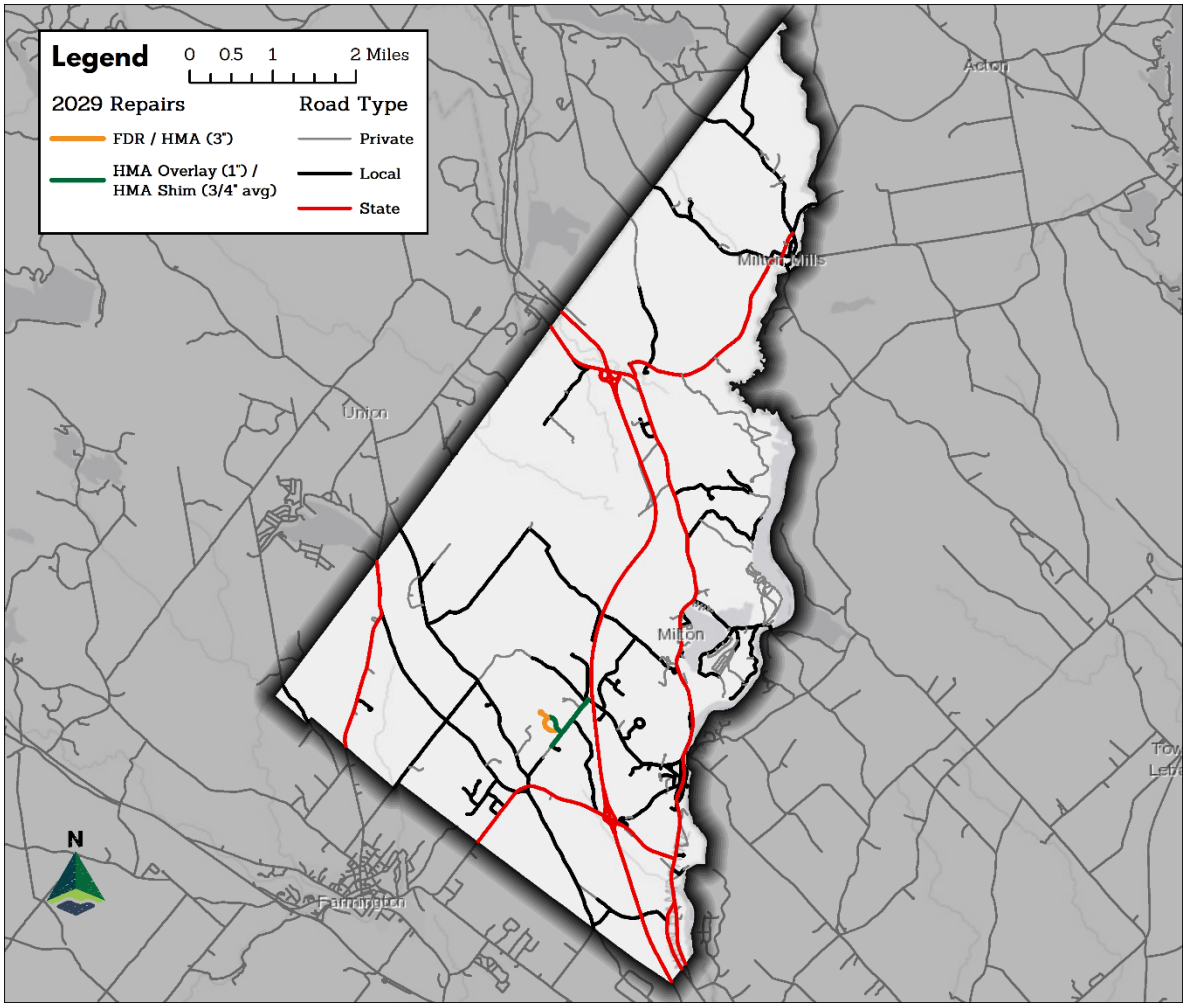
2028 Treatments



Average PCI After Repairs	61.2
Average PCI Without Repairs	53.1
Total Miles Treated	1.09
Total Repair Cost	$370,313
FDR & HMA (3")	*$370,313*

Roads Treated: Briar Ridge Road, Jennifer Lane, Sleeping Bear Drive

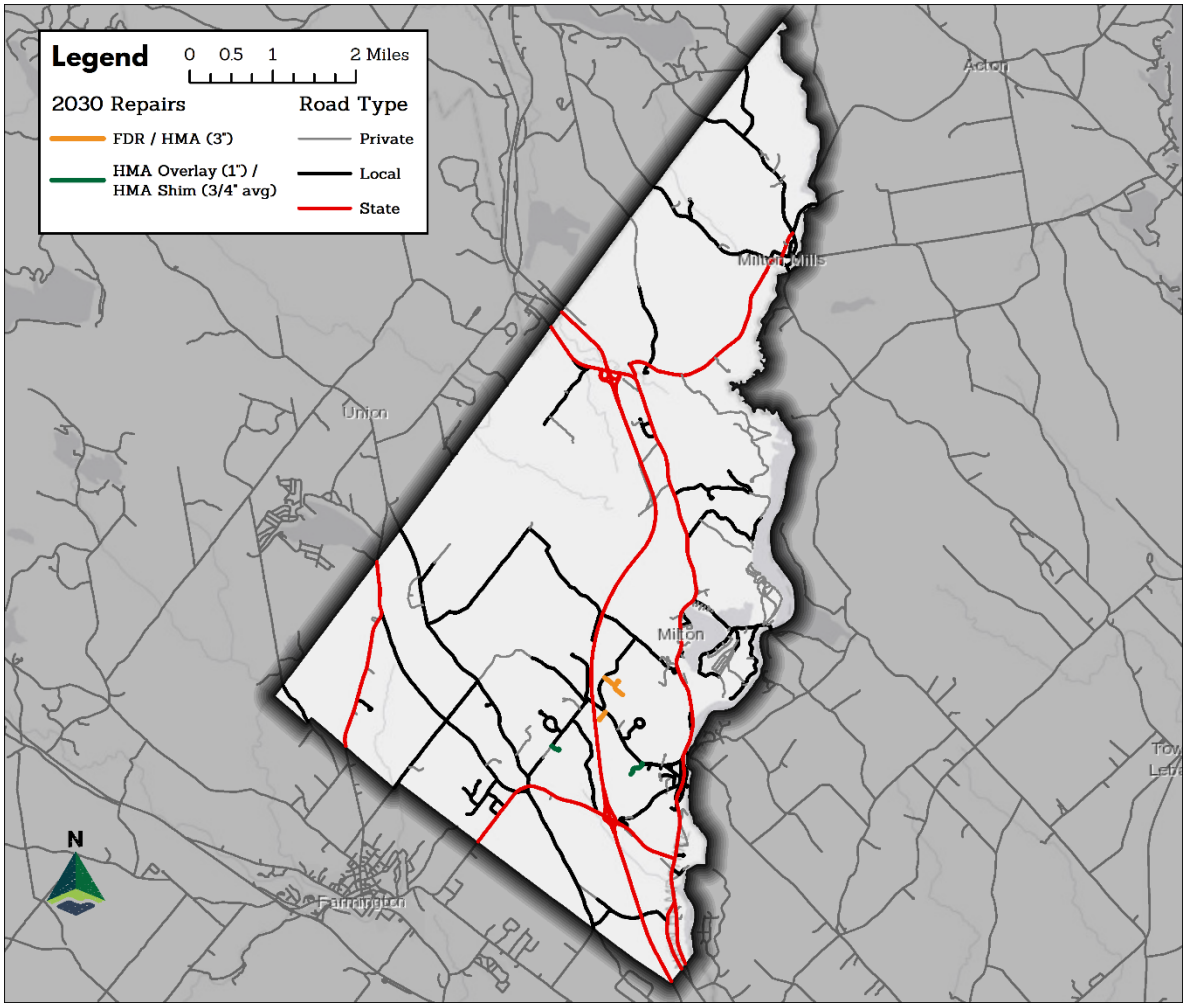
2029 Treatments



Average PCI After Repairs	59.68
Average PCI Without Repairs	50.72
Total Miles Treated	1.44
Total Repair Cost	$344,863
FDR & HMA (3")	*$170,773*
HMA Overlay (1")	*$89,853*
HMA Shim (3/4" avg)	*$84,237*

Roads Treated: Heron Circle, Rookery Road, Winding Road

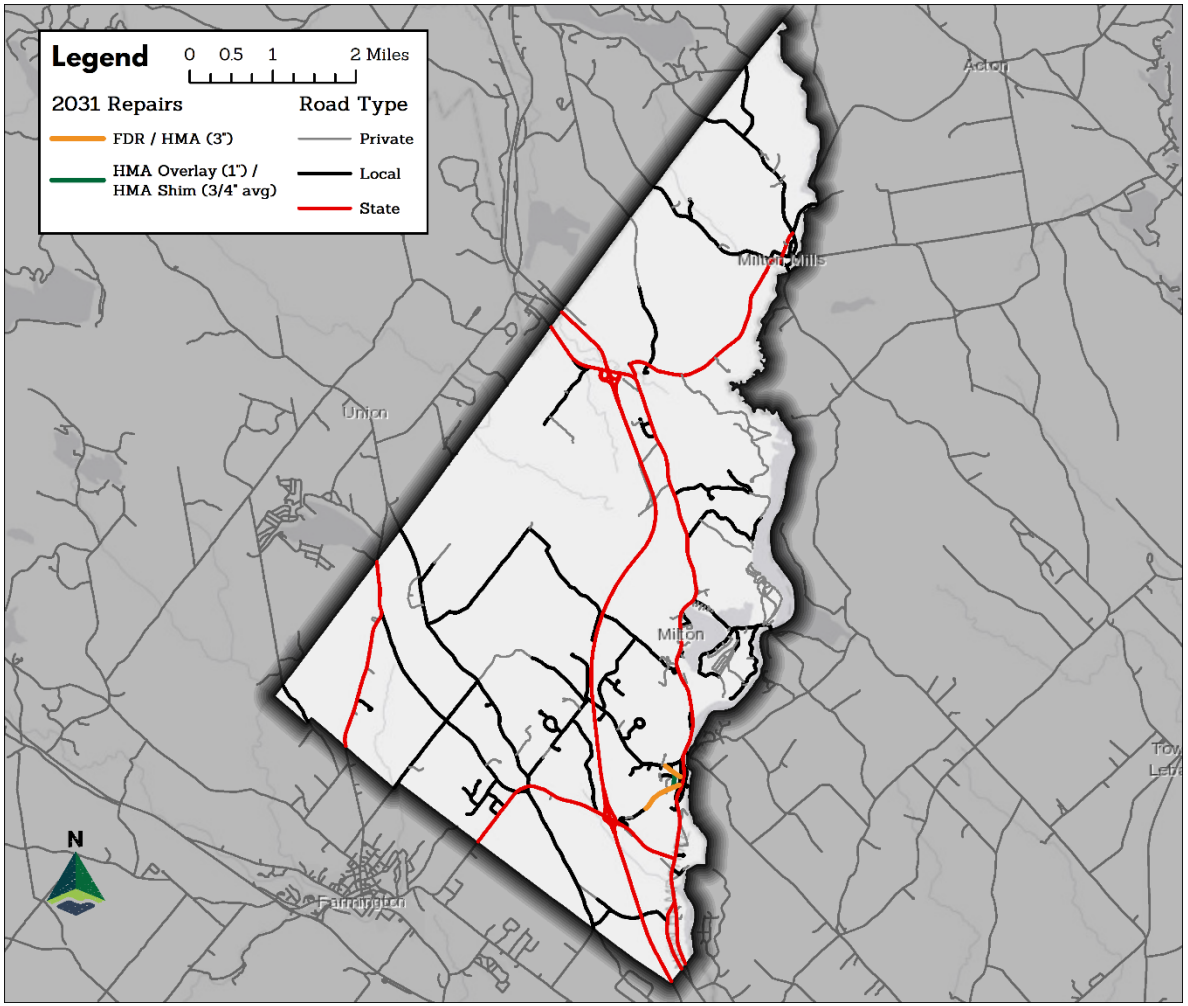
2030 Treatments



Average PCI After Repairs	58.21
Average PCI Without Repairs	48.45
Total Miles Treated	0.9
Total Repair Cost	$248,250
FDR & HMA (3")	*$188,196*
HMA Overlay (1")	*$30,996*
HMA Shim (3/4" avg)	*$29,058*

Roads Treated: Liberty Circle, Lydia Lane, Ridgeview Drive, Spring Brook Drive, Tierra Drive

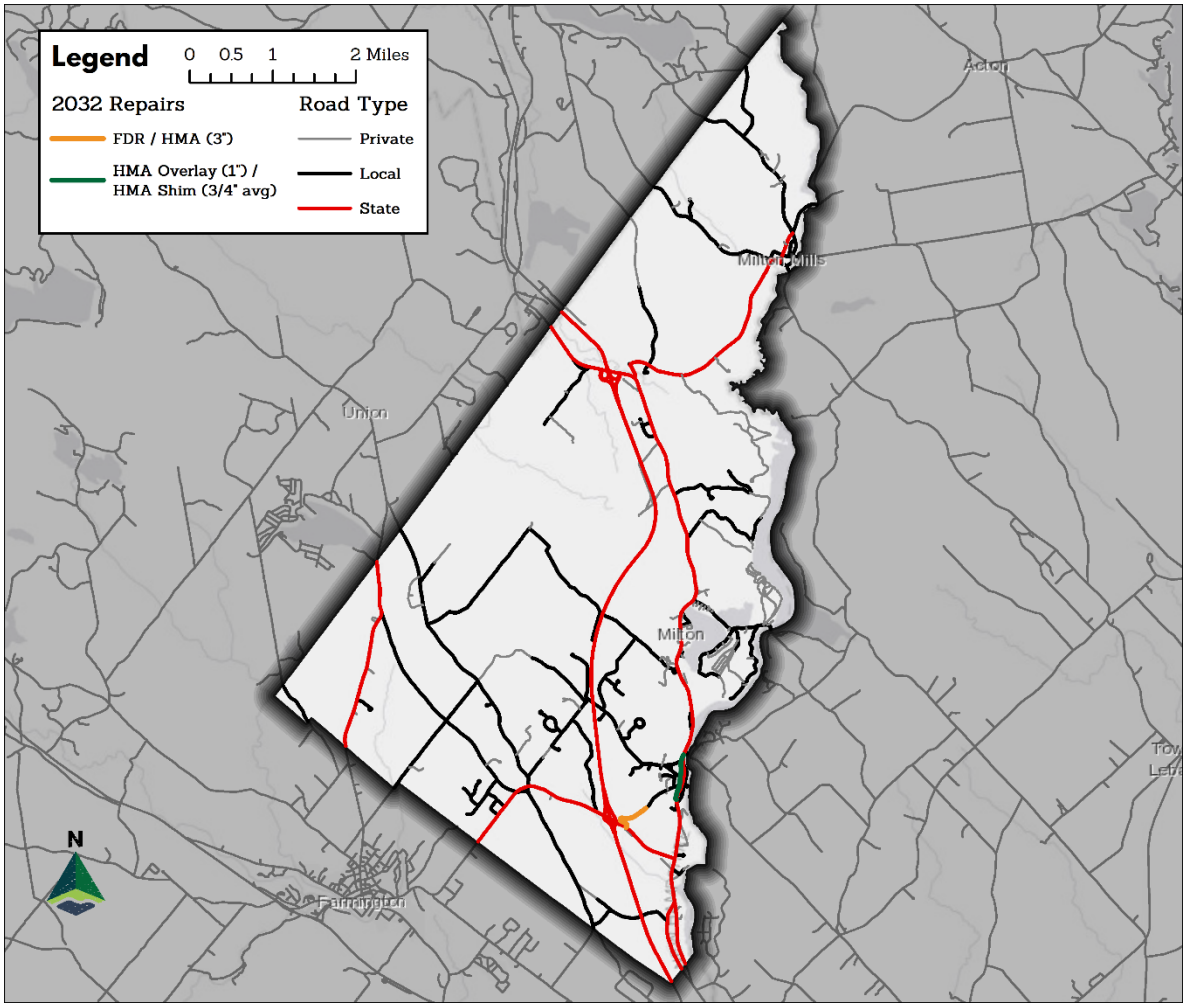
2031 Treatments



Average PCI After Repairs	56.5
Average PCI Without Repairs	46.29
Total Miles Treated	0.9
Total Repair Cost	$328,888
FDR & HMA (3")	*$300,039*
HMA Overlay (1")	*$14,890*
HMA Shim (3/4" avg)	*$13,959*

Roads Treated: Elm Street, School Street, Steeple Street

2032 Treatments

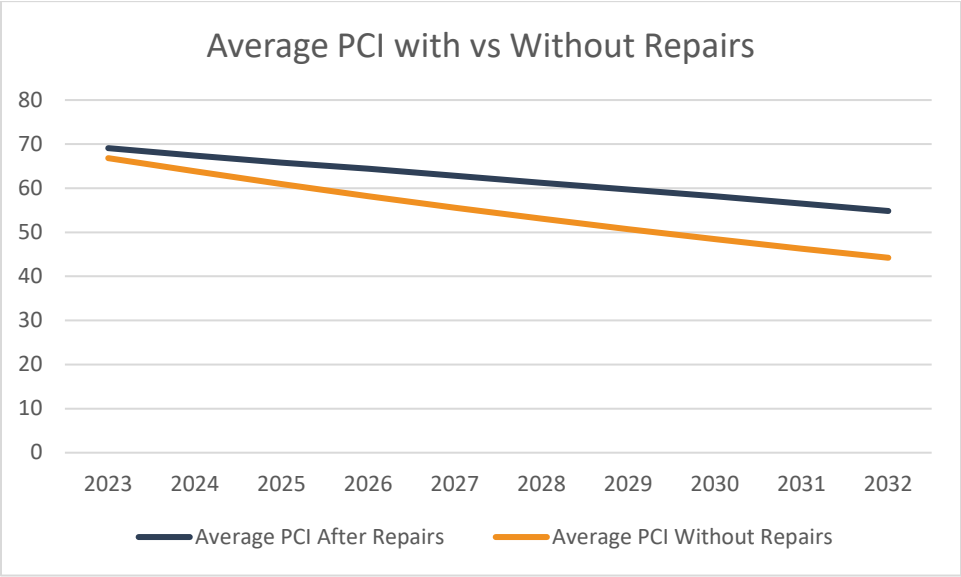


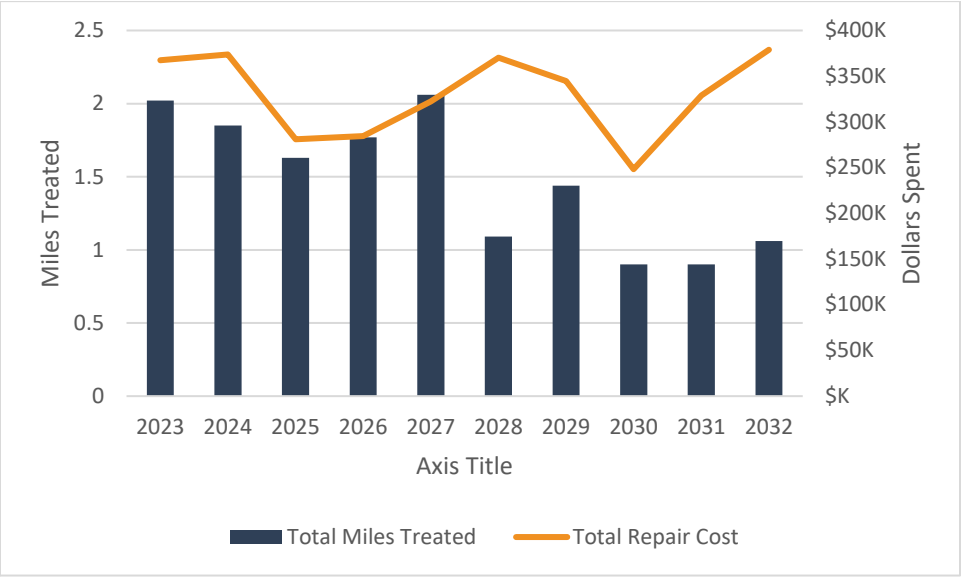
Average PCI After Repairs	54.83
Average PCI Without Repairs	44.22
Total Miles Treated	1.06
Total Repair Cost	$378,913
FDR & HMA (3")	*$262,486*
HMA Overlay (1")	*$60,091*
HMA Shim (3/4" avg)	*$56,336*

Roads Treated: Dawson Street, Elm Street

Totals (2023-2032)

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Average PCI After Repairs	69.09	67.39	65.82	64.42	62.86	61.2	59.68	58.21	56.5	54.83
Average PCI Without Repairs	66.82	63.82	60.95	58.21	55.6	53.1	50.72	48.45	46.29	44.22
Total Miles Treated	2.02	1.85	1.63	1.77	2.06	1.09	1.44	0.9	0.9	1.06
Total Repair Cost	$367,344	$373,867	$280,996	$284,443	$322,190	$370,313	$344,863	$248,250	$328,888	$378,913





Appendix D - RSMS Protocol

Statewide Asset Data Exchange System (SADES)

Road Surface Management System (RSMS) Assessment Guide

Partnership with

NH Department of Transportation
NH Regional Planning Commissions
UNH Technology Transfer Center

SADES RSMS – Version 3.0

Data Collection Specifications Guide

This document was established to outline an assessment standard for specified inventory and condition collection criteria for municipal road networks in the state of New Hampshire. All specifications were initially developed by the Technology Transfer Center at UNH (T^2). They were then reviewed by the NH Department of Transportation (DOT).

As a part of the SADES project, all collected data will be compiled into a composite statewide map. This data will then be prepared for redistribution for any interested parties. The data will be available through three outlets: a web application, a web mapping service, and a direct download portal. The initial data compilation, QA/QC, and redistribution will be completed by T^2. Data collection efforts are to be organized by each RPC for their respective jurisdictions. T^2 has an equipment loan program for use by any of the aforementioned entities that need access to GPS field data collection equipment. This equipment is available on a first-come-first-served reservation basis. An outline of the loan program and the available equipment will be distributed by T^2 to all stake-holding parties.

TABLE OF CONTENTS

General User Information

Data will be collected using the ESRI Collector App for the iPad.

Additional recommended equipment for conducting the assessment includes:

Tape Measure
Reflective Vest

If you have questions or concerns about this iPad application or the SADES RSMS Assessment program, please contact the UNH Technology Transfer Center.

Contact Information:

Chris Dowd
SADES Manager
chris@nhsades.com
Office: (603) 862-5489
Mobile: (603) 397-7745

General Information

Date:
User Input Date

Record the date when the road assessment is performed.

Observer/Organization:
User Input

Record the observer(s) completing the assessment as well as the organization for which they are collecting for. Initials and abbreviations are accepted.

Road Name:
User Input

Record the full road name. Unless recording a new road, leave name as is.

Road Alias:
User Input

If municipality uses a different road name than that shown on the map, input here.

Town Name:
User Input

Record the full name of the town. Unless recording a new road, leave name as is.

Surface Type:
Paved
Unpaved

Shoulder Type:
Paved
Unpaved
None

Road Surface Width:
User input number

The width of the road surface measured in feet. If paved, width is from edges of pavement on each side.

Number of Lanes:
User input number

The number of lanes making up the pavement width.

Last Year Surveyed
User input number

If known, input year in which the inventory data was last updated.

Longitudinal/Transverse Cracking

Longitudinal cracks are cracks which run parallel to the roadway centerline. Longitudinal cracks are usually found at construction joints and between lanes.

Transverse cracks run perpendicular to the roadway centerline. Transverse cracks are generally spaced at regular intervals and caused by expansion and contraction of the road surface material.

Long./Trnsv. Cracking Severity:
No Defects
Low
Medium
High

No Defects — The road section has no visible signs of longitudinal/transverse cracking

Low — Hairline cracks with little or no spalling (width of pencil tip)

Medium — Crack widths up to 1/4" in width with some spalling evident (width of pencil)

High — Well-defined cracks filled with foreign material (sand, stones, etc.) Extensive spalling and breakage

Long./Trnsv. Cracking Extent:
Low
Medium
High

Low — The overall length of *longitudinal* cracking is less than 10% of the section length and/or *transverse* cracks are 50' apart.

Medium — The overall length of *longitudinal* cracking is between 10% and 30% of the total section length and/or *transverse* cracks are between 25' and 50' apart.

High — The overall length of *longitudinal* cracking is over 30% of the total section length and/or *transverse* cracks are less than 25' apart.

Notes:

1. Spalling refers to the physical relocation and/or displacement of pieces of original pavement
2. Transverse cracks must extend across at least one full lane width to be counted as transverse. Cracks limited to wheel paths, typically alligator cracks, are not included in this category.
3. Multiple cracks within 8" of primary crack are considered as part of the primary crack.

High Severity

Transverse Crack

Longitudinal Crack

Medium Severity

Transverse Crack

Longitudinal Crack

Low Severity

Alligator Cracking

Alligator cracking refers to interconnected crack patterns that resemble alligator skin or chicken wire. Pavement pieces range in size from one to six inches on a side.

Alligator Cracking Severity:
No Defects
Low
Medium
High

No Defects — The road section has no visible signs of alligator cracking.

Low — Crack pattern is just beginning to appear. Cracks have no measureable *width* and no actual pavement separation is found.

Medium — Easily discernible cracking with measureable crack *widths* up to 1/8" and some breakup. Pavement pieces, while loose, are still interconnected.

High — Wide cracking (1/4") has resulted in major pavement breakup with loose pieces actually displaced.

Alligator Cracking Extent:
Low
Medium
High

Low — The *total area* exhibiting alligator cracking encompasses less than 10% of the roadway section

Medium — The *total area* exhibiting alligator cracking encompasses between 10% and 30% of the roadway section

High — The *total area* exhibiting alligator cracking encompasses greater than 30% of the roadway section

Notes:

1. When alligator cracking is the primary distress, it is generally related to traffic loading. As such, alligator cracking will be found primarily in wheel paths.

High Severity

Medium Severity

Low Severity

Edge Cracking

Edge cracking refers to cracks adjacent and/or parallel to the edge of the pavement. While generally confined to the outer one or two feet of pavement, edge cracking can progress into the travel lane.

Edge Cracking Severity:
No Defects
Low
Medium
High

No Defects — The roadway does not exhibit edge cracking.

Low — Cracking evident; however, no breakup. Crack widths <1/8" and confined to 12" from *edge of pavement.*

Medium — Multiple cracking occurring with some breakup. Cracks extend *up to 24" into pavement*.

High — Extensive cracking *beyond 24" into roadway*; breakup. This condition closely resembles alligator cracking

Edge Cracking Extent:
Low
Medium
High

Low — The section length affected by cracking is *less than 10% of the total section length.*

Medium — The section length affected by cracking is *between 10% and 30% of total section length.*

High — The section length affected by cracking is *greater than 30% of the total section length*.

High Severity

Medium Severity

Low Severity

Patching/Potholes

Patching refers to areas where the original pavement has been removed and subsequently replaced but is showing deterioration. Potholes are areas where portions of the road pavement have broken and loss of pavement has resulted in a bowl-shaped depression.

Patching/Potholes Extent:
No Defects
Low
Medium
High

No Defects — No patches showing deterioration or potholes detected in the rated section.

Low — The *total area* of patching showing deterioration is less than 10% of the total section area and/or there are fewer than 5 potholes per 1000' section length.

Medium — The *total area* of patching showing deterioration is between 10% and 30% of the total section area and/or there are between 5 and 10 potholes per 1000' section length.

High — The *total area* of patching showing deterioration is greater than 30% of the total section area and/or there are more than 10 potholes per 1000' section length.

Notes:

1. Edge cracks, spalling of longitudinal/transverse cracks and displacement of alligator cracks are not counted as potholes.

2. Only patches that show deterioration should be evaluated. Good patches should be ignored. Surface area, rather than depth of deterioration, should be used to assess extent.

Patching

Pothole

Drainage

Drainage severities are judged by the ability for run-off to flow from the paved area to a location that does not influence roadway conditions. Visual indicators of drainage problems include accumulation of debris and sand as well as high water marks. Evaluations during or just after a rainfall event can be extremely beneficial.

Drainage Condition:
Good
Fair
Poor

Good — There is no evidence of water accumulation on the pavement surface. Roadway has good crown. Positive drainage can be visually confirmed. Ditches, gutters, and other drainage structures are clear, clean, and functioning.

Fair — There is evidence of occasional water accumulation on the pavement surface. Road crown is minimal. Ditches, gutters, and other drainage structures are functional though probably need maintenance.

Poor — There is evidence of recurring and extensive ponding of water on the pavement surface. Roadway has no crown. Ditches, gutters, and other drainage structures are not functioning or non-existent.

Notes:

Sure signs of poor drainage include:

1. Road shoulders above the edge of pavement;
2. Standing water; and
3. Outwashes or accumulations of sand along the edge of the roadway.

Interview with local knowledge will also help determine areas of poor drainage.

Rutting

Rutting refers to the channel depressions in the wheel paths. Rutting causes water to drain along the road surface rather than drain to the edge of the road.

Rutting Severity:
No Defects
Low
Medium
High

No Defects — No visible rutting in the rated section.

Low — Depth of rut is less than 1".

Medium — Ruts are between 1" and 3" deep.

High — Ruts are greater than 3" deep.

Rutting Extent:
Low
Medium
High

Low — *Less than 10% of the total road surface* is covered by rutting.

Medium — *Between 10% and 30% of the total road surface* is covered by rutting.

High — *More than 30% of the total road surface* is covered by rutting.

Notes:

1. Ruts are caused by a permanent deformation in any of the road layers or subgrade. Ruts result from repeated vehicle passes when the road is soft. Significant rutting can destroy a road.

High Severity

Medium Severity

Low Severity

Roughness

Pavement roughness is defined as irregularities in the roadway surface which adversely affect the comfort of the ride.

Roughness Condition:
Smooth
Noticeably Uneven
Rough
Very Rough

Smooth	Road has *even surface* – ideal for smooth, undisturbed travel. New roads and recent resurfacing generally fall into this category. (There may be minor distortions not noticeable to the typical rider)
Noticeably Uneven	*Noticeable unevenness*, but vehicle may continue safely at the posted speeds. Sags and humps have not yet become hazardous.
Rough	Pavement surface is *very uneven*, causing a safety hazard for vehicles traveling at the posted speed limit.
Very Rough	Surface roughness is *severe*, causing the vehicle to lower speed below posted limit.

Notes:

1. Assessment of roughness should be determined while the survey vehicle is traveling at posted speeds.
2. This category is also a "catch-all" for conditions which are not included in other categories – i.e., corrugations, waves, settlement, etc.

Frost Heave Severity

Pavement roughness is defined as irregularities in the roadway surface which adversely affect the comfort of the ride.

Frost Heave Severity:
None
Low
Medium
Severe

None — Interview with local knowledge does not identify this road segment as being prone to frost heaves.

Low — Interview with local knowledge indicates that this segment is prone to minor frost heave severity, but does not affect vehicle travel.

Medium — Interview with local knowledge indicates that this segment is prone to substantial frost heave severity and is just beginning to affect vehicle travel.

Severe — Interview with local knowledge indicates that this segment is prone to major frost heave severity and clearly affects vehicle travel.

Notes:

This information could come from an interview with local knowledge that is familiar with the areas winter conditions

Frost Heave

Factors

There are two factors that will aid in determining the priority of a road segment during the SADES RSMS Forecasting. Follow the guidelines below to determine these factors.

Traffic Volume:
1
2
3
4
5

This category has been divided into five groups. It's best for the municipality to take the largest volume road and making it a 5 and the lowest volume in town a 1. Input the traffic volume of the particular road segment using the following guidelines:

1 Low
2 *Medium-Low*
3 Medium
4 Medium-High
5 High

Importance:
1
2
3
4
5

Factors that may play a role in determine the importance of a road segment are whether or not there is a school on the road, a hospital on the road, the segment is on an emergency route, or critical service are located on the road. Input the importance of the particular road segment using the following guidelines:

1 Low
2 *Medium-Low*
3 Medium
4 Medium-High
5 High

Notes:

An interview with local knowledge may also help determine both of these factors.

Local Knowledge

It is recommended that the organization responsible for data collection meet with a person with local knowledge (i.e. road agent or DPW director) to discuss areas of concern. Please use the following fields to record information about that meeting.

Interview with Local Knowledge:
Yes
No

Please record whether or not there was a meeting held with a person of local knowledge.

Interview Comments:
User input text (500 ch. max)

Please record any comments or information received from meeting with local knowledge for a particular segment.

Weather Conditions

Weather Condtions:
Sunny/Clear
Overcast/Cloudy
Rain
Snow
Other

If desired, record the weather conditions observed on the day of collection.

General Comments

General Comments:
User input comments (500 ch. max)

Record any comments about the road segment that the collector felt was not covered in the above assessment.