Newmarket Road Surface Management System Report

This report was completed by the Town of Newmarket in collaboration with the Strafford Regional Planning Commission. Road Surface Management System assessments were completed in the town in November 2022, and the forecasting report was finalized in May 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 in to 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 Newmarket

Phase 1 road surveys were conducted in November of 2022, with forecasting taking place during the Spring months of 2023. This was the second round of RSMS surveying that SRPC has done with Newmarket that was done at no cost to the town. Newmarket previously served as a pilot project for RSMS in 2015. The town worked diligently with SRPC to ensure that a meaningful product was the result of this project. DPW Director Rick Malasky and Town Engineer Lyndsey Butler 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 Newmarket.

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 three times over the course of February and May 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=a99997340f524af4b786956eedc51fea

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.

The town of Newmarket sets aside around 10k each year for cracked sealing across the municipality. This is a phenomenal preservation method to assure the roads do not deteriorate at a significant rate. However, there was no way to integrate this preservation method into the software. It will appear that the town's overall PCI score will decrease steadily over the next 10 years, but this is not reflecting that preservation technique. The town decided to tackle the roads that were in the worse shape to budget for as cracks are dealt with as needed throughout the Summer.

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 Newmarket 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 Ranking	PCI	Street	Order	Length (ft)	Width (ft)	Lanes	Surface Type	Year	Repair	Cost
25.25	59	Brandon Dr	1	406.8848	20	2	Paved	2031	FDR & HMA (4")	$29,293
27	52	Briallia Cir	1	1928.742	24	2	Paved	2025	FDR & HMA (4")	$137,934
25.75	57	Candice Ln	1	1162.12	20	2	Paved	2028	FDR & HMA (4")	$76,121
24.5	62	Carolyn Dr	1	1250.097	24	2	Paved	2032	FDR & HMA (4")	$111,455
29	44	Channing Way	1	856.4026	24	2	Paved	2028	FDR & HMA (4")	$67,315
33	28	Colonial Dr	1	581.7495	12	2	Paved	2027	FDR & HMA (4")	$22,155
41.5	58	Creighton St	1	1013.288	16	2	Paved	2027	FDR & HMA (4")	$51,452
34.75	21	Doe Farm Ln	1	1318.112	22	2	Paved	2026	FDR & HMA (4")	$89,175
31.25	35	Doe Farm Ln	2	1319.578	22	2	Paved	2026	FDR & HMA (4")	$89,274
30.5	38	Doe Farm Ln	3	1351.574	22	2	Paved	2026	FDR & HMA (4")	$91,438
67.25	71	Durrell Dr	3	1834.982	18	2	Paved	2029	FDR & HMA (4")	$111,637
70.75	57	Durrell Dr	1	1321.37	24	2	Paved	2029	FDR & HMA (4")	$107,187
69	64	Durrell Dr	2	694.5324	24	2	Paved	2029	FDR & HMA (4")	$56,339
21.5	74	Edwin Ln	1	779.6116	24	2	Paved	2028	HMA Overlay (1")	$14,064
21.5	74	Edwin Ln	1	779.6116	24	2	Paved	2028	HMA Shim (3/4" avg)	$13,185
31	36	Fogg Cir	1	1075.874	22	2	Paved	2026	FDR & HMA (4")	$72,786
22	72	Forbes Rd	1	1745.632	20	2	Paved	2031	HMA Overlay (1")	$28,843
22	72	Forbes Rd	1	1745.632	20	2	Paved	2031	HMA Shim (3/4" avg)	$27,041
25.5	58	Gordon Ave	1	616.7181	26	2	Paved	2029	HMA Overlay (1")	$12,438
25.5	58	Gordon Ave	1	616.7181	26	2	Paved	2029	HMA Shim (3/4" avg)	$11,661
76.25	95	Grant Rd	1	1324.238	22	2	Paved	2025	HMA Overlay (1")	$19,924
76.25	95	Grant Rd	1	1324.238	22	2	Paved	2025	HMA Shim (3/4" avg)	$18,679
79.5	82	Grant Rd	2	1319.233	22	2	Paved	2025	HMA Overlay (1")	$19,849
79.5	82	Grant Rd	2	1319.233	22	2	Paved	2025	HMA Shim (3/4" avg)	$18,608
80.5	78	Grant Rd	3	1318.571	22	2	Paved	2025	HMA Overlay (1")	$19,839
80.5	78	Grant Rd	3	1318.571	22	2	Paved	2025	HMA Shim (3/4" avg)	$18,599
80.25	79	Grant Rd	4	1320.556	22	2	Paved	2025	HMA Overlay (1")	$19,868
80.25	79	Grant Rd	4	1320.556	22	2	Paved	2025	HMA Shim (3/4" avg)	$18,627

Priority Ranking	PCI	Street	Order	Length (ft)	Width (ft)	Lanes	Surface Type	Year	Repair	Cost
80.5	78	Grant Rd	5	1320.232	22	2	Paved	2025	HMA Overlay (1")	$19,864
80.5	78	Grant Rd	5	1320.232	22	2	Paved	2025	HMA Shim (3/4" avg)	$18,622
80	80	Grant Rd	6	1299.37	22	2	Paved	2025	HMA Shim (3/4" avg)	$18,328
80	80	Grant Rd	6	1299.37	22	2	Paved	2025	HMA Overlay (1")	$19,550
28.5	78	Great Hill Dr	1	1322.299	24	2	Paved	2031	HMA Overlay (1")	$26,218
28.5	78	Great Hill Dr	1	1322.299	24	2	Paved	2031	HMA Shim (3/4" avg)	$24,580
29.25	75	Great Hill Dr	2	1319.793	24	2	Paved	2031	HMA Overlay (1")	$26,169
29.25	75	Great Hill Dr	2	1319.793	24	2	Paved	2031	HMA Shim (3/4" avg)	$24,533
27.75	81	Great Hill Dr	3	1292.433	24	2	Paved	2031	HMA Overlay (1")	$25,626
27.75	81	Great Hill Dr	3	1292.433	24	2	Paved	2031	HMA Shim (3/4" avg)	$24,024
24.5	62	Heartwood Cir	1	461.1347	20	2	Paved	2027	FDR & HMA (4")	$29,269
65.5	78	Hersey Ln	1	1319.19	18	2	Paved	2024	FDR & HMA (4")	$68,562
64.5	82	Hersey Ln	2	1318.324	18	2	Paved	2024	FDR & HMA (4")	$68,517
66.75	73	Hersey Ln	3	1323.373	18	2	Paved	2024	FDR & HMA (4")	$68,780
23	68	Huckins Dr	1	1552.918	24	2	Paved	2028	HMA Shim (3/4" avg)	$26,264
23	68	Huckins Dr	1	1552.918	24	2	Paved	2028	HMA Overlay (1")	$28,015
27.5	50	Kielty Dr	1	437.4803	24	2	Paved	2024	FDR & HMA (4")	$30,316
28.5	46	Kimball Way	1	1608.766	24	2	Paved	2027	FDR & HMA (4")	$122,532
30.25	71	Ladyslipper Dr	1	1318.395	20	2	Paved	2030	FDR & HMA (4")	$91,973
33.5	58	Ladyslipper Dr	2	1320.568	20	2	Paved	2030	FDR & HMA (4")	$92,125
30.25	71	Ladyslipper Dr	3	1320.478	20	2	Paved	2030	FDR & HMA (4")	$92,118
31	68	Ladyslipper Dr	4	1405.175	20	2	Paved	2030	FDR & HMA (4")	$98,027
32.75	57	Lita Ln	1	1025.187	20	2	Paved	2031	FDR & HMA (4")	$73,807
21.5	74	Mastin Dr	1	1319.542	22	2	Paved	2032	FDR & HMA (4")	$107,843
19.5	82	Mastin Dr	2	1202.579	22	2	Paved	2032	FDR & HMA (4")	$98,283
26	56	Merrill Ln	1	1200.393	22	2	Paved	2027	FDR & HMA (4")	$83,809
35.25	19	Neal Mill Rd	1	1325.987	16	2	Paved	2028	FDR & HMA (4")	$69,484
35.875	16.5	Neal Mill Rd	2	940.9415	16	2	Paved	2028	FDR & HMA (4")	$49,307
21	76	Oak St	1	361.2709	24	2	Paved	2031	HMA Shim (3/4" avg)	$6,715

Priority Ranking	PCI	Street	Order	Length (ft)	Width (ft)	Lanes	Surface Type	Year	Repair	Cost
21	76	Oak St	1	361.2709	24	2	Paved	2031	HMA Overlay (1")	$7,163
16.25	95	Pond St	1	278.6539	24	2	Paved	2031	HMA Overlay (1")	$5,525
16.25	95	Pond St	1	278.6539	24	2	Paved	2031	HMA Shim (3/4" avg)	$5,180
30.75	37	Prescott St	1	555.5798	12	2	Paved	2027	FDR & HMA (4")	$21,158
19	84	Sandy Ln	1	932.6396	22	2	Paved	2029	HMA Overlay (1")	$15,916
19	84	Sandy Ln	1	932.6396	22	2	Paved	2029	HMA Shim (3/4" avg)	$14,921
43.75	45	Schanda Dr	1	1323.331	20	2	Paved	2023	FDR & HMA (4")	$74,050
40.5	58	Schanda Dr	2	1318.467	20	2	Paved	2023	FDR & HMA (4")	$73,778
39.5	62	Schanda Dr	3	1320.328	20	2	Paved	2023	FDR & HMA (4")	$73,882
41.25	55	Schanda Dr	4	1066.797	20	2	Paved	2023	FDR & HMA (4")	$59,695
24.5	62	Shady Ln	1	488.8233	20	2	Paved	2027	FDR & HMA (4")	$31,026
28.5	46	Short St	1	212.6607	12	2	Paved	2027	FDR & HMA (4")	$8,099
23	68	Stanorm Dr	1	901.5421	20	2	Paved	2029	HMA Shim (3/4" avg)	$13,113
23	68	Stanorm Dr	1	901.5421	20	2	Paved	2029	HMA Overlay (1")	$13,987
21.25	75	Stonewall Way	1	836.2551	24	2	Paved	2024	HMA Overlay (1")	$13,300
21.25	75	Stonewall Way	1	836.2551	24	2	Paved	2024	HMA Shim (3/4" avg)	$12,469
18.75	85	Tasker Ln	1	344.9114	14	2	Paved	2032	HMA Overlay (1")	$4,117
18.75	85	Tasker Ln	1	344.9114	14	2	Paved	2032	HMA Shim (3/4" avg)	$3,860
34.25	83	Terrace Dr	1	1659.188	28	2	Paved	2032	HMA Overlay (1")	$39,609
30	100	Terrace Dr	2	544.739	20	2	Paved	2031	HMA Overlay (1")	$9,001
30.75	37	Turkey Ridge Rd	1	1246.156	20	2	Paved	2023	FDR & HMA (4")	$69,732
27.5	50	Winslow Dr	1	1198.046	24	2	Paved	2024	FDR & HMA (4")	$83,022

Appendix B – Analysis Detail Report *(Priority)*

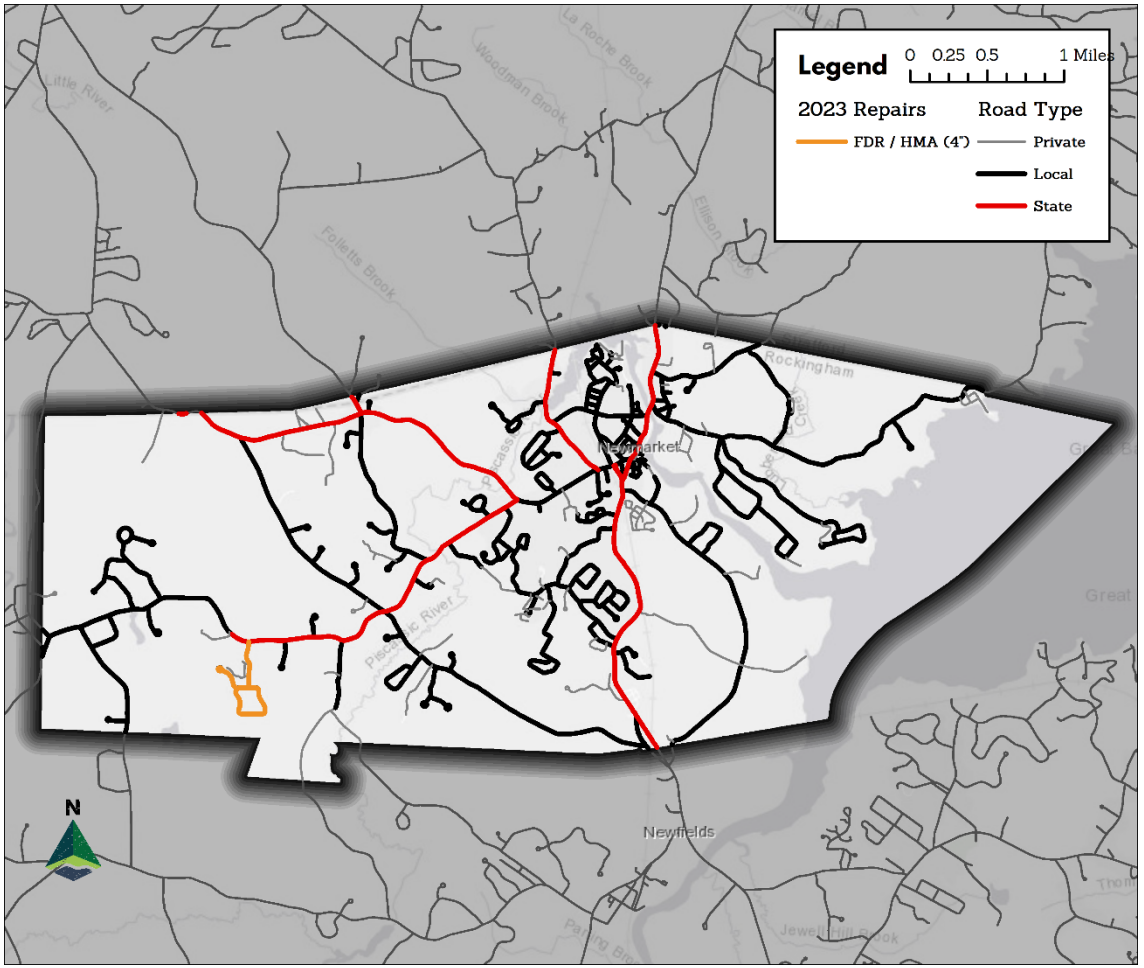
Priority	PCI	Street	Order	Length (ft)	Width (ft)	Lanes	Surface Type	Year	Repair	Cost
80.5	78	Grant Rd	3	1318.571	22	2	Paved	2025	HMA Overlay (1")	$19,839
80.5	78	Grant Rd	3	1318.571	22	2	Paved	2025	HMA Shim (3/4" avg)	$18,599
80.5	78	Grant Rd	5	1320.232	22	2	Paved	2025	HMA Overlay (1")	$19,864
80.5	78	Grant Rd	5	1320.232	22	2	Paved	2025	HMA Shim (3/4" avg)	$18,622
80.25	79	Grant Rd	4	1320.556	22	2	Paved	2025	HMA Overlay (1")	$19,868
80.25	79	Grant Rd	4	1320.556	22	2	Paved	2025	HMA Shim (3/4" avg)	$18,627
80	80	Grant Rd	6	1299.37	22	2	Paved	2025	HMA Shim (3/4" avg)	$18,328
80	80	Grant Rd	6	1299.37	22	2	Paved	2025	HMA Overlay (1")	$19,550
79.5	82	Grant Rd	2	1319.233	22	2	Paved	2025	HMA Overlay (1")	$19,849
79.5	82	Grant Rd	2	1319.233	22	2	Paved	2025	HMA Shim (3/4" avg)	$18,608
76.25	95	Grant Rd	1	1324.238	22	2	Paved	2025	HMA Overlay (1")	$19,924
76.25	95	Grant Rd	1	1324.238	22	2	Paved	2025	HMA Shim (3/4" avg)	$18,679
70.75	57	Durrell Dr	1	1321.37	24	2	Paved	2029	FDR & HMA (4")	$107,187
69	64	Durrell Dr	2	694.5324	24	2	Paved	2029	FDR & HMA (4")	$56,339
67.25	71	Durrell Dr	3	1834.982	18	2	Paved	2029	FDR & HMA (4")	$111,637
66.75	73	Hersey Ln	3	1323.373	18	2	Paved	2024	FDR & HMA (4")	$68,780
65.5	78	Hersey Ln	1	1319.19	18	2	Paved	2024	FDR & HMA (4")	$68,562
64.5	82	Hersey Ln	2	1318.324	18	2	Paved	2024	FDR & HMA (4")	$68,517
43.75	45	Schanda Dr	1	1323.331	20	2	Paved	2023	FDR & HMA (4")	$74,050
41.5	58	Creighton St	1	1013.288	16	2	Paved	2027	FDR & HMA (4")	$51,452
41.25	55	Schanda Dr	4	1066.797	20	2	Paved	2023	FDR & HMA (4")	$59,695
40.5	58	Schanda Dr	2	1318.467	20	2	Paved	2023	FDR & HMA (4")	$73,778
39.5	62	Schanda Dr	3	1320.328	20	2	Paved	2023	FDR & HMA (4")	$73,882
35.875	16.5	Neal Mill Rd	2	940.9415	16	2	Paved	2028	FDR & HMA (4")	$49,307
35.25	19	Neal Mill Rd	1	1325.987	16	2	Paved	2028	FDR & HMA (4")	$69,484
34.75	21	Doe Farm Ln	1	1318.112	22	2	Paved	2026	FDR & HMA (4")	$89,175
34.25	83	Terrace Dr	1	1659.188	28	2	Paved	2032	HMA Overlay (1")	$39,609
33.5	58	Ladyslipper Dr	2	1320.568	20	2	Paved	2030	FDR & HMA (4")	$92,125

Priority	PCI	Street	Order	Length (ft)	Width (ft)	Lanes	Surface Type	Year	Repair	Cost
33	28	Colonial Dr	1	581.7495	12	2	Paved	2027	FDR & HMA (4")	$22,155
32.75	57	Lita Ln	1	1025.187	20	2	Paved	2031	FDR & HMA (4")	$73,807
31.25	35	Doe Farm Ln	2	1319.578	22	2	Paved	2026	FDR & HMA (4")	$89,274
31	36	Fogg Cir	1	1075.874	22	2	Paved	2026	FDR & HMA (4")	$72,786
31	68	Ladyslipper Dr	4	1405.175	20	2	Paved	2030	FDR & HMA (4")	$98,027
30.75	37	Prescott St	1	555.5798	12	2	Paved	2027	FDR & HMA (4")	$21,158
30.75	37	Turkey Ridge Rd	1	1246.156	20	2	Paved	2023	FDR & HMA (4")	$69,732
30.5	38	Doe Farm Ln	3	1351.574	22	2	Paved	2026	FDR & HMA (4")	$91,438
30.25	71	Ladyslipper Dr	1	1318.395	20	2	Paved	2030	FDR & HMA (4")	$91,973
30.25	71	Ladyslipper Dr	3	1320.478	20	2	Paved	2030	FDR & HMA (4")	$92,118
30	100	Terrace Dr	2	544.739	20	2	Paved	2031	HMA Overlay (1")	$9,001
29.25	75	Great Hill Dr	2	1319.793	24	2	Paved	2031	HMA Overlay (1")	$26,169
29.25	75	Great Hill Dr	2	1319.793	24	2	Paved	2031	HMA Shim (3/4" avg)	$24,533
29	44	Channing Way	1	856.4026	24	2	Paved	2028	FDR & HMA (4")	$67,315
28.5	78	Great Hill Dr	1	1322.299	24	2	Paved	2031	HMA Overlay (1")	$26,218
28.5	78	Great Hill Dr	1	1322.299	24	2	Paved	2031	HMA Shim (3/4" avg)	$24,580
28.5	46	Kimball Way	1	1608.766	24	2	Paved	2027	FDR & HMA (4")	$122,532
28.5	46	Short St	1	212.6607	12	2	Paved	2027	FDR & HMA (4")	$8,099
27.75	81	Great Hill Dr	3	1292.433	24	2	Paved	2031	HMA Overlay (1")	$25,626
27.75	81	Great Hill Dr	3	1292.433	24	2	Paved	2031	HMA Shim (3/4" avg)	$24,024
27.5	50	Kielty Dr	1	437.4803	24	2	Paved	2024	FDR & HMA (4")	$30,316
27.5	50	Winslow Dr	1	1198.046	24	2	Paved	2024	FDR & HMA (4")	$83,022
27	52	Briallia Cir	1	1928.742	24	2	Paved	2025	FDR & HMA (4")	$137,934
26	56	Merrill Ln	1	1200.393	22	2	Paved	2027	FDR & HMA (4")	$83,809
25.75	57	Candice Ln	1	1162.12	20	2	Paved	2028	FDR & HMA (4")	$76,121
25.5	58	Gordon Ave	1	616.7181	26	2	Paved	2029	HMA Overlay (1")	$12,438
25.5	58	Gordon Ave	1	616.7181	26	2	Paved	2029	HMA Shim (3/4" avg)	$11,661
25.25	59	Brandon Dr	1	406.8848	20	2	Paved	2031	FDR & HMA (4")	$29,293
24.5	62	Carolyn Dr	1	1250.097	24	2	Paved	2032	FDR & HMA (4")	$111,455

Priority	PCI	Street	Order	Length (ft)	Width (ft)	Lanes	Surface Type	Year	Repair	Cost
24.5	62	Heartwood Cir	1	461.1347	20	2	Paved	2027	FDR & HMA (4")	$29,269
24.5	62	Shady Ln	1	488.8233	20	2	Paved	2027	FDR & HMA (4")	$31,026
23	68	Huckins Dr	1	1552.918	24	2	Paved	2028	HMA Shim (3/4" avg)	$26,264
23	68	Huckins Dr	1	1552.918	24	2	Paved	2028	HMA Overlay (1")	$28,015
23	68	Stanorm Dr	1	901.5421	20	2	Paved	2029	HMA Shim (3/4" avg)	$13,113
23	68	Stanorm Dr	1	901.5421	20	2	Paved	2029	HMA Overlay (1")	$13,987
22	72	Forbes Rd	1	1745.632	20	2	Paved	2031	HMA Overlay (1")	$28,843
22	72	Forbes Rd	1	1745.632	20	2	Paved	2031	HMA Shim (3/4" avg)	$27,041
21.5	74	Edwin Ln	1	779.6116	24	2	Paved	2028	HMA Overlay (1")	$14,064
21.5	74	Edwin Ln	1	779.6116	24	2	Paved	2028	HMA Shim (3/4" avg)	$13,185
21.5	74	Mastin Dr	1	1319.542	22	2	Paved	2032	FDR & HMA (4")	$107,843
21.25	75	Stonewall Way	1	836.2551	24	2	Paved	2024	HMA Overlay (1")	$13,300
21.25	75	Stonewall Way	1	836.2551	24	2	Paved	2024	HMA Shim (3/4" avg)	$12,469
21	76	Oak St	1	361.2709	24	2	Paved	2031	HMA Shim (3/4" avg)	$6,715
21	76	Oak St	1	361.2709	24	2	Paved	2031	HMA Overlay (1")	$7,163
19.5	82	Mastin Dr	2	1202.579	22	2	Paved	2032	FDR & HMA (4")	$98,283
19	84	Sandy Ln	1	932.6396	22	2	Paved	2029	HMA Overlay (1")	$15,916
19	84	Sandy Ln	1	932.6396	22	2	Paved	2029	HMA Shim (3/4" avg)	$14,921
18.75	85	Tasker Ln	1	344.9114	14	2	Paved	2032	HMA Overlay (1")	$4,117
18.75	85	Tasker Ln	1	344.9114	14	2	Paved	2032	HMA Shim (3/4" avg)	$3,860
16.25	95	Pond St	1	278.6539	24	2	Paved	2031	HMA Overlay (1")	$5,525
16.25	95	Pond St	1	278.6539	24	2	Paved	2031	HMA Shim (3/4" avg)	$5,180

Appendix C – Annual Maps

2023 Treatments

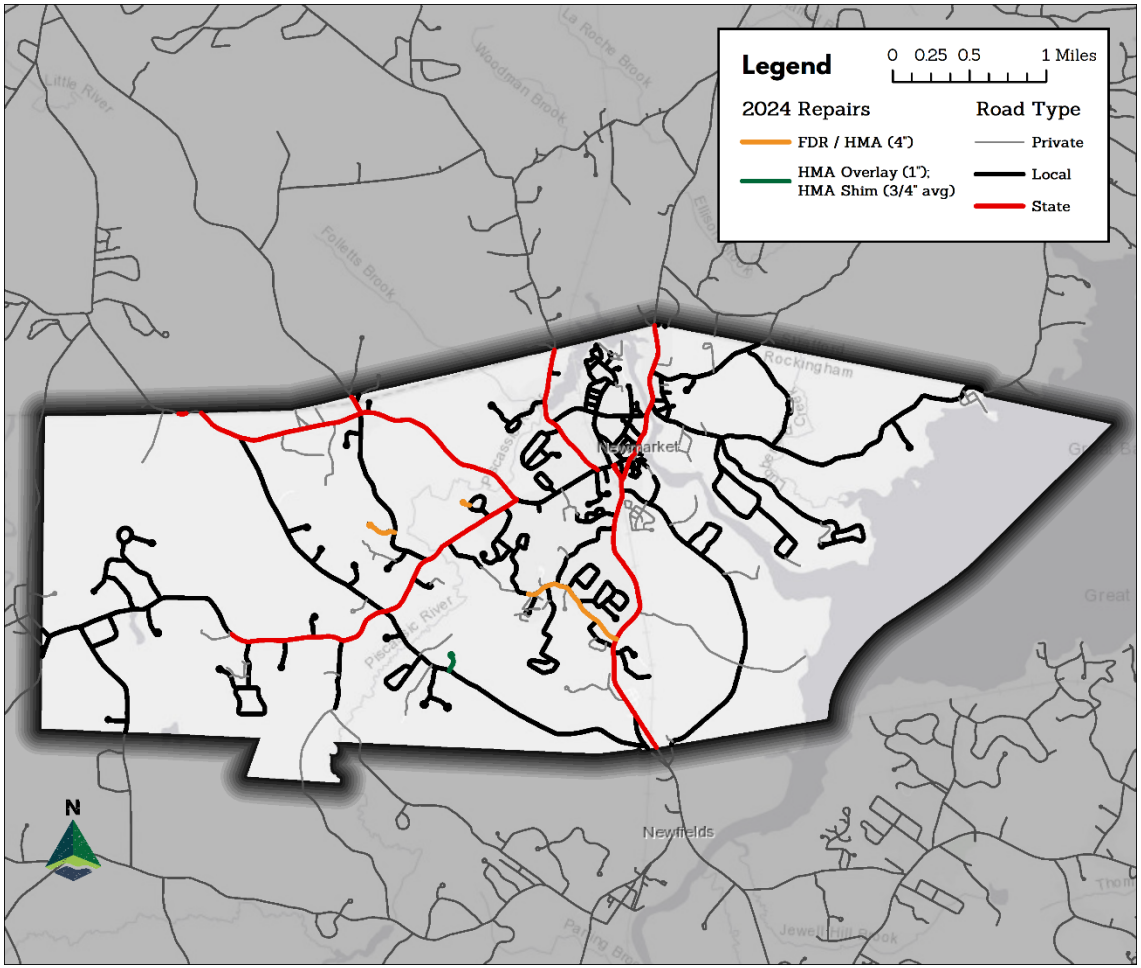


Average PCI After Repairs	79.55
Average PCI Without Repairs	78.35
Total Miles Treated	1.19
Total Repair Cost	$351,137
Full Depth Reclaim (FDR) and Hot Mix Asphalt (HMA) (4")	*$351,137*

Roads Treated

- Schanda Drive
- Turkey Ridge Road

2024 Treatments

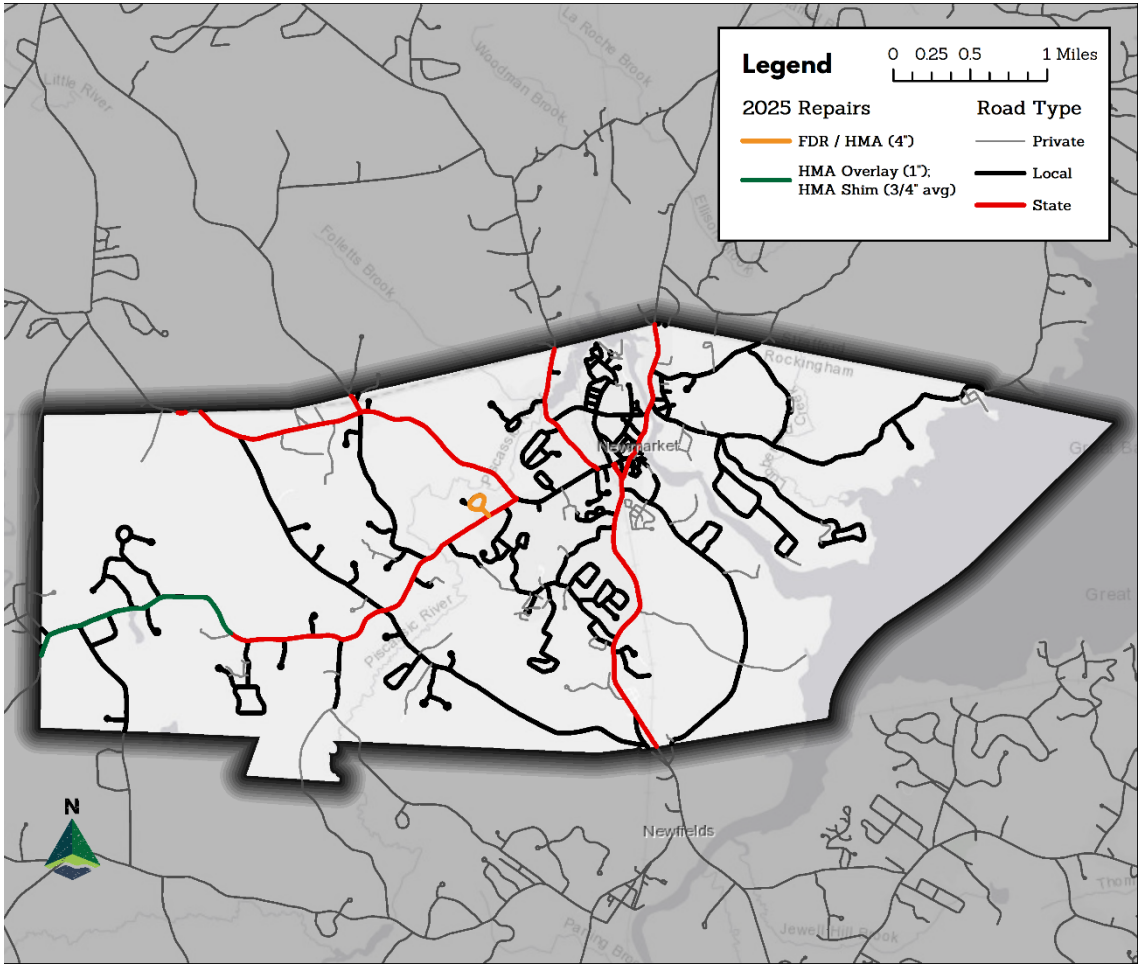


Average PCI After Repairs	77
Average PCI Without Repairs	74.83
Total Miles Treated	1.38
Total Repair Cost	$344,967
FDR & HMA (4")	*$319,198*
HMA Overlay (1")	*$13,300*
HMA Shim (3/4" avg)	*$12,469*

Roads Treated

- Hersey Lane
- Kielty Drive
- Stonewall Way
- Winslow Drive

2025 Treatments

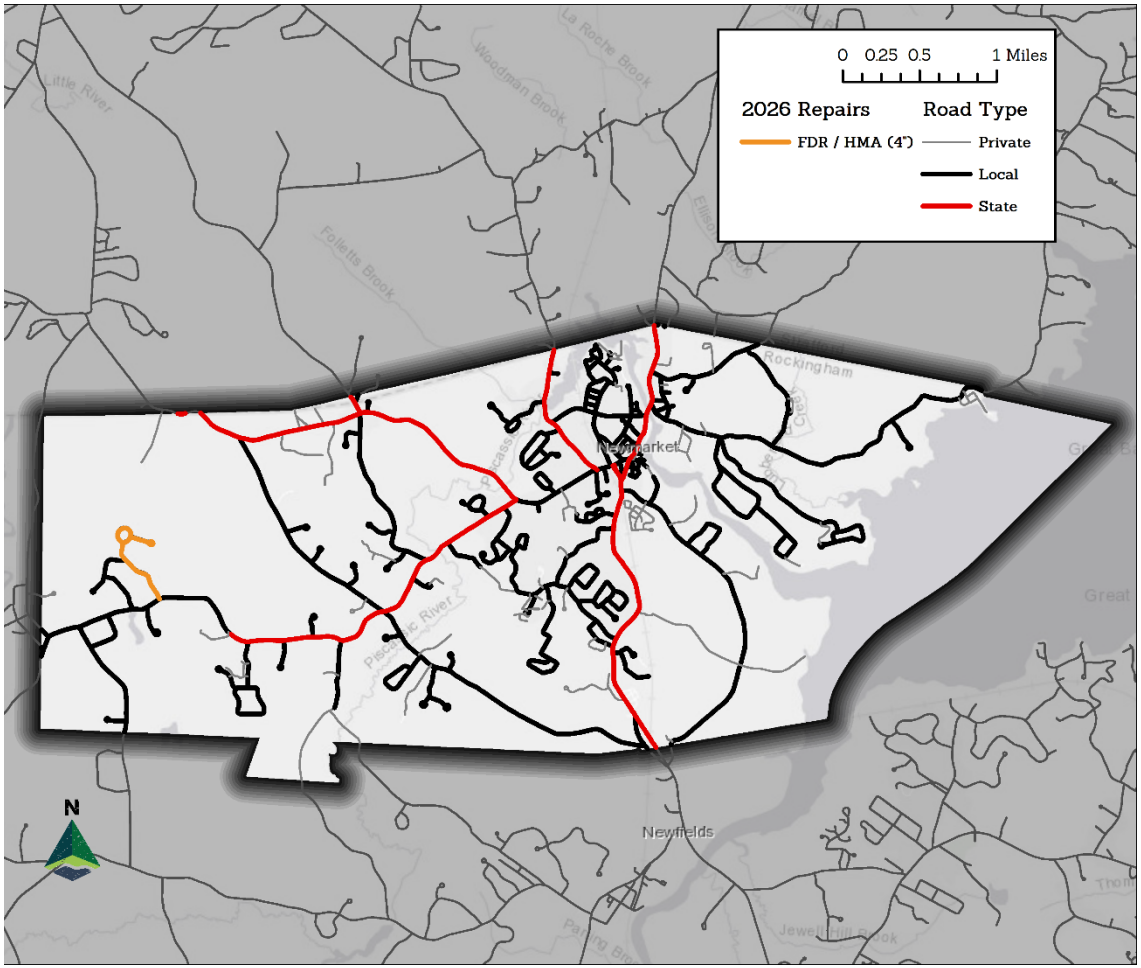


Average PCI After Repairs	74.36
Average PCI Without Repairs	71.47
Total Miles Treated	3.36
Total Repair Cost	$368,289
FDR & HMA (4")	*$137,934*
HMA Overlay (1")	*$118,893*
HMA Shim (3/4" avg)	*$111,462*

Roads Treated

- Grant Road
- Briallia Circle

2026 Treatments

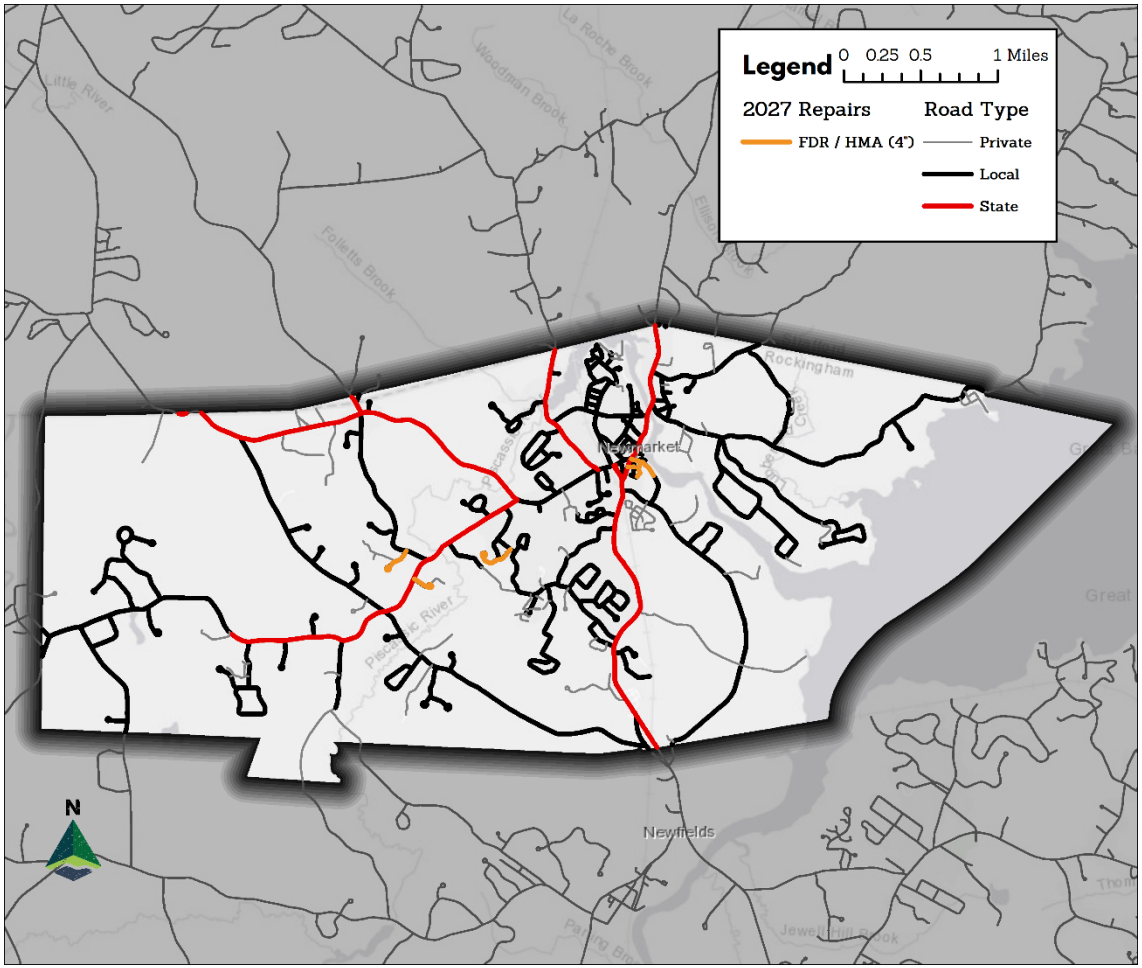


Average PCI After Repairs	72.39
Average PCI Without Repairs	68.26
Total Miles Treated	0.96
Total Repair Cost	$342,673
FDR & HMA (4")	*$342,673*

Roads Treated

- Doe Farm Lane
- Fogg Circle

2027 Treatments

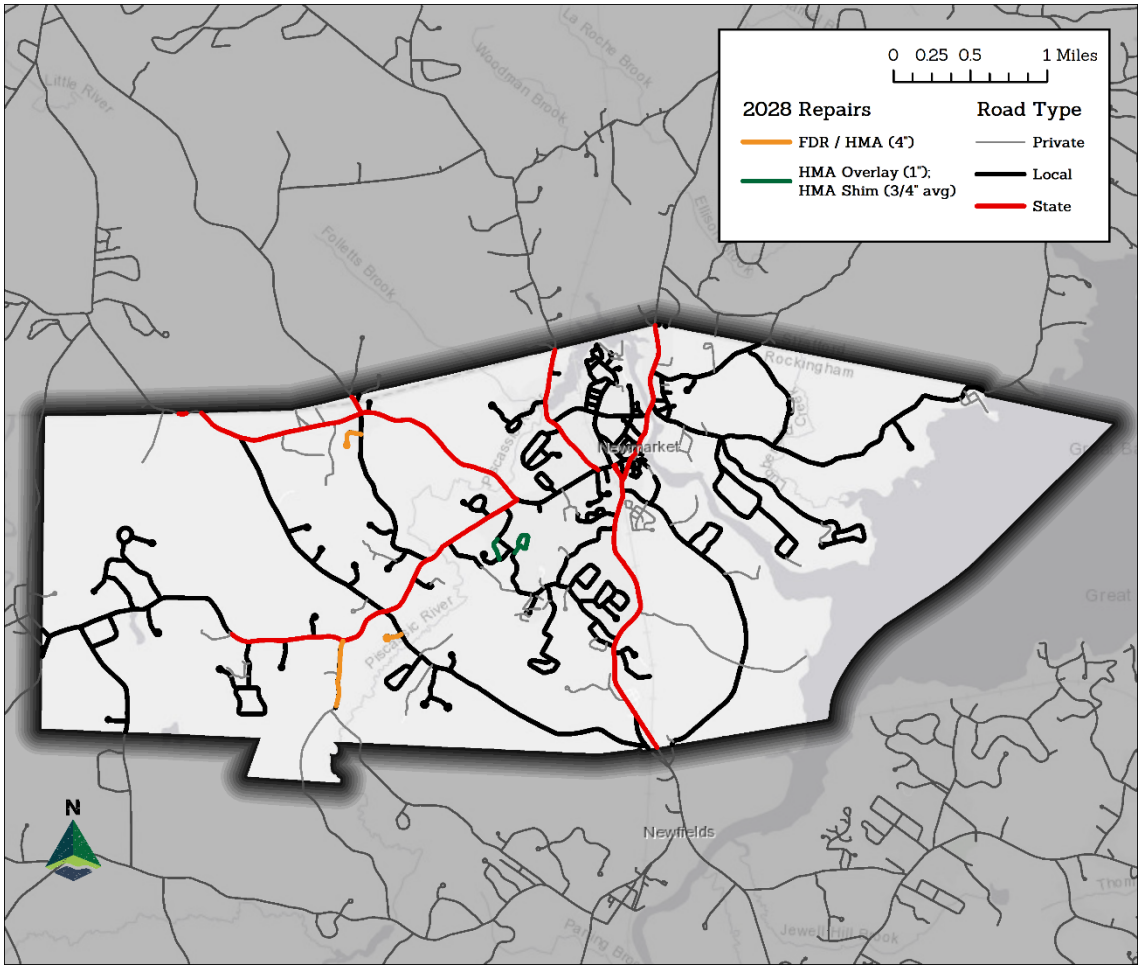


Average PCI After Repairs	71.43
Average PCI Without Repairs	65.19
Total Miles Treated	1.16
Total Repair Cost	$369,499
FDR & HMA (4")	*$369,499*

Roads Treated

- Colonial Drive
- Creighton Street
- Heartwood Circle
- Kimball Way
- Merrill Lane
- Prescott Street
- Shady Lane
- Short Street

2028 Treatments

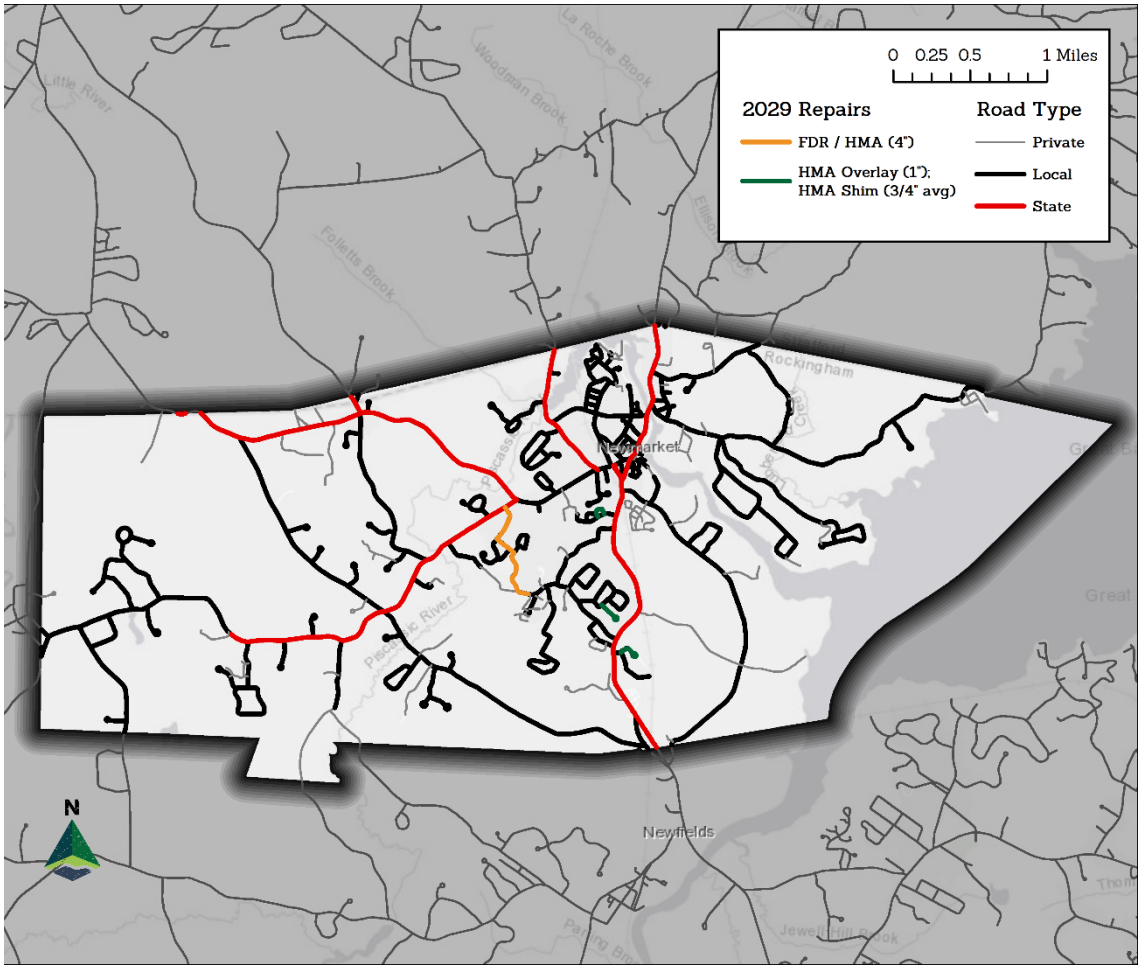


Average PCI After Repairs	69.89
Average PCI Without Repairs	62.27
Total Miles Treated	1.25
Total Repair Cost	$343,755
FDR & HMA (4")	*$262,227*
HMA Overlay (1")	*$42,078*
HMA Shim (3/4" avg)	*$39,448*

Roads Treated

- Candice Lane
- Channing Way
- Edwin Lane
- Huckins Drive
- Neal Mill Road

2029 Treatments

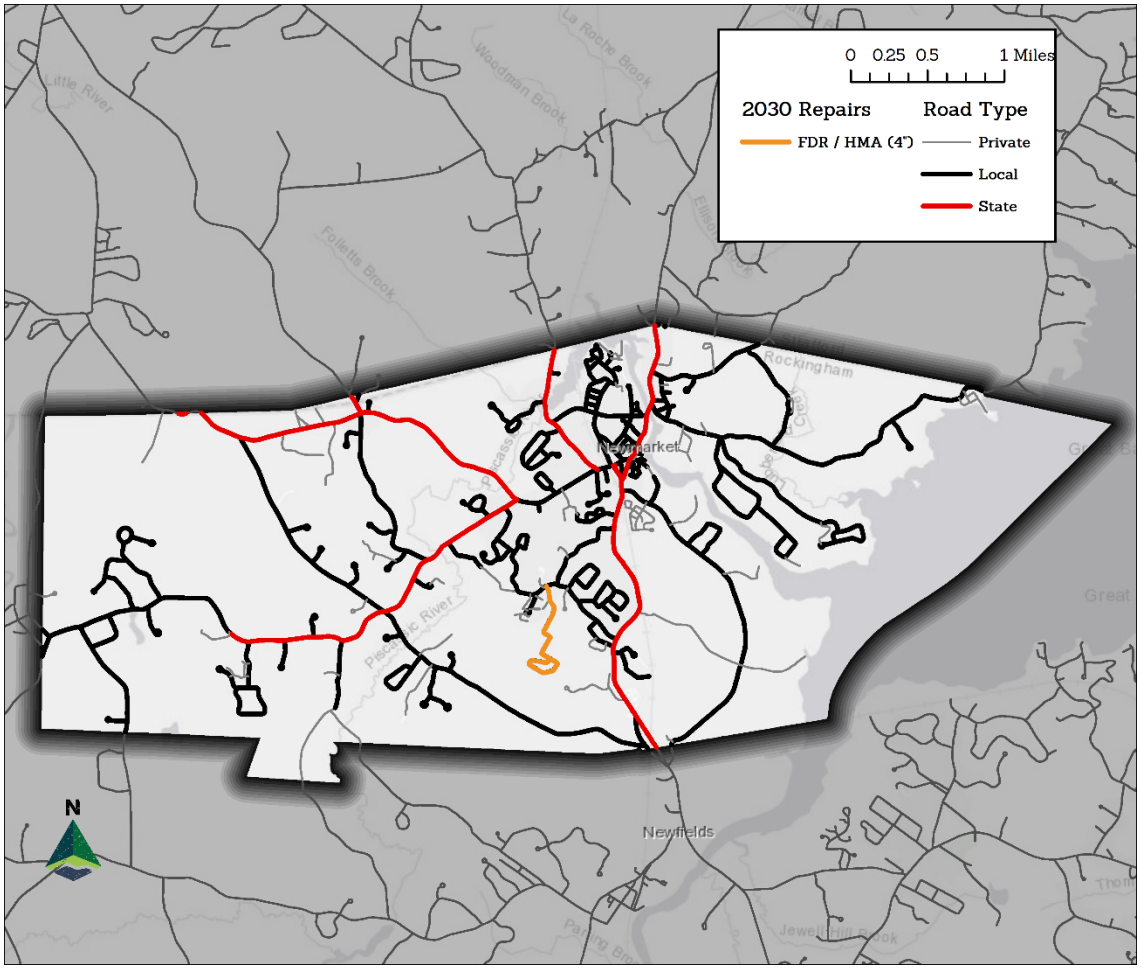


Average PCI After Repairs	67.99
Average PCI Without Repairs	59.48
Total Miles Treated	1.19
Total Repair Cost	$357,199
FDR & HMA (4")	*$275,163*
HMA Overlay (1")	*$42,341*
HMA Shim (3/4" avg)	*$39,695*

Roads Treated

- Durrell Drive
- Gordon Ave
- Sandy Lane
- Stanorm Drive

2030 Treatments

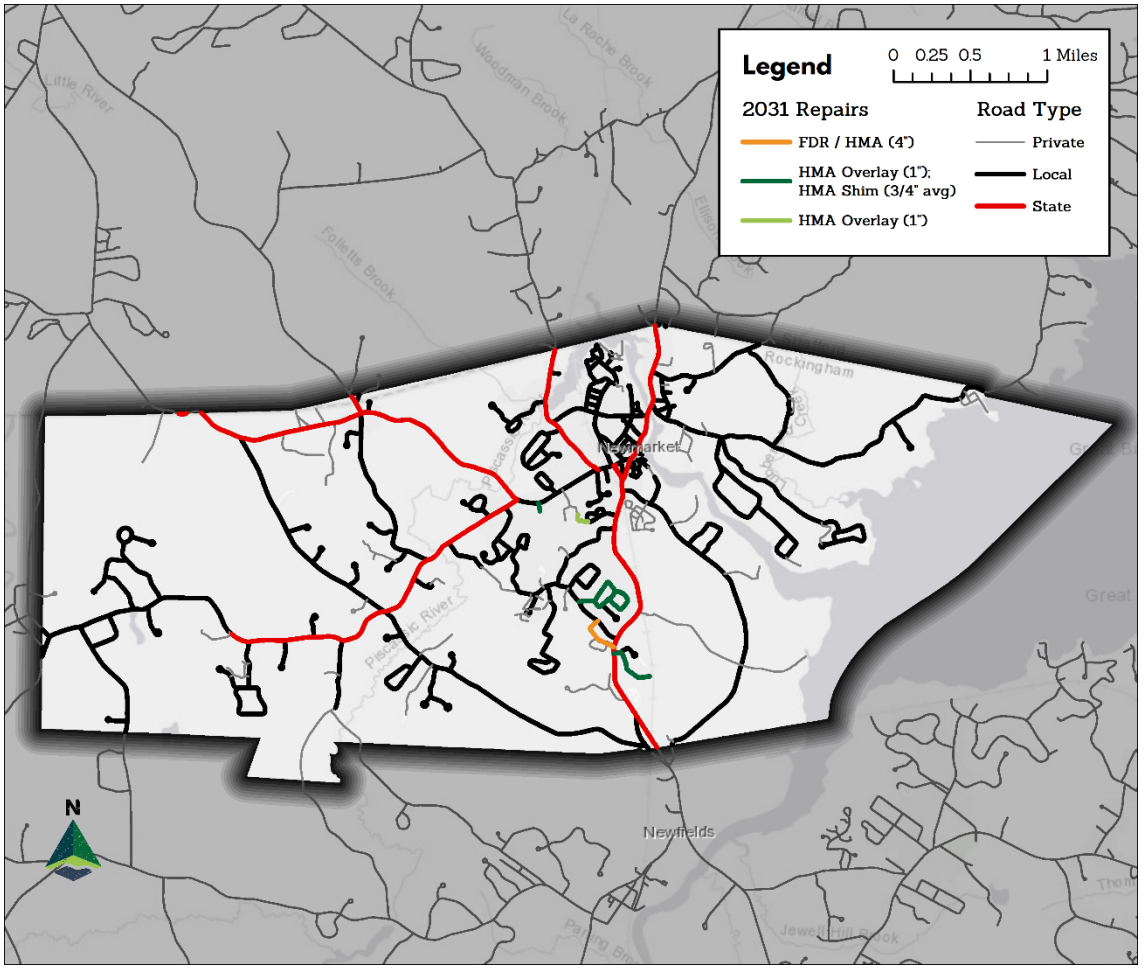


Average PCI After Repairs	65.94
Average PCI Without Repairs	56.81
Total Miles Treated	1.02
Total Repair Cost	$374,243
FDR & HMA (4")	*$374,243*

Roads Treated

- Ladyslipper Drive

2031 Treatments

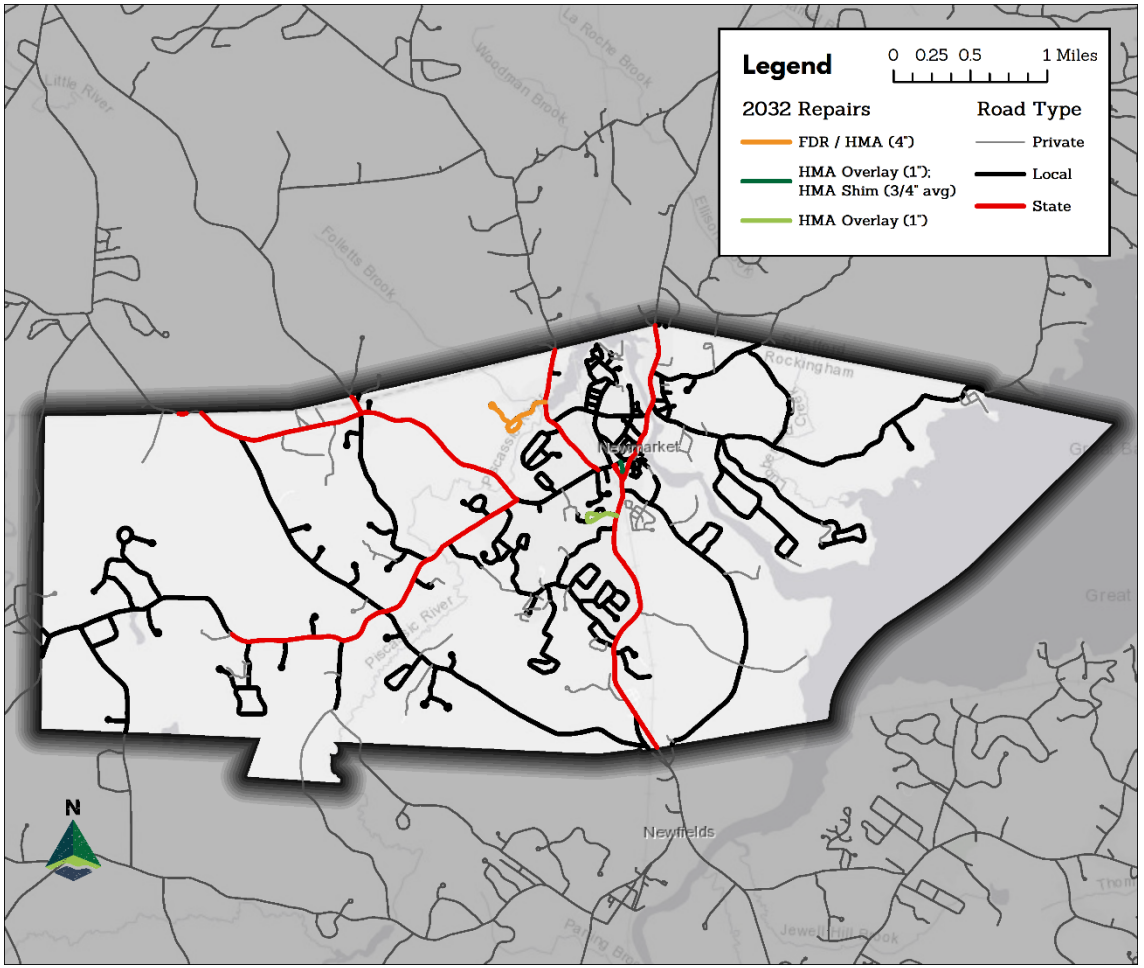


Average PCI After Repairs	64.6
Average PCI Without Repairs	54.27
Total Miles Treated	1.57
Total Repair Cost	$343,718
FDR & HMA (4")	*$103,100*
HMA Overlay (1")	*$128,545*
HMA Shim (3/4" avg)	*$112,073*

Roads Treated

- Brandon Drive
- Forbes Road
- Great Hill Drive
- Lita Lane
- Oak Street
- Pond Street
- Terrace Drive

2032 Treatments



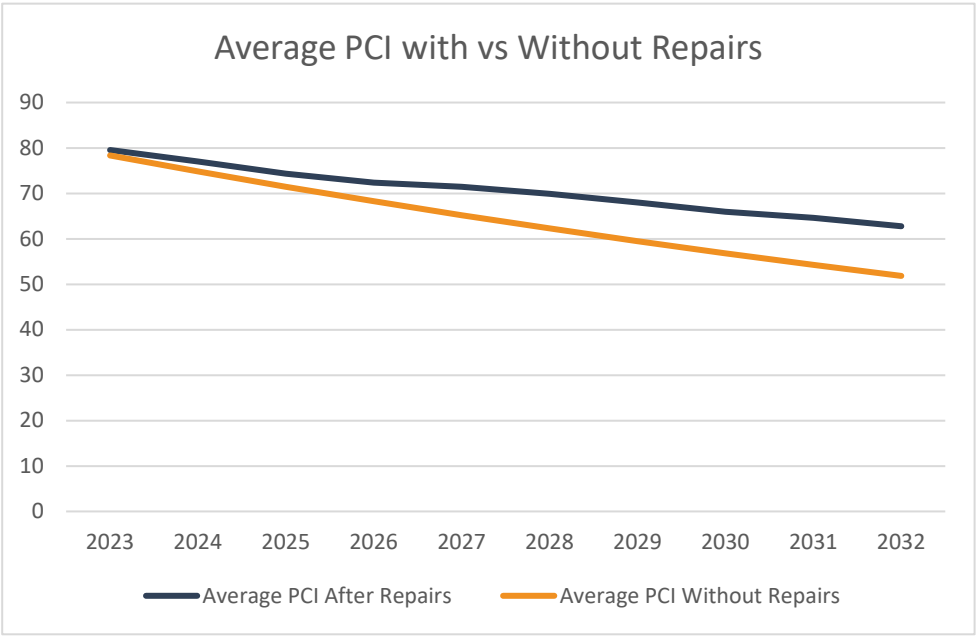
Average PCI After Repairs	62.77
Average PCI Without Repairs	51.84
Total Miles Treated	1.09
Total Repair Cost	$365,167
FDR & HMA (4")	*$317,581*
HMA Overlay (1")	*$43,726*
HMA Shim (3/4" avg)	*$3,860*

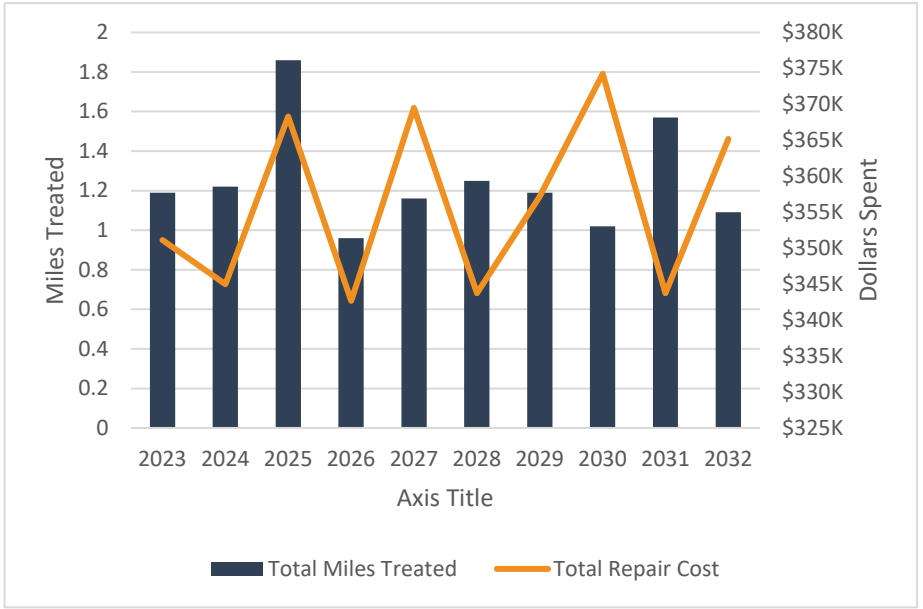
Roads Treated

- Carolyn Drive
- Mastin Drive
- Tasker Lane
- Terrace Drive

Totals (2023-2032)

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Average PCI After Repairs	79.55	77	74.36	72.39	71.43	69.89	67.99	65.94	64.6	62.77
Average PCI Without Repairs	78.35	74.83	71.47	68.26	65.19	62.27	59.48	56.81	54.27	51.84
Total Miles Treated	1.19	1.22	1.86	0.96	1.16	1.25	1.19	1.02	1.57	1.09
Total Repair Cost	$351,137	$344,967	$368,289	$342,673	$369,499	$343,755	$357,199	$374,243	$343,718	$365,167





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.