NORTHWOOD ROAD SURFACE MANAGEMENT SYSTEM REPORT

This report was completed by the Town of Northwood in collaboration with Strafford Regional Planning Commission. Road Surface Management System assessments were completed in the town in August 2021, and the forecasting report was finalized in December 2021.

AUTHORS

Stephen Geis, Planning Technician Formatting: Shayna Sylvia, Communications and Outreach Planner



This page intentionally left blank.

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 segment 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 handbook¹.

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.

PAVEMENT CONDITION INDEX (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 treatme									
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.								

¹ The RSMS handbook is distributed during the annual data collection training facilitated by UNH T2 staff. The 2019 collection manual can be found in the Appendix.

NORTHWOOD ROAD SURFACE MANAGEMENT SYSTEM

Phase 1 road surveys were conducted in August of 2021, with forecasting taking place during the Fall months of 2021. This was the first round of RSMS surveying that SRPC has done with Northwood 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 despite the circumstances. Town Administrator Walter Johnson and Road Agent Chris Brown worked closely with SRPC staff to update the road condition changes that took place during the project pause and create a forecasting schedule that worked best for the Town of Northwood.

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 September and October 2021 to ensure accuracy of current road conditions.

Northwood, in 2021, has approximately 30 total miles of town-maintained road and 27 Miles of paved roads. At the time of forecasting, approximately 46% were in excellent condition (PCI score: above 80), 16% were in good condition (PCI Score: 75-80), 17% were in fair condition (PCI Score: 65-74), and 21% were in poor condition (PCI Score: <65). 2026's projected PCI scores are going to leave Northwood is a very good place with 73% of their roads being either in good or excellent condition.



2026 Road Conditions



Poor



FINAL MAINTENANCE SCHEDULE AND BUDGETING INFORMATION

The table below (Table 1.) details the final budget and maintenance schedule for the Town of Northwood. For more information on budgeting and road specific treatments, please see the Appendix A.

NEW REPAIRS										
Repair	2022	2023	2024	2025	2026					
Crack Sealing	\$3,268	\$4,922	\$364	\$0	\$0					
Overlays	\$177,848	\$144,334	\$127,556	\$152,253	\$196,250					
Pavement Preservation/Maintenance	\$0	\$13,079	\$80,574	\$107,593	\$0					
Rehabilitate and Rebuild	\$88,039	\$51,395	\$0	\$0	\$0					
Total	\$269,155	\$213,730	\$208,494	\$259,846	\$196,250					

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. Below is a map of road condition projection for 2026. Summer/Fall 2026 will be the next round of RSMS surveying.



APPENDICES

APPENDIX A -ANALYSIS DETAIL REPORT (ALPHABETIZED) APPENDIX B - ANALYSIS DETAIL REPORT (PRIORITY) APPENDIX C - YEARLY MAPS APPENDIX D - RSMS PROTOCOL

This page intentionally left blank.

APPENDIX A - ANALYSIS DETAIL REPORT (ALPHABETIZED)

	ANALYSIS DETAIL REPORT BY ALPHABETICAL ORDER											
Priority	PCI	Street	Order	Length (ft)	Width (ft)	Surface Type	Year	Repair	Cost			
13.25	47	Allen Farm Rd	1	1319.966	24	Paved	2023	Milling / HMA (1.5")	\$29,241			
14	44	Allen Farm Rd	2	1319.96	24	Paved	2023	Milling / HMA (1.5")	\$29,240			
14.25	43	Allen Farm Rd	3	829.0505	24	Paved	2023	Milling / HMA (1.5")	\$18,366			
8.5	66	Bennetts Bridge Rd	1	1318.691	16	Paved	2024	Asphalt Rubber SAM	\$11,982			
8.25	67	Bennetts Bridge Rd	2	828.7961	16	Paved	2024	Crack Seal (Minor)	\$364			
8.25	67	Bennetts Bridge Rd	2	828.7961	16	Paved	2024	Asphalt Rubber SAM	\$7,530			
0	100	Bigelow Rd	1	795.8515	20	Paved	2026	Milling / HMA (1.5")	\$16,148			
2.75	89	Bow Lake Rd	1	1320.356	20	Paved	2023	Crack Seal (Minor)	\$562			
2.75	89	Bow Lake Rd	2	1320.52	20	Paved	2023	Crack Seal (Minor)	\$563			
4.25	83	Bow Lake Rd	3	1319.556	20	Paved	2023	Crack Seal (Minor)	\$562			
2.5	90	Bow Lake Rd	4	1319.23	20	Paved	2023	Crack Seal (Minor)	\$562			
2.5	90	Bow Lake Rd	5	1320.539	20	Paved	2023	Crack Seal (Minor)	\$563			
3.75	85	Bow Lake Rd	6	1322.222	20	Paved	2023	Crack Seal (Minor)	\$563			
3.25	87	Bow Lake Rd	7	1319.651	20	Paved	2023	Crack Seal (Minor)	\$562			
2.5	90	Bow Lake Rd	8	1318.112	20	Paved	2023	Crack Seal (Minor)	\$562			
5.5	78	Bow Lake Rd	9	993.7318	20	Paved	2023	Crack Seal (Minor)	\$423			
10.25	59	Bow St	1	1321.218	18	Paved	2022	Milling / HMA (1.5")	\$21,271			
10.25	59	Bow St	2	1320.878	18	Paved	2022	Milling / HMA (1.5")	\$21,265			
8.75	65	Bow St	3	1321.128	18	Paved	2022	Milling / HMA (1.5")	\$21,269			
8	68	Church St	1	729.7446	20	Paved	2023	Milling / HMA (1.5")	\$13,471			
7	72	Gulf Rd	1	1318.448	16	Paved	2024	Milling / HMA (1.5")	\$20,094			
10.25	59	Gulf Rd	2	1318.941	16	Paved	2024	Milling / HMA (1.5")	\$20,102			

	ANALYSIS DETAIL REPORT BY ALPHABETICAL ORDER											
Priority	PCI	Street	Order	Length (ft)	Width (ft)	Surface Type	Year	Repair	Cost			
6.75	73	Gulf Rd	3	1321.468	16	Paved	2024	Milling / HMA (1.5")	\$20,140			
8	68	Gulf Rd	4	1666.739	16	Paved	2024	Milling / HMA (1.5")	\$25,403			
6	76	Harmony Rd	1	1319.54	18	Paved	2023	Milling / HMA (1.5")	\$21,923			
8	68	Harmony Rd	2	1319.399	18	Paved	2023	Milling / HMA (1.5")	\$21,921			
12	52	Jenness Pond Rd	1	1321.383	18	Paved	2023	FDR w/ Asphalt Stabilization and HMA (3")	\$51,395			
13.25	47	Jenness Pond Rd	2	1320.481	18	Paved	2023	Asphalt Rubber SAM	\$13,079			
3.5	86	Jenness Pond Rd	3	1318.583	18	Paved	2022	Crack Seal (Minor)	\$544			
4	84	Jenness Pond Rd	4	1320.125	18	Paved	2022	Crack Seal (Minor)	\$545			
4.75	81	Jenness Pond Rd	5	1321.685	18	Paved	2022	Crack Seal (Minor)	\$546			
3	88	Jenness Pond Rd	6	1318.99	18	Paved	2022	Crack Seal (Minor)	\$544			
1.75	93	Jenness Pond Rd	7	1319.253	18	Paved	2022	Crack Seal (Minor)	\$545			
1.25	95	Jenness Pond Rd	8	1318.811	18	Paved	2022	Crack Seal (Minor)	\$544			
5.75	77	Lower Deerfield Rd	1	1319.113	20	Paved	2026	Milling / HMA (1.5")	\$26,765			
4.75	81	Lower Deerfield Rd	2	1318.912	20	Paved	2026	Milling / HMA (1.5")	\$26,761			
4.5	82	Lower Deerfield Rd	3	1319.292	20	Paved	2026	Milling / HMA (1.5")	\$26,768			
2.25	91	Lower Deerfield Rd	4	1167.928	20	Paved	2026	Milling / HMA (1.5")	\$23,697			
4.25	83	Lucas Pond Rd	6	1321.626	16	Paved	2026	Milling / HMA (1.5")	\$21,453			
5.75	77	Lucas Pond Rd	7	1318.397	16	Paved	2026	Milling / HMA (1.5")	\$21,400			
3	88	Lucas Pond Rd	8	1319.626	16	Paved	2026	Milling / HMA (1.5")	\$21,420			
8.5	66	Lucas Pond Rd	9	729.329	16	Paved	2026	Milling / HMA (1.5")	\$11,838			
6	76	Oakwood Dr	1	1317.18	20	Paved	2024	Milling / HMA (1.5")	\$25,094			

	ANALYSIS DETAIL REPORT BY ALPHABETICAL ORDER										
Priority	PCI	Street	Order	Length (ft)	Width (ft)	Surface Type	Year	Repair	Cost		
12	52	Oakwood Dr	2	877.8037	20	Paved	2024	Milling / HMA (1.5")	\$16,723		
8.75	65	Old Mountain Rd	1	3080.869	16	Paved	2025	Milling / HMA (1.5")	\$48,458		
10.25	59	Old Mountain Rd	1	1319.124	16	Paved	2025	Milling / HMA (1.5")	\$20,748		
7.75	69	Old Mountain Rd	2	1319.313	16	Paved	2025	Milling / HMA (1.5")	\$20,751		
8.25	67	Old Mountain Rd	3	1319.74	16	Paved	2025	Milling / HMA (1.5")	\$20,758		
10	60	Old Mountain Rd	4	1321.621	16	Paved	2025	Milling / HMA (1.5")	\$20,787		
3.5	86	Old Mountain Rd	5	1319.307	16	Paved	2025	Milling / HMA (1.5")	\$20,751		
14	44	Old Pittsfield Rd	2	1321.845	18	Paved	2022	FDR w/ Asphalt Stabilization and HMA (3")	\$49,819		
8.25	67	Old Pittsfield Rd	3	1141.859	18	Paved	2022	Milling / HMA (1.5")	\$18,383		
9	64	Old Turnpike Rd	1	1320.371	18	Paved	2022	Milling / HMA (1.5")	\$21,257		
8.5	66	Old Turnpike Rd	2	1320.489	18	Paved	2022	Milling / HMA (1.5")	\$21,259		
13.5	46	Old Turnpike Rd	3	1320.377	18	Paved	2022	Milling / HMA (1.5")	\$21,257		
10.75	57	Old Turnpike Rd	4	1320.391	18	Paved	2022	Milling / HMA (1.5")	\$21,257		
13.5	46	Old Turnpike Rd	5	660.3131	18	Paved	2022	Milling / HMA (1.5")	\$10,631		
11	56	Priest Rd	1	612.2551	18	Paved	2023	Milling / HMA (1.5")	\$10,172		
0	100	Ridge Rd	1	1321.281	18	Paved	2025	Asphalt Rubber SAM	\$13,938		
0	100	Ridge Rd	2	1321.451	18	Paved	2025	Asphalt Rubber SAM	\$13,940		
0	100	Ridge Rd	3	1319.897	18	Paved	2025	Asphalt Rubber SAM	\$13,923		
0	100	Ridge Rd	4	1318.367	18	Paved	2025	Asphalt Rubber SAM	\$13,907		
0	100	Ridge Rd	5	1573.251	18	Paved	2025	Asphalt Rubber SAM	\$16,596		
0	100	Ridge Rd	6	1218.011	22	Paved	2025	Asphalt Rubber SAM	\$15,704		

	ANALYSIS DETAIL REPORT BY ALPHABETICAL ORDER											
Priority	PCI	Street	Order	Length (ft)	Width (ft)	Surface Type	Year	Repair	Cost			
0	100	Ridge Rd	7	1519.084	22	Paved	2025	Asphalt Rubber SAM	\$19,585			
2.75	89	Sherburne Hill Rd		2454.206	22	Paved	2024	Asphalt Rubber SAM	\$30,661			
25		Sherburne Hill Rd	1	1322.642	22	Paved	2024	Asphalt Rubber SAM	\$16,524			
0	100	Sherburne Hill Rd	2	1110.78	22	Paved	2024	Asphalt Rubber SAM	\$13,877			
13.25	47	Ye Olde Canterbury Road	-	1014.107	18	Paved	2022	FDR w/ Asphalt Stabilization and HMA (3")	\$38,220			

APPENDIX B - ANALYSIS DETAIL REPORT (PRIORITY)

	ANALYSIS DETAIL REPORT BY PRIORITY										
Priority	PCI	Street	Order	Length (ft)	Width (ft)	Surface Type	Year	Repair	Cost		
25	-	Sherburne Hill Rd	1	1322.642	22	Paved	2024	Asphalt Rubber SAM	\$16,524		
14.25	43	Allen Farm Rd	3	829.0505	24	Paved	2023	Milling / HMA (1.5")	\$18,366		
14	44	Allen Farm Rd	2	1319.96	24	Paved	2023	Milling / HMA (1.5")	\$29,240		
14	44	Old Pittsfield Rd	2	1321.845	18	Paved	2022	FDR w/ Asphalt Stabilization and HMA (3")	\$49,819		
13.5	46	Old Turnpike Rd	3	1320.377	18	Paved	2022	Milling / HMA (1.5")	\$21,257		
13.5	46	Old Turnpike Rd	5	660.3131	18	Paved	2022	Milling / HMA (1.5")	\$10,631		
13.25	47	Allen Farm Rd	1	1319.966	24	Paved	2023	Milling / HMA (1.5")	\$29,241		
13.25	47	Jenness Pond Rd	2	1320.481	18	Paved	2023	Asphalt Rubber SAM	\$13,079		
13.25	47	Ye Olde Canterbury Road	-	1014.107	18	Paved	2022	FDR w/ Asphalt Stabilization and HMA (3")	\$38,220		
12	52	Jenness Pond Rd	1	1321.383	18	Paved	2023	FDR w/ Asphalt Stabilization and HMA (3")	\$51,395		
12	52	Oakwood Dr	2	877.8037	20	Paved	2024	Milling / HMA (1.5")	\$16,723		
11	56	Priest Rd	1	612.2551	18	Paved	2023	Milling / HMA (1.5")	\$10,172		
10.75	57	Old Turnpike Rd	4	1320.391	18	Paved	2022	Milling / HMA (1.5")	\$21,257		
10.25	59	Bow St	1	1321.218	18	Paved	2022	Milling / HMA (1.5")	\$21,271		
10.25	59	Bow St	2	1320.878	18	Paved	2022	Milling / HMA (1.5")	\$21,265		
10.25	59	Gulf Rd	2	1318.941	16	Paved	2024	Milling / HMA (1.5")	\$20,102		
10.25	59	Old Mountain Rd	1	1319.124	16	Paved	2025	Milling / HMA (1.5")	\$20,748		
10	60	Old Mountain Rd	4	1321.621	16	Paved	2025	Milling / HMA (1.5")	\$20,787		
9	64	Old Turnpike Rd	1	1320.371	18	Paved	2022	Milling / HMA (1.5")	\$21,257		
8.75	65	Bow St	3	1321.128	18	Paved	2022	Milling / HMA (1.5")	\$21,269		
8.75	65	Old Mountain Rd	1	3080.869	16	Paved	2025	Milling / HMA (1.5")	\$48,458		
8.5	66	Bennetts Bridge Rd	1	1318.691	16	Paved	2024	Asphalt Rubber SAM	\$11,982		

	ANALYSIS DETAIL REPORT BY PRIORITY										
Priority	PCI	Street	Order	Length (ft)	Width (ft)	Surface Type	Year	Repair	Cost		
8.5	66	Lucas Pond Rd	9	729.329	16	Paved	2026	Milling / HMA (1.5")	\$11,838		
8.5	66	Old Turnpike Rd	2	1320.489	18	Paved	2022	Milling / HMA (1.5")	\$21,259		
8.25	67	Bennetts Bridge Rd	2	828.7961	16	Paved	2024	Crack Seal (Minor)	\$364		
8.25	67	Bennetts Bridge Rd	2	828.7961	16	Paved	2024	Asphalt Rubber SAM	\$7,530		
8.25	67	Old Mountain Rd	3	1319.74	16	Paved	2025	Milling / HMA (1.5")	\$20,758		
8.25	67	Old Pittsfield Rd	3	1141.859	18	Paved	2022	Milling / HMA (1.5")	\$18,383		
8	68	Church St	1	729.7446	20	Paved	2023	Milling / HMA (1.5")	\$13,471		
8	68	Gulf Rd	4	1666.739	16	Paved	2024	Milling / HMA (1.5")	\$25,403		
8	68	Harmony Rd	2	1319.399	18	Paved	2023	Milling / HMA (1.5")	\$21,921		
7.75	69	Old Mountain Rd	2	1319.313	16	Paved	2025	Milling / HMA (1.5")	\$20,751		
7	72	Gulf Rd	1	1318.448	16	Paved	2024	Milling / HMA (1.5")	\$20,094		
6.75	73	Gulf Rd	3	1321.468	16	Paved	2024	Milling / HMA (1.5")	\$20,140		
6	76	Harmony Rd	1	1319.54	18	Paved	2023	Milling / HMA (1.5")	\$21,923		
6	76	Oakwood Dr	1	1317.18	20	Paved	2024	Milling / HMA (1.5")	\$25,094		
5.75	77	Lower Deerfield Rd	1	1319.113	20	Paved	2026	Milling / HMA (1.5")	\$26,765		
5.75	77	Lucas Pond Rd	7	1318.397	16	Paved	2026	Milling / HMA (1.5")	\$21,400		
5.5	78	Bow Lake Rd	9	993.7318	20	Paved	2023	Crack Seal (Minor)	\$423		
4.75	81	Jenness Pond Rd	5	1321.685	18	Paved	2022	Crack Seal (Minor)	\$546		
4.75	81	Lower Deerfield Rd	2	1318.912	20	Paved	2026	Milling / HMA (1.5")	\$26,761		
4.5	82	Lower Deerfield Rd	3	1319.292	20	Paved	2026	Milling / HMA (1.5")	\$26,768		
4.25	83	Bow Lake Rd	3	1319.556	20	Paved	2023	Crack Seal (Minor)	\$562		
4.25	83	Lucas Pond Rd	6	1321.626	16	Paved	2026	Milling / HMA (1.5")	\$21,453		
4	84	Jenness Pond Rd	4	1320.125	18	Paved	2022	Crack Seal (Minor)	\$545		
3.75	85	Bow Lake Rd	6	1322.222	20	Paved	2023	Crack Seal (Minor)	\$563		
3.5	86	Jenness Pond Rd	3	1318.583	18	Paved	2022	Crack Seal (Minor)	\$544		

	ANALYSIS DETAIL REPORT BY PRIORITY										
Priority	PCI	Street	Order	Length (ft)	Width (ft)	Surface Type	Year	Repair	Cost		
3.5	86	Old Mountain Rd	5	1319.307	16	Paved	2025	Milling / HMA (1.5")	\$20,751		
3.25	87	Bow Lake Rd	7	1319.651	20	Paved	2023	Crack Seal (Minor)	\$562		
3	88	Jenness Pond Rd	6	1318.99	18	Paved	2022	Crack Seal (Minor)	\$544		
3	88	Lucas Pond Rd	8	1319.626	16	Paved	2026	Milling / HMA (1.5")	\$21,420		
2.75	89	Bow Lake Rd	1	1320.356	20	Paved	2023	Crack Seal (Minor)	\$562		
2.75	89	Bow Lake Rd	2	1320.52	20	Paved	2023	Crack Seal (Minor)	\$563		
2.75	89	Sherburne Hill Rd	-	2454.206	22	Paved	2024	Asphalt Rubber SAM	\$30,661		
2.5	90	Bow Lake Rd	4	1319.23	20	Paved	2023	Crack Seal (Minor)	\$562		
2.5	90	Bow Lake Rd	5	1320.539	20	Paved	2023	Crack Seal (Minor)	\$563		
2.5	90	Bow Lake Rd	8	1318.112	20	Paved	2023	Crack Seal (Minor)	\$562		
2.25	91	Lower Deerfield Rd	4	1167.928	20	Paved	2026	Milling / HMA (1.5")	\$23,697		
1.75	93	Jenness Pond Rd	7	1319.253	18	Paved	2022	Crack Seal (Minor)	\$545		
1.25	95	Jenness Pond Rd	8	1318.811	18	Paved	2022	Crack Seal (Minor)	\$544		
0	100	Bigelow Rd	1	795.8515	20	Paved	2026	Milling / HMA (1.5")	\$16,148		
0	100	Ridge Rd	1	1321.281	18	Paved	2025	Asphalt Rubber SAM	\$13,938		
0	100	Ridge Rd	2	1321.451	18	Paved	2025	Asphalt Rubber SAM	\$13,940		
0	100	Ridge Rd	3	1319.897	18	Paved	2025	Asphalt Rubber SAM	\$13,923		
0	100	Ridge Rd	4	1318.367	18	Paved	2025	Asphalt Rubber SAM	\$13,907		
0	100	Ridge Rd	5	1573.251	18	Paved	2025	Asphalt Rubber SAM	\$16,596		
0	100	Ridge Rd	6	1218.011	22	Paved	2025	Asphalt Rubber SAM	\$15,704		
0	100	Ridge Rd	7	1519.084	22	Paved	2025	Asphalt Rubber SAM	\$19,585		
0	100	Sherburne Hill Rd	2	1110.78	22	Paved	2024	Asphalt Rubber SAM	\$13,877		

APPENDIX C - YEARLY MAPS









Average PCI After Repairs	79.31
Average PCI Without Repairs	68.35
Total Miles Treated	2.81
Total Repair Cost	\$208,494

Crack Seal (Minor)	\$364
Milling / HMA (1.5")	\$127,556
Asphalt Rubber SAM	\$80,574
Total	\$208,494

Roads Treated: Bennett's Bridge Road Gulf Road Oakwood Drive Sherburne Hill Road





Average PCI After Repairs	78.53
Average PCI Without Repairs	65.28
Total Miles Treated	3.65
Total Repair Cost	\$259,846

Milling / HMA (1.5")	\$152,253
Asphalt Rubber SAM	\$107,593
Total	\$259,846

Roads Treated: Old Mountain Road Ridge Road





Average PCI After Repairs	77.26
Average PCI Without Repairs	62.34
Total Miles Treated	2.01
Total Repair Cost	\$196,250

Milling / HMA (1.5")	\$196,250
Total	\$196,250

Roads Treated:

Bigelow Road Lower Deerfield Road Lucas Pond Road



Total (2022-2026)

	2022	2023	2024	2025	2026
Average PCI After Repairs	79.36	80.15	79.31	78.53	77.26
Average PCI Without Repairs	74.95	71.57	68.35	65.28	62.34
Total Miles Treated	4.03	4.10	2.81	3.65	2.01
Total Repair Cost	\$269,155	\$213,730	\$208,494	\$259,846	\$196,250

APPENDIX D - RSMS PROTOCOL

Statewide Asset Data Exchange System (SADES)



<u>Road Surface Management System</u> (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 (T²). 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 T². Data collection efforts are to be organized by each RPC for their respective jurisdictions. T² 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 T² to all stake-holding parties.

DATA COLLECTION SPECIFICATIONS GUIDE	1
GENERAL USER INFORMATION	4
GENERAL INFORMATION	6
Date:	6
Observer/Organization:	6
Road Name:	6
Road Alias:	6
Town Name:	6
Surface Type:	6
Shoulder Type:	6
Road Surface Width:	6
Number of Lanes:	6
Last Year Surveyed	6
LONGITUDINAL/TRANSVERSE CRACKING	<u> 7</u>
Long./Trnsv. Cracking Severity:	7
Long./Trnsv. Cracking Extent:	7
ALLIGATOR CRACKING	<u>9</u>
Alligator Cracking Severity:	9
Alligator Cracking Extent:	9
EDGE CRACKING	11
Edge Cracking Severity:	11
Edge Cracking Extent:	11
PATCHING/POTHOLES	<u>13</u>
Patching/Potholes Extent:	13

TABLE OF CONTENTS

DRAINAGE	
Drainage Condition:	
RUTTING	
Rutting Severity:	
Rutting Extent:	
ROUGHNESS	
Roughness Condition:	
FROST HEAVE SEVERITY	21
Frost Heave Severity:	
FACTORS	23
Traffic Volume:	23
Importance:	
LOCAL KNOWLEDGE	24
Interview with Local Knowledge:	
Interview Comments:	
WEATHER CONDITIONS	24
Weather Condtions:	24
GENERAL COMMENTS	
General Comments:	

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 <u>chris@nhsades.com</u> 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)
- <u>Medium</u> Crack widths up to 1/4" in width with some spalling evident (width of pencil)
 - <u>High</u> 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.

- <u>Medium</u> 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.
 - <u>High</u> 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. <u>Spalling</u> 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

<u>Medium Severity</u>



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 DefectsThe road section has no visible signs of alligator cracking.LowCrack pattern is just beginning to appear. Cracks have no measureable
width and no actual pavement separation is found.MediumEasily discernible cracking with measureable crack widths up to 1/8"
and some breakup. Pavement pieces, while loose, are still
interconnected.HighWide cracking (1/4") has resulted in major pavement breakup with

Alligator Cracking Extent:
Low
Medium
High

loose pieces actually displaced.

- Low The total area exhibiting alligator cracking encompasses less than 10% of the roadway section
- <u>Medium</u> The *total area* exhibiting alligator cracking encompasses between 10% and 30% of the roadway section
 - <u>High</u> 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.

<u>High Severity</u>



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
5

<u>No Defects</u>	The roadway does not exhibit edge cracking.
Low	Cracking evident; however, no breakup. Crack widths <1/8" and confined to 12" from <i>edge of pavement</i> .
<u>Medium</u>	Multiple cracking occurring with some breakup. Cracks extend <i>up to</i> 24" into pavement.
<u>High</u>	Extensive cracking <i>beyond 24" into roadway</i> ; breakup. This condition closely resembles alligator cracking

Edge Cracking Extent:
Low
Medium
High

- <u>Low</u> The section length affected by cracking is *less than 10% of the total section length.*
- <u>Medium</u> The section length affected by cracking is *between 10% and 30% of total section length.*
 - <u>High</u> The section length affected by cracking is *greater than 30% of the total section length*.

<u>High Severity</u>



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

<u>No Defects</u>	No patches showing deterioration or potholes detected in the rated section.
<u>Low</u>	The <i>total area</i> 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.
<u>Medium</u>	The <i>total area</i> 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.
<u>High</u>	The <i>total area</i> 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. <u>Only patches that show deterioration should be evaluated</u>. Good patches should be ignored. Surface area, rather than depth of deterioration, should be used to assess extent.

Patching



<u>Pothole</u>



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

<u>Good</u>	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.
<u>Fair</u>	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.
<u>Poor</u>	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.
of noor dr	

Sure signs of poor drainage include:1. Road shoulders above the edge of pavement;

2. Standing water; and

Notes:

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.

No Defects Low Medium	Rutting Severity:
Low Medium High	No Defects
Medium	Low
High	Medium
niyn	High

No Defects	No visible rutting in the rated section.
Low	Depth of rut is less than 1".
<u>Medium</u>	Ruts are between 1" and 3" deep.
<u>High</u>	Ruts are greater than 3" deep.

Rutting Extent:	
Low	
Medium	
High	

- Low Less than 10% of the total road surface is covered by rutting.
- <u>Medium</u> Between 10% and 30% of the total road surface is covered by rutting.
 - <u>High</u> 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.

<u>High Severity</u>



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	
<u>Smooth</u>	Road has <i>even surface</i> – 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.
<u>Rough</u>	Pavement surface is <i>very uneven</i> , causing a safety hazard for vehicles traveling at the posted speed limit.

<u>Very Rough</u> 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	
<u>None</u>	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.MediumInterview with local knowledge indicates that this segment is prone to
substantial frost heave severity and is just beginning to affect vehicle
- travel.SevereInterview 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.

raffic Volume:	

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:

- <u>1</u> Low
- 2 Medium-Low
- <u>3</u> Medium
- 4 Medium-High
- <u>5</u> 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:

- <u>1</u> Low
- 2 Medium-Low
- <u>3</u> Medium
- 4 Medium-High
- <u>5</u> 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.