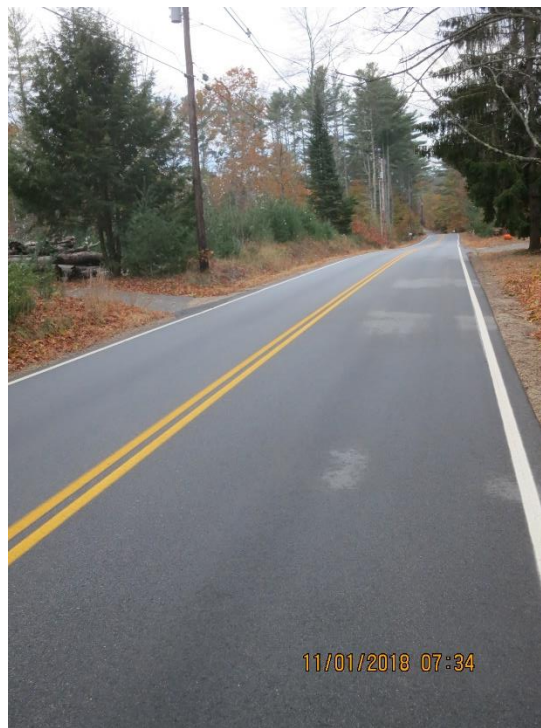


# Road Surface Management System and Guardrail Inventory

## Tuftonboro, NH



The Lakes Region Planning Commission conducted a Road Inventory, Condition Assessment, and Forecasting for the town of Tuftonboro, NH. This is part of a program done in partnership with the NH Department of Transportation and UNH Technology Transfer Center. Inventory and Assessments were entered into the Road Surface Management System (RSMS) software for analysis, prioritization, and generation of repair strategies. Repair strategies and a 10-year budget plan have been prepared in partnership with the town and presented within this report.



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## **I. Introduction**

Road infrastructure is a major investment by a community and is utilized by all residents on a daily basis. Paved roads require routine and preventative maintenance, which should be attended to before they require rehabilitation or reconstruction.

The town of Tuftonboro engaged the Lakes Region Planning Commission to conduct a road inventory data collection, identification of pavement conditions, operation of the Road Surface Management System (RSMS) software, and inventory and assessment of the guardrails found on local paved and gravel roads. This program is in partnership with NH Department of Transportation (DOT), University of New Hampshire Technology Transfer (UNH T2), and the regional planning commissions to assist communities in planning local road maintenance. Pavement and planning resources are listed and described in Appendix A.

Approximately 51% of the paved, town-maintained roads in Tuftonboro, NH warranted some type of maintenance or repair at the time of the assessment (this was determined as having a Pavement Condition Index (PCI) of 70 or less). The needed repairs cannot all be done in one season or paid for all at once. However, if the work is planned and prioritized, it is possible to sustain a solid roads network.

## **II. RSMS Data Collection and Forecasting Program Overview**

LRPC staff conducted an inventory of road conditions for all paved, town-maintained roads based on a list of roads derived from NHDOT centerline shapefiles. The field assessment considered a variety of physical characteristics including: cracking, rutting, and potholes. The roads were assessed in July 2018. The Road Agent evaluated each road segment for the relative amount of traffic that it bears and the Tuftonboro Selectmen determined relative importance to the town. LRPC entered the data into the RSMS program, which developed a Pavement Condition Index (PCI) and a list of maintenance and repair recommendations. Working from RSMS reports, town officials and the road agent can prepare a detailed comprehensive long-term work and budget plan.

NH DOT divided the road system into ¼-mile sections for assessment and analysis. The following tasks were conducted by LRPC using UNH T2's RSMS data collection protocols and software:

1. Drove all paved Class V roads in town and determined and documented a variety of general characteristics and at least several physical conditions of each section.
2. Worked with the Road Agent and Selectboard to characterize and document the relative priority and amount of traffic for each road segment.
3. Reviewed maintenance or repair methods by category with the Road Agent.

4. Worked with the Road Agent to develop guidelines for selecting repair strategies; and applied this to all road segments.
5. Reviewed the anticipated changes in the conditions and costs.

### III. Road Network Inventory and Collection Survey

#### Local Road Infrastructure

Three numbered state roads cross Tuftonboro in generally a Southeast to Northwest direction. NH Routes 171, 109, and 109A, sometimes referred locally as Upper, Middle, and Lower Roads. The town owns and maintains 28 miles of paved roads and 5.8 miles of unpaved roads. There are 5.5 miles of Class VI roads, owned by the town but are not maintained. There are also numerous miles of private roads in Tuftonboro, neither owned nor maintained by the town. The focus of this project is the Class V paved roads. Using the standard rate of \$19.60 per Square Yards, the value of Tuftonboro's paved road infrastructure is approximately \$6,439,253.

#### Identification and Characterization of Sections

Roads were segmented into roughly quarter-mile sections by NH DOT, based mainly on road geometry. There were 118 sections defined for the 28 miles of roads assessed. Segments ranged in length from 268 to 1,904 feet, about 64% were a quarter of a mile (1,320') or less. The sections are shown in Appendix B. The town's Road Agent and Selectboard reviewed each segment and characterized its local importance and the relative volume of traffic that it handles, each on a five-point scale.

#### Pavement Condition Rating

In many New Hampshire communities rating the condition of paved road sections has been based on a process similar to "common informal practice" in which local highway personnel rely heavily on visual inspections and experience to schedule maintenance activities. One problem with the informal approach is that experience is very difficult to transfer from one person to another. It also can be difficult to objectively explain maintenance decisions to local governing bodies.

RSMS applies a comprehensive condition rating technique based on sound engineering and management practices. These techniques enable the user to draw objective, consistent, and easy-to-explain conclusions.

Researchers and practitioners have developed a set of pavement condition rating scales based on visual inspection. A road section is inspected, and the **severity** and **extent** of surface distresses are recorded. The RSMS distress characteristics for pavement include:

## Road Pavement Distresses

- Longitudinal/transverse cracking
- Alligator cracking
- Edge cracking
- Patching/potholes
- Drainage
- Rutting
- Roughness



An example of Alligator Cracking on North Line Road



An example of Longitudinal Cracking on Dame Road

Personnel trained in RSMS condition assessment determine conditions from a vehicle, driving over each segment at least three times with closer inspection where necessary. LRPC staff used a tablet and RSMS software to enter the road condition information for each section (Appendix C). The condition information was combined with the traffic volume and importance ratings, resulting in a PCI for each segment that could range from 1 to 100 where 100 represents top condition. In Tuftonboro segment Pavement Condition Indexes ranged from 36 to 100. The overall network PCI was 71. Appendix E represents the pavement conditions at the time of the assessment, grouped into four categories.

## **IV. Approaching Road Repair Needs**

### **Pavement Preservation**

With time, all roads deteriorate. The exact rate will vary based on local conditions. **Pavement preservation** is a program employing a network level, long-term strategy that enhances pavement performance by using an integrated, cost-effective set of practices that extend the pavement life, improve safety, and meet motorist expectations. Pavement preservation is a set of non-structural applications to preserve the surface, including minor rehabilitation as well as preventative and routine maintenance ranging from crack sealing to thin overlays.

All too frequently, municipal officials set priorities by the “worst first” approach; they give the most deteriorated roads the highest priorities. Such roads are also the most expensive to repair, which commits a large amount of town funds to only a few roads; communities then find that inadequate funds remain to accomplish the relatively inexpensive preventative and routine maintenance necessary to extend the life of the rest of the road network. These roads have low to moderate deterioration and can have their useful lives extended significantly at a lower cost by utilizing pavement preservation strategies. Further details on pavement preservation are available through UNH T2 and NH DOT (Appendix A).

## V. Selection of Maintenance and Repair Options

### Maintenance and Repair Options

In meeting with the Tuftonboro Road Agent, materials on a wide variety of potential repair strategies (nearly twenty) were provided and discussed (See associated document, *RSMS Repair Strategies*). Some strategies are more applicable than others based on conditions, expense, even the amount of sunshine received on site. Generally, in addition to deferred maintenance, the repairs fall into three broad types: Preservation, Repair & Overlay, and Rehabilitation & Reconstruction.

1. Deferred Maintenance: No action required. The road section is in very good condition. No cost involved.

2. Preservation Maintenance: Sealing cracks and patching potholes for specific small areas; routine maintenance should include cleaning ditches and culverts. Crack sealing, patching, ditch, and culvert cleaning, and mowing of shoulders and adjacent areas are essential to get the intended service life from a section of pavement. Examples include crack, fog, sand, and chips seals as well as isolated patch & shim.

#### Good Preservation Candidate Profile

- Sound structural pavement with good profile
- Minor to moderate surface distress
- PCI >60

Routine maintenance can usually be performed by the town’s road crew, at relatively low cost and should be included in the town’s annual budget. Roads requiring routine maintenance are slowly but surely deteriorating. Adequate funds should be made available consistently across annual budgets to ensure that roads in good condition remain so.

3. Repair and Overlay: Coating of the surface and chip seals of thin (1½ inch) overlays are used to prevent or slow further deterioration. Hot mix asphalt (HMA) overlays and milling are examples of these type of strategies.



Repair and overlay is performed on roads that are in sufficiently good condition and require inexpensive repair to extend road life. Much of the work may be within the public works department's capability.

4. Rehabilitation and Reconstruction: These include major repairs of the road surface such as an asphalt overlay after surface preparation treatments or the excavation of the road base, the replacement and often the addition of aggregate, and new paved surface. The road including its sub-base has deteriorated to such an extent that the base must be replaced or stabilized. Such conditions are usually caused by too long a period of inadequate maintenance, and by poor subsurface drainage. In the latter conditions, appropriate repair and/or new construction of ditches and culverts should be included in the project. Full Depth Reclamation (FDR) projects fall into this repair type. Contractors usually perform rehabilitation repairs.

Before town officials attempt to fund rehabilitation repairs out of annual budgets, they should consider the impact on routine and preventive maintenance. It is much less expensive in the long run to keep good roads in good condition than to let them deteriorate to the point where they need rehabilitation. On the other hand, roads needing rehabilitation are rapidly deteriorating and will become much worse quickly without adequate funding.

Reconstruction is so costly that it can absorb a large portion, if not all, of a municipality's annual budget, and therefore allow too small a budget for routine and preventative maintenance. Municipalities should consider funding this sort of work through long-term planning such as Capital Improvements Program (CIP) and use of Capital Reserve Funds and bonds. Resources for information about and assistance with CIPs are listed in Appendix A.

## **VI. Forecasting**

In addition to generating a Pavement Condition Index for each road segment, the RSMS software forecasts what PCI could be anticipated annually if various repair strategies (or nothing at all) were applied over the next 9-10 years. The software not only projects the PCI of individual segments but also the full road network.

Based on the information entered into the RSMS Forecasting program, the tool can:

- Calculate a Pavement Condition Index (PCI)
- Calculate a road segment Priority
- Suggest maintenance/repairs
- Calculate estimated repair costs
- The amount of extended life span resulting from developed reports



The RSMS Forecasting program is not a project-level tool. Its focus is on the network as a whole. It is up to the town to make decisions regarding repairs. It provides a set of recommended repair alternatives consistent with the repair strategy for each road section's drainage and condition. The program lists twenty different maintenance and repair options. The RSMS Repair Strategies document lists a range of possible treatments with costs ranging from \$0.40/SY to \$18.26/SY. These prices include the typical labor costs.

Five of those options are ones that are typically used in Tuftonboro (Crack Seal, Chip Seal, Overlay (1" and 1.5"), Milling/HMA (1.5"), Full Depth Reclamation (FDR) and HMA (3")) and were utilized in this forecasting process. After LRPC staff reviewed repair strategies and budgets, an RSMS forecast for Tuftonboro was drafted and then refined through correspondence with the Town Road Agent and Selectboard. The steps taken in the forecasting process were:

1. An initial forecasted report was created using a \$10,000/year budget increase (about 5%). Using this scenario insufficient funds were available to maintain the roads in the same condition and would not allow for any improvements.
2. The second forecasted report was created using a 10% per year budget increase (The detailed report for this scenario can be found in the addendum). This allowed for the overall condition of the roads to gradually increase over the 10-year period. There was also a surplus of funds in the outlying years.
3. A list was created of all the roads in town. It was sorted by priority, the first 9 roads (38 roads total) of highest priority were separated as the top 25%. Each year the budget was increased by 10% while raising the overall PCI and eventually maintaining a PCI.
4. Maintenance and repairs were conducted on the top 25% of priority roads within the first six years of the forecasted plan. During these years, roads in the remaining 75% of priority were chosen based on maintenance needs, budgets, and geographic distribution.
5. After the first six years, roads that have not been treated yet were chosen for their initial maintenance and repairs.
6. The remaining years, all the roads received a secondary treatment if needed. By the end of the 10 years, every road was rated with a PCI of 70 or higher.
7. The third forecasted report followed a budget of a 7.5% per year increase. This was chosen as a "Goldilocks strategy" based off the previous two scenarios. (The detailed report for this scenario can be found in the addendum.)
8. This scenario also followed the priority list described in step #3.
9. The top 25% of priority roads were addressed within the first five years, mostly receiving mid-cost preventative maintenance treatments. Also, most were addressed once more before the end of the 10-year period.
10. The remaining 75% of roads were addressed over the span of the 10 years and were assigned at least one pavement treatment.
11. The 7.5% budget increase scenario would allow the PCI to gradually increase over a 10-year time span while using mostly milling and HMA as a treatment to maintain the quality of roads for this time period. However, after this 10-year period, the roads would most likely need higher cost treatments to continue to maintain the average PCI.

## **VII. Guardrail Inventory and Collection Survey**

In addition to RSMS, the Tuftonboro selectmen requested an inventory and assessment of the guardrails on all municipal roads. The guardrail collection survey was made up of nine components. Included was a waypoint number, date, road name, length, height, beam material and condition, post material and condition, and comments (Appendix G). Materials of guardrails can include steel, aluminum, and wood; Tuftonboro guardrails primarily consisted of steel. The condition was based on a scale of good, fair, poor. There were equally as many beams in good condition as fair, and a small percentage rated as poor.

There were 36 guardrails assessed, 28 of which were directly across from each other at the same location (Appendix F). The only two guardrails made of wood are found on County Road, the remaining are composed of steel.

Forecasting is not available for guardrails, but this inventory may be useful for prioritizing and tracking maintenance and repair work.

## **VIII. Conclusion**

The resulting schedule of maintenance and repair strategies (Addendum) addresses the priorities listed above while staying close to the stated 10% increased budget. This is projected to gradually raise the PCI for the town road network from 71 to 83 (Appendix E), while leaving each road segment with a PCI of 70 or higher.

The “reports” list the actions to be taken each year, the associated costs, and the resulting network PCI. Maps in Appendix E show the anticipated PCI for each segment in 2023 and 2028 based on this schedule.

The schedule provides a guide for the town to follow utilizing pavement maintenance and repair strategies that have been employed by the Road Agent in the past. To keep this plan current, it is recommended that all road surface work be tracked annually and that the condition assessment be repeated in five years.

The inventory and assessment of guardrails in the town assists in planning and budgeting of maintenance and repair projects.

# Appendix A

## Useful Resources

### University of New Hampshire Technology Transfer (UNH T<sup>2</sup>)

- SADES (Statewide Asset Data Exchange System)- Establishes a primary transportation inventory of assets including a maintainable condition assessment process for many state and local agencies.
  - <https://t2.unh.edu/sades-0>
- Road Scholar Program- The Road Scholar Program establishes educational and training requirements for municipal level highway practitioners and recognizes those who have successfully completed specified T2 Center workshops.
  - <https://t2.unh.edu/roads-scholar-program>
- T2 Workshops- Provides workshops relative to roadway materials, basics of a good road, maintenance techniques, drainage techniques, and many other technical assistance topics. Many of these sessions are offered for municipal officials.
  - <https://t2.unh.edu/workshop-descriptions>

### New Hampshire Department of Transportation (NH DOT)

- Provides information and support regarding statewide and municipal transportation projects
  - <https://www.nh.gov/dot/projects/index.htm>

### New Hampshire Municipal Association (NHMA)

- Provides information about the benefits of implementing a Capital Improvement Plan
  - <https://www.nhmunicipal.org/TownAndCity/Article/586>

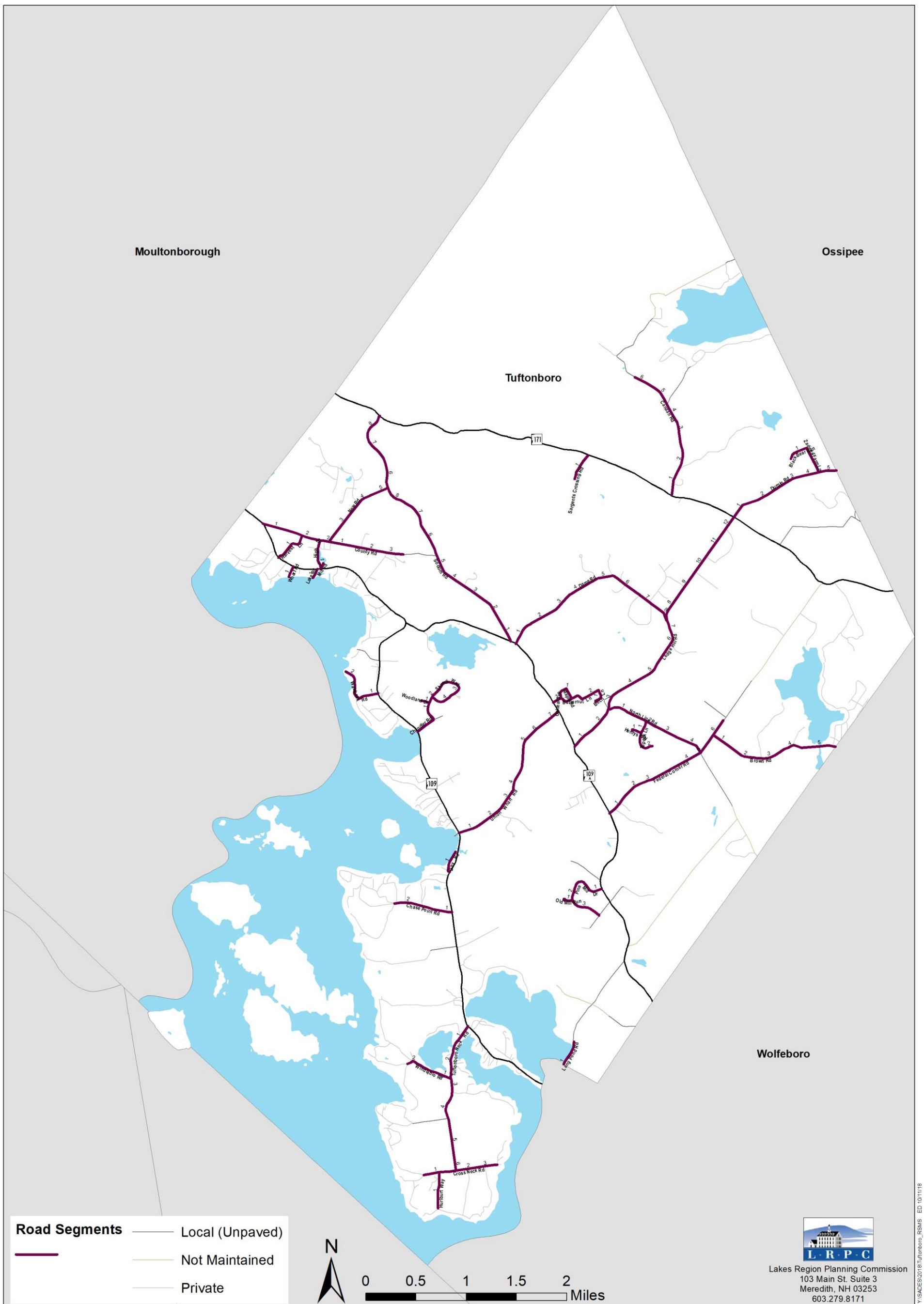
### Lakes Region Planning Commission (LRPC)

- Provides more information about the SADES program that LRPC participates in and other transportation services provided by LRPC
- Can assist municipalities in establishing a Capital Improvement Program
  - <https://www.lakesrpc.org/servicestransportation.asp>

## Appendix B

### Map of Road Segments

# Tuftonboro RSMS Road Segments



# Appendix C

## SADES Road Surface Management System Specification Guide

- 1) General Information
  - a. Assessment Date
  - b. Observer(s)/Organization
  - c. Road Name
  - d. Road Alias
  - e. Town Name
  - f. Surface Type
  - g. Shoulder Type
  - h. Road Surface Width
  - i. Number of Lanes
  - j. Last Year Surveyed
- 2) Longitudinal/Transverse Cracking
  - a. Severity
  - b. Extent
- 3) Alligator Cracking
  - a. Severity
  - b. Extent
- 4) Edge Cracking
  - a. Severity
  - b. Extent
- 5) Patching/Potholes
  - a. Extent
- 6) Drainage
  - a. Condition
- 7) Rutting
  - a. Severity
  - b. Extent
- 8) Roughness
  - a. Condition
- 9) Frost Heave
  - a. Severity
- 10) Factors
  - a. Traffic Volume
  - b. Importance
- 11) Local Knowledge
  - a. Interview with Local Knowledge
  - b. Interview Comments
- 12) General Comments

## Appendix D

### Summary Tables

#### Annual Repair Costs and PCI

<b>7.5% Budget Increase</b>	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Average PCI Without Repairs	67.76	64.71	61.80	59.01	56.36	53.82	51.40	49.09	46.88	44.77
Average PCI After Repairs	71.01	71.39	72.63	72.62	72.97	74.18	73.90	73.71	75.10	78.71
Total Miles Treated	4.47	8.19	4.38	2.18	5.31	3.79	1.95	1.55	2.38	8.88
Total Repair Cost	\$219,132	\$232,658	\$247,371	\$272,516	\$289,922	\$311,503	\$333,219	\$370,056	\$384,239	\$411,269

<b>10% Budget Increase</b>	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Average PCI Without Repairs	67.76	64.71	61.80	59.01	56.36	53.82	51.40	49.09	46.88	44.77
Average PCI After Repairs	71.15	71.66	72.63	73.41	74.62	76.15	76.89	78.06	80.94	83.49
Total Miles Treated	4.65	6.30	4.74	3.16	4.55	5.57	2.42	3.64	7.81	6.94
Total Repair Cost	\$221,342	\$242,335	\$268,769	\$294,945	\$323,195	\$336,412	\$390,286	\$424,999	\$461,088	\$515,483



# Annual Repair Cost by Repair Category

7.5% Budget Increase	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Crack Sealing	\$4,106	\$23,452	\$15,670	\$0	\$24,142	\$0	\$0	\$0	\$0	\$40,744
Overlays	\$25,524	\$40,423	\$231,701	\$216,702	\$210,799	\$185,434	\$134,873	\$0	\$189,243	\$250,706
Patching	\$0	\$2,790	\$0	\$0	\$0	\$25,455	\$0	\$0	\$0	\$8,472
Pavement Preservation/Maintenance	\$91,858	\$165,993	\$0	\$0	\$0	\$0	\$0	\$0	\$15,178	\$0
Rehabilitate and Rebuild	\$97,644	\$0	\$0	\$55,814	\$54,982	\$100,613	\$198,346	\$370,056	\$179,818	\$111,346
Total	\$219,132	\$232,658	\$247,371	\$272,516	\$289,922	\$311,503	\$333,219	\$370,056	\$384,239	\$411,269

10% Budget Increase	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Crack Sealing	\$12,082	\$11,302	\$9,453	\$0	\$12,685	\$14,082	\$0	\$13,178	\$2,145	\$928
Overlays	\$19,314	\$138,691	\$259,316	\$193,417	\$124,067	\$256,107	\$160,345	\$85,502	\$40,934	\$514,554
Patching	\$0	\$0	\$0	\$7,057	\$0	\$11,463	\$0	\$0	\$0	\$0
Pavement Preservation/Maintenance	\$41,521	\$92,342	\$0	\$0	\$21,622	\$0	\$7,202	\$0	\$282,192	\$0
Rehabilitate and Rebuild	\$148,425	\$0	\$0	\$94,470	\$164,820	\$54,760	\$222,738	\$326,320	\$135,816	\$0
Total	\$221,342	\$242,335	\$268,769	\$294,945	\$323,195	\$336,412	\$390,286	\$424,999	\$461,088	\$515,483

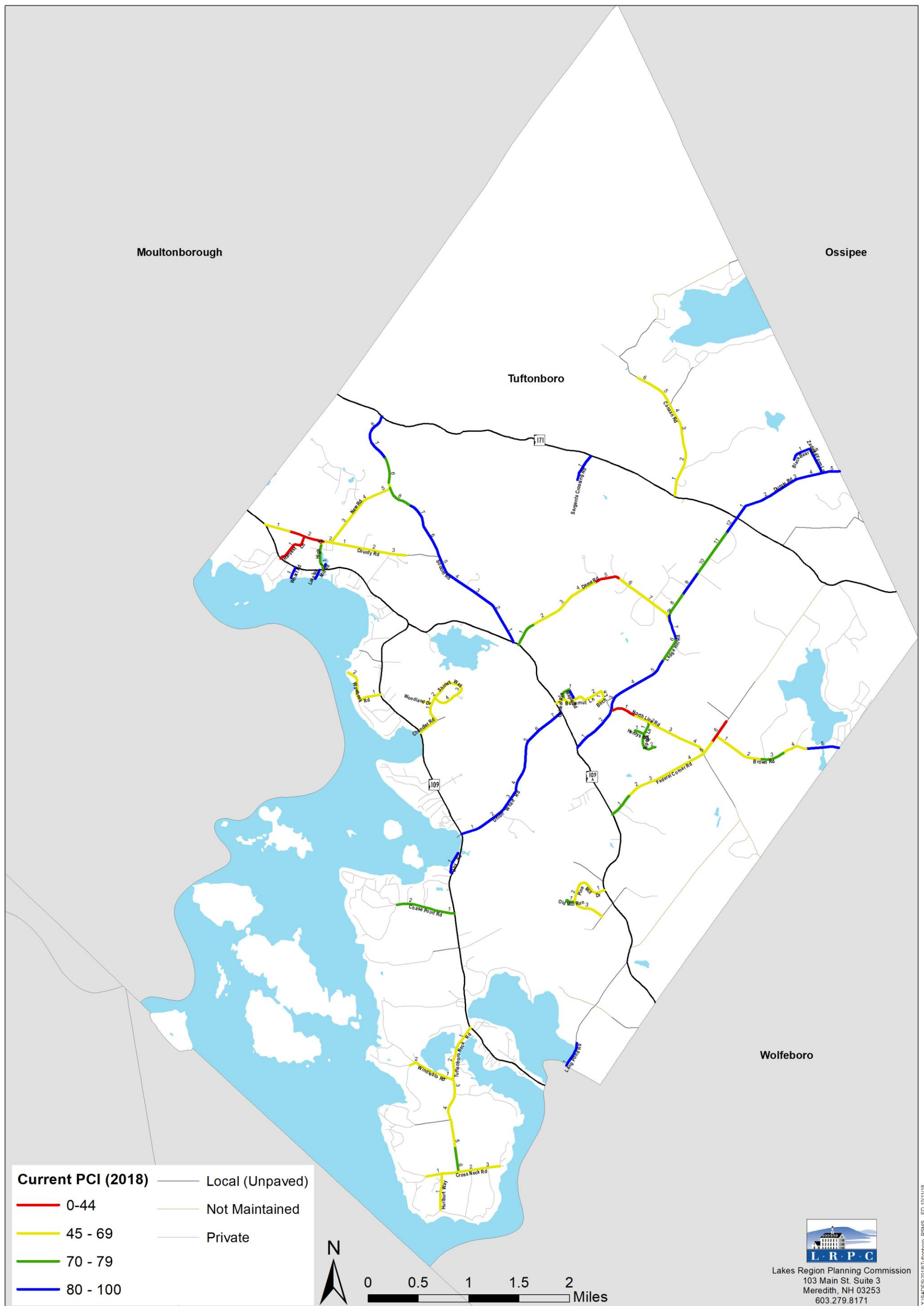
## Annual Cost by Repair

7.5% Budget Increase	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Chip Seal	\$91,858	\$18,898	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Crack Seal (Major)	\$4,106	\$23,452	\$15,670	\$0	\$24,142	\$0	\$0	\$0	\$0	\$40,744
Double Chip Seal	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$15,178	\$0
FDR & HMA (3")	\$97,644	\$0	\$0	\$55,814	\$54,982	\$100,613	\$198,346	\$370,056	\$179,818	\$111,346
HMA Overlay (1")	\$25,524	\$40,423	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$221,582
HMA Overlay (1.5")	\$0	\$0	\$37,116	\$0	\$126,433	\$0	\$0	\$0	\$37,346	\$29,125
HMA Shim (3/4" avg)	\$0	\$147,095	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Isolated Patch and HMA Shim	\$0	\$2,790	\$0	\$0	\$0	\$25,455	\$0	\$0	\$0	\$8,472
Milling / HMA (1.5")	\$0	\$0	\$194,586	\$216,702	\$84,366	\$185,434	\$134,873	\$0	\$151,897	\$0
Total	\$219,132	\$232,658	\$247,371	\$272,516	\$289,922	\$311,503	\$333,219	\$370,056	\$384,239	\$411,269

10% Budget Increase	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Chip Seal	\$41,521	\$78,320	\$0	\$0	\$0	\$0	\$0	\$0	\$243,092	\$0
Crack Seal (Major)	\$0	\$0	\$0	\$0	\$4,685	\$0	\$0	\$13,178	\$2,145	\$0
Crack Seal (Minor)	\$12,082	\$11,302	\$9,453	\$0	\$8,000	\$14,082	\$0	\$0	\$0	\$928
Double Chip Seal	\$0	\$14,022	\$0	\$0	\$11,014	\$0	\$7,202	\$0	\$39,100	\$0
FDR & HMA (3")	\$148,425	\$0	\$0	\$94,470	\$164,820	\$54,760	\$222,738	\$326,320	\$135,816	\$0
HMA Overlay (1")	\$0	\$0	\$32,533	\$21,791	\$26,716	\$0	\$17,722	\$0	\$0	\$436,543
HMA Overlay (1.5")	\$19,314	\$138,691	\$107,085	\$84,327	\$20,911	\$0	\$0	\$23,731	\$2,981	\$0
HMA Shim (3/4" avg)	\$0	\$0	\$0	\$0	\$10,608	\$0	\$0	\$0	\$0	\$0
Isolated Patch and HMA Shim	\$0	\$0	\$0	\$7,057	\$0	\$11,463	\$0	\$0	\$0	\$0
Milling / HMA (1.5")	\$0	\$0	\$119,698	\$87,299	\$76,440	\$256,107	\$142,623	\$61,771	\$37,953	\$78,011
Total	\$221,342	\$242,335	\$268,769	\$294,945	\$323,195	\$336,412	\$390,286	\$424,999	\$461,088	\$515,483

Appendix E  
Pavement Condition Index (PCI) Maps

### Current Pavement Condition Index (PCI)



5-Year Forecasted Pavement Condition Index (PCI)

Maps

7.5% and 10% Increased Budget Scenarios

# Tuftonboro RSMS

## 5-Year Pavement Condition Index (PCI)

7.5% Budget Increase

Moultonborough

Ossipee

Tuftonboro

Wolfeboro

5-Year PCI (2023)

0-44

45-69

70-79

80-100

Local (Unpaved)

Not Maintained

Private

N

0


0.5

1

1.5

2

Miles



Lakes Region Planning Commission

103 Main St. Suite 3

Meredith, NH 03253

603.279.8171

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# Tuftonboro RSMS

## 5-Year Pavement Condition Index (PCI)

10% Budget Increase

Moultonborough

Ossipee

Tuftonboro

Wolfeboro

5-Year PCI (2023)

0-44

45-69

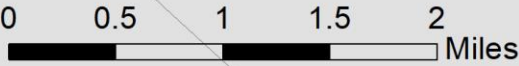
70-79

80-100

Local (Unpaved)

Not Maintained

Private



Lakes Region Planning Commission  
103 Main St. Suite 3  
Meredith, NH 03253  
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10-Year Forecasted Pavement Condition Index (PCI)

Maps

7.5% and 10% Increased Budget Scenarios

# Tuftonboro RSMS

## 10-Year Pavement Condition Index (PCI)

7.5% Budget Increase

Moultonborough

Ossipee

Tuftonboro

Wolfeboro

10-year PCI (2028)

0-44

45-69

70-79

80-100

Local (Unpaved)

Not Maintained

Private





Lakes Region Planning Commission

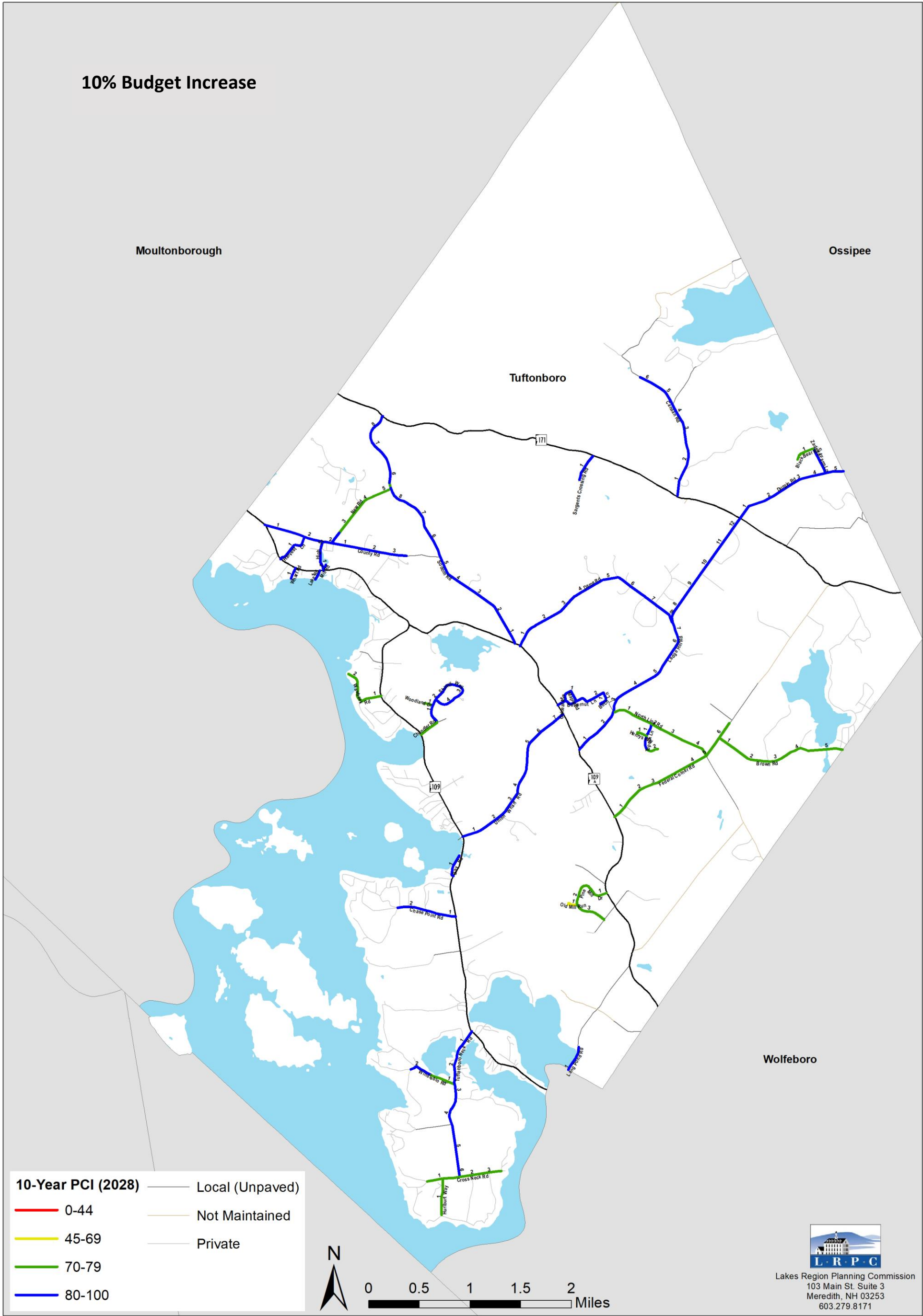
103 Main St. Suite 3

Meredith, NH 03253

603.279.8171

# Tuftonboro RSMS

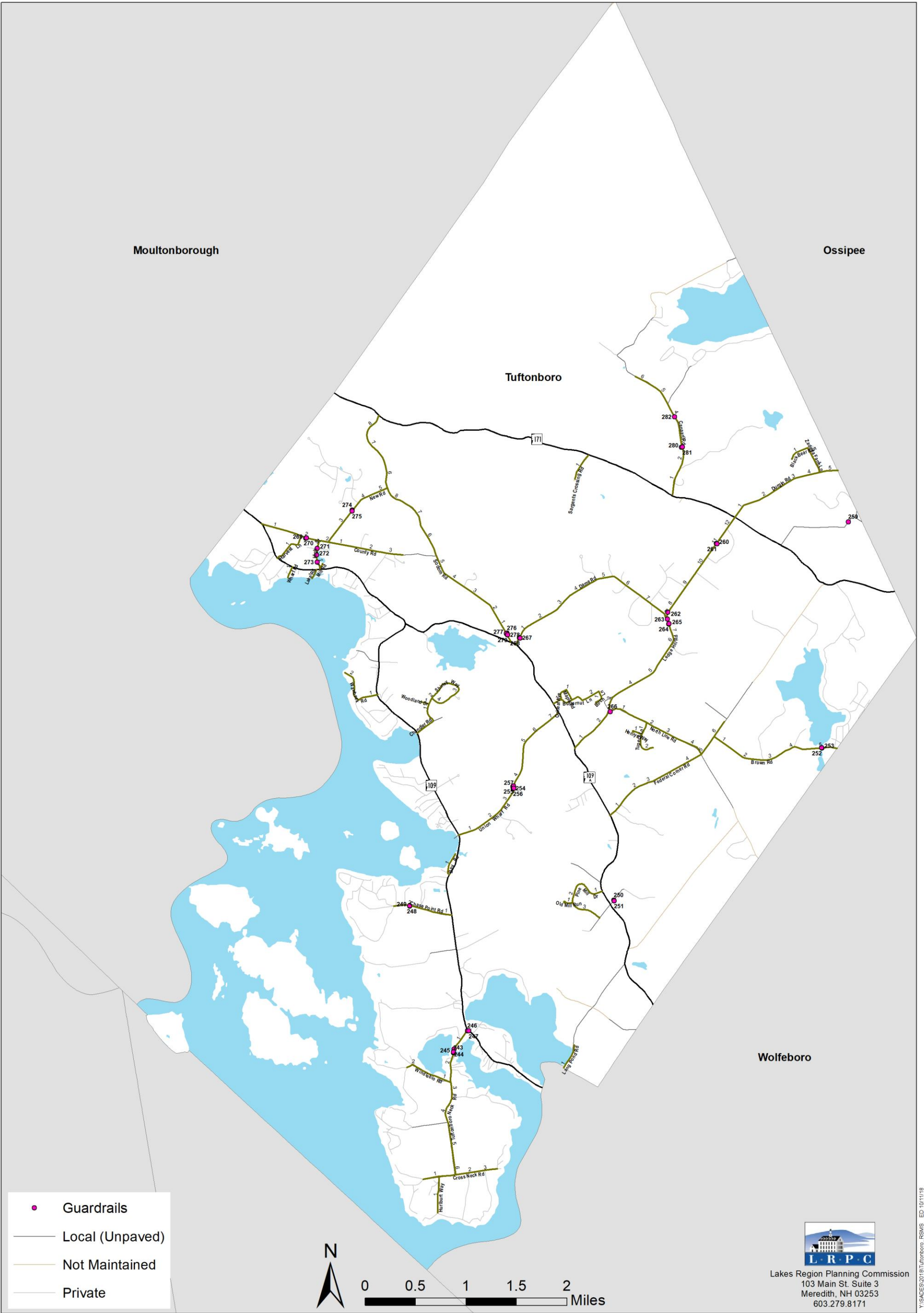
## 10-Year Pavement Condition Index (PCI)



Appendix G  
Map of Guardrail Locations



# Tuftonboro Guardrail Locations



Appendix H  
Summary of Guardrail Inventory and Collection Survey

Waypoint	Road Name	Length	Height	Beam Mat	Beam Cond	Post Mat	Post Cond
<b>242+243</b>	Tuftonboro Neck Road	163	2.85	Steel	Good	Steel	Good
<b>244+245</b>	Tuftonboro Neck Road	164.5	2.8	Steel	Good	Steel	Good
<b>248</b>	Chase Point Road	41.5	3	Steel	Poor	Steel	Good
<b>249</b>	Chase Point Road	41.5	3	Steel	Poor	Steel	Good
<b>250</b>	Curtis Road	29	3	Steel	Good	Steel	Fair
<b>251</b>	Curtis Road	29	3	Steel	Good	Steel	Fair
<b>252</b>	Brown Road	54	3	Steel	Poor	Steel	Poor
<b>253</b>	Brown Road	54	3	Steel	Fair	Steel	Poor
<b>254</b>	Union Wharf Road	42	2	Steel	Fair	Steel	Fair
<b>255</b>	Union Wharf Road	40	2	Steel	Fair	Steel	Fair
<b>256</b>	Union Wharf Road	42	2	Steel	Poor	Steel	Fair
<b>257</b>	Union Wharf Road	40	2	Steel	Poor	Steel	Fair
<b>259</b>	Phineous Graves Road	143	3	Steel	Fair	Steel	Fair
<b>260</b>	Ledge Hill Road	53	2.5	Steel	Fair	Steel	Fair
<b>261</b>	Ledge Hill Road	79	2.5	Steel	Fair	Steel	Fair
<b>262</b>	Ledge Hill Road	195	3	Steel	Good	Steel	Good
<b>263</b>	Ledge Hill Road	195	2	Steel	Poor	Steel	Poor
<b>264</b>	Ledge Hill Road	43	3	Steel	Fair	Steel	Fair
<b>265</b>	Ledge Hill Road	45	3	Steel	Fair	Steel	Fair
<b>266</b>	North Line Road	14	3	Steel	Good	Steel	Good
<b>267</b>	Dame Road	15	3	Steel	Good	Steel	Good
<b>268</b>	Dame Road	16	3	Steel	Good	Steel	Good
<b>269</b>	County Road	98	3.5	Wood	Good	Wood	Good
<b>270</b>	County Road	116	3.5	Wood	Good	Wood	Good
<b>271</b>	High Street	150	3	Steel	Fair	Steel/Wood	Fair
<b>272</b>	High Street	288	2	Steel	Fair	Steel/Wood	Fair
<b>273</b>	High Street	312	2	Steel	Good	Steel	Good
<b>274</b>	New Road	143	3	Steel	Good	Steel	Good
<b>275</b>	New Road	85	3	Steel	Good	Steel	Good
<b>276</b>	Sodom Road	40	3	Steel	Fair	Steel	Fair
<b>277</b>	Sodom Road	30	3	Steel	Fair	Steel	Fair
<b>278</b>	Sodom Road	39	3	Steel	Fair	Steel	Fair
<b>279</b>	Sodom Road	39	3	Steel	Fair	Steel	Fair
<b>280</b>	Canaan Road	16	2.5	Steel	Good	Steel	Good
<b>281</b>	Canaan Road	16	2.5	Steel	Good	Steel	Good
<b>282</b>	Canaan Road	360	3	Steel	Fair	Steel	Fair



# Appendix I

## SADES Data Collection Program

### SADES Data Collection Program and Lakes Region Planning Commission (LRPC)

The SADES (Statewide Asset Data Exchange System) is a joint program among regional planning commissions, NHDOT, NHDES and UNH T<sup>2</sup> that establishes a primary transportation asset inventory system and maintainable condition assessment process for many state and local agencies. This unique approach to statewide asset management utilizes modern technology for accurate, sustainable, efficient, and cost effective data collection and analysis. Even though the UNH Technology Transfer Center (UNH T<sup>2</sup>) has made asset management software packages available for over 25 years, alignment of recent technological changes with new electronic devices and software advances has made dynamic data management much more manageable.

The SADES training program brings LRPC technicians and planners together with experts from NHDOT, NHDES, UNH T<sup>2</sup>, and the private sector to learn about structural and environmental factors, how to inventory and assess the condition of these factors, and how to efficiently use the state-wide data collection system. By requiring this training of all technicians along with rigorous quality assurance and quality control (QA/QC) and ongoing technical support, a high standard and level of consistency is assured.

SADES Training is required and on-going support provided to LRPC planners and technicians in the use of the SADES inventory and analysis and forecasting software. The development, piloting, and implementation of these transportation management modules was completed in large and small communities across the state to ensure that the software formulas could accommodate and properly reflect the conditions encountered in most New Hampshire communities.

Trained and certified LRPC planners and technicians can utilize the SADES protocol to inventory and assess the following transportation assets:

Stream Crossings and Culverts;  
Pedestrian Infrastructure;  
Pavement Conditions (RSMS);  
Guardrails



# Road Surface Management System Tuftonboro, NH

## Addendum

## Repair Detail By Year

### 7.5% Budget Increase

Year	Street	Order ID	Repair Category	Repair	Miles Treated	Cost
2019	Dame Rd	5	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$48,510
	High St	1	Overlays	HMA Overlay (1")	0.25	\$13,073
	High St	2	Overlays	HMA Overlay (1")	0.25	\$12,451
	Ledge Hill Rd	1	Pavement Preservation/Maintenance	Chip Seal	0.25	\$7,831
	Ledge Hill Rd	2	Pavement Preservation/Maintenance	Chip Seal	0.25	\$7,825
	Ledge Hill Rd	3	Pavement Preservation/Maintenance	Chip Seal	0.25	\$7,819
	Ledge Hill Rd	4	Pavement Preservation/Maintenance	Chip Seal	0.25	\$7,819
	Ledge Hill Rd	5	Pavement Preservation/Maintenance	Chip Seal	0.25	\$7,825
	Ledge Hill Rd	6	Pavement Preservation/Maintenance	Chip Seal	0.25	\$7,819
	Ledge Hill Rd	7	Pavement Preservation/Maintenance	Chip Seal	0.25	\$7,819
	Ledge Hill Rd	8	Pavement Preservation/Maintenance	Chip Seal	0.25	\$7,825
	Ledge Hill Rd	9	Pavement Preservation/Maintenance	Chip Seal	0.25	\$7,831
	Ledge Hill Rd	10	Pavement Preservation/Maintenance	Chip Seal	0.25	\$7,825
	Ledge Hill Rd	11	Pavement Preservation/Maintenance	Chip Seal	0.25	\$7,825
	Ledge Hill Rd	12	Pavement Preservation/Maintenance	Chip Seal	0.19	\$5,792
	North Line Rd	1	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$49,134
	Sodom Rd	6	Crack Sealing	Crack Seal (Major)	0.25	\$1,916

	Sodom Rd	8	Crack Sealing	Crack Seal (Major)	0.29	\$2,190
	Total for Year 2019				4.47	\$219,132
2020	Bay Rd	1	Patching	Isolated Patch and HMA Shim	0.23	\$2,790
	Black Bear Run	1	Pavement Preservation/Maintenance	HMA Shim (3/4" avg)	0.20	\$7,554
	Chase Point Rd	1	Pavement Preservation/Maintenance	Chip Seal	0.25	\$8,076
	Chase Point Rd	2	Pavement Preservation/Maintenance	Chip Seal	0.34	\$10,823
	Durgin Rd	1	Crack Sealing	Crack Seal (Major)	0.25	\$1,976
	Durgin Rd	2	Crack Sealing	Crack Seal (Major)	0.25	\$1,976
	Durgin Rd	3	Crack Sealing	Crack Seal (Major)	0.25	\$1,976
	Durgin Rd	4	Crack Sealing	Crack Seal (Major)	0.25	\$1,976
	Durgin Rd	5	Crack Sealing	Crack Seal (Major)	0.16	\$1,236
	Lake Rd	1	Pavement Preservation/Maintenance	HMA Shim (3/4" avg)	0.10	\$3,099
	Lang Pond Rd	1	Crack Sealing	Crack Seal (Major)	0.25	\$1,717
	Mill Rd	1	Pavement Preservation/Maintenance	HMA Shim (3/4" avg)	0.05	\$1,212
	New Rd	3	Overlays	HMA Overlay (1")	0.25	\$13,461
	New Rd	4	Overlays	HMA Overlay (1")	0.25	\$13,471
	New Rd	5	Overlays	HMA Overlay (1")	0.25	\$13,491
	Sargents Crossing Rd	1	Pavement Preservation/Maintenance	HMA Shim (3/4" avg)	0.27	\$11,475
	Sodom Rd	1	Pavement Preservation/Maintenance	HMA Shim (3/4" avg)	0.25	\$10,562
	Sodom Rd	2	Pavement Preservation/Maintenance	HMA Shim (3/4" avg)	0.25	\$10,562
	Sodom Rd	3	Pavement Preservation/Maintenance	HMA Shim (3/4" avg)	0.25	\$10,562
	Sodom Rd	4	Pavement Preservation/Maintenance	HMA Shim (3/4" avg)	0.25	\$10,570

	Sodom Rd	5	Pavement Preservation/Maintenance	HMA Shim (3/4" avg)	0.25	\$10,562
	Sodom Rd	6	Pavement Preservation/Maintenance	HMA Shim (3/4" avg)	0.25	\$10,562
	Sodom Rd	7	Pavement Preservation/Maintenance	HMA Shim (3/4" avg)	0.25	\$10,570
	Sodom Rd	7	Pavement Preservation/Maintenance	HMA Shim (3/4" avg)	0.25	\$10,562
	Sodom Rd	8	Pavement Preservation/Maintenance	HMA Shim (3/4" avg)	0.26	\$11,163
	Sodom Rd	8	Pavement Preservation/Maintenance	HMA Shim (3/4" avg)	0.29	\$12,083
	Union Wharf Rd	1	Crack Sealing	Crack Seal (Major)	0.25	\$1,890
	Union Wharf Rd	2	Crack Sealing	Crack Seal (Major)	0.25	\$1,890
	Union Wharf Rd	3	Crack Sealing	Crack Seal (Major)	0.25	\$1,890
	Union Wharf Rd	4	Crack Sealing	Crack Seal (Major)	0.25	\$1,890
	Union Wharf Rd	5	Crack Sealing	Crack Seal (Major)	0.25	\$1,890
	Union Wharf Rd	6	Crack Sealing	Crack Seal (Major)	0.25	\$1,890
	Union Wharf Rd	7	Crack Sealing	Crack Seal (Major)	0.17	\$1,254
	Wharf Rd	1	Pavement Preservation/Maintenance	HMA Shim (3/4" avg)	0.11	\$4,638
	Zadeda Farm Ln	1	Pavement Preservation/Maintenance	HMA Shim (3/4" avg)	0.27	\$11,355
	Total for Year 2020				8.19	\$232,658
2021	Brown Rd	1	Overlays	Milling / HMA (1.5")	0.25	\$27,641
	Brown Rd	2	Overlays	Milling / HMA (1.5")	0.25	\$27,641
	Brown Rd	3	Overlays	Milling / HMA (1.5")	0.25	\$27,683
	Brown Rd	4	Overlays	Milling / HMA (1.5")	0.25	\$27,704
	Brown Rd	5	Crack Sealing	Crack Seal (Major)	0.32	\$2,525
	Henrys Way	1	Overlays	HMA Overlay (1.5")	0.12	\$9,038
	North Line Rd	1	Crack Sealing	Crack Seal (Major)	0.25	\$1,887
	North Line Rd	2	Overlays	Milling / HMA (1.5")	0.26	\$26,965

	North Line Rd	3	Overlays	Milling / HMA (1.5")	0.26	\$26,985
	North Line Rd	4	Overlays	Milling / HMA (1.5")	0.28	\$29,966
	Tuftonboro Neck Rd	1	Crack Sealing	Crack Seal (Major)	0.25	\$1,860
	Tuftonboro Neck Rd	2	Crack Sealing	Crack Seal (Major)	0.25	\$1,860
	Tuftonboro Neck Rd	3	Crack Sealing	Crack Seal (Major)	0.25	\$1,865
	Tuftonboro Neck Rd	4	Crack Sealing	Crack Seal (Major)	0.25	\$1,860
	Tuftonboro Neck Rd	5	Crack Sealing	Crack Seal (Major)	0.25	\$1,860
	Tuftonboro Neck Rd	6	Crack Sealing	Crack Seal (Major)	0.26	\$1,951
	Tupeak Ln	1	Overlays	HMA Overlay (1.5")	0.25	\$18,728
	Tupeak Ln	2	Overlays	HMA Overlay (1.5")	0.13	\$9,350
	Total for Year 2021				4.38	\$247,371
2022	Dame Rd	6	Overlays	Milling / HMA (1.5")	0.25	\$27,270
	Dame Rd	7	Overlays	Milling / HMA (1.5")	0.25	\$27,188
	Dame Rd	8	Overlays	Milling / HMA (1.5")	0.18	\$19,550
	Federal Corner Rd	1	Overlays	Milling / HMA (1.5")	0.25	\$28,591
	Federal Corner Rd	2	Overlays	Milling / HMA (1.5")	0.25	\$28,526
	Federal Corner Rd	3	Overlays	Milling / HMA (1.5")	0.25	\$28,526
	Federal Corner Rd	4	Overlays	Milling / HMA (1.5")	0.25	\$28,526
	Federal Corner Rd	5	Overlays	Milling / HMA (1.5")	0.25	\$28,526
	Federal Corner Rd	6	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$55,814
	Total for Year 2022				2.18	\$272,516
2023	Dame Rd	1	Overlays	Milling / HMA (1.5")	0.25	\$28,122
	Dame Rd	2	Overlays	Milling / HMA (1.5")	0.25	\$28,122
	Dame Rd	3	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$54,982
	Dame Rd	4	Overlays	Milling / HMA (1.5")	0.25	\$28,122
	Dame Rd	5	Crack Sealing	Crack Seal (Major)	0.25	\$1,984
	Sodom Rd	1	Crack Sealing	Crack Seal (Major)	0.25	\$2,172
	Sodom Rd	2	Crack Sealing	Crack Seal (Major)	0.25	\$2,172
	Sodom Rd	3	Crack Sealing	Crack Seal (Major)	0.25	\$2,172
	Sodom Rd	4	Crack Sealing	Crack Seal (Major)	0.25	\$2,173

	Sodom Rd	5	Crack Sealing	Crack Seal (Major)	0.25	\$2,172
	Sodom Rd	6	Crack Sealing	Crack Seal (Major)	0.25	\$2,172
	Sodom Rd	7	Crack Sealing	Crack Seal (Major)	0.25	\$2,173
	Sodom Rd	7	Crack Sealing	Crack Seal (Major)	0.25	\$2,172
	Sodom Rd	8	Crack Sealing	Crack Seal (Major)	0.26	\$2,295
	Sodom Rd	8	Crack Sealing	Crack Seal (Major)	0.29	\$2,484
	Tuftonboro Neck Rd	1	Overlays	HMA Overlay (1.5")	0.25	\$20,895
	Tuftonboro Neck Rd	2	Overlays	HMA Overlay (1.5")	0.25	\$20,895
	Tuftonboro Neck Rd	3	Overlays	HMA Overlay (1.5")	0.25	\$20,943
	Tuftonboro Neck Rd	4	Overlays	HMA Overlay (1.5")	0.25	\$20,895
	Tuftonboro Neck Rd	5	Overlays	HMA Overlay (1.5")	0.25	\$20,895
	Tuftonboro Neck Rd	6	Overlays	HMA Overlay (1.5")	0.26	\$21,909
	Total for Year 2023				5.31	\$289,922
2024	Canaan Rd	1	Overlays	Milling / HMA (1.5")	0.25	\$28,670
	Canaan Rd	2	Overlays	Milling / HMA (1.5")	0.25	\$29,461
	Canaan Rd	3	Overlays	Milling / HMA (1.5")	0.26	\$29,879
	Canaan Rd	4	Overlays	Milling / HMA (1.5")	0.25	\$29,571
	Canaan Rd	5	Overlays	Milling / HMA (1.5")	0.25	\$28,780
	Canaan Rd	6	Overlays	Milling / HMA (1.5")	0.12	\$14,159
	Cross Neck Rd	1	Overlays	Milling / HMA (1.5")	0.25	\$24,913
	Cross Neck Rd	2	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$51,454
	Cross Neck Rd	3	Rehabilitate and Rebuild	FDR & HMA (3")	0.24	\$49,159
	Union Wharf Rd	1	Patching	Isolated Patch and HMA Shim	0.25	\$3,820
	Union Wharf Rd	2	Patching	Isolated Patch and HMA Shim	0.25	\$3,820
	Union Wharf Rd	3	Patching	Isolated Patch and HMA Shim	0.25	\$3,820
	Union Wharf Rd	4	Patching	Isolated Patch and HMA Shim	0.25	\$3,820



	Union Wharf Rd	5	Patching	Isolated Patch and HMA Shim	0.25	\$3,820
	Union Wharf Rd	6	Patching	Isolated Patch and HMA Shim	0.25	\$3,820
	Union Wharf Rd	7	Patching	Isolated Patch and HMA Shim	0.17	\$2,535
	Total for Year 2024				3.79	\$311,503
2025	County Rd	1	Overlays	Milling / HMA (1.5")	0.25	\$29,973
	County Rd	2	Overlays	Milling / HMA (1.5")	0.25	\$29,973
	County Rd	3	Overlays	Milling / HMA (1.5")	0.25	\$29,882
	Harvest Ln	1	Rehabilitate and Rebuild	FDR & HMA (3")	0.36	\$80,442
	Hurlburt Way	1	Overlays	Milling / HMA (1.5")	0.36	\$45,045
	Windleblo Rd	1	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$61,392
	Windleblo Rd	2	Rehabilitate and Rebuild	FDR & HMA (3")	0.23	\$56,512
	Total for Year 2025				1.95	\$333,219
2026	County Rd	1	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$54,717
	County Rd	2	Rehabilitate and Rebuild	FDR & HMA (3")	0.35	\$85,473
	Shirley Way	1	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$60,339
	Shirley Way	2	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$60,522
	Shirley Way	3	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$60,477
	Shirley Way	4	Rehabilitate and Rebuild	FDR & HMA (3")	0.20	\$48,528
	Total for Year 2026				1.55	\$370,056
2027	Birch Ln	1	Rehabilitate and Rebuild	FDR & HMA (3")	0.17	\$44,002
	Butternut Ln	1	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$65,334
	Butternut Ln	2	Rehabilitate and Rebuild	FDR & HMA (3")	0.27	\$70,482
	Chandler Rd	1	Overlays	Milling / HMA (1.5")	0.20	\$25,760
	Lang Pond Rd	1	Pavement Preservation/Maintenance	Double Chip Seal	0.25	\$15,178
	Maple Rd	1	Overlays	HMA Overlay (1.5")	0.12	\$11,445
	Oakleaf Ave	1	Overlays	HMA Overlay (1.5")	0.13	\$13,045
	Old Mill Run	1	Overlays	HMA Overlay (1.5")	0.12	\$12,855

	Pine Mill Dr	1	Overlays	Milling / HMA (1.5")	0.25	\$36,455
	Pine Mill Dr	2	Overlays	Milling / HMA (1.5")	0.25	\$36,455
	Pine Mill Dr	3	Overlays	Milling / HMA (1.5")	0.30	\$43,193
	Woodland Dr	1	Overlays	Milling / HMA (1.5")	0.08	\$10,034
	Total for Year 2027				2.38	\$384,239
2028	County Rd	1	Crack Sealing	Crack Seal (Major)	0.25	\$2,323
	County Rd	1	Crack Sealing	Crack Seal (Major)	0.25	\$2,102
	County Rd	2	Crack Sealing	Crack Seal (Major)	0.35	\$3,283
	County Rd	2	Crack Sealing	Crack Seal (Major)	0.25	\$2,323
	County Rd	3	Crack Sealing	Crack Seal (Major)	0.25	\$2,316
	Dame Rd	1	Crack Sealing	Crack Seal (Major)	0.25	\$2,321
	Dame Rd	2	Crack Sealing	Crack Seal (Major)	0.25	\$2,321
	Dame Rd	3	Crack Sealing	Crack Seal (Major)	0.25	\$2,321
	Dame Rd	4	Crack Sealing	Crack Seal (Major)	0.25	\$2,321
	Dame Rd	5	Crack Sealing	Crack Seal (Major)	0.25	\$2,323
	Dame Rd	6	Crack Sealing	Crack Seal (Major)	0.25	\$2,323
	Dame Rd	7	Crack Sealing	Crack Seal (Major)	0.25	\$2,316
	Dame Rd	8	Crack Sealing	Crack Seal (Major)	0.18	\$1,665
	Harvest Ln	1	Crack Sealing	Crack Seal (Major)	0.36	\$3,189
	High St	1	Patching	Isolated Patch and HMA Shim	0.25	\$4,339
	High St	2	Patching	Isolated Patch and HMA Shim	0.25	\$4,133
	Ledge Hill Rd	1	Overlays	HMA Overlay (1")	0.25	\$17,345
	Ledge Hill Rd	2	Overlays	HMA Overlay (1")	0.25	\$17,332
	Ledge Hill Rd	3	Overlays	HMA Overlay (1")	0.25	\$17,318
	Ledge Hill Rd	4	Overlays	HMA Overlay (1")	0.25	\$17,318
	Ledge Hill Rd	5	Overlays	HMA Overlay (1")	0.25	\$17,332
	Ledge Hill Rd	6	Overlays	HMA Overlay (1")	0.25	\$17,318
	Ledge Hill Rd	7	Overlays	HMA Overlay (1")	0.25	\$17,318

Ledge Hill Rd	8	Overlays	HMA Overlay (1")	0.25	\$17,332
Ledge Hill Rd	9	Overlays	HMA Overlay (1")	0.25	\$17,345
Ledge Hill Rd	10	Overlays	HMA Overlay (1")	0.25	\$17,332
Ledge Hill Rd	11	Overlays	HMA Overlay (1")	0.25	\$17,332
Ledge Hill Rd	12	Overlays	HMA Overlay (1")	0.19	\$12,828
New Rd	3	Crack Sealing	Crack Seal (Major)	0.25	\$2,430
New Rd	4	Crack Sealing	Crack Seal (Major)	0.25	\$2,432
New Rd	5	Crack Sealing	Crack Seal (Major)	0.25	\$2,435
Sargents Crossing Rd	1	Overlays	HMA Overlay (1.5")	0.27	\$29,125
Sodom Rd	6	Overlays	HMA Overlay (1")	0.25	\$18,133
Wawbeek Rd	1	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$52,141
Wawbeek Rd	2	Rehabilitate and Rebuild	FDR & HMA (3")	0.28	\$59,206
Total for Year 2028				8.88	\$411,269
Total				43.09	\$3,071,885

## Repair Detail by Year

### 10% Budget Increase

Year	Street	Order ID	Repair Category	Repair	Miles Treated	Cost
2019	Bay Rd	1	Crack Sealing	Crack Seal (Minor)	0.23	\$1,104
	Dame Rd	5	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$48,510
	Federal Corner Rd	6	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$50,781
	Lake Rd	1	Pavement Preservation/Maintenance	Chip Seal	0.10	\$2,400
	Lang Pond Rd	1	Crack Sealing	Crack Seal (Minor)	0.25	\$1,210
	Ledge Hill Rd	1	Crack Sealing	Crack Seal (Minor)	0.25	\$1,333
	Ledge Hill Rd	2	Crack Sealing	Crack Seal (Minor)	0.25	\$1,332
	Ledge Hill Rd	3	Crack Sealing	Crack Seal (Minor)	0.25	\$1,331
	Ledge Hill Rd	4	Crack Sealing	Crack Seal (Minor)	0.25	\$1,331
	Ledge Hill Rd	5	Crack Sealing	Crack Seal (Minor)	0.25	\$1,332
	Ledge Hill Rd	6	Pavement Preservation/Maintenance	Chip Seal	0.25	\$7,819
	Ledge Hill Rd	7	Pavement Preservation/Maintenance	Chip Seal	0.25	\$7,819
	Ledge Hill Rd	8	Overlays	HMA Overlay (1.5")	0.25	\$19,314
	Ledge Hill Rd	9	Pavement Preservation/Maintenance	Chip Seal	0.25	\$7,831
	Ledge Hill Rd	10	Pavement Preservation/Maintenance	Chip Seal	0.25	\$7,825
	Ledge Hill Rd	11	Pavement Preservation/Maintenance	Chip Seal	0.25	\$7,825
	Ledge Hill Rd	12	Crack Sealing	Crack Seal (Minor)	0.19	\$986
	North Line Rd	1	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$49,134
	Sargents Crossing Rd	1	Crack Sealing	Crack Seal (Minor)	0.27	\$1,513
	Wharf Rd	1	Crack Sealing	Crack Seal (Minor)	0.11	\$611
	Total for Year 2019				4.65	\$221,342

2020	Brown Rd	3	Overlays	HMA Overlay (1.5")	0.25	\$19,947
	Brown Rd	4	Overlays	HMA Overlay (1.5")	0.25	\$19,962
	Brown Rd	5	Crack Sealing	Crack Seal (Minor)	0.32	\$1,780
	Durgin Rd	1	Crack Sealing	Crack Seal (Minor)	0.25	\$1,437
	Durgin Rd	2	Crack Sealing	Crack Seal (Minor)	0.25	\$1,437
	Durgin Rd	3	Crack Sealing	Crack Seal (Minor)	0.25	\$1,437
	Durgin Rd	4	Crack Sealing	Crack Seal (Minor)	0.25	\$1,437
	Durgin Rd	5	Crack Sealing	Crack Seal (Minor)	0.16	\$899
	High St	1	Overlays	HMA Overlay (1.5")	0.25	\$19,962
	High St	2	Overlays	HMA Overlay (1.5")	0.25	\$19,011
	New Rd	3	Overlays	HMA Overlay (1.5")	0.25	\$19,916
	New Rd	4	Overlays	HMA Overlay (1.5")	0.25	\$19,932
	New Rd	5	Overlays	HMA Overlay (1.5")	0.25	\$19,962
	Sodom Rd	1	Pavement Preservation/Maintenance	Chip Seal	0.25	\$8,443
	Sodom Rd	2	Pavement Preservation/Maintenance	Chip Seal	0.25	\$8,443
	Sodom Rd	3	Pavement Preservation/Maintenance	Chip Seal	0.25	\$8,443
	Sodom Rd	4	Crack Sealing	Crack Seal (Minor)	0.25	\$1,438
	Sodom Rd	5	Pavement Preservation/Maintenance	Chip Seal	0.25	\$8,443
	Sodom Rd	6	Pavement Preservation/Maintenance	Chip Seal	0.25	\$8,443
	Sodom Rd	6	Pavement Preservation/Maintenance	Double Chip Seal	0.25	\$14,022
	Sodom Rd	7	Pavement Preservation/Maintenance	Chip Seal	0.25	\$8,449
	Sodom Rd	7	Crack Sealing	Crack Seal (Minor)	0.25	\$1,437
	Sodom Rd	8	Pavement Preservation/Maintenance	Chip Seal	0.26	\$8,923
	Sodom Rd	8	Pavement Preservation/Maintenance	Chip Seal	0.29	\$9,658

	Zadeda Farm Ln	1	Pavement Preservation/Maintenance	Chip Seal	0.27	\$9,076
	Total for Year 2020				6.30	\$242,335
2021	Brown Rd	1	Overlays	Milling / HMA (1.5")	0.25	\$27,641
	Brown Rd	2	Overlays	HMA Overlay (1.5")	0.25	\$20,554
	Canaan Rd	1	Overlays	Milling / HMA (1.5")	0.25	\$26,085
	Canaan Rd	2	Overlays	HMA Overlay (1.5")	0.25	\$19,932
	Canaan Rd	3	Overlays	HMA Overlay (1.5")	0.26	\$20,215
	Canaan Rd	4	Overlays	Milling / HMA (1.5")	0.25	\$26,905
	Canaan Rd	5	Overlays	Milling / HMA (1.5")	0.25	\$26,185
	Canaan Rd	6	Overlays	Milling / HMA (1.5")	0.12	\$12,882
	Chase Point Rd	1	Overlays	HMA Overlay (1")	0.25	\$13,902
	Chase Point Rd	2	Overlays	HMA Overlay (1")	0.34	\$18,631
	Cross Neck Rd	1	Overlays	HMA Overlay (1.5")	0.25	\$16,855
	Hurlburt Way	1	Overlays	HMA Overlay (1.5")	0.36	\$29,530
	Union Wharf Rd	1	Crack Sealing	Crack Seal (Minor)	0.25	\$1,419
	Union Wharf Rd	2	Crack Sealing	Crack Seal (Minor)	0.25	\$1,419
	Union Wharf Rd	3	Crack Sealing	Crack Seal (Minor)	0.25	\$1,419
	Union Wharf Rd	4	Crack Sealing	Crack Seal (Minor)	0.25	\$1,419
	Union Wharf Rd	5	Crack Sealing	Crack Seal (Minor)	0.25	\$1,419
	Union Wharf Rd	6	Crack Sealing	Crack Seal (Minor)	0.25	\$1,419
	Union Wharf Rd	7	Crack Sealing	Crack Seal (Minor)	0.17	\$941
	Total for Year 2021				4.74	\$268,769
2022	Cross Neck Rd	2	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$48,313
	Cross Neck Rd	3	Rehabilitate and Rebuild	FDR & HMA (3")	0.24	\$46,158
	Federal Corner Rd	1	Overlays	HMA Overlay (1")	0.25	\$14,369
	Federal Corner Rd	2	Overlays	HMA Overlay (1.5")	0.25	\$21,212
	Federal Corner Rd	3	Overlays	HMA Overlay (1.5")	0.25	\$21,212
	Federal Corner Rd	4	Overlays	HMA Overlay (1.5")	0.25	\$21,212
	Federal Corner Rd	5	Overlays	Milling / HMA (1.5")	0.25	\$28,526

	Federal Corner Rd	6	Patching	Isolated Patch and HMA Shim	0.25	\$3,587
	North Line Rd	1	Patching	Isolated Patch and HMA Shim	0.25	\$3,470
	North Line Rd	2	Overlays	HMA Overlay (1.5")	0.26	\$20,693
	North Line Rd	3	Overlays	Milling / HMA (1.5")	0.26	\$27,849
	North Line Rd	4	Overlays	Milling / HMA (1.5")	0.28	\$30,924
	Old Mill Run	1	Overlays	HMA Overlay (1")	0.12	\$7,422
	Total for Year 2022				3.16	\$294,945
2023	Black Bear Run	1	Pavement Preservation/Maintenance	Double Chip Seal	0.20	\$11,014
	Brown Rd	1	Crack Sealing	Crack Seal (Minor)	0.25	\$1,510
	Brown Rd	2	Crack Sealing	Crack Seal (Minor)	0.25	\$1,510
	Brown Rd	3	Crack Sealing	Crack Seal (Minor)	0.25	\$1,512
	Brown Rd	4	Crack Sealing	Crack Seal (Minor)	0.25	\$1,513
	Brown Rd	5	Crack Sealing	Crack Seal (Minor)	0.32	\$1,956
	Cross Neck Rd	1	Crack Sealing	Crack Seal (Major)	0.25	\$1,702
	Dame Rd	1	Overlays	HMA Overlay (1.5")	0.25	\$20,911
	Dame Rd	2	Overlays	Milling / HMA (1.5")	0.25	\$28,122
	Dame Rd	3	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$54,982
	Dame Rd	4	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$54,982
	Dame Rd	5	Pavement Preservation/Maintenance	HMA Shim (3/4" avg)	0.25	\$10,608
	Dame Rd	6	Overlays	Milling / HMA (1.5")	0.25	\$28,143
	Dame Rd	7	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$54,857
	Dame Rd	8	Overlays	Milling / HMA (1.5")	0.18	\$20,175
	Henrys Way	1	Overlays	HMA Overlay (1")	0.12	\$6,506
	Hurlburt Way	1	Crack Sealing	Crack Seal (Major)	0.36	\$2,982
	Tupeck Ln	1	Overlays	HMA Overlay (1")	0.25	\$13,480
	Tupeck Ln	2	Overlays	HMA Overlay (1")	0.13	\$6,730
	Total for Year 2023				4.55	\$323,195

2024	Federal Corner Rd	1	Crack Sealing	Crack Seal (Minor)	0.25	\$1,562
	Federal Corner Rd	2	Crack Sealing	Crack Seal (Minor)	0.25	\$1,558
	Federal Corner Rd	3	Crack Sealing	Crack Seal (Minor)	0.25	\$1,558
	Federal Corner Rd	4	Crack Sealing	Crack Seal (Minor)	0.25	\$1,558
	Federal Corner Rd	5	Crack Sealing	Crack Seal (Minor)	0.25	\$1,558
	Federal Corner Rd	6	Crack Sealing	Crack Seal (Minor)	0.25	\$1,559
	New Rd	3	Patching	Isolated Patch and HMA Shim	0.25	\$3,817
	New Rd	4	Patching	Isolated Patch and HMA Shim	0.25	\$3,820
	New Rd	5	Patching	Isolated Patch and HMA Shim	0.25	\$3,826
	North Line Rd	2	Crack Sealing	Crack Seal (Minor)	0.26	\$1,520
	North Line Rd	3	Crack Sealing	Crack Seal (Minor)	0.26	\$1,521
	North Line Rd	4	Crack Sealing	Crack Seal (Minor)	0.28	\$1,689
	Tuftonboro Neck Rd	1	Overlays	Milling / HMA (1.5")	0.25	\$29,000
	Tuftonboro Neck Rd	2	Overlays	Milling / HMA (1.5")	0.25	\$29,000
	Tuftonboro Neck Rd	3	Overlays	Milling / HMA (1.5")	0.25	\$29,066
	Tuftonboro Neck Rd	4	Overlays	Milling / HMA (1.5")	0.25	\$29,000
	Tuftonboro Neck Rd	5	Overlays	Milling / HMA (1.5")	0.25	\$29,000
	Tuftonboro Neck Rd	6	Overlays	Milling / HMA (1.5")	0.26	\$30,407
	Wawbeek Rd	1	Overlays	Milling / HMA (1.5")	0.25	\$23,512
	Wawbeek Rd	2	Overlays	Milling / HMA (1.5")	0.28	\$26,697
	Windleblo Rd	1	Overlays	Milling / HMA (1.5")	0.25	\$30,427
	Windleblo Rd	2	Rehabilitate and Rebuild	FDR & HMA (3")	0.23	\$54,760
Total for Year 2024					5.57	\$336,412
2025	Chandler Rd	1	Overlays	Milling / HMA (1.5")	0.20	\$24,187
	Pine Mill Dr	1	Overlays	Milling / HMA (1.5")	0.25	\$34,229
	Pine Mill Dr	2	Overlays	Milling / HMA (1.5")	0.25	\$34,229
	Pine Mill Dr	3	Overlays	Milling / HMA (1.5")	0.30	\$40,556
	Shirley Way	1	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$58,468



	Shirley Way	2	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$58,646
	Shirley Way	3	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$58,601
	Shirley Way	4	Rehabilitate and Rebuild	FDR & HMA (3")	0.20	\$47,023
	Wharf Rd	1	Pavement Preservation/Maintenance	Double Chip Seal	0.11	\$7,202
	Woodland Dr	1	Overlays	Milling / HMA (1.5")	0.08	\$9,422
	Zadedda Farm Ln	1	Overlays	HMA Overlay (1")	0.27	\$17,722
	Total for Year 2025				2.42	\$390,286
2026	Birch Ln	1	Rehabilitate and Rebuild	FDR & HMA (3")	0.17	\$42,637
	County Rd	1	Overlays	Milling / HMA (1.5")	0.25	\$30,932
	County Rd	1	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$54,717
	County Rd	2	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$60,477
	County Rd	2	Rehabilitate and Rebuild	FDR & HMA (3")	0.35	\$85,473
	County Rd	3	Overlays	Milling / HMA (1.5")	0.25	\$30,839
	Harvest Ln	1	Rehabilitate and Rebuild	FDR & HMA (3")	0.36	\$83,016
	Maple Rd	1	Overlays	HMA Overlay (1.5")	0.12	\$11,090
	Oakleaf Ave	1	Overlays	HMA Overlay (1.5")	0.13	\$12,641
	Tuftonboro Neck Rd	1	Crack Sealing	Crack Seal (Major)	0.25	\$2,178
	Tuftonboro Neck Rd	2	Crack Sealing	Crack Seal (Major)	0.25	\$2,178
	Tuftonboro Neck Rd	3	Crack Sealing	Crack Seal (Major)	0.25	\$2,183
	Tuftonboro Neck Rd	4	Crack Sealing	Crack Seal (Major)	0.25	\$2,178
	Tuftonboro Neck Rd	5	Crack Sealing	Crack Seal (Major)	0.25	\$2,178
	Tuftonboro Neck Rd	6	Crack Sealing	Crack Seal (Major)	0.26	\$2,283
	Total for Year 2026				3.64	\$424,999
2027	Butternut Ln	1	Rehabilitate and Rebuild	FDR & HMA (3")	0.25	\$65,334
	Butternut Ln	2	Rehabilitate and Rebuild	FDR & HMA (3")	0.27	\$70,482
	Canaan Rd	1	Pavement Preservation/Maintenance	Chip Seal	0.25	\$9,494
	Canaan Rd	2	Pavement Preservation/Maintenance	Chip Seal	0.25	\$9,756

Canaan Rd	3	Pavement Preservation/Maintenance	Chip Seal	0.26	\$9,894
Canaan Rd	4	Pavement Preservation/Maintenance	Chip Seal	0.25	\$9,792
Canaan Rd	5	Pavement Preservation/Maintenance	Chip Seal	0.25	\$9,530
Canaan Rd	6	Pavement Preservation/Maintenance	Chip Seal	0.12	\$4,689
Chase Point Rd	1	Pavement Preservation/Maintenance	Double Chip Seal	0.25	\$16,708
Chase Point Rd	2	Pavement Preservation/Maintenance	Double Chip Seal	0.34	\$22,392
Dame Rd	1	Pavement Preservation/Maintenance	Chip Seal	0.25	\$9,610
Dame Rd	2	Pavement Preservation/Maintenance	Chip Seal	0.25	\$9,610
Dame Rd	3	Pavement Preservation/Maintenance	Chip Seal	0.25	\$9,610
Dame Rd	4	Pavement Preservation/Maintenance	Chip Seal	0.25	\$9,610
Dame Rd	5	Pavement Preservation/Maintenance	Chip Seal	0.25	\$9,618
Dame Rd	6	Pavement Preservation/Maintenance	Chip Seal	0.25	\$9,618
Dame Rd	7	Pavement Preservation/Maintenance	Chip Seal	0.25	\$9,588
Dame Rd	8	Pavement Preservation/Maintenance	Chip Seal	0.18	\$6,895
Durgin Rd	1	Pavement Preservation/Maintenance	Chip Seal	0.25	\$10,526
Durgin Rd	2	Pavement Preservation/Maintenance	Chip Seal	0.25	\$10,526
Durgin Rd	3	Pavement Preservation/Maintenance	Chip Seal	0.25	\$10,526
Durgin Rd	4	Pavement Preservation/Maintenance	Chip Seal	0.25	\$10,526

	Durgin Rd	5	Pavement Preservation/Maintenance	Chip Seal	0.16	\$6,586
	Mill Rd	1	Overlays	HMA Overlay (1.5")	0.05	\$2,981
	Sargents Crossing Rd	1	Overlays	Milling / HMA (1.5")	0.27	\$37,953
	Tupeck Ln	1	Crack Sealing	Crack Seal (Major)	0.25	\$2,145
	Union Wharf Rd	1	Pavement Preservation/Maintenance	Chip Seal	0.25	\$10,068
	Union Wharf Rd	2	Pavement Preservation/Maintenance	Chip Seal	0.25	\$10,068
	Union Wharf Rd	3	Pavement Preservation/Maintenance	Chip Seal	0.25	\$10,068
	Union Wharf Rd	4	Pavement Preservation/Maintenance	Chip Seal	0.25	\$10,068
	Union Wharf Rd	5	Pavement Preservation/Maintenance	Chip Seal	0.25	\$10,068
	Union Wharf Rd	6	Pavement Preservation/Maintenance	Chip Seal	0.25	\$10,068
	Union Wharf Rd	7	Pavement Preservation/Maintenance	Chip Seal	0.17	\$6,681
	Total for Year 2027				7.81	\$461,088
2028	Bay Rd	1	Overlays	HMA Overlay (1")	0.23	\$14,359
	High St	1	Overlays	Milling / HMA (1.5")	0.25	\$34,538
	High St	2	Overlays	Milling / HMA (1.5")	0.25	\$32,894
	Lake Rd	1	Overlays	Milling / HMA (1.5")	0.10	\$10,579
	Lang Pond Rd	1	Overlays	HMA Overlay (1")	0.25	\$15,744
	Ledge Hill Rd	1	Overlays	HMA Overlay (1")	0.25	\$17,345
	Ledge Hill Rd	2	Overlays	HMA Overlay (1")	0.25	\$17,332
	Ledge Hill Rd	3	Overlays	HMA Overlay (1")	0.25	\$17,318
	Ledge Hill Rd	4	Overlays	HMA Overlay (1")	0.25	\$17,318
	Ledge Hill Rd	5	Overlays	HMA Overlay (1")	0.25	\$17,332
	Ledge Hill Rd	6	Overlays	HMA Overlay (1")	0.25	\$17,318
	Ledge Hill Rd	7	Overlays	HMA Overlay (1")	0.25	\$17,318

Ledge Hill Rd	8	Overlays	HMA Overlay (1")	0.25	\$17,332
Ledge Hill Rd	9	Overlays	HMA Overlay (1")	0.25	\$17,345
Ledge Hill Rd	10	Overlays	HMA Overlay (1")	0.25	\$17,332
Ledge Hill Rd	11	Overlays	HMA Overlay (1")	0.25	\$17,332
Ledge Hill Rd	12	Overlays	HMA Overlay (1")	0.19	\$12,828
Oakleaf Ave	1	Crack Sealing	Crack Seal (Minor)	0.13	\$928
Sodom Rd	1	Overlays	HMA Overlay (1")	0.25	\$18,119
Sodom Rd	2	Overlays	HMA Overlay (1")	0.25	\$18,119
Sodom Rd	3	Overlays	HMA Overlay (1")	0.25	\$18,119
Sodom Rd	4	Overlays	HMA Overlay (1")	0.25	\$18,133
Sodom Rd	5	Overlays	HMA Overlay (1")	0.25	\$18,119
Sodom Rd	6	Overlays	HMA Overlay (1")	0.25	\$18,119
Sodom Rd	6	Overlays	HMA Overlay (1")	0.25	\$18,133
Sodom Rd	7	Overlays	HMA Overlay (1")	0.25	\$18,133
Sodom Rd	7	Overlays	HMA Overlay (1")	0.25	\$18,119
Sodom Rd	8	Overlays	HMA Overlay (1")	0.26	\$19,149
Sodom Rd	8	Overlays	HMA Overlay (1")	0.29	\$20,727
Total for Year 2028				6.94	\$515,483
	Total			49.79	\$3,478,854