

THE TOWNSHIP OF



SOUTH ALGONQUIN

2022 ROAD INVENTORY AND CONDITION ASSESSMENT

REVISIONS

| No. | Date | Revisions |
|------------|---------------|---|
| 0 | May 4, 2022 | First draft of final report |
| 1 | May 10, 2022 | Revisions based on comments from the Township (road conditions) |
| 2 | May 12, 2022 | Revisions based on comments from the Township (traffic volumes) |
| 3 | May 13, 2022 | Revisions based on comments from the Township (general) |
| 4 | May 13, 2022 | Revisions based on comments from the Township (general) |
| 5 | June 23, 2022 | Revisions based on comments from the Township |
| 6 | June 29, 2022 | Revisions based on comments from the Township |
| 7 | June 29, 2022 | Revisions based on comments from the Township |
| 8 | June 29, 2022 | Revisions based on comments from the Township |
| 9 | July 20, 2022 | Revisions based on comments from the Township |
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Executive Summary

The 2022 Township of South Algonquin Road Inventory Condition Assessment summarizes the road system survey completed in the fall of 2021 and spring of 2022. The study identifies the roads based on their, current condition and proposed reconstruction or rehabilitation strategy.

Data collection and road ratings were done generally in accordance with the Ministry of Transportation (MTO) Inventory Manual for Municipal Roads (1991) (the “Manual”).

The purpose of the study is to provide an overview of the condition of the road system with each road section being evaluated on several factors which contribute to the overall condition of the system. The physical condition of the road is an empirical evaluation based on structural adequacy, current surface condition and improvement history. The total performance of the system also considers drainage, geometrics, road classification, roadside environment, and traffic volumes.

Accurate traffic volumes play an important role in classifying the roads and assessing their overall performance and identifying existing deficiencies. It is recommended that the Township implement an annual traffic counting program in order to ensure compliance with Ontario Regulation 239/02 (Minimum

Maintenance Standards for Municipal Highways) with respect to patrolling and maintenance requirements. Accurate traffic counts are also important to ensure that road sections are constructed to meet the expected service levels. Historical and future growth within the Township were reviewed. Based on available information, it was decided that future growth would not be significant and this has been accounted for in recommended improvements.

A complete review of the geometrics of each road section is outside the scope of this assignment. It should be noted that estimated costs for reconstruction or rehabilitation are based on improving the road sections with their current horizontal and vertical alignments. Recommended improvements are determined through information collected in the field and based on recommendations of the Manual. Improvements set out in the Manual are general in nature as the original purpose was to apply the same standard to all municipalities in Ontario. Items included in the reconstruction or rehabilitation strategies set out in the Manual may not be applicable to the Township of South Algonquin. It is expected that details of any reconstruction or rehabilitations will be reviewed during the detailed design process of any capital or maintenance improvements.

Several road conditions are reviewed and rated in the field. This information was then used to calculate the Condition Rating of each road section and determine the need for rehabilitation or reconstruction. Deficiencies categorize each road section as 'Adequate', 'Now', '(1-5)', or '(6-10)'.

The *Manual* notes that rural roads with an average annual daily traffic (AADT) volume of less than fifty (50) shall be considered adequate as low volume roads even if they have an identified need. These roads have been given proposed rehabilitation or reconstruction strategies, but these deficiencies should be addressed with normal maintenance procedures. The traffic volumes for 20 road sections were measured in 2021 and the remaining traffic volumes were estimated based on proximity to the measured sections.

Benchmark costs are based on standard items recommended in the *Manual* and derived from unit price contracts within and around the Township. Unit rates were refined further based on discussions with township staff. The estimated total cost of improvements to the road network is \$20,171,000.00 including low volume roads.

The *Manual* prioritizes road sections largely based on their current condition and traffic volumes. As a result, roads that are in poor condition are given a high priority (worst first) as

are roads with higher traffic volumes. Current industry practice has shifted towards prioritizing preservation over reconstruction. It is **recognized in the industry that the proper treatment at the proper time extends the life cycle of any municipal asset.** There are several preservation operations that can be undertaken, such as crack sealing and micro surfacing, and the Township must decide which are best suited to meet the needs of the Township. It is recommended that the Township carry whatever annual budget can be afforded for this purpose.

Of the identified needs, \$3,306,000 is for roads that are already deficient ('NOW'). As low volume roads are considered adequate, costs for these roads have been excluded.

Based on the identified needs of the Township, budget recommendations for annual preservation programs have been developed as follows:

- \$198,000 annually on hot mix resurfacing based on a 15 year cycle
- \$205,000 annually on single surface treatment based on a 7 year cycle
- \$370,000 annually for gravel resurfacing based on a 3 year cycle
- \$15,000 annually for crack sealing

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1.0 Introduction

The road network in a typical single tier municipality represents the single largest investment for the municipality and the taxpayers who support the road system.

The largest annual expenditure that a small urban or rural municipality will make will be on their road system. Typically, this includes everything from staff and equipment to seasonal maintenance to capital construction improvements.

A typical road budget for the average small municipality should allow for the ongoing maintenance needs of the road network, including bridges, in conjunction with relatively minor capital construction improvements. Most municipalities cannot afford larger capital projects without the assistance of government funding.

As a result of provincial requirements introduced in the fall of 2012, municipalities seeking funding from the federal and provincial government to assist in the completion of capital projects must have prepared an Asset Management Plan (AMP). The Township of South Algonquin retained the services of Jewell Engineering Inc. to carry out a Roads Inventory and Condition Assessment of the township road system for inclusion in the Township's AMP. The roads assessment will provide the Township with a current physical evaluation of road assets and allow staff to develop short- and long-term capital and maintenance programs.

2.0 Background

All township roads were reviewed and have been included in this report. The study will assist the Township in identifying the physical and financial needs of the road network with respect to the recommended improvements to the road network within the 10-year horizon.

The township road system consists of approximately 322.09 centreline kilometres of hard and loose topped roads built and maintained for the purposes of moving traffic, people, goods, and services throughout the Township. The Township of South Algonquin completes the majority of capital improvements and all roadside maintenance using their own forces. Contractor support is used for paving and surface treatment operations.

3.0 Objectives

The primary objectives of this study were to;

- Provide an overview of the entire municipal road network and the individual sections that make up the system in a form that will allow the Township to objectively consider the needs of each section as identified in the assessment
- Provide an assessment of the condition of the municipal road system through an established rating system and an evaluation of defined parameters for each of the sections of the road system
- Provide recommended rehabilitation and reconstruction strategies for all road sections based on available information, Minimum Maintenance Standards, Municipal guidelines and standards and current industry standards and methodologies
- Provide the Township with options related to the management of the road system and allow municipal staff to develop short (Now), mid (1-5 years) and long (6-10 years) term capital and maintenance programs based on the needs of the road network and in the best interest of public health and safety
- Provide cost estimates for the required rehabilitation or reconstruction of municipal assets based on appropriate benchmark costing



4.0 Report Content and Scope

This report was prepared by Jewell Engineering Inc. for the Township of South Algonquin. Road assessments are based on the criteria prescribed in the Ministry of Transportation Inventory Manual for Municipal Roads (1991) (the *'Manual'*).

The scope of the report includes summaries of the data collected along with discussion and analyses of the same.

All the Township's roads were reviewed and have been included in this report. The study will assist the Township in identifying physical and financial needs with respect to the recommended improvements to the road network within the 10-year horizon.

Traffic volumes were measured in 2021 and 2022 for 20 road sections. The remaining road sections were estimated based on proximity to the measured road sections and discussion with Township staff. Discretion should be exercised in using these volumes to establish road classifications under Minimum Maintenance Standards. The Township will assume some risk in classifying roads based on theoretical traffic volumes.

Population growth is typically applied to recommended improvements. However, discussion with staff indicates that the Township of South Algonquin's growth potential may be affected by issues beyond the control of the Township. For this reason, the population increase within the Township over the last 10 years has been very little to no growth.

5.0 Asset Condition Rating Methodology

5.1 Asset Condition Rating Methodology

The most recent Inventory Manual for Municipal Roads was published in 1991 and replaced the Municipal Roads Appraisal section of the Inventory Manual – Municipal Roads and Railway Level Crossings dated August 1988.

The purpose of the Manual is to;

- Assist in the appraisal of municipal roads
- Provide municipalities with additional information to effectively manage their road needs
- Identify additional engineering studies that may be required
- Identify rehabilitation or reconstruction strategies
- Develop cost estimates for rehabilitation or reconstruction strategies

The roads assessment was done through the completion of the following steps;

- i. Field review and inventory of current road system
- ii. Preparation of preliminary condition assessment
- iii. Discussions with the Township
- iv. Identification of the needs of the road system
- v. Review and update of construction unit prices
- vi. Preparation of final condition assessment report

5.2 Field Review and Inventory of Current Road System

Field review of the road network is a subjective process. Critical characteristics of the road are rated on a numeric scale out of 10, 15 or 25 depending on how important the quality is deemed to be as it relates to the performance of the road. To assist in mitigating the subjective nature of the evaluations, the *Manual* provides ranges for each condition rather than a specific value for a condition.

The *Manual* uses six (6) categories to determine the timing of the needs of each road section. These include Geometrics, Structural Adequacy, Surface Type, Surface Width, Capacity and Drainage.

Considered in conjunction with the field assessment and traffic volumes, these critical components assist in determining when and what strategy is to be implemented for each road section. Timing provided is for



reconstruction and is an estimate of the remaining service life of the road section if remedial action is not taken. Specified time frames identify as 'ADEQUATE', 'NOW', Within (1-5) Years ['(1-5)'] or Within (6-10) Years ['(6-10)'].

Although a road section may have an identified need, the *Manual* suggests that rural road sections with an AADT of less than fifty (50) be considered adequate with normal maintenance procedures. For this reason, along with O. Reg 239/02, it is recommended that the Township implement an annual traffic counting program in order to ensure service levels are maintained.

Roads with an identified 'NOW' need essentially represent the municipal road infrastructure deficit, roads that require reconstruction or major rehabilitation. The existing condition is less than the minimum tolerable standard. In theory, these road sections should undergo the suggested improvements immediately but the reality is most municipalities cannot afford the cost.

Road sections with an identified need and timing of '(1-5)' are expected to have a need that falls below the minimum tolerable standard within the next 5 years. Proposed improvements should be implemented within the 1 to 5-year horizon.

Road sections with an identified need and timing of '(6-10)' are expected to have a need that falls below the minimum tolerable standard within 10 years. The proposed improvements should be implemented within the 6 to 10-year horizon.

Road sections deemed Adequate have no identified needs. These roads are expected to meet or exceed the minimum tolerable standard for the 10-year study period.

5.3 *Condition Assessment*

5.3.1 *Roadside Drainage*

Evaluation of drainage systems, including storm sewer systems, is largely based on historical data and the condition of any existing underground infrastructure. As little to no historical information was available regarding flooding within the urban centres, (Whitney and Madawaska) and a closed-circuit television inspection of the storm sewers was not completed, drainage along urban roads was assumed to be present and satisfactory. Township staff did not identify any concerns with the function of storm sewer systems.

Drainage for road sections within the semi-urban and rural areas of the Township is provided primarily through open ditches. The topography and terrain within the Township have resulted in intermittent ditching in many road sections.

Discussion with the Township identified three road sections that are subject to seasonal flooding and must be closed to traffic until water levels recede. The Township estimates that the road in areas prone to seasonal flooding should be raised approximately 600mm to prevent overtopping. Otherwise, the Township did not identify any concerns with the rural drainage systems.

5.3.2 *Maintenance Demand*

The *Manual* also includes a rating for the maintenance demand for each road section. While some road sections may require less maintenance, in the absence of information to the contrary, it is reasonable to assume all road sections require regular or average levels of maintenance. Values assigned to road sections for maintenance demand are reflective of average maintenance requirements. Reduced values have been assigned to road sections which require an excessive level of maintenance. These roads have been identified through discussions with the Township.

5.3.3 *Capacity and Level of Service*

Capacity and Level of Service are related to the traffic volumes and the design hour volume (DHV). For rural road sections with a DHV of less than 1200, the level of service component is not applicable and the road section is instead reviewed based on the geometrics (horizontal and vertical alignment). Based on available information, there are no rural road sections within the Township network with a DHV greater than 1200.



For semi-urban and urban road sections with a DHV less than 1700, the *Manual* assumes the level of service is adequate. Therefore, road sections meeting this criterion have been given the maximum value for Level of Service.

Based on the foregoing, the township road network is understood to have adequate capacity and the study does not provide further comment on Capacity.

5.3.4 Horizontal and Vertical Alignment

A complete analysis of the horizontal and vertical components of each road section is outside the scope of this study due to budgetary constraints.

The absence of any commentary on the geometrics of the township road network should not be construed as an indication that there are no roads with substandard geometry. It is recommended that the Township compile a list of horizontal and vertical curves that may be of concern so further investigation can be completed.

5.3.5 Road Sections

Generally, a road network is composed of road sections that are consistent throughout their length based on characteristics such as surface type, roadside environment, or speed limit. Even with consistency in section attributes, it is reasonable to break longer road sections into shorter, more manageable, lengths. Long road sections are difficult to evaluate as the severity and density of distresses in the road can vary widely over a greater distance.

The financial constraints of the Township make it highly unlikely that urban road sections longer than 2.5km or rural roads longer than 5.0km can be constructed in the course of one construction

season. Keeping an inventory of long road sections, reconstructed over several years, will result in differential deterioration of the road section and make it difficult to assess the performance of the road section.

If the road is to be reviewed as one section, it may be deemed to meet minimum requirements when large sections do not. Likewise, a section may be deemed to be below minimum tolerable standards when large sections of the road are in good condition. The former puts the Township at risk while the latter may result in unnecessary expenditures.

5.3.6 *Right-of-Way Width*

Right-of-way width is also a component of the review. The width of the existing rights-of-way were not measured and are unknown. The Township has noted that many of the township roads are forced/trespass or shoreline roads. This greatly limits the Township's ability to properly maintain or improve these road sections although the roads do not appear to be adversely affected. Acquiring a 20m (66') road allowance, where possible and practical, would be beneficial for maintenance, improvements and in future planning and development.

5.4 *Types of Improvements*

Determination of improvements to a road section is largely based on the performance of the road as a whole. Consideration must be given to existing drainage and the improvement history, specifically type and timing of recent improvements, of the road section when assessing the structural adequacy of the underlying road base and subbase.

For this reason, it is important that the Township maintain accurate records of improvements made to any road section in their network to assist in future assessments of their road network.

Structural problems would lean toward reconstruction or replacement strategies while age related distresses would be better suited to rehabilitation strategies such as resurfacing. Proper assessment of the condition of the road is critical as determination of a suitable rehabilitation or reconstruction will ensure the Township is effectively distributing their financial resources.

Possible improvements include:

- {R1} - Basic Resurfacing, Single Lift of Hot Mix 50mm or Surface Treatment
- {R2} - Basic Resurfacing, Double Lift of Hot Mix 100mm
- {RM} - Major Resurfacing, Double Lift of Hot Mix 100mm
- {PR1} - Pulverize and Resurface, Single Lift of Hot Mix 50mm
- {PR2} - Pulverize and Resurface, Double Lift of Hot Mix 100mm
- {MP} - Mill and Pave
- {BS} - Base and Surface
- {RW} - Resurface and Widen
- {REC} - Reconstruction (Rural and Semi Urban)
- {RNS} - Reconstruction Nominal Storm Sewers (Urban)
- {RSS} - Reconstruction with Storm Sewers

Other maintenance operations noted in the report include:

- {SD} - Spot drainage repairs
- {SR} - Spot Road repairs
- {CS} - Crack Seal/Rout and Seal

It is important to appreciate the date the Manual was last published and the changing perspective on how municipal road assets should be managed. Municipalities are trending away from a 'worst first' approach and moving towards preservation of their linear assets. It is recognized in the industry that the proper treatment at the proper time extends the life cycle (Table 2) of any municipal asset and while the improvements in the Manual address renewal, technology has changed significantly since 1991. There are currently many preservation options available that the Manual does not consider which may be practical for the Township of South Algonquin. Discussions with township staff and a review of municipal roads indicate that the Township does have some level of preservation included in the road management program.

6.0 Road Structure

Every road is designed to last for a specific number of years. Generally, it is accepted that properly constructed roadways will have a life span of approximately 50 years with surface rehabilitation depending on the surface type. High class bitumen (HCB) or asphalt will provide a high riding quality for between 12 and 16 years before needing to be resurfaced. A road surface of Low-Class Bitumen (LCB) or surface treatment will provide a high riding quality for 6 to 10 years before needing to be resurfaced. The performance of both pavement types depends greatly on the traffic loading to which the roads are subjected. Road deterioration, pavement deterioration in particular, begins at a relatively slow pace for a newly constructed road. Over time, as the road is subjected to vehicular loading, distresses begin to manifest in the road surface. Distress in the road surface accelerates the deterioration as surface water penetrates more readily into the road base and subbase.

6.1 Road Components

Roads are layered structures of selected and processed materials which have been designed to resist wear, support wheel loads, and provide drainage. The conventional road structure consists of layers of subbase, base, and surface which are placed on a subgrade to support traffic load and distribute it to the roadbed. The highest loading on a road section occurs at the point where vehicle tires contact the road surface. It is critical that the pavement be designed to effectively transmit the vehicle loads to the road subgrade and that the road subgrade is capable of handling the load being transferred. Therefore, materials with greater strength are required higher in the road structure (at the surface) with materials with lesser strength being used deeper (further from the surface) in the road structure. Extremely poor-quality subgrade would require a larger depth of high strength material in the road structure.

6.2 Drainage

Road performance is determined, in large part, by drainage, both surface and internal. Surface drainage is influenced by the characteristics of the road such as crossfall and surface permeability. Internal drainage is affected by surface permeability, the granular materials used in the road structure and crossfall of the subbase and base layers.

The two primary sources of water in a road structure are surface infiltration and groundwater. Surface infiltration occurs through cracks in the road surface as well as through granular shoulders. Groundwater

seepage into road subgrade can occur through the combination of a high-water table and capillary action. The presence of water in a road structure can influence road performance by reducing the strength and durability of the materials.

6.3 Service Life and Road Maintenance

Road maintenance begins immediately after a road is constructed and takes one of three forms; preventive, routine or corrective. Figure 5 shows the typical deterioration of a pavement over its service life.

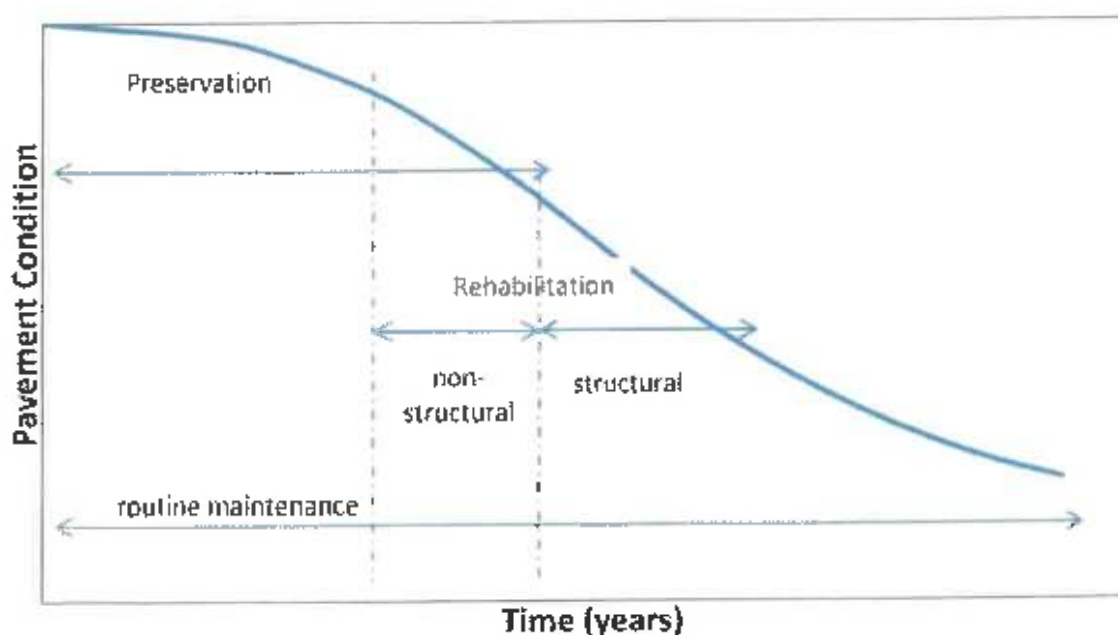


Figure 1 - Typical Pavement Deterioration and Timing of Pavement Treatments (Transportation Association of Canada Pavement Asset Design and Management Guide)

6.3.1 Maintenance

General roadway maintenance considers road components within the right-of-way and includes activities such as shoulder grading, roadside mowing, crack sealing and erosion control. Completion of these tasks improve the performance of the road. Ideally, these activities are completed proactively in order to prevent problems from occurring.

Routine maintenance is generally considered a reactive process that includes inexpensive, localized work that can be completed by municipal forces. This would include such tasks as pothole repairs, drainage improvements, and shallow patching.

The Township does undertake annual maintenance on the road network. The extent of work completed is dependent on budget and includes strategies such as;

- Spot improvements to the wearing surface and patching
- Spot drainage improvements and shoulder grading
- Roadside mowing and brushing

The Township logs municipal road allowances which has several benefits. Clearing trees from within the road allowance allows the road better access to the sun, reducing winter maintenance issues, provides space for improvements and increases driver safety. In addition, revenue from logging operations helps offset municipal operating costs.

6.3.2 Preservation

Preservation activities include work such as crack sealing, functional milling and resurfacing, and overlays and are generally expected to service the road for anywhere from five to ten years.

6.3.3 Rehabilitation

Rehabilitation strategies are required when additional preservation measures are no longer cost effective due to the pavement condition. These activities include resurfacing, cold in-place recycling and full depth reclamation.

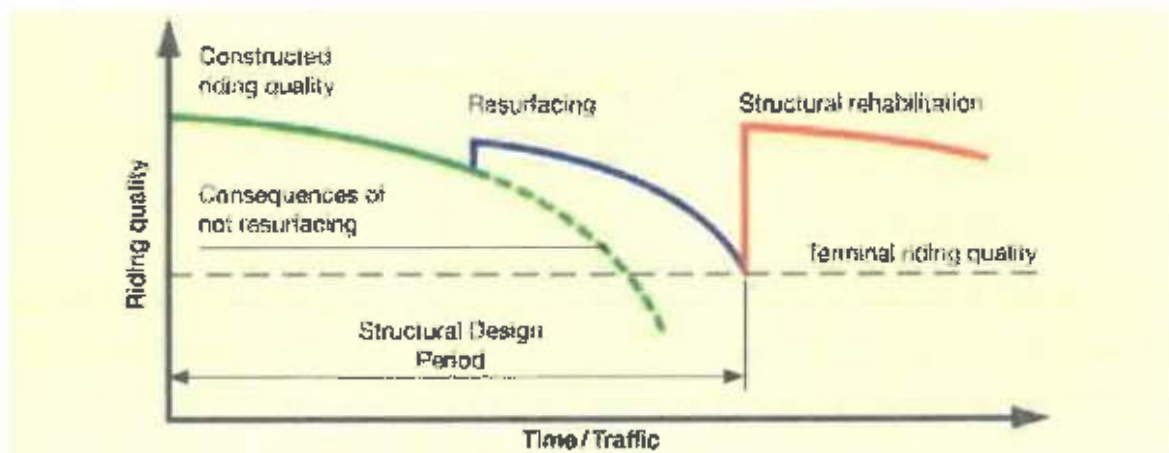


Figure 2 - Impact of Proper Maintenance on Road Service Life (Wirtgen Cold Recycling Technology Manual)

Figure 2 illustrates the effectiveness of timely maintenance, preservation and rehabilitation to ensure road sections reach their maximum service life prior to needing a full depth reconstruction. It is also

important to recognize that the service life (Time/Traffic) would be much shorter for an improperly constructed road as a result of accelerated deterioration due to an inadequate pavement design.

7.0 Road System Inventory & Classification

7.1 Surface Type and Roadside Environment

The road network within the Township of South Algonquin would be considered a Rural single tier road system.

The Manual includes the following definitions for roadside environment;

Rural – Areas with sparse development or where development is less than 50% of the frontage, including developed areas extending less than 300 metres on one side or 200 metres on both sides and no curb and gutter.

Semi-Urban (Suburban) – Development exceeds 50% of the frontage for a minimum of 300 metres on one side or 200 metres on both sides

AND

No curbs and gutters, with or without storm/combination sewers or curb and gutter on one side only without storm/combination sewers

or

For subdivisions, the majority of the lot frontages are 30 metres or greater and the roads comply with minimum road standards.

Urban – Curb and gutters on both sides with or served by storm/combination sewers

or

Curb and gutter on one side with or served by storm/combination sewers

or

Reversed paved shoulders with or served by storm/combination sewers

or

For subdivisions, the majority of the lot frontages are less than 30 metres

Table 1 identifies the length of road by Roadside Environment.

Table 1 – Breakdown by Roadside Environment

| Roadside Environment | Length (km) | Percentage of System |
|----------------------|---------------|----------------------|
| Rural (R) | 110.40 | 90.43% |
| Semi-Urban (S) | 10.76 | 8.81% |
| Urban (U) | 0.93 | 0.76% |
| Total | 122.09 | 100.00% |

Table 2 breaks the road network into lengths by surface type.

Table 2 – Road Breakdown by Surface Type

| Surface Type | Length (km) | Percentage of System |
|--|---------------|----------------------|
| Earth (ETH) | 6.68 | 5.47% |
| Gravel (G/S) | 77.77 | 63.70% |
| Low Class Bituminous (LCB) (Surface Treatment) over Cold Mix Asphalt | 21.94 | 17.97% |
| High Class Bituminous (HCB) (Asphalt) | 15.70 | 12.86% |
| Total | 122.09 | 100.00% |

Road classifications by the 'Manual' are based on the traffic volumes and the roadside environment for each road section. Rural roads are classified on traffic volumes while semi-urban and urban roads are classified on their primary function. However, most municipalities base their capital and maintenance operations on O. Reg 239/02, Minimum Maintenance Standards for Municipal Highways (MMS), which uses traffic volumes as well as the speed limit to classify each road section. During the completion of the study, all road sections were classified using both systems.

Posted maximum speeds limits were noted in the field review but not every road section had a posted maximum speed limit. As the Township of South Algonquin does not have any by-laws regarding the speed limits on roads without a posted speed limit, statutory speed limits were interpreted from the *Highway Traffic Act (HTA) R.S.O. 1990*. Relevant excerpts from the HTA have been included in Appendix J.

Table 3 identifies the Minimum Maintenance Standard road classifications.

Table 3 – Minimum Maintenance Standard (MMS) Road Classifications

| Average Annual Daily Traffic (number of motor vehicles) | Posted or Statutory Speed Limit (kilometers per hour) | | | | | | |
|---|---|---------|---------|---------|---------|---------|--------|
| | 91 - 100 | 81 - 90 | 71 - 80 | 61 - 70 | 51 - 60 | 41 - 50 | 1 - 40 |
| 53,000 or more | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 23,000 - 52,999 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| 15,000 - 22,999 | 1 | 1 | 2 | 2 | 2 | 3 | 3 |
| 12,000 - 14,999 | 1 | 1 | 2 | 2 | 2 | 3 | 3 |
| 10,000 - 11,999 | 1 | 1 | 2 | 2 | 3 | 3 | 3 |
| 8,000 - 9,999 | 1 | 1 | 2 | 3 | 3 | 3 | 3 |
| 6,000 - 7,999 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 5,000 - 5,999 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 4,000 - 4,999 | 1 | 2 | 3 | 3 | 3 | 4 | 4 |
| 3,000 - 3,999 | 1 | 2 | 3 | 3 | 3 | 4 | 4 |
| 2,000 - 2,999 | 1 | 2 | 3 | 3 | 4 | 5 | 5 |
| 1,000 - 1,999 | 1 | 3 | 3 | 3 | 4 | 5 | 5 |
| 500 - 999 | 1 | 3 | 4 | 4 | 4 | 5 | 5 |
| 200 - 499 | 1 | 3 | 4 | 4 | 5 | 5 | 6 |
| 80 - 199 | 1 | 3 | 4 | 5 | 5 | 6 | 6 |
| 0 - 79 | 1 | 3 | 6 | 6 | 6 | 6 | 6 |

Table 4 breaks the network into road classifications under the MMS.

Table 4 – Road Breakdown by Class (O.Reg 239/02)

| Road Classification | Length (km) | Percentage of System |
|---------------------|---------------|----------------------|
| 1 | 0.00 | 0.0% |
| 2 | 0.00 | 0.0% |
| 3 | 0.00 | 0.0% |
| 4 | 10.40 | 8.52% |
| 5 | 15.19 | 12.44% |
| 6 | 96.50 | 79.04% |
| Total | 122.09 | 100.00% |

8.0 Road System Time of Need and Adequacy

8.1 Time of Need

The system adequacy reflects the current state of the road network and serves as a benchmark on which to base future evaluations. Road sections with a rehabilitation or reconstruction strategy with a 'NOW' need are a representation of work that is currently required on the road system to address the existing needs of the system.

Table 5 – Summary of Costs by Time of Need

| Item | NOW | 1-5 | 6-10 | Total |
|--------------------|--------------------|------------------|------------------|--------------------|
| Construction Needs | \$3,306,000 | \$421,000 | \$0.00 | \$3,727,000 |
| Resurfacing Needs | \$0 | \$0 | \$167,000 | \$167,000 |
| Total | \$3,306,000 | \$421,000 | \$167,000 | \$3,894,000 |

As stated previously, the 'Manual' states that low volume rural roads with an AADT less than 50 shall be considered adequate with normal maintenance procedures. The township road network currently includes 85.61km of rural roads with an AADT less than 50. Estimated improvements costs for these roads is \$16,277,000.

8.2 System Adequacy

System adequacy is a comparison between the length of the road network without an identified 'NOW' need and the length of the entire network resulting in a rating out of 100. The road system adequacy is calculated as follows;

$$\text{System Adequacy} = \frac{\text{Total Length of Road (km)} - (\text{Length of NOW Deficiencies})}{\text{Total Length of Road (km)}} \times 100$$

A decrease in system adequacy over time would indicate that inappropriate strategies are being implemented and/or adequate funds are not being directed to the road network. Therefore, a review of

historical system adequacy figures is a good indicator of the overall performance of the road network, capital, and maintenance.

Based on the 2022 evaluation, the Township of South Algonquin road network has a System Adequacy of 97.2%. An acceptable level for a lower tier system is 60% while an upper tier system should be 70%.

It should be noted that while low volume roads are considered adequate, these roads make up approximately 50% of the municipal road network. Excluding these roads from the system adequacy calculation has a significant effect and greatly improves the result.

9.0 Road System Rating and Prioritization

9.1 Road System Rating

Road System Ratings are a basic measure of the importance of a road section relative to its condition and the traffic it serves. These are only two factors and many other factors need to be considered when rating the importance of one road section over another. However, the rating provides the Township with some insight into the importance of each road section to road users. The evaluation for each road section includes a Priority Rating with a higher number representing a road considered to be of higher importance.

9.2 Prioritization

A Priority Guide Number is another rating that, along with condition and traffic, also considers the cost of improving the road section when prioritizing the road sections requiring rehabilitation or reconstruction. Including the improvement cost in the prioritization assists the Township in providing the most benefit to drivers per dollar spent. Again, there are other project specific factors that should be considered in prioritizing road projects and this reinforces the need for accurate traffic volumes.

10.0 Findings

The terrain and soil type throughout the Township can be classified as rocky and rolling which has largely driven the design and means and methods of construction of the municipal road network. There were several needs that were consistent throughout the road network including;

- Ditching - intermittent or not present at all on many road sections
- Boulders with the road surface
- Low shoulders on the inside of horizontal curves
- High shoulders against the ditch foreslope (berms)

Ditching

There are three (3) road sections subject to flooding during the year. Overall, the lack of ditching does not seem to be adversely affecting the performance of the road system with one exception. On many of the rural roads, there is little to no ditching on crest curves. This is trapping water on the travelled surface of the gravel roads and causing significant erosion mostly in the shoulder but erosion was also noted on the traveled surface of several road sections. Increased maintenance is required to address the on-going erosion through the placement of additional gravel both on the surface and the shoulders.

Although the width of the existing road allowances are unknown, discussions with Township staff identified several road sections as forced/ trespass roads or shoreline roads. The Township has limited ability to make improvements to the road cross section of forced roads and it is most likely that property would need to be acquired to facilitate any improvements.

Based on discussions with township staff, significant improvements are not planned for any of the shoreline roads therefore property is less of a concern in these road sections.

Boulders

Many road sections, loose and hard topped, had boulders within the traveled surface. It is unknown whether the boulders were not removed during construction or if they have simply worked their way to the surface. It is likely that their presence is a combination of both.

Low Shoulders on the Inside of Horizontal Curves

A driver's tendency is to track to the inside of a horizontal curve. Although there is not a significant length of rural hard topped roads, this has lead to lower shoulders in the horizontal curves leading to more severe edge break and moderate severity potholing in the shoulder of these areas.

High Shoulders Against the Ditch Foreslope (Berms)

The majority of roads within the Township follow the contours of the existing ground and are built up from their surroundings which provides some grade to assist with surface drainage. Although there are many roads with narrow shoulders, buildup of winter sand and the growth of vegetation in the shoulders prevents surface water from draining away from the road. This situation further compounds the low shoulder condition against the travelled edge as water from the shoulder is actually directed back towards the driving surface.

During a field review with Township staff, it was noted that spring grading operations would include removal of the berms at the edge of the road platform. This will greatly improve surface drainage and reduce erosion in the shoulder and/or driving surface.

11.0 Recommendations

Based on the road inventory and condition assessment, Jewell Engineering Inc. puts forth the following recommendations for consideration by the Township.

11.0.1 Assumptions

For budgetary considerations, standard widths (as per the Manual) have been applied to all road sections. Actual dimensions and quantities should be refined prior to finalizing budget requirements. Cost estimates are in 2022 dollars.

11.0.2 Other Cost Considerations

Suggested budget allocations are exclusive of the contractors administrative costs such as mobilization/demobilization, bonding and insurance, etc.

The recommendations of the study, in terms of the anticipated funding required for the road system, are based on generic reconstruction practices outlined in the Manual. These include general items typical of road reconstruction or resurfacing projects and do not necessarily consider the full width of the right-of-way. This is to say, non-typical items not directly related to the reconstruction of the road, such as sidewalks and utility relocations, are not accounted for in the cost estimates. Thus the need for more detailed engineering strategies prior to rehabilitation or reconstruction of road assets.

11.0.4 Traffic Counting Program

It is recommended that the Township implement an annual traffic counting program to ensure accurate volumes are attributed to each road section and that each road is classified properly. Not all sections need to be updated each year. Counts should be completed in a manner that allows all road sections to be updated between study updates.

11.1 Resurfacing

Gravel Resurfacing

There are currently 16.16km of gravel road that have been identified as a 'NOW' reconstruct. Of the remaining 61.23km, 16.86km are low volume roads which have been identified as having a 'NOW' reconstruct need. To properly maintain the remaining 44.37km of gravel road within a typical 3-year cycle, the Township should resurface 14.8km per year. At \$25,000/km, the Township should budget approximately \$370,000 per year for gravel resurfacing.

It is assumed that the Township would not resurface low volume gravel roads that have a 'NOW' reconstruct need.

Low Class Bituminous (Surface Treatment)

There are currently no surface treated roads that have been identified as a 'NOW' reconstruct need. To resurface the 25.04km of low-class bituminous road within a typical 7-year cycle, the Township should resurface 3.57km per year. At \$57,000/km for a single surface treatment, the Township should budget approximately \$205,000 per year for resurfacing low class bituminous roads.

High Class Bituminous (Hot Mix Asphalt)

There are currently no sections of asphalt road that have been identified as a 'NOW' reconstruct. To resurface the 16.43km of high-class bituminous road within a typical 15-year cycle, the Township should resurface 1.1km per year. At \$155,000/km to resurface with one lift of asphalt, the Township should budget approximately \$170,500 per year for resurfacing asphalt roads.

Total recommended annual preservation budget is \$760,500.00 for preservation programs. This excludes any capital reconstruction projects.

11.2 Reconstruction

Since the last study was completed, the Township has completed a mix of resurfacing and reconstruction projects. It is recommended that the Township continue this practice and include a budget allocation for preservation, resurfacing and reconstruction.

The Manual uses the 'Priority Guide Number' to prioritize road sections with an improvement cost based on cost per user. Prioritizing roads based on best value for dollar spent rather than on the condition of the road will assist the Township in preparing a reasonable and effective capital plan for reconstruction projects.

Other recommendations to consider:

1. Implement an annual traffic counting program. 20% of the roads can be counted annually, ensuring the Township has accurate and up-to-date information. Accurate traffic volumes ensure roads are classified, constructed, and maintained properly. This will also assist in prioritizing needs and preparing capital and maintenance programs.
2. If the Township would like to more accurately reflect future construction costs based on actual road properties, consideration should be given to development of municipal standards for the road network. Cost estimates prepared in this report are based on rehabilitation and reconstruction items included in the Manual and do not necessarily reflect current road conditions.

From a budgetary perspective, the Township should look to prioritize preservation type projects, such as crack sealing, and rehabilitation projects, such as resurfacing, over reconstruction projects as this will maintain and renew the road network and assist in ensuring the maximum service life of the system is reached.

12.0 *Statement of Limitations*

This report has been prepared by Jewell Engineering Inc. on behalf of the Township of South Algonquin. Conclusions and recommendations in this report are based on observations in the field and available background information.

The report documents the road conditions observed on the specific days the roads were reviewed and should only be used as a guideline in preparing short- and long-term capital and maintenance programs. Costs are preliminary and based on the Inventory Manual and do not necessarily consider all aspects of rehabilitation or reconstruction.

The report has been prepared for the express use of the Township of South Algonquin and any use by a third party is prohibited.

APPENDIX A
SECTION LISTING

| <i>Section No.</i> | <i>Name</i> | <i>From</i> | <i>To</i> |
|--------------------|------------------------|--------------------------------|-------------------------------|
| RD010 | Airy Road | Highway 60 | 0.9km west of Highway 60 |
| RD020 | Airy Road | 0.9 km west of Highway 60 | 1.2 km west of Highway 60 |
| RD030 | Galeairy Lake Road | Maple Drive (N) | Maple Drive (S) |
| RD035 | Galeairy Lake Road | Highway 60 | Maple Drive (N) |
| RD040 | Maple Drive | Galeairy Lake Rd. N. | Galeairy Lake Rd. S. |
| RD050 | Sunset Trail | Maple Drive | End |
| RD060 | Birch Crescent | Maple Drive | End |
| RD070 | Hemlock Crescent | Maple Drive | End |
| RD080 | Galeairy Lake Crescent | Galeairy Lake Road | End |
| RD090 | Fire Route-Dam | Galeairy Lake Road | End |
| RD100 | Hay Creek Road (PA) | Highway 60 | 1.25 km South of Highway 60 |
| RD110 | Hay Creek Road (UP) | 1.25 km South of Ottawa Street | McCrae's Mill |
| RD120 | Dave Bowers Road | Hay Creek Road | 0.1 km west of Hay Creek Road |
| RD130 | Ottawa Street | First Avenue | Second Avenue |
| RD135 | Ottawa Street | Highway 60 | First Avenue |
| RD140 | Lake Street | Third Avenue | Lakeshore Drive |
| RD145 | Lake Street | Second Avenue | Third Avenue |
| RD150 | Boat Launch Road | Ottawa Street | 0.10 west of Ottawa Street |
| RD160 | Lakeshore Avenue | Hay Creek Road | Third Street |
| RD170 | First Avenue | Hay Creek Road | Ottawa Street |
| RD180 | Second Avenue | Hay Creek Road | Ottawa Street |
| RD190 | Third Avenue | Hay Creek Road | Lakeshore Drive |
| RD200 | Mill Street | First Avenue | Second Avenue |
| RD220 | Paradise Road | Highway 60 | 1.1 km south of Highway 60 |
| RD230 | Paradise Road | 1.1 km south of Highway 60 | End |
| RD240 | Hilltop Crescent | Highway 60 | End |
| RD250 | Church Hill Street | Post Street | 0.06 km South of Post Street |
| RD254 | Church Hill Street | 0.06 South of Post Street | 300m North of Highway 60 |
| RD258 | Church Hill Street | 300m North of Highway 60 | Highway 60 |

| <i>Section No.</i> | <i>Name</i> | <i>From</i> | <i>To</i> |
|--------------------|-----------------------|---------------------------------|---------------------------------|
| RD260 | Park Street | Highway 60 | Paradise Rd. |
| RD280 | Post Street | Highway 60 | Medical Centre Road |
| RD290 | Post Street | Medical Centre Road | End |
| RD300 | Medical Centre Road | Post Street | End |
| RD310 | Madawaska Avenue | Post Street | Madawaska Street |
| RD320 | Madawaska Street | Algonquin Street | End |
| RD330 | Madawaska Street | Highway 60 | Madawaska Avenue |
| RD335 | Madawaska Street | Madawaska Avenue | Algonquin Street |
| RD340 | Algonquin Street | Madawaska Street | Algonquin Crescent |
| RD340 | Algonquin Street | Algonquin Crescent | End |
| RD350 | Algonquin Crescent | Highway 60 | End |
| RD360 | Nipissing Road | Algonquin Street | 0.6 km East of Algonquin Street |
| RD380 | Nipissing Road | 0.6 km East of Algonquin Street | 2.3 km East of Algonquin Street |
| RD390 | Old Highway 127 | Highway 60 | Highway 127 |
| RD400 | Spectacle Lake Road | Highway 60 | Dickens Township Boundary |
| RD410 | Aylen Lake Road | Highway 60 | End |
| RD420 | Gaffney Road | Aylen Lake Road | Moonlight Road |
| RD424 | Gaffney Road | Moonlight Bay Road | Burnt Depot Road |
| RD428 | Gaffney Road | Burnt Depot Road | End |
| RD430 | Burnt Depot Road | Gaffney Road | 200m East of Gaffney Road |
| RD435 | Burnt Depot Road | 200m East of Gaffney Road | End |
| RD440 | Moonlight Bay Road | Gaffney Road | End |
| RD450 | Whites Road | Aylen Lake Road | End |
| RD460 | North Aylen Lake Road | Aylen Lake | Chapel Lane |
| RD463 | North Aylen Lake Road | Chapel Lane | Ferndale Lane |
| RD468 | North Aylen Lake Road | Ferndale Lane | End |
| RD470 | Pringles Road | North Aylen Lake Road | End |
| RD480 | Shields Road | North Aylen Lake Road | End |
| RD490 | Old Farm Road | Aylen Lake North Road | End |
| RD500 | Paplinskie Road | Highway 60 | Civic #221 |
| RD505 | Paplinskie Road | Civic #221 | End |

| <i>Section No.</i> | <i>Name</i> | <i>From</i> | <i>To</i> |
|--------------------|-------------------------------|---------------------------------------|---------------------------------------|
| RD510 | Dunnes Road | Highway 60 | End |
| RD520 | Dawson Street | Highway 60 West | Highway 60 East |
| RD530 | Merton Street | Murchison Road | Highway 60 |
| RD540 | Murchison Road | Dawson Street | End |
| RD550 | Holstein Street | Merton Road | End |
| RD580 | Victoria Street | Highway 60 | Major Lake Road |
| RD590 | Fire Route - Pump House | Major Lake Road | End |
| RD600 | Tom and Mick Murray Park Road | Highway 523 | End |
| RD610 | Major Lake Road | Highway 60 | Victoria Street |
| RD612 | Major Lake Road | Victoria Street | 4.7km North of Highway 60 |
| RD613 | Major Lake Road | 4.7km North of Highway 60 | 6km North of Highway 60 |
| RD614 | Major Lake Road | 6km North of Highway 60 | Victoria Lake Road |
| RD615 | Major Lake Road | Victoria Lake Road | McCaulley Lake Road |
| RD630 | Victoria Lake Road | Major Lake Road | Civic #700 |
| RD635 | Victoria Lake Road | Civic #700 | End |
| RD640 | McCaulley Lake Road | Major Lake Road | End |
| RD660 | Reids Road | Highway 523 | End |
| RD670 | Lyell Lake Landing Road | Highway 523 | End |
| RD680 | McGuey Road | Highway 127 | Civic# 471 |
| RD685 | McGuey Road | Civic #471 | End |
| RD690 | McRae-Hay Lake Road (PA) | 2.4km West of Highway 127 (Civic 510) | McRae-Hay Lake Road (UP) |
| RD691 | McRae-Hay Lake Road (PA) | Highway 127 | 2.4km West of Highway 127 (Civic 510) |
| RD700 | McRae-Hay Lake Road (UP) | North Road | End |
| RD710 | Bennett Road | McRae-Hay Lake Road | End |
| RD730 | McKenzie Lake Road | Highway 127 | Proven Line |
| RD732 | McKenzie Lake Road | Proven Line | North McKenzie Lake Road |
| RD734 | McKenzie Lake Road | North McKenzie Lake Road | South McKenzie Lake Road |

| <i>Section No.</i> | <i>Name</i> | <i>From</i> | <i>To</i> |
|--------------------|--------------------------|--------------------------------|--------------------------------|
| RD736 | McKenzie Lake Road | South McKenzie Lake Road | Highway 127 |
| RD740 | South McKenzie Lake Road | McKenzie Lake Road | End |
| RD750 | North McKenzie Lake Road | McKenzie Lake Rd. | Civic #681 (Moosemeat Archery) |
| RD752 | North McKenzie Lake Road | Civic #681 (Moosemeat Archery) | Henry Coglan Drive |
| RD755 | North McKenzie Lake Road | Henry Coglan Drive | End |
| RD760 | Henry Coglan Drive | North McKenzie Lake Road | End |
| RD770 | Proven Line | McKenzie Lake Road | Pastwa Lake Road |
| RD780 | Pastwa Lake Road | Proven Line | 2.7 km East of Proven Line |
| RD785 | Pastwa Lake Road | 2.7 km East of Proven Line | End |
| RD790 | Kuiack Road | Pastwa Lake Road | End |
| RD791 | Kenny Road | Paradise | End |

APPENDIX B

ROAD SECTIONS BY CRITICAL DEFICIENCIES

Township South Algonquin (2022) Road Conditions

| Name | From | To | Surface Condition | Surface Type | Surface Width | Structural Adequacy | Drainage |
|------------------------|--------------------------------|-------------------------------|-------------------|--------------|---------------|---------------------|----------|
| Airy Road | Highway 60 | 0.9km west of Highway 60 | 8 | ADEQ | ADEQ | ADEQ | ADEQ |
| Airy Road | 0.9 km west of Highway 60 | 1.2 km west of Highway 60 | 9 | ADEQ | NOW | ADEQ | (1-5) |
| Galeairy Lake Road | Maple Drive (N) | Maple Drive (S) | 9 | ADEQ | ADEQ | ADEQ | ADEQ |
| Galeairy Lake Road | Highway 60 | Maple Drive (N) | 9 | ADEQ | ADEQ | ADEQ | ADEQ |
| Maple Drive | Galeairy Lake Rd. N. | Galeairy Lake Rd. S. | 9 | ADEQ | ADEQ | ADEQ | ADEQ |
| Sunset Trail | Maple Drive | End | 7 | ADEQ | ADEQ | ADEQ | ADEQ |
| Birch Crescent | Maple Drive | End | 9 | ADEQ | ADEQ | ADEQ | ADEQ |
| Hemlock Crescent | Maple Drive | End | 9 | ADEQ | ADEQ | ADEQ | ADEQ |
| Galeairy Lake Crescent | Galeairy Lake Road | End | 9 | NOW | NOW | ADEQ | (6-10) |
| Fire Route-Dam | Galeairy Lake Road | End | 7 | ADEQ | ADEQ | ADEQ | ADEQ |
| Hay Creek Road (PA) | Highway 60 | 1.25 km South of Highway 60 | 4 | ADEQ | ADEQ | NOW | ADEQ |
| Hay Creek Road (UP) | 1.25 km South of Ottawa Street | McCrae's Mill | 7 | NOW | ADEQ | ADEQ | (6-10) |
| Dave Bowers Road | Hay Creek Road | 0.1 km west of Hay Creek Road | 7 | ADEQ | NOW | ADEQ | ADEQ |
| Ottawa Street | First Avenue | Second Avenue | 9 | ADEQ | ADEQ | ADEQ | ADEQ |
| Ottawa Street | Highway 60 | First Avenue | 8 | ADEQ | ADEQ | ADEQ | ADEQ |
| Lake Street | Third Avenue | Lakeshore Drive | 8 | ADEQ | ADEQ | ADEQ | ADEQ |
| Lake Street | Second Avenue | Third Avenue | 8 | ADEQ | ADEQ | ADEQ | ADEQ |
| Boat Launch Road | Ottawa Street | 0.10 west of Ottawa Street | 9 | ADEQ | ADEQ | ADEQ | ADEQ |

| Name | From | To | Surface Condition | Surface Type | Surface Width | Structural Adequacy | Drainage |
|---------------------|----------------------------|------------------------------|-------------------|--------------|---------------|---------------------|----------|
| | | | | | | | |
| Lakeshore Avenue | Hay Creek Road | Third Street | 7 | ADEQ | NOW | ADEQ | ADEQ |
| First Avenue | Hay Creek Road | Ottawa Street | 10 | ADEQ | ADEQ | ADEQ | ADEQ |
| Second Avenue | Hay Creek Road | Ottawa Street | 5 | ADEQ | ADEQ | (1-5) | ADEQ |
| Third Avenue | Hay Creek Road | Lakeshore Drive | 6 | ADEQ | ADEQ | (6-10) | ADEQ |
| Mill Street | First Avenue | Second Avenue | 10 | ADEQ | ADEQ | ADEQ | ADEQ |
| Paradise Road | Highway 60 | 1.1 km south of Highway 60 | 10 | ADEQ | ADEQ | ADEQ | ADEQ |
| Paradise Road | 1.1 km south of Highway 60 | End | 6 | ADEQ | ADEQ | ADEQ | (6-10) |
| Hilltop Crescent | Highway 60 | End | 6 | NOW | ADEQ | ADEQ | ADEQ |
| Church Hill Street | Post Street | 0.06 km South of Post Street | 9 | ADEQ | ADEQ | ADEQ | ADEQ |
| Church Hill Street | 0.06 South of Post Street | 300m North of Highway 60 | 5 | ADEQ | ADEQ | (1-5) | NOW |
| Church Hill Street | 300m North of Highway 60 | Highway 60 | 7 | NOW | ADEQ | ADEQ | ADEQ |
| Park Street | Highway 60 | Paradise Rd. | 10 | ADEQ | ADEQ | ADEQ | ADEQ |
| Post Street | Highway 60 | Medical Centre Road | 9 | ADEQ | ADEQ | ADEQ | ADEQ |
| Post Street | Medical Centre Road | End | 6 | ADEQ | ADEQ | (1-5) | (1-5) |
| Medical Centre Road | Post Street | End | 6 | ADEQ | ADEQ | (1-5) | ADEQ |
| Madawaska Avenue | Post Street | Madawaska Street | 10 | ADEQ | ADEQ | ADEQ | NOW |
| Madawaska Street | Algonquin Street | End | 7 | ADEQ | ADEQ | ADEQ | ADEQ |
| Madawaska Street | Highway 60 | Madawaska Avenue | 5 | ADEQ | ADEQ | (1-5) | ADEQ |
| Madawaska Street | Madawaska Avenue | Algonquin Street | 10 | ADEQ | ADEQ | ADEQ | ADEQ |
| Algonquin Street | Algonquin Crescent | End | 7 | ADEQ | ADEQ | ADEQ | ADEQ |
| Algonquin Street | Madawaska Street | Algonquin Crescent | 9 | ADEQ | ADEQ | ADEQ | ADEQ |
| Algonquin Crescent | Highway 60 | End | 8 | ADEQ | ADEQ | ADEQ | ADEQ |

| Name | From | To | Surface Condition | Surface Type | Surface Width | Structural Adequacy | Drainage |
|-----------------------|---------------------------------|---------------------------------|-------------------|--------------|---------------|---------------------|----------|
| Nipissing Road | Algonquin Street | 0.6 km East of Algonquin Street | 7 | ADEQ | ADEQ | (1-5) | ADEQ |
| Nipissing Road | 0.6 km East of Algonquin Street | 2.3 km East of Algonquin Street | 7 | ADEQ | ADEQ | ADEQ | ADEQ |
| Old Highway 127 | Highway 60 | Highway 127 | 6 | ADEQ | ADEQ | ADEQ | (6-10) |
| Spectacle Lake Road | Highway 60 | Dickens Township Boundary | 9 | ADEQ | ADEQ | ADEQ | ADEQ |
| Aylen Lake Road | Highway 60 | End | 10 | ADEQ | ADEQ | ADEQ | ADEQ |
| Gaffney Road | Aylen Lake Road | Moonlight Road | 6 | ADEQ | ADEQ | ADEQ | ADEQ |
| Gaffney Road | Moonlight Bay Road | Burnt Depot Road | 8 | ADEQ | ADEQ | ADEQ | ADEQ |
| Gaffney Road | Burnt Depot Road | End | 7 | ADEQ | NOW | ADEQ | ADEQ |
| Burnt Depot Road | 200m East of Gaffney Road | End | 4 | ADEQ | NOW | NOW | (6-10) |
| Burnt Depot Road | Gaffney Road | 200m East of Gaffney Road | 7 | ADEQ | ADEQ | ADEQ | ADEQ |
| Moonlight Bay Road | Gaffney Road | End | 8 | ADEQ | ADEQ | ADEQ | ADEQ |
| Whites Road | Aylen Lake Road | End | 6 | ADEQ | ADEQ | ADEQ | ADEQ |
| North Aylen Lake Road | Aylen Lake | Chapel Lane | 6 | ADEQ | NOW | ADEQ | ADEQ |
| North Aylen Lake Road | Chapel Lane | Ferndale Lane | 7 | ADEQ | NOW | ADEQ | ADEQ |
| North Aylen Lake Road | Ferndale Lane | End | 7 | ADEQ | NOW | ADEQ | ADEQ |
| Pringles Road | North Aylen Lake Road | End | 7 | ADEQ | ADEQ | ADEQ | ADEQ |
| Shields Road | North Aylen Lake Road | End | 10 | ADEQ | ADEQ | ADEQ | ADEQ |
| Old Farm Road | Aylen Lake North Road | End | 4 | ADEQ | NOW | NOW | (6-10) |
| Papilnskie Road | Highway 60 | Civic #221 | 7 | ADEQ | NOW | ADEQ | (6-10) |
| Papilnskie Road | Civic #221 | End | 7 | ADEQ | ADEQ | ADEQ | (6-10) |
| Dunnes Road | Highway 60 | End | 5 | ADEQ | NOW | ADEQ | (6-10) |
| Dawson Street | Highway 60 West | Highway 60 East | 7 | ADEQ | ADEQ | ADEQ | ADEQ |

| Name | From | To | Surface Condition | Surface Type | Surface Width | Structural Adequacy | Drainage |
|-------------------------------|---------------------------------------|---------------------------------------|-------------------|--------------|---------------|---------------------|----------|
| | | | | | | | |
| Merton Street | Murchison Road | Highway 60 | 7 | ADEQ | ADEQ | ADEQ | ADEQ |
| Murchison Road | Dawson Street | End | 7 | ADEQ | ADEQ | ADEQ | ADEQ |
| Holstein Street | Merton Road | End | 7 | ADEQ | ADEQ | ADEQ | ADEQ |
| Victoria Street | Highway 60 | Major Lake Road | 8 | ADEQ | ADEQ | ADEQ | ADEQ |
| Fire Route - Pump House | Major Lake Road | End | 9 | ADEQ | ADEQ | ADEQ | ADEQ |
| Tom and Mick Murray Park Road | Highway 523 | End | 8 | ADEQ | NOW | ADEQ | ADEQ |
| Major Lake Road | Highway 60 | Victoria Street | 5 | ADEQ | ADEQ | (8-10) | ADEQ |
| Major Lake Road | Victoria Street | 4.7km North of Highway 60 | 7 | ADEQ | ADEQ | (6-10) | ADEQ |
| Major Lake Road | 4.7km North of Highway 60 | 8km North of Highway 60 | 9 | ADEQ | ADEQ | ADEQ | ADEQ |
| Major Lake Road | 6km North of Highway 60 | Victoria Lake Road | 6 | ADEQ | ADEQ | (6-10) | ADEQ |
| Major Lake Road | Victoria Lake Road | McCauley Lake Road | 9 | ADEQ | ADEQ | (6-10) | ADEQ |
| Victoria Lake Road | Major Lake Road | Civic #700 | 8 | ADEQ | ADEQ | ADEQ | ADEQ |
| Victoria Lake Road | Civic #700 | End | 7 | ADEQ | ADEQ | ADEQ | ADEQ |
| McCauley Lake Road | Major Lake Road | End | 7 | ADEQ | ADEQ | ADEQ | ADEQ |
| Reids Road | Highway 523 | End | 8 | ADEQ | ADEQ | ADEQ | ADEQ |
| Lyell Lake Landing Road | Highway 523 | End | 8 | ADEQ | ADEQ | ADEQ | ADEQ |
| McGuey Road | Highway 127 | Civic# 471 | 8 | ADEQ | ADEQ | ADEQ | ADEQ |
| McGuey Road | Civic #471 | End | 8 | ADEQ | ADEQ | ADEQ | ADEQ |
| McRae-Hay Lake Road (PA) | 2.4km West of Highway 127 (Civic 510) | McRae-Hay Lake Road (UP) | 4 | ADEQ | ADEQ | NOW | ADEQ |
| McRae-Hay Lake Road (PA) | Highway 127 | 2.4km West of Highway 127 (Civic 510) | 6 | ADEQ | ADEQ | (1-5) | ADEQ |
| McRae-Hay Lake Road (UP) | North Road | End | 7 | ADEQ | NOW | ADEQ | ADEQ |
| Bennett Road | McRae-Hay Lake Road | End | 4 | ADEQ | NOW | NOW | (8-10) |

| Name | From | To | Surface Condition | Surface Type | Surface Width | Structural Adequacy | Drainage |
|--------------------------|--------------------------------|--------------------------------|-------------------|--------------|---------------|---------------------|----------|
| | | | | | | | |
| McKenzie Lake Road | South McKenzie Lake Road | Highway 127 | 8 | ADEQ | ADEQ | ADEQ | ADEQ |
| McKenzie Lake Road | Highway 127 | Proven Line | 9 | ADEQ | ADEQ | ADEQ | ADEQ |
| McKenzie Lake Road | Proven Line | North McKenzie Lake Road | 8 | ADEQ | ADEQ | ADEQ | ADEQ |
| McKenzie Lake Road | North McKenzie Lake Road | South McKenzie Lake Road | 7 | ADEQ | ADEQ | ADEQ | ADEQ |
| South McKenzie Lake Road | McKenzie Lake Road | End | 7 | ADEQ | ADEQ | ADEQ | ADEQ |
| North McKenzie Lake Road | McKenzie Lake Rd. | Civic #681 (Moosemeat Archery) | 6 | ADEQ | ADEQ | ADEQ | ADEQ |
| North McKenzie Lake Road | Civic #681 (Moosemeat Archery) | Henry Coglian Drive | 7 | ADEQ | ADEQ | ADEQ | ADEQ |
| North McKenzie Lake Road | Henry Coglian Drive | End | 8 | ADEQ | ADEQ | ADEQ | ADEQ |
| Henry Coglian Drive | North McKenzie Lake Road | End | 8 | ADEQ | ADEQ | ADEQ | ADEQ |
| Proven Line | McKenzie Lake Road | Pastwa Lake Road | 7 | ADEQ | ADEQ | ADEQ | ADEQ |
| Pastwa Lake Road | Proven Line | 2.7 km East of Proven Line | 7 | ADEQ | ADEQ | NOW | NOW |
| Pastwa Lake Road | 2.7 km East of Proven Line | End | 1 | ADEQ | NOW | NOW | NOW |
| Kuiack Road | Pastwa Lake Road | End | 8 | ADEQ | NOW | ADEQ | ADEQ |
| Kenny Road | Paradise | End | 9 | ADEQ | ADEQ | ADEQ | ADEQ |

APPENDIX C
'NOW' RECONSTRUCTION NEEDS

NOW Reconstruction Needs All Roads

| Sec. # | Name | From | To | Length | Priority Guide | Surf | Type of Improvement | Time of Improvement | Total Cost |
|--------|------------------------|--------------------------------|-----------------------------|--------|----------------|------|---------------------|---------------------|-----------------------|
| RD100 | Hay Creek Road (PA) | Highway 60 | 1.25 km South of Highway 60 | 1.250 | 151.2 | LCB | REC | NOW | \$1,359,895.83 |
| RD110 | Hay Creek Road (UP) | 1.25 km South of Ottawa Street | McCrae's Mill | 0.750 | 87.6 | G/S | REC | NOW | \$928,467.11 |
| RD254 | Church Hill Street | 0.06 South of Post Street | 300m North of Highway 60 | 0.380 | 33.2 | LCB | REC | NOW | \$363,785.60 |
| RD240 | Hilltop Crescent | Highway 60 | End | 0.360 | 16.9 | ETH | REC | NOW | \$242,287.63 |
| RD258 | Church Hill Street | 300m North of Highway 60 | Highway 60 | 0.300 | 12.8 | G/S | REC | NOW | \$287,199.16 |
| RD080 | Galeairy Lake Crescent | Galeairy Lake Road | End | 0.130 | 6.0 | G/S | REC | NOW | \$124,452.97 |
| <hr/> | | | | | | | | | |
| 3.170 | | | | | | | | | \$3,306,088.30 |

APPENDIX D

'(1-5)' RECONSTRUCTION NEEDS

1-5 Year Reconstruction Needs All Roads

| Sec. # | Name | From | To | Length | Priority Guide | Surf | Type of Improvement | Time of Improvement | Total Cost |
|--------|---------------------|---------------------|------------------|--------------|----------------|------|---------------------|---------------------|---------------------|
| RD300 | Medical Centre Road | Post Street | End | 0.170 | 39.0 | LCB | REC | (1-5) | \$162,746.19 |
| RD290 | Post Street | Medical Centre Road | End | 0.170 | 29.9 | LCB | REC | (1-5) | \$162,746.19 |
| RD330 | Madawaska Street | Highway 60 | Madawaska Avenue | 0.100 | 8.6 | LCB | REC | (1-5) | \$95,733.05 |
| | | | | 0.440 | | | | | \$421,225.43 |

APPENDIX E

'(6-10)' RESURFACING NEEDS

6-10 Year Resurfacing Needs All Roads

| Sec. # | Name | From | To | Length | Priority Guide | Surf | Type of Improvement | Time of Improvement | Total Cost |
|--------|-----------------|-------------------------|--------------------|--------|----------------|------|---------------------|---------------------|---------------------|
| RD610 | Major Lake Road | Highway 60 | Victoria Street | 0.700 | 245.7 | LCB | R1 | (6-10) | \$40,360.32 |
| RD614 | Major Lake Road | 6km North of Highway 60 | Victoria Lake Road | 2.000 | 232.4 | LCB | R1 | (6-10) | \$115,315.20 |
| RD190 | Third Avenue | Hay Creek Road | Lakeshore Drive | 0.120 | 89.3 | LCB | R1 | (6-10) | \$11,254.54 |
| <hr/> | | | | | | | | | |
| | | | | | | | | | \$166,930.06 |

APPENDIX F
MINIMUM MAINTENANCE STANDARDS (MMS)
ROAD CLASSIFICATIONS

MMS Classification

| Sec. # | Name | From | To | Length | MMS Class | AADT Year | AADT Year | Speed Limit |
|--------|------------------------|--------------------------------|-------------------------------|--------|-----------|-----------|-----------|-------------|
| RD010 | Airy Road | Highway 60 | 0.9km west of Highway 60 | 0.900 | 6 | 10 | 2021 | 50 |
| RD020 | Airy Road | 0.9 km west of Highway 60 | 1.2 km west of Highway 60 | 0.300 | 6 | 10 | 2021 | 50 |
| RD030 | Galeairy Lake Road | Maple Drive (N) | Maple Drive (S) | 0.440 | 6 | 318 | 2021 | 40 |
| RD035 | Galeairy Lake Road | Highway 60 | Maple Drive (N) | 0.250 | 6 | 318 | 2021 | 40 |
| RD040 | Maple Drive | Galeairy Lake Rd. N. | Galeairy Lake Rd. S. | 0.850 | 5 | 300 | | 50 |
| RD050 | Sunset Trail | Maple Drive | End | 0.600 | 6 | 40 | | 50 |
| RD060 | Birch Crescent | Maple Drive | End | 0.150 | 6 | 20 | | 50 |
| RD070 | Hemlock Crescent | Maple Drive | End | 0.130 | 6 | 20 | | 50 |
| RD080 | Galeairy Lake Crescent | Galeairy Lake Road | End | 0.130 | 6 | 20 | | 40 |
| RD090 | Fire Route-Dam | Galeairy Lake Road | End | 0.050 | 6 | 5 | | 50 |
| RD100 | Hay Creek Road (PA) | Highway 60 | 1.25 km South of Highway 60 | 1.250 | 5 | 638 | 2021 | 40 |
| RD110 | Hay Creek Road (UP) | 1.25 km South of Ottawa Street | McCrae's Mill | 0.750 | 5 | 638 | 2021 | 40 |
| RD120 | Dave Bowers Road | Hay Creek Road | 0.1 km west of Hay Creek Road | 0.100 | 6 | 20 | | 50 |
| RD130 | Ottawa Street | First Avenue | Second Avenue | 0.200 | 5 | 624 | 2021 | 50 |
| RD135 | Ottawa Street | Highway 60 | First Avenue | 0.400 | 5 | 624 | 2021 | 50 |
| RD140 | Lake Street | Third Avenue | Lakeshore Drive | 0.250 | 6 | 156 | | 50 |
| RD145 | Lake Street | Second Avenue | Third Avenue | 0.300 | 6 | 156 | | 50 |
| RD150 | Boat Launch Road | Ottawa Street | 0.10 west of Ottawa Street | 0.100 | 6 | 10 | | 50 |
| RD160 | Lakeshore Avenue | Hay Creek Road | Third Street | 0.600 | 6 | 30 | | 50 |

| Sec. # | Name | From | To | Length | MMS Class | AADT Year | AADT Year | Speed Limit |
|--------|---------------------|----------------------------|------------------------------|--------|-----------|-----------|-----------|-------------|
| RD170 | First Avenue | Hay Creek Road | Ottawa Street | 0.200 | 6 | 156 | | 50 |
| RD180 | Second Avenue | Hay Creek Road | Ottawa Street | 0.210 | 6 | 156 | | 50 |
| RD190 | Third Avenue | Hay Creek Road | Lakeshore Drive | 0.120 | 6 | 156 | | 50 |
| RD200 | Mill Street | First Avenue | Second Avenue | 0.200 | 6 | 156 | | 50 |
| RD220 | Paradise Road | Highway 60 | 1.1 km south of Highway 60 | 1.100 | 6 | 195 | 2021 | 50 |
| RD230 | Paradise Road | 1.1 km south of Highway 60 | End | 1.300 | 6 | 5 | 2021 | 50 |
| RD240 | Hilltop Crescent | Highway 60 | End | 0.360 | 6 | 50 | | 50 |
| RD250 | Church Hill Street | Post Street | 0.06 km South of Post Street | 0.060 | 6 | 93 | | 50 |
| RD254 | Church Hill Street | 0.06 South of Post Street | 300m North of Highway 60 | 0.380 | 6 | 93 | | 50 |
| RD258 | Church Hill Street | 300m North of Highway 60 | Highway 60 | 0.300 | 6 | 93 | | 50 |
| RD260 | Park Street | Highway 60 | Paradise Rd. | 0.245 | 6 | 93 | | 50 |
| RD280 | Post Street | Highway 60 | Medical Centre Road | 0.270 | 5 | 371 | 2021 | 50 |
| RD290 | Post Street | Medical Centre Road | End | 0.170 | 6 | 93 | | 50 |
| RD300 | Medical Centre Road | Post Street | End | 0.170 | 6 | 186 | | 50 |
| RD310 | Madawaska Avenue | Post Street | Madawaska Street | 0.050 | 6 | 0 | | 50 |
| RD320 | Madawaska Street | Algonquin Street | End | 1.000 | 6 | 40 | | 50 |
| RD330 | Madawaska Street | Highway 60 | Madawaska Avenue | 0.100 | 6 | 25 | 2021 | 50 |
| RD335 | Madawaska Street | Madawaska Avenue | Algonquin Street | 0.200 | 5 | 300 | | 50 |
| RD340 | Algonquin Street | Madawaska Street | Algonquin Crescent | 0.700 | 6 | 39 | 2021 | 50 |
| RD340 | Algonquin Street | Algonquin Crescent | End | 0.210 | 6 | 39 | 2021 | 50 |
| RD350 | Algonquin Crescent | Highway 60 | End | 0.400 | 6 | 20 | | 50 |

| <i>Soc. #</i> | <i>Name</i> | <i>From</i> | <i>To</i> | <i>Length</i> | <i>MMS Class</i> | <i>AADT Year</i> | <i>AADT</i> | <i>Speed Limit</i> |
|---------------|-----------------------|---------------------------------|---------------------------------|---------------|------------------|------------------|-------------|--------------------|
| RD360 | Nipissing Road | Algonquin Street | 0.6 km East of Algonquin Street | 0.600 | 5 | 300 | 300 | 50 |
| RD380 | Nipissing Road | 0.6 km East of Algonquin Street | 2.3 km East of Algonquin Street | 1.670 | 5 | 300 | 300 | 50 |
| RD390 | Old Highway 127 | Highway 60 | Highway 127 | 5.530 | 6 | 38 | 2021 | 80 |
| RD400 | Spectacle Lake Road | Highway 60 | Dickens Township Boundary | 1.380 | 6 | 62 | 2021 | 50 |
| RD410 | Aylen Lake Road | Highway 60 | End | 8.300 | 5 | 86 | 2021 | 60 |
| RD420 | Gaffney Road | Aylen Lake Road | Moonlight Road | 0.810 | 6 | 21 | | 80 |
| RD424 | Gaffney Road | Moonlight Bay Road | Burnt Depot Road | 3.870 | 6 | 21 | | 80 |
| RD428 | Gaffney Road | Burnt Depot Road | End | 0.620 | 6 | 21 | | 80 |
| RD435 | Burnt Depot Road | 200m East of Gaffney Road | End | 0.300 | 6 | 5 | | 80 |
| RD430 | Burnt Depot Road | Gaffney Road | 200m East of Gaffney Road | 0.200 | 6 | 5 | | 80 |
| RD440 | Moonlight Bay Road | Gaffney Road | End | 2.200 | 6 | 5 | | 80 |
| RD450 | Whites Road | Aylen Lake Road | End | 0.700 | 6 | 5 | | 80 |
| RD460 | North Aylen Lake Road | Aylen Lake | Chapel Lane | 3.320 | 6 | 43 | | 80 |
| RD463 | North Aylen Lake Road | Chapel Lane | Fermdale Lane | 2.080 | 6 | 43 | | 80 |
| RD466 | North Aylen Lake Road | Fermdale Lane | End | 2.310 | 6 | 43 | | 80 |
| RD470 | Pringles Road | North Aylen Lake Road | End | 0.670 | 6 | 10 | | 80 |
| RD480 | Shields Road | North Aylen Lake Road | End | 0.160 | 6 | 10 | | 80 |
| RD490 | Old Farm Road | Aylen Lake North Road | End | 0.310 | 6 | 5 | | 80 |
| RD505 | Paplinskie Road | Civic #221 | End | 1.100 | 6 | 39 | 2021 | 80 |
| RD500 | Paplinskie Road | Highway 60 | Civic #221 | 1.000 | 6 | 39 | | 80 |
| RD510 | Dunnes Road | Highway 60 | End | 2.100 | 6 | 10 | | 80 |

| Sec. # | Name | From | To | Length | MMS Class | AADT Year | Speed Limit |
|--------|-------------------------------|---------------------------------------|---------------------------|--------|-----------|-----------|-------------|
| RD520 | Dawson Street | Highway 60 West | Highway 60 East | 0.800 | 6 | 101 | 50 |
| RD530 | Merton Street | Murchison Road | Highway 60 | 0.610 | 6 | 101 | 50 |
| RD540 | Murchison Road | Dawson Street | End | 0.240 | 6 | 101 | 50 |
| RD550 | Holstein Street | Merton Road | End | 0.500 | 6 | 50 | 50 |
| RD580 | Victoria Street | Highway 60 | Major Lake Road | 0.400 | 6 | 79 | 2021 |
| RD590 | Fire Route - Pump House | Major Lake Road | End | 0.150 | 6 | 20 | 50 |
| RD600 | Tom and Mick Murray Park Road | Highway 523 | End | 0.670 | 6 | 5 | 80 |
| RD610 | Major Lake Road | Highway 60 | Victoria Street | 0.700 | 5 | 209 | 2021 |
| RD612 | Major Lake Road | Victoria Street | 4.7km North of Highway 60 | 4.000 | 4 | 209 | 2021 |
| RD613 | Major Lake Road | 4.7km North of Highway 60 | 6km North of Highway 60 | 1.300 | 4 | 209 | 2021 |
| RD614 | Major Lake Road | 6km North of Highway 60 | Victoria Lake Road | 2.000 | 4 | 209 | 2021 |
| RD615 | Major Lake Road | Victoria Lake Road | McCauley Lake Road | 3.100 | 4 | 209 | 2021 |
| RD630 | Victoria Lake Road | Major Lake Road | Civic #700 | 3.440 | 6 | 5 | 80 |
| RD635 | Victoria Lake Road | Civic #700 | End | 2.510 | 6 | 5 | 80 |
| RD640 | McCauley Lake Road | Major Lake Road | End | 3.150 | 6 | 11 | 2021 |
| RD660 | Reids Road | Highway 523 | End | 0.100 | 6 | 20 | 80 |
| RD670 | Lyell Lake Landing Road | Highway 523 | End | 0.400 | 6 | 30 | 80 |
| RD680 | McGuey Road | Highway 127 | Civic# 471 | 2.370 | 6 | 44 | 2021 |
| RD685 | McGuey Road | Civic #471 | End | 1.970 | 6 | 44 | 2021 |
| RD690 | McRae-Hay Lake Road (PA) | 2.4km West of Highway 127 (Civic 510) | McRae-Hay Lake Road (UP) | 2.000 | 6 | 19 | 2021 |

| Sec. # | Name | From | To | Length | MMS Class | AADT | Year | Speed Limit |
|--------|--------------------------|--------------------------------|---------------------------------------|----------------|-----------|------|------|-------------|
| RD691 | McRae-Hay Lake Road (PA) | Highway 127 | 2.4km West of Highway 127 (Civic 510) | 2.400 | 6 | 19 | 2021 | 80 |
| RD700 | McRae-Hay Lake Road (UP) | North Road | End | 2.480 | 6 | 19 | | 80 |
| RD710 | Bennett Road | McRae-Hay Lake Road | End | 2.360 | 6 | 5 | | 80 |
| RD736 | McKenzie Lake Road | South McKenzie Lake Road | Highway 127 | 1.560 | 6 | 45 | 2021 | 80 |
| RD739 | McKenzie Lake Road | Highway 127 | Proven Line | 1.580 | 6 | 45 | 2021 | 80 |
| RD732 | McKenzie Lake Road | Proven Line | North McKenzie Lake Road | 2.460 | 6 | 45 | 2021 | 80 |
| RD734 | McKenzie Lake Road | North McKenzie Lake Road | South McKenzie Lake Road | 3.190 | 6 | 45 | 2021 | 80 |
| RD740 | South McKenzie Lake Road | McKenzie Lake Road | End | 2.600 | 6 | 5 | | 80 |
| RD750 | North McKenzie Lake Road | McKenzie Lake Rd. | Civic #681 (Moosemeat Archery) | 3.410 | 6 | 36 | | 80 |
| RD752 | North McKenzie Lake Road | Civic #681 (Moosemeat Archery) | Henry Coglian Drive | 2.800 | 6 | 36 | | 80 |
| RD755 | North McKenzie Lake Road | Henry Coglian Drive | End | 2.310 | 6 | 36 | | 80 |
| RD760 | Henry Coglian Drive | North McKenzie Lake Road | End | 1.900 | 6 | 5 | | 80 |
| RD770 | Proven Line | McKenzie Lake Road | Pastwa Lake Road | 1.720 | 6 | 10 | | 80 |
| RD780 | Pastwa Lake Road | Proven Line | 2.7 km East of Proven Line | 2.400 | 6 | 10 | | 80 |
| RD785 | Pastwa Lake Road | 2.7 km East of Proven Line | End | 3.060 | 6 | 5 | | 80 |
| RD790 | Kuitack Road | Pastwa Lake Road | End | 0.500 | 6 | 1 | | 80 |
| RD791 | Kenny Road | Paradise | End | 0.200 | 6 | 25 | | 50 |
| | | | | <u>122.085</u> | | | | |

APPENDIX G
LOW VOLUME ROADS

Rural Low Volume Roads AADT < 50

| Name | From | To | Section # | Length | Road Environment | Current AADT (EST#) |
|--------------------------|--------------------------------|--------------------------------|-----------|--------|------------------|---------------------|
| Burnt Depot Road | Gaffney Road | 200m East of Gaffney Road | RD430 | 0.200 | R | 5 |
| Papilnskie Road | Highway 60 | Civic #221 | RD500 | 1.000 | R | 39 |
| Madawaska Avenue | Post Street | Madawaska Street | RD310 | 0.050 | R | 0 |
| Madawaska Street | Algonquin Street | End | RD320 | 1.000 | R | 40 |
| Dave Bowers Road | Hay Creek Road | 0.1 km west of Hay Creek Road | RD120 | 0.100 | R | 20 |
| Lakeshore Avenue | Hay Creek Road | Third Street | RD160 | 0.600 | R | 30 |
| Paradise Road | 1.1 km south of Highway 60 | End | RD230 | 1.300 | R | 5 |
| Airy Road | Highway 60 | 0.9km west of Highway 60 | RD010 | 0.900 | R | 10 |
| Airy Road | 0.9 km west of Highway 60 | 1.2 km west of Highway 60 | RD020 | 0.300 | R | 10 |
| Sunset Trail | Maple Drive | End | RD050 | 0.600 | R | 40 |
| McKenzie Lake Road | Highway 127 | Proven Line | RD730 | 1.580 | R | 45 |
| McKenzie Lake Road | Proven Line | North McKenzie Lake Road | RD732 | 2.460 | R | 45 |
| North McKenzie Lake Road | Civic #681 (Moosemeat Archery) | Henry Coglian Drive | RD752 | 2.800 | R | 36 |
| North McKenzie Lake Road | McKenzie Lake Rd. | Civic #681 (Moosemeat Archery) | RD750 | 3.410 | R | 36 |
| McKenzie Lake Road | North McKenzie Lake Road | South McKenzie Lake Road | RD734 | 3.190 | R | 45 |
| Victoria Lake Road | Major Lake Road | Civic #700 | RD630 | 3.440 | R | 5 |

| Name | From | To | Section # | Length | Road Environment | Current AADT (EST#) |
|-------------------------|---------------------------|------------------|-----------|--------|------------------|---------------------|
| Gaffney Road | Moonlight Bay Road | Burnt Depot Road | RD424 | 3.870 | R | 21 |
| Gaffney Road | Aylen Lake Road | Moonlight Road | RD420 | 0.810 | R | 21 |
| North Aylen Lake Road | Chapel Lane | Ferndale Lane | RD463 | 2.080 | R | 43 |
| North Aylen Lake Road | Aylen Lake | Chapel Lane | RD460 | 3.320 | R | 43 |
| Old Highway 127 | Highway 60 | Highway 127 | RD390 | 5.530 | R | 38 |
| Gaffney Road | Burnt Depot Road | End | RD428 | 0.620 | R | 21 |
| Burnt Depot Road | 200m East of Gaffney Road | End | RD435 | 0.300 | R | 5 |
| Moonlight Bay Road | Gaffney Road | End | RD440 | 2.200 | R | 5 |
| Whites Road | Aylen Lake Road | End | RD450 | 0.700 | R | 5 |
| North Aylen Lake Road | Ferndale Lane | End | RD466 | 2.310 | R | 43 |
| Pringles Road | North Aylen Lake Road | End | RD470 | 0.670 | R | 10 |
| Shields Road | North Aylen Lake Road | End | RD480 | 0.160 | R | 10 |
| Old Farm Road | Aylen Lake North Road | End | RD490 | 0.310 | R | 5 |
| Papilinskie Road | Civic #221 | End | RD505 | 1.100 | R | 39 |
| Dunnes Road | Highway 60 | End | RD510 | 2.100 | R | 10 |
| Fire Route - Pump House | Major Lake Road | End | RD590 | 0.150 | R | 20 |
| Victoria Lake Road | Civic #700 | End | RD635 | 2.510 | R | 5 |
| McCauley Lake Road | Major Lake Road | End | RD640 | 3.150 | R | 11 |
| Reids Road | Highway 523 | End | RD660 | 0.100 | R | 20 |
| Lyell Lake Landing Road | Highway 523 | End | RD670 | 0.400 | R | 30 |

| Name | From | To | Section # | Length | Road Environment | Current AADT (EST#) |
|-------------------------------|---------------------------------------|---------------------------------------|-----------|--------|------------------|---------------------|
| McGuey Road | Civic #471 | End | RD685 | 1.970 | R | 44 |
| McRae-Hay Lake Road (PA) | 2.4km West of Highway 127 (Civic 510) | McRae-Hay Lake Road (UP) | RD690 | 2.000 | R | 19 |
| McRae-Hay Lake Road (UP) | North Road | End | RD700 | 2.480 | R | 19 |
| Bennett Road | McRae-Hay Lake Road | End | RD710 | 2.360 | R | 5 |
| McKenzie Lake Road | South McKenzie Lake Road | Highway 127 | RD736 | 1.560 | R | 45 |
| South McKenzie Lake Road | McKenzie Lake Road | End | RD740 | 2.600 | R | 5 |
| North McKenzie Lake Road | Henry Coglian Drive | End | RD755 | 2.310 | R | 36 |
| Tom and Mick Murray Park Road | Highway 523 | End | RD600 | 0.670 | R | 5 |
| Henry Coglian Drive | North McKenzie Lake Road | End | RD760 | 1.900 | R | 5 |
| Proven Line | McKenzie Lake Road | Pastwa Lake Road | RD770 | 1.720 | R | 10 |
| Pastwa Lake Road | Proven Line | 2.7 km East of Proven Line | RD780 | 2.400 | R | 10 |
| Pastwa Lake Road | 2.7 km East of Proven Line | End | RD785 | 3.080 | R | 5 |
| Kuliack Road | Pastwa Lake Road | End | RD790 | 0.500 | R | 1 |
| McRae-Hay Lake Road (PA) | Highway 127 | 2.4km West of Highway 127 (Civic 510) | RD691 | 2.400 | R | 19 |
| McGuey Road | Highway 127 | Civic# 471 | RD680 | 2.370 | R | 44 |
| | | | | 85.640 | | |

APPENDIX H
LOW VOLUME ROADS COSTING

Low Volume Road Needs (AADT < 50)

| Sec. # | Name | From | To | Length | Priority Guide | Surf | Type of Improvement | Time of Improvement | Total Cost |
|--------|-------------------------------|---------------------------------------|-------------------------------|--------|----------------|------|---------------------|---------------------|----------------|
| RD466 | North Ayles Lake Road | Ferndale Lane | End | 2.310 | 20.6 | G/S | REC | Maintenance | \$1,554,678.96 |
| RD460 | North Ayles Lake Road | Ayles Lake | Chapel Lane | 3.320 | 19.4 | G/S | REC | Maintenance | \$2,234,430.36 |
| RD463 | North Ayles Lake Road | Chapel Lane | Ferndale Lane | 2.080 | 19.3 | G/S | REC | Maintenance | \$1,399,884.08 |
| RD500 | Papinskie Road | Highway 60 | Civic #221 | 1.000 | 17.2 | G/S | REC | Maintenance | \$673,021.19 |
| RD160 | Lakeshore Avenue | Hay Creek Road | Third Street | 0.600 | 13.0 | G/S | REC | Maintenance | \$403,812.72 |
| RD428 | Gaffney Road | Burnt Depot Road | End | 0.620 | 9.7 | G/S | REC | Maintenance | \$417,273.14 |
| RD700 | McRae-Hay Lake Road (UP) | North Road | End | 2.480 | 9.3 | G/S | REC | Maintenance | \$1,669,092.56 |
| RD120 | Dave Bowers Road | Hay Creek Road | 0.1 km west of Hay Creek Road | 0.100 | 8.2 | G/S | REC | Maintenance | \$67,302.12 |
| RD690 | McRae-Hay Lake Road (PA) | 2.4km West of Highway 127 (Civic 510) | McRae-Hay Lake Road (UP) | 2.000 | 6.3 | LCB | REC | Maintenance | \$1,500,183.11 |
| RD510 | Dunnes Road | Highway 60 | End | 2.100 | 5.6 | ETH | REC | Maintenance | \$1,413,344.51 |
| RD020 | Airy Road | 0.9 km west of Highway 60 | 1.2 km west of Highway 60 | 0.300 | 5.4 | G/S | REC | Maintenance | \$201,906.36 |
| RD785 | Pastwa Lake Road | 2.7 km East of Proven Line | End | 3.080 | 4.3 | ETH | REC | Maintenance | \$2,072,905.28 |
| RD490 | Old Farm Road | Ayles Lake North Road | End | 0.310 | 3.5 | ETH | REC | Maintenance | \$208,636.57 |
| RD710 | Bennett Road | McRae-Hay Lake Road | End | 2.360 | 3.3 | G/S | REC | Maintenance | \$1,588,330.02 |
| RD435 | Burnt Depot Road | 200m East of Gaffney Road | End | 0.300 | 3.1 | G/S | REC | Maintenance | \$201,906.36 |
| RD600 | Tom and Mick Murray Park Road | Highway 523 | End | 0.670 | 2.7 | G/S | REC | Maintenance | \$334,017.93 |

| Sec. # | Name | From | To | Length | Priority Guide | Surf | Type of Improvement | Time of Improvement | Total Cost |
|--------|-------------|------------------|-----|--------|----------------|------|---------------------|---------------------|------------------------|
| RD790 | Kuiack Road | Pastwa Lake Road | End | 0.500 | 0.4 | G/S | REC | Maintenance | \$336,510.60 |
| | | | | | | | | | <u>\$16,277,235.86</u> |
| | | | | | | | | | <u>24.130</u> |

APPENDIX I
SCHEDULE OF UNIT PRICES

Estimated 2022 Construction Unit Prices

| Item | Description | Unit Price |
|-------------|---|----------------------------|
| 1 | Excavation | \$ 15.00 / m ³ |
| 2 | Hot Mix | \$ 170.00 / tonne |
| 3 | Granular A | \$ 25.00 / tonne |
| 4 | Granular B | \$ 22.00 / tonne |
| 5 | Concrete Base Placed | \$ 300.00 / m ³ |
| 6 | Curb And Gutter Removed | \$ 40.00 / m |
| 7 | Curb And Gutter Placed | \$ 160.00 / m |
| 8 | Subdrain Placed | \$ 35.00 / m |
| 9 | Storm Sewer Placed | \$ 350.00 / m |
| 10 | Catch Basin Leads Placed | \$ 300.00 / m |
| 11 | Manholes Removed | \$ 1,000.00 ea. |
| 12 | Manholes Placed | \$ 6,500.00 ea. |
| 13 | Catch Basins Removed | \$ 500.00 ea. |
| 14 | Catch Basins Placed | \$ 4,500.00 ea. |
| 15 | Adjust Manholes | \$ 1,200.00 ea. |
| 16 | Adjust Catch Basins | \$ 1,200.00 ea. |
| 17 | Asphalt Planing (Cross Fall Correction) | \$ 6.00 / m ² |
| 18 | In-Place Processing (Asphalt Pulverizing) | \$ 3.00 / m ² |
| 19 | Single Surface Treatment | \$ 6.00 / m ² |
| 20 | Double Surface Treatment | \$ 10.00 / m ² |
| 21 | Partial Depth Removal (Milling) | \$ 3.00 / m ² |

APPENDIX J
RATE OF SPEED

Municipal Act, 2001 S.O. 2001, CHAPTER 25

PART I

GENERAL

Interpretation

1 (1) In this Act,

"local municipality" means a single-tier municipality or a lower-tier municipality; ("municipalité locale")

Highway Traffic Act, R.S.O. 1990

Interpretation, general

Definitions

1 (1) In this Act,

"built-up area" means a territory contiguous to a highway not within a local municipality, other than a local municipality that had the status of a township on December 31, 2002 and, but for the enactment of the Municipal Act, 2001, would have had the status of a township on January 1, 2003, where,

(a) not less than 50 per cent of the frontage upon one side of the highway for a distance of not less than 200 metres is occupied by dwellings, buildings used for business purposes, schools or churches,

(b) not less than 50 per cent of the frontage upon both sides of the highway for a distance of not less than 100 metres is occupied by dwellings, buildings used for business purposes, schools or churches, or

(c) not more than 200 metres of the highway separates any territory described in clause (a) or (b) from any other territory described in clause (a) or (b),

and signs are displayed as required by the regulations; ("agglomération")

PART IX

RATE OF SPEED

Rate of speed

128 (1) No person shall drive a motor vehicle at a rate of speed greater than,

(a) 50 kilometres per hour on a highway within a local municipality or within a built-up area;

(b) despite clause (a), 80 kilometres per hour on a highway, not within a built-up area, that is within a local municipality that had the status of a township on December 31, 2002

and, but for the enactment of the Municipal Act, 2001, would have had the status of a township on January 1, 2003, if the municipality is prescribed by regulation;

(b.1) 80 kilometres per hour on a highway not within a local municipality or within a built-up area;

(c) 80 kilometres per hour on a highway designated by the Lieutenant Governor in Council as a controlled-access highway under the Public Transportation and Highway Improvement Act, whether or not the highway is within a local municipality or built-up area;

(d) the rate of speed prescribed for motor vehicles on a highway in accordance with subsection (2), (5), (6), (6.1) or (7); or

(e) the maximum rate of speed set under subsection (10) and posted in a construction zone designated under subsection (8) or (8.1).

(f) REPEALED: 2019, c. 8, Sched. 1, s. 24.

2005, c. 26, Sched. A, s. 17 (1); 2006, c. 11, Sched. B, s. 6 (2); 2006, c. 32, Sched. D, s. 4 (1); 2019, c. 8, Sched. 1, s. 24; 2021, c. 26, Sched. 1, s. 10.

