Township of Hamilton

Road Needs Study Report – 2024

D.M. Wills Project No. 24-4931

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Prepared for:
Township of Hamilton

Executive Summary

The Township of Hamilton (Township) retained the services of D.M. Wills Associates (Wills) to undertake a review of the Township's existing road network, and assess its physical condition as well as confirm various road attributes. Data collected during the field review was used to develop a prioritized listing of the road network needs, the results of which are documented in this report.

The Township's road infrastructure system spans a total of 299 km primarily within a rural setting, with small areas of urban and semi-urban development. The road network includes surfaces ranging from gravel to hot mix paved (asphalt). The Township has approximately 24 km of gravel roads, 153 km of surface treated roads (low class bituminous (LCB) and intermediate class bituminous (ICB)), and 122km of hot mix asphalt paved roads (high class bituminous (HCB)).

Two primary indicators of the relative health of a road are the structural adequacy and surface condition ratings. The current average structural adequacy rating for the Township's road network is 15.3/20. The current average surface condition rating for the Township's road network is 8/10.

5% (15.4 km) of the road network has a Structural "NOW" need, 14% (41.7 km) has a Structural "1-5" year need, and 15% (45.9 km) of the road network has a Structural "6-10" year need.

It should be noted that a structural "NOW" need does not explicitly mean that work must be undertaken on the road immediately (although this may be so in some cases). A structural "NOW" need means that a significant portion of the road is showing distress of the road bed and requires significant intervention i.e. reconstruction or major rehabilitation to renew it service life. A structural "1–5" year need is expected to become a "NOW" need in the next five years, and a "6–10" year need is expected to become a "NOW" need in the next 10 years.

Note that many "6-10" year reconstruction needs may be deferred by timely resurfacing, extending their service lives. As highlighted above, the Township has a notable portion of their roads (15%) with a" 6–10" Year Structural Need.

Resurfacing and Preservation Management

In addition to addressing currently deficient roads (i.e. capital reconstruction), a dedicated preservation management approach is required, **and perhaps even more important**, to "keep the good roads good"; the fundamental principle being that it costs much less to maintain a good road than it does to let it fail and then reconstruct it, from a life cycle cost perspective. Ultimately, the goal of preservation management is to extend the useful life of a road and road network, maximizing the Township's investment over the road life-cycle.

Road resurfacing is an effective way of extending the overall life of the pavement structure and therefore a road resurfacing program is highly recommended. Roads with a structural adequacy of 12/20 or greater are included as candidates for potential resurfacing. Preliminary recommendations and prioritization for road resurfacing are based on condition rating and traffic demands on each road section, as per the Inventory Manual. A road with higher traffic volumes and fair structural adequacy is given priority over a road with moderate traffic and good structural adequacy score, in an attempt to intervene and extend the life of the road before it deteriorates to a level that can no longer be resurfaced (i.e. more expensive reconstruction is required). Specific resurfacing treatment recommendations must be assessed through further field investigation and detail design effort, prior to selecting and implementing the resurfacing strategy.

Based on typical degradation rates for gravel roads, surface treatment, and hot mix, a resurfacing program and related budget is recommended as follows:

Hot Mix Paved Roads:

- 122.1 km of paved roads (HCB).
- Degradation rate 0.25 / year (rating drops from 10 to 5, over a 20-year period).
- Annual resurfacing 6.1 km / year.
- **Annual budget $2,061,800**: (6.1 km / year x $169,000 / ln **RMP1** x 2 lanes).

Surface Treated Roads:

- 153.4 km of surface treated roads (LCB & ICB).
- Degradation rate 0.625 / year (rating drops from 10 to 5, over a 7-year period).
- Annual resurfacing 21.9 km / year.
- **Annual budget $613,200** (21.9 km / year x $28,000 / km **ST1**).

Gravel roads require regular maintenance. Maintenance includes regular grading and reapplication of new gravel. Typically, gravel roads should be resurfaced on a 3 - 5 year cycle.

Gravel Roads:

- 23.8 km of earth / gravel roads.
- 75 mm gravel every 3 years.
- Annual gravelling of 7.9 km.
- Granular A ($23,000 / km).
- **Annual budget $181,700** (7.9 km / year x $23,000 / km **G**) **.

** *Cost based on supply of Gravel only with application of gravel by internal forces.*

Based on typical degradation rates for gravel roads, surface treatment, and hot mix, a total resurfacing program, (hot mix, surface treatment and gravel) is estimated at $2,856,700 per year.

Preservation techniques seal the surface as to prevent water infiltration into the granular base. Rout and Seal is used on HCB pavements to seal individual cracks. Slurry Seal / Microsurfacing is used on LCB and HCB pavements to seal large areas, although wide / active cracks will reflect through the treatment. An annual preservation management budget has been estimated as follows:

Cracksealing

- 122.1 km of paved roads (HCB).
- Assume that cracksealing will be applied, on average, once per resurfacing cycle.
- Annual cracksealing of 6.1 km / year.
- **Annual budget $30,500** (6.1 km x $5,000 / km **Cracksealing**).

Slurry Seal / Microsurfacing

- 122.1 km of paved roads (HCB).
- 153.4 km of surface treated roads (LCB).
- Assume that slurry seal / microsurfacing will be applied, on average, once per resurfacing cycle.
- 28.0 km of road to preserve per year (6.1 km HCB and 21.9 km of LCB).
- **Annual budget $765,500** (28.0 km x $26,000 / km **Slurry Sealing / Microsurfacing**).

Further to the recommendations above with respect to resurfacing, it is also recommended that regular maintenance in the form of roadside ditch cleanout and brush clearing be undertaken as a critical component to preservation management in order to extend the useful service life of the existing roads.

Capital Improvements

Preliminary recommendations and prioritization for planned capital improvements i.e. reconstruction, have been developed based on the condition rating and traffic demands on each road section, as per the Inventory Manual. Those roads identified as having a "NOW" or 1 – 5 year need have been included in the capital improvement plan for reconstruction.

A total length of 57.1 km of roads were identified as having structural needs in the "NOW" or 1 – 5 year periods. The estimated cost to improve these roads is approximately $17.3 M.

It is important to highlight the network's average structural adequacy score of 15.3/20, as noted previously. A significant portion of the Township's roads are approaching a condition that will require reconstruction, as opposed to less costly resurfacing.

A fully funded 10 year plan following the recommendations in this report includes $2.9 M/year for resurfacing needs and $1.7 M/year for the capital needs over ten years.

Given that a majority of the Township's Road network have a structural need of 6-10 years or no structural need, Wills recommends that priority should be given to resurfacing and preservation over capital needs should funding fall short of ideal levels.

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1.0 Purpose, Background and Study Method

1.1 Purpose

The purpose of the 2024 Road Needs Study Report is to update the current road inventory and road condition assessments within the Township of Hamilton (Township). Using this information, a prioritized listing of the road network needs is developed. The information derived from the study and documented in this report will provide assistance to the Township for developing and executing a planned road maintenance and improvement program.

The Township retained the services of D.M. Wills Associates (Wills) to undertake a review of the existing road network and assess its physical condition as well as confirm various attributes. Data collected as a result of the field review is used to develop a prioritized listing of the road network needs, the results of which are documented in this report.

1.2 Background

The Township of Hamilton is located in the County of Northumberland, between Rice Lake and Cobourg. The Township is largely rural with some scattered urban / semi-urban developments.

This Road Needs Study Report was completed to inventory and document the Township's existing road assets. This current study (2024) utilizes and builds from the road asset information documented in the 2019 Road Needs Study.

1.3 Study Objectives

Based on discussion with Township staff, the following study objectives were identified:

- Provide a current inventory and value of the Township's roads, assess road conditions and needs, and develop a priority listing for construction needs and improvements.
- Provide a prioritized list of capital projects for the Township to invest in.

To ensure compliance with the latest Ministry of Transportation (MTO) guidelines, the inventories were completed in accordance with the most current edition of the Inventory Manual for Municipal Roads.

1.4 Study Methodology

The procedure utilized to complete the study was in accordance with the Ministry of Transportation's Inventory Manual for Municipal Roads (February 1991).

Additionally, field reviews for the purpose of Pavement Condition Index (PCI) were undertaken in accordance with:

- MTO Manual for Condition Rating of Flexible Pavements, SP-024.
- MTO Manual for Condition Rating of Surface-Treated Roads, SP-021.

There are two key observations when using PCI methods: the Ride Condition Rating (RCR), and the Distress Manifestation Index (DMI). RCR is a subjective measurement of how smooth a travelled surface is, rated from 0 to 10, with 10 representing excellent, new surfaces, and 0 representing an extremely rough, impassible road. DMI aggregates various forms of visible pavement distress into a rating from 0 to 10, with 10 representing a new surface and 0 representing a destroyed surface.

RCR and DMI are rated strictly independently. A rough road may have relatively few visible distresses while a fairly smooth road may display many distresses. In general, rough roads display associated visible distresses.

The combined approach facilitates comparing all the Township's roads, as the Inventory Manual prescribes the same rating system regardless of surface type, while also providing detailed descriptions of the types of distress encountered on surfaces as per the PCI ratings. This approach is compliant with O. Reg. 588/17. Wills undertook the field study in September and October of 2024.

During the field study, a visual assessment of the following road characteristics was documented to assess the current adequacy of the road:

- Platform Width (overall width of road)
- Surface Width (width of pavement surface)
- Shoulder Width
- Surface Type (gravel, low class bituminous, or high class bituminous)
- Drainage Type (open ditches vs. storm sewers etc.)
- Surface Condition (assigned based on Ride Condition Rating for this Study)
- Maintenance Demand
- Roadside Environment
- Capacity
- Alignment

1.4.1 Critical Deficiencies

Critical deficiencies represent road characteristics that result in increased maintenance costs or lead to an inadequate level of service. Road sections may be assessed as critically deficient if any one of the following characteristics fall below the minimum tolerable standards defined in the MTO Inventory Manual:

- Surface type - Insufficient surface type for traffic volumes
- Surface width - Insufficient width of the road surface excluding the shoulders
- Capacity - Inability of the road to accommodate traffic volumes at peak periods
- Structural Adequacy - Inability of the road base to support vehicular traffic
- Drainage - Increased frequency of flooding or excessive maintenance effort required to prevent flooding

Critically deficient roads have generally reached the end of their service life and /or require major work to improve e.g. widening or new surface type. As such, reconstruction is generally required.

Surface Type

The following parameters were used to assess the adequacy of the road surface type. Road sections with traffic volumes (AADT) in excess of the minimum tolerable values for Earth and Gravel in **Table** 1, were noted as critically deficient triggering a "NOW" surface type need as per the Inventory Manual Method.

Table 1 - Surface Type by Annual Average Daily Traffic (AADT)

Surface Type	AADT		
	Inventory Manual		MTO Pavement Design and Rehabilitation Manual[1]
	Tolerable Range	Design Standard	
Earth (E)	<50	-	-
Gravel (G)	<400	0-199	0 - 199
Low Class Bituminous (LCB) / Surface Treatment	-	200-399	200 - 1500
High Class Bituminous (HCB) / Hot Mix	-	400+	>1500

[1] Ministry of Transportation. Pavement Design and Rehabilitation Manual, Second Edition, 2013, Table 3.3.3 Structural Design Guidelines for Flexible Pavement – Secondary Highways

Table 1 provides further guidance with respect to surface type from both the Inventory Manual as well as the MTO Pavement Design and Rehabilitation Manual.

As detailed in **Table 1,** Gravel surfaces are generally considered acceptable for AADT of less than 200 vehicles but may be tolerable up to 400 AADT. Transition to Surface Treatment should be considered above 200 AADT. Gravel road maintenance costs (resurfacing, grading, dust suppression, etc.) versus surface treatment costs are key considerations.

Low Class Bituminous (LCB) i.e. Surface Treatment may be acceptable for traffic volumes between 200 and 1500 AADT. A transition to a Hot Mix or High Class Bituminous surface from Surface Treatment must be considered on a case by case basis. The following factors require consideration:

- Surface Treatment Maintenance Costs
- Commercial Vehicle Loading
- Roadside Environment (Urban, Semi-urban, vs. Rural)
- On-street Parking
- Adjacent Drainage Infrastructure i.e. curb and gutter, catch basins etc.
- Asphalt Availability / Cost
- Surface / Platform Width
- Traffic Volume Growth
- Sub-base Quality
- Roadbed Frost Susceptibility
- Future Resurfacing / Rehabilitation Costs

Vehicle loading is one of the key considerations for pavement design and ultimately the decision between Hot Mix and Surface Treatment. Roads with high levels of commercial traffic require a more substantial pavement structure. The values noted in **Table 1**, for the "MTO Method" are generally reflective of a highway with 10% commercial vehicles. Roads with AADT in excess of 400 vehicles with a good sub-base and commercial vehicles up to 10% may still perform very well with a Surface Treatment. Existing/past performance of a Surface Treatment can be an excellent indicator when considering the upgrade to Hot Mix.

Surface Width

Surface widths that fall below minimum tolerable standards, as detailed in the MTO Inventory Manual are noted as critically deficient triggering a "NOW" need.

The Default Minimum Surface Widths for Rural roads are included in **Table 2**:

Table 2 – Rural Road Surface Width by Annual Average Daily Traffic (AADT)

	AADT							
	1-49	40-199	200-399	400-999	1000-1999	2000-2999	3000-3999	4000+
Road Width (m)	5.0	5.5	5.5	6.0	6.0	6.0	6.5	6.5

Capacity

An in-depth traffic capacity analysis was not completed as part of the scope of this Road Needs Study. Decisions with respect to expansion of roads should be made within the context of a Transportation Master Plan or Official Plan for the Township.

However, from a general perspective, a two-lane road can typically provide adequate service up to an AADT of approximately 12,000 vehicles. The functionality of a road from a capacity standpoint is of course dependent upon other factors in combination with volume. Adjacent land uses, the number of access points i.e. entrances, and side roads etc. also have a significant impact on how the road functions.

A rural road with limited entrances and side roads will have a much greater capacity to flow traffic versus an urban street with many entrances and side road intersections. The AADT of 12,000 can be used as a 'rule of thumb' to trigger further analysis on the road capacity and operation. For the purposes of this study, a detailed capacity analysis was not undertaken as part of the scope of work. All roads were assigned to be adequate from a capacity perspective noting that no road section had an AADT greater than 6,000.

Structural Adequacy

In cases where road base or structure is showing distress over more than 20% of the length of the road section, a score between 1 and 7 (out of 20) is assessed and the road section is assigned a "NOW" need and considered Critically Deficient per the Inventory Manual. The structural adequacy rating is often the best indicator of the overall road section's health.

It should be noted that a structural "NOW" need does not explicitly mean that work must be undertaken on the road immediately (although this may be so in some cases). A structural "NOW" need means that a significant portion of the road is showing distress of the road bed and requires significant intervention i.e. reconstruction or major rehabilitation to renew it service life. A structural "1–5" year need is expected to become a "NOW" need in the next five years, and a "6–10" year need is expected to become a "NOW" need in the next 10 years.

Drainage

A road section is assessed as a "NOW" need for drainage generally when a road becomes impassible due to water one or more times a year. This information is not

readily accessible from inspection. Characteristics such as ditching, water ponding on or around the road, and evidence of past washouts were used to assess road drainage. As such, a road was given a "NOW" need for drainage if there were evident drainage problems that would likely lead to an impassable road during a heavy rain or a rapid snow melt.

2.0 The Road System

2.1 Inventory and Classification

All roads in the township road system were inventoried according to the methods outlined in the Inventory Manual for Municipal Roads.

The inventory procedure requires that each road in the system be studied as a separate unit. Initially, the road system was divided into sections so that each conformed, as close as possible, to the following requirements:

- Uniform traffic volume
- Uniform terrain
- Uniform physical conditions
- Uniform adjacent land

Depending on location with respect to the built up areas, roads were classified in a manner generally descriptive of the type of construction as follows:

- Urban - Roads with curb and gutter and storm sewer drainage.
- Semi-Urban - Roads in built up areas (development exceeds 50% of the frontage) without curb and gutter or curb and gutter on one side only.
- Rural - Roads with development on less than 50% of the frontage.

Rural roads were further evaluated based on estimated traffic volumes, such as 0 to 50 vehicles per day, 51 to 200, and 201 to 400 etc. For the purpose of this study, existing traffic counts from the 2019 study were used. These existing traffic counts were brought forward using a 1.5%/year growth rate. Additionally, thirteen (13) traffic counts were completed in October of 2024. Where gaps existed in the data, traffic volumes were estimated using similar traffic count data and/or using local characteristics for each road section.

Table 3 summarizes the total road length in kilometres by surface type and road environment as of October 2024.

The existing road system consists of 299 km of roadway, 24 km of gravel roads, 153 km of surface treated roads (LCB & ICB) and 122 km of HCB (asphalt paved) roads; with all calculations being approximate and rounded to the nearest kilometre.

Table 3 - Road System Inventory

Township of Hamilton		
Road System in Kilometres		
(As of October 2024)		
A.	**Surface Type**	**Totals***
	Earth	0
	Gravel (Loose Top Gravel)	24
	Surface Treatment (LCB & ICB)	153
	Hot Mix Asphalt (HCB)	122
	Total A	**299 km**
B.	**Roadside Environment**	
(i)	**Rural**	
	Earth	0
	Gravel (loose Top Gravel)	24
	Surface Treatment (LCB & ICB)	152
	Hot Mix Asphalt (HCB)	79
	Total Rural	**255 km**
(ii)	**Semi-Urban**	
	Gravel (loose Top Gravel)	<1
	Surface Treatment (LCB)	1
	Hot Mix Asphalt (HCB)	36
	Total Semi-Urban	**37 km**
(iii)	**Urban**	
	Gravel (loose Top Gravel)	0
	Surface Treatment (LCB)	0
	Hot Mix Asphalt (HCB)	7
	Total Urban	**7 km**
	Total B	**299 km**
**Estimated to the nearest tenth of a kilometre.*		

2.2 Unassumed Roads

Through discussion with township staff, four unassumed roads were identified within the Township. These roads will be uploaded to the Township's inventory at a future date. It is likely these roads will need to be added in the next Road Need Study report. These sections are listed below.

1. Archibald Court (From Van Luven Road to Dead End)
2. McCarty Road (From County Road 45 to Fawnhill Court)
3. McCarty Road (From Fawnhill Court to Dead End)
4. Lise Court (From Lake Street to Dead End, in Bewdley)

2.3 Updated Traffic Counts

As part of this study, the Township requested updated Traffic Counts. Township staff identified 13 locations, were 7-day counts were completed. Traffic counts, vehicle type, and speed were collected and tabulated. A summary of the traffic data can be found below.

Table 4 – Traffic Count Data Summary

Count No.	Location	2024 AADT	2019 AADT (Adjusted)	Annual Growth Rate
1	Ontario St between June & Hwy 401	2383	2470	-0.7%
2	Danforth Rd E between Jarvis Rd & Hill 60	1338	1158	2.9%
3	Danforth Rd W between Division St N & CR 45	1457	1150	4.9%
4	Danforth Rd W between CR 18 & CR 74	693	617	2.4%
5	Telephone Rd between CR 18 & Theatre Rd	1066	990	1.5%
6	Telephone Rd between Theatre Rd & CR 2	1235	1128	1.8%
7	Theatre Rd between Telephone Rd & CR 2	1483	1266	3.2%
8	Nagle Rd between Van Luven Rd & Meadowland Dr	1199	1186	0.2%
9	Van Luven Rd between Oriole Cres & Oriole Cres	797	1003	-4.5%
10	Community Centre Rd between CR 45 & Elm Ave	1988	1709	3.1%
11	Cavan Rd between CR 9 & Sackville Bridge Rd	660	773	-3.1%
12	Rice Lake Dr N between CR 9 & Cavan Rd	537	435	4.3%
13	Rice Lake Dr N between CR 28 & Dieppe Rd	962	1030	-1.3%
			Average:	1.1%

The Township had previously completed traffic counts in 2012. These traffic counts were used in both the 2014 and 2019 Road Needs Studies. The records of these counts were not available, so some assumptions were made to analyze traffic growth within the Township. The primary assumption made is that the counts from 2012 were completed during the summer. As the new traffic counts were completed in the fall of 2024, the traffic

counts from 2019 were adjusted with a seasonal factor of 0.8. This is a typical value to convert between Summer Average Daily Traffic (SADT) and Annual Average Daily Traffic (AADT). With these assumptions, an average traffic growth rate of 1.1% has been experienced by the township over the past 5 years. Counts were completed at 13 locations, thus this average growth rate may not fully reflect the traffic growth for the entire Township.

3.0 Road Needs

The primary purpose of the study is to develop a list of all roads within the Township ranked according to priority with respect to road needs.

The method of evaluating road needs in terms of type, cost and timing of improvements is identified in the Inventory Manual for Municipal Roads.

It is important to note that budgetary restrictions will often influence the level of upgrades to the road system and therefore it is imperative to maximize the improvements based on availability of funds and needs priority.

3.1 Critical Deficiencies

The inventory of the road system revealed that certain road sections are now deficient or will become deficient during the study period.

As noted previously, critical deficiencies include road characteristics which result in increased maintenance costs, and which inevitably lead to an inadequate level of service. A road section is critically deficient if any one of the following characteristics fall below the minimum tolerable standards defined in the Inventory Manual.

- Surface type - Incorrect surface type to suit traffic volumes on the roadway.
- Surface width - Insufficient width of the road surface excluding the shoulders.
- Capacity - Inability of the road to accommodate traffic volumes at peak periods.
- Structural Adequacy - Inability of the road base to support vehicular traffic.
- Drainage - Increased frequency of flooding or excessive maintenance effort required to prevent flooding.

Of the 299 km of roads inventoried, a total of 41.6 km were found to be critically deficient in one or more areas. Of the 41.6 km, approximately 14.7 km represents roads with AADT equal or less than 50 vehicles. Regardless of condition, roads with AADT of 50 or less are typically assigned as “Adequate” (as per the Ministry protocol) for the purpose of the system adequacy calculation.

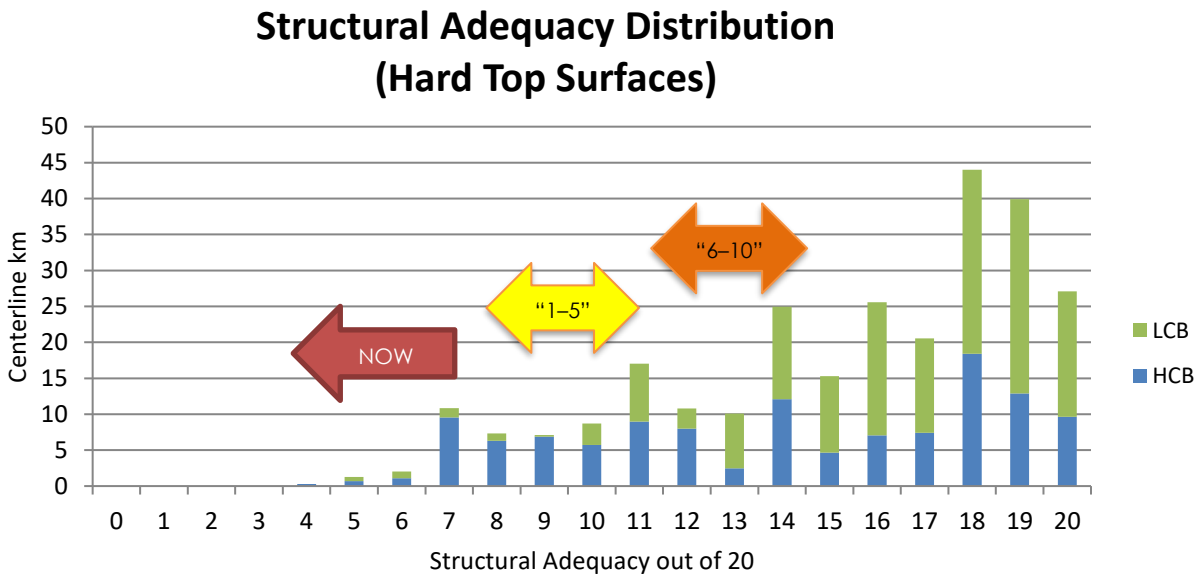
The overall system adequacy for the Township's road network, which is based upon the total road kilometres less the identified critically deficient ("NOW" needs) roads, is as follows:

$$\text{2024 System Adequacy} = \frac{299 - (41.6 - 14.7)}{299} \text{ x } 100\% = 91\%$$

The average surface condition rating of all roads is 8.0/10 while the average structural adequacy rating is 15.3/20. This suggests that the typical road has a good riding quality, and at the point where resurfacing should be prioritized to maintain the good riding quality.

A review of the structural adequacy distribution of the Township's hard top roads identifies a group of roads, 172.6 km, that are in very good condition (structural adequacy of 15 and over), and with regular resurfacing and preservative maintenance, should not require reconstruction in the next 10 years. Another cohort of roads, approximately 45.9 km, are in average condition (Structural Adequacy from 12 to 14). Some of these roads may continue to perform well, but without timely resurfacing and preventative maintenance, many of them are expected to become NOW or 1–5 year needs. The remaining 57.1 km of hard top road network is well distributed over the very poor to poor range (structural adequacy from 1 to 11). Most of these roads will require reconstruction over the next 5 years to fully repair them.

It is therefore recommended that, while the Township endeavors to repair these poor roads as part of its 10-year capital plan, every reasonable effort is made, through preservation management, to prevent the current cohort of fair to very good roads (172.6 km) from becoming capital reconstruction needs themselves.



3.2 Pavement Condition Index (PCI)

Pavement Condition Index (PCI) was calculated based on the same MTO PCI methodologies, using the following empirical formula:

$$\mathbf{PCI} = \mathbf{10} \times \sqrt{\frac{\mathbf{RCR}}{\mathbf{10}}} \times \mathbf{DMI} \times \mathbf{w_c}$$

Where DMI is the Distress Manifestation Index (0 to 10), calculated based on distress severity and density, RCR is the assigned Ride Condition Rating out of 10, $\boldsymbol{w_c}$ is the weighting constant to adjust for pavement bias (1.088 for HCB and 0.962 for LCB and gravel surfaces).

The overall weighted PCI for the Township's road network is as follows:

$$\mathbf{Overall\ Weighted\ Condition} = \frac{\sum \mathbf{length} \times \mathbf{PCI}}{\sum \mathbf{length}} = \mathbf{80.4}$$

3.3 Priority Ratings of Roads

A mathematical empirical formula was used to calculate the priority rating for each road section. The priority rating is a weighted calculation which takes into account the existing traffic volume and overall condition rating of the road.

This priority analysis is an impartial procedure to place the deficiencies in order of relative need. **A higher Priority Rating number indicates a relatively greater need for improvement.**

The formula takes into account the current traffic volume (AADT), whether it is from actual road counts or estimated road counts and the Condition Rating (CR) of the road at the time of this Road Needs Study Report. The formula is as follows:

$$\textbf{Priority Rating} = 0.2 \times (100 - CR) \times (AADT + 40)^{0.25}$$

In utilizing the above equation Wills identified a priority listing for review with Township staff. It is important to emphasize that the priority rating calculation considers only CR and traffic volumes.

When developing the recommended capital expenditure plan consideration may be given to the remaining useful service life of a road / roadbed with a view to coordinating major reconstruction efforts at / near the end of the road's life. Furthermore, while a priority rating will give a general idea of which roads should be improved before others, it does not prescribe an exact order for road improvements nor does it determine the timing of preservation and rehabilitation work. For example, it may be wise to defer the full reconstruction of a high priority road ("let the bad roads fail") in favour of resurfacing work on a medium priority road ("keep the good roads good").

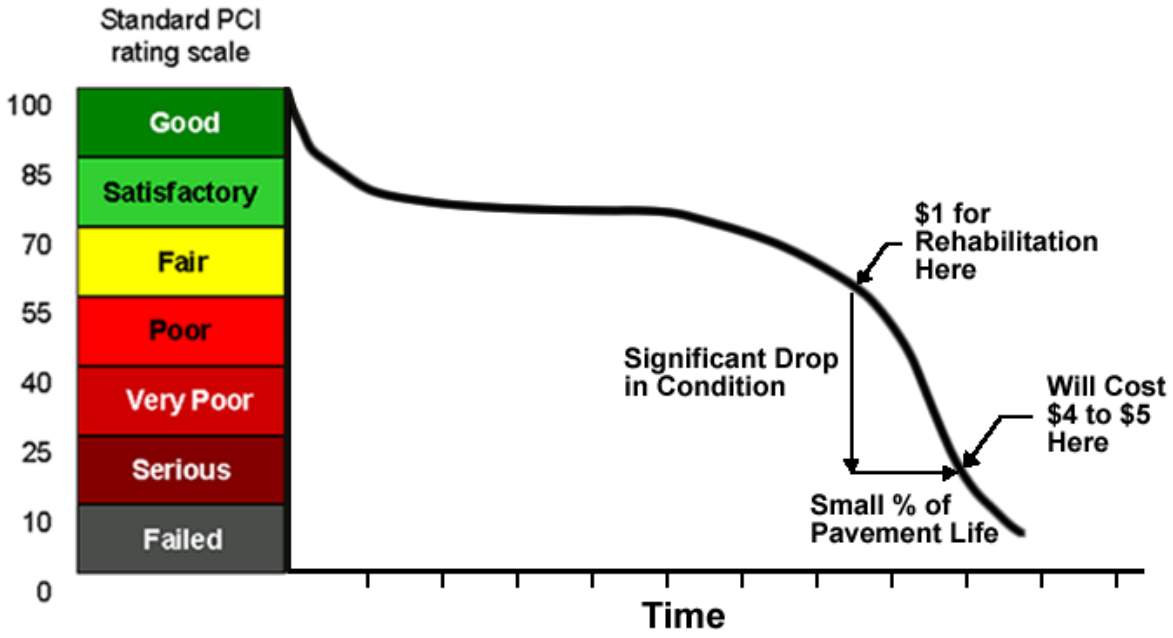
4.0 Roads Best Management Practices

The key to managing a pavement / road network is the timing of maintenance and rehabilitation activities. This idea evolves from the fact that a pavement's structural integrity does not fall constantly with time. A pavement generally provides a constant, acceptable condition for the first part of its service life and then begins to deteriorate very rapidly. In many cases, maintenance and rehabilitation measures are not taken until structural failure or noticeable changes in ride quality become apparent. This is the "fix it once it is already broken" approach.

The unfortunate consequence of this decision is that maintenance and rehabilitation becomes exponentially more expensive over the life of the pavement and is often overlooked until the pavement condition reaches a severe state of distress. There is opportunity for substantial cost savings when intervention is made *before* the pavement becomes severely compromised; i.e. "fix it before it breaks". **Figure 1** illustrates the underlying principle in support of a preservation management approach to pavement infrastructure. The principle also has application to each of the classes of roads maintained by the Township. Significant cost savings will result from proactive intervention rather than simply waiting as long as possible before performing maintenance.

Examples of approach to roads management with their associated cost implications over the lifecycle of a road are set out below in **Section 4.1** and are provided as an illustration of the benefit of a "preservation management approach".

Figure 1 - Typical Service Life of an Asphalt Pavement



4.1 Example Life Cycle Cost Analysis

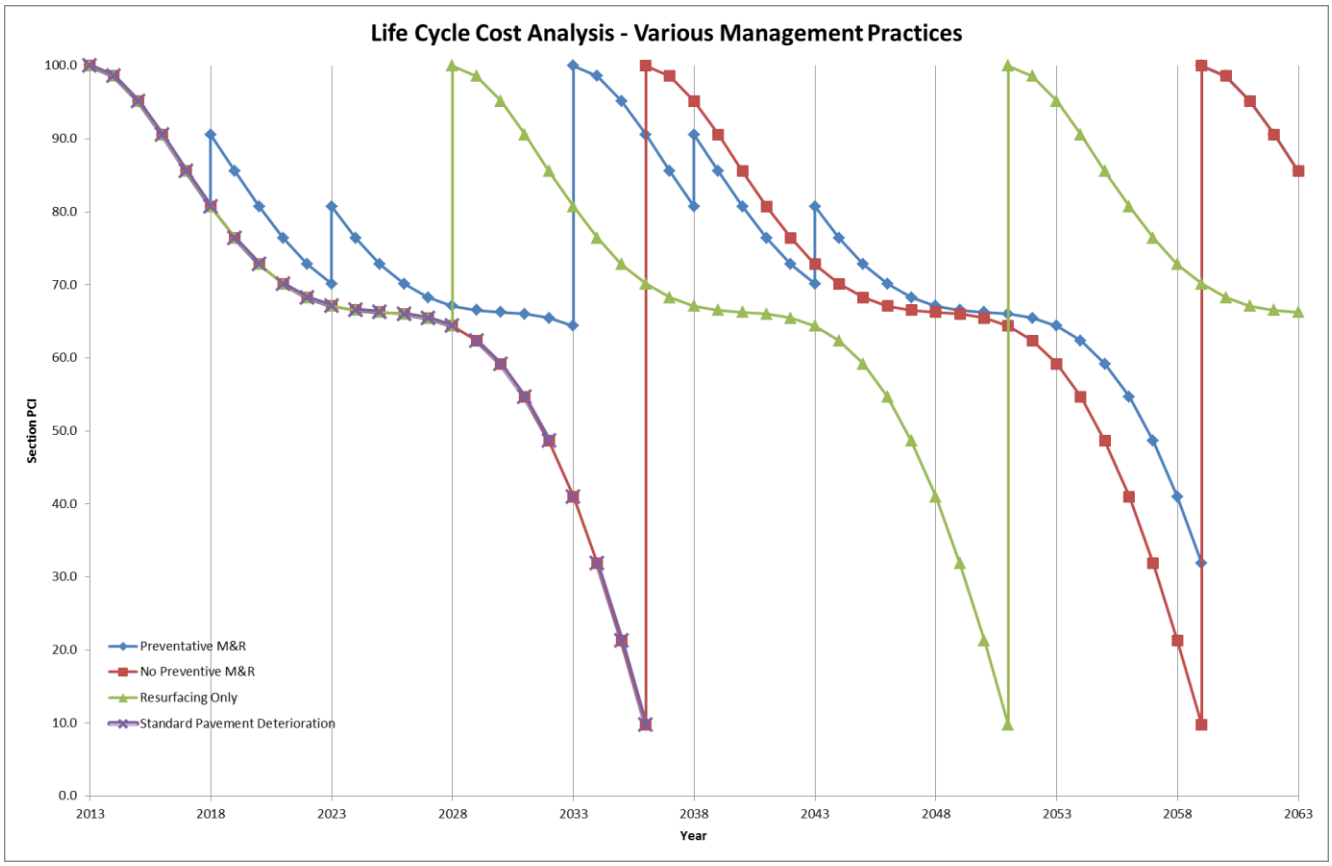
The following life cycle costs analysis compares three (3) different municipalities Municipality 1, Municipality 2 and Municipality 3; each with three distinct approaches to pavement management. For this analysis we will assume each of the three municipalities has 7000 m^2 of pavement, i.e. 1 km of asphalt paved road that is 7 m wide. In each scenario, the road is assumed to have been constructed in 2013 and will operate under normal traffic loading.

The Life Cycle Cost Analysis (LCCA) assumes no user costs. The LCCA uses a discount rate of 2.5% / year.

The LCCA shows the three different municipalities and tracks their pavement management decisions and related condition over the specified time period. Municipality 1 represents decisions made based on strategic preventive maintenance and rehabilitation (M&R), Municipality 2 represents decisions based on no preventive M&R and Municipality 3 represents decisions based on resurfacing only.

Figure 2 below illustrates a time- pavement condition plot for each municipality.

Figure 2 - Time-Condition Plot for 3 Municipalities



The costs associated with the corresponding maintenance and rehabilitation decisions are outlined in the following three (3) charts:

Preventive M&R									
Year	**Age**	**Treatment**	**Δ PCI**	**PCI_q**	**Quantity**	**Unit**	**Unit Cost**	**Total Cost**	**Present Worth**
		-- Annual Ditching/Clearing --							
2018	**5**	**Localized Preventive - Rout and Seal**	81-90	Satisfactory-Good	1000	m	$1.50	$1,500.00	**$1,325.78**
2023	**10**	**Global Preventive - Slurry Seal**	70-81	Satisfactory-Good	7000	m^2	$6.50	$45,500.00	**$35,544.53**
2033	**20**	**Surface Course**	64-100	Poor-Good					
		Mill and Dispose of Surface Course			7000	m^2	$12.00	$84,000.00	
		50mm Surface Course			892.5	t	$135.00	$120,487.50	
								$204,487.50	**$124,792.78**
2038	**25**	**Localized Preventive - Rout and Seal**	81-88	Satisfactory-Good	4500	m	$1.50	$6,750.00	**$3,640.89**
2043	**30**	**Global Preventive - Slurry Seal**	68-78	Satisfactory-Good	7000	m^2	$6.50	$45,500.00	**$21,691.79**
2048	**35**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	5%	m^2	$30.00	$10,500.00	**$4,424.40**
2053	**40**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	10%	m^2	$30.00	$21,000.00	**$7,821.04**
2058	**45**	**Full Reconstruction**	32-100	Serious-Good					
		Remove Asphalt Full Depth			7000	m^2	$15.00	$105,000.00	
		Add and Compact Corrective Aggregate/Correct Crossfall (25mm avg.)			420	t	$35.00	$14,700.00	
		40mm Base Course			686	t	$125.00	$85,750.00	
		50mm Surface Course			892.5	t	$135.00	$120,487.50	
								$325,937.50	**$107,290.28**
2063	**5**	**Localized Preventive - Rout and Seal**	81-90	Satisfactory-Good	1000	m	$1.50	$1,500.00	**$436.41**
		Final PCI in 2063:	**90**	**Good**				**Net:**	**$306,967.90**
								Residual Value:	**$85,346.08**
								Total Cost:	**$221,621.82**

The policy of Municipality 1 is to strategically intervene with preventative maintenance measures over the course of the pavement's service life. Two (2) significant maintenance measures are performed on the pavement at various times and ultimately extend the service life of the pavement, prorating the total cost of the pavement over a longer period of time. Eventually, a full reconstruction is required and this cycle repeats. The total life cycle costs are substantially less when compared to Municipality 2 and 3, at a total of $221,622 over 50 years.

No Preventive M&R									
Year	**Age**	**Treatment**	**Δ PCI**	**PCI_q**	**Quantity**	**Unit**	**Unit Cost**	**Total Cost**	**Present Worth**
2023	**10**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	5%	m^2	$30.00	$10,500.00	**$8,202.58**
2028	**15**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	10%	m^2	$30.00	$21,000.00	**$14,499.78**
2030	**17**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	20%	m^2	$30.00	$42,000.00	**$27,602.19**
2036	**23**	**Full Reconstruction**	10-100	Poor-Good					
		Remove Asphalt Full Depth			7000	m^2	$15.00	$105,000.00	
		Add and Compact Corrective Aggregate/Correct Crossfall (25mm avg.)			420	t	$35.00	$14,700.00	
		40mm Base Course			686	t	$125.00	$85,750.00	
		50mm Surface Course			892.5	t	$135.00	$120,487.50	
								$325,937.50	**$184,707.88**
2043	**7**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	5%	m^2	$30.00	$10,500.00	**$5,005.80**
2048	**12**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	10%	m^2	$30.00	$21,000.00	**$8,848.79**
2053	**17**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	20%	m^2	$30.00	$42,000.00	**$15,642.09**
2059	**23**	**Full Reconstruction**	10-100	Poor-Good					
		Remove Asphalt Full Depth			7000	m^2	$15.00	$105,000.00	
		Add and Compact Corrective Aggregate/Correct Crossfall (25mm avg.)			420	t	$35.00	$14,700.00	
		40mm Base Course			686	t	$125.00	$85,750.00	
		50mm Surface Course			892.5	t	$135.00	$120,487.50	
								$325,937.50	**$104,673.45**
		Final PCI in 2063:	**86**	**Good**				**Net:**	**$369,182.56**
								Residiual Value:	**$81,552.92**
								Total Cost:	**$287,629.64**

The policy of Municipality 2 is to simply construct the pavement and wait until serious deficiencies begin to appear before acting. This approach unfortunately remains common still today. Over the last period of the pavement's life, maintenance is required to ensure safety and operation until the pavement becomes completely destroyed. Once the pavement has failed, a complete reconstruction is carried out restoring the pavement to new condition. This cycle repeats again until a second reconstruction is required. The total costs are substantial and total $287,630 over 50 years.

The policy of Municipality 3 is periodic resurfacing. The pavement is constructed and time passes until early signs of serious distress are observed. This occurs after the time when preventive maintenance is neither appropriate nor possible, but before the pavement becomes completely destroyed. Resurfacing is performed and restores the pavement to almost new condition. The pavement then deteriorates for the remainder of its life, requiring significant maintenance in the last years before it becomes completely destroyed. A full reconstruction is then carried out and the cycle continues. The total costs are in between that of Municipality 1 and 2 at $260,038 over 50 years.

Resurfacing Only									
Year	**Age**	**Treatment**	**Δ PCI**	**PCI_q**	**Quantity**	**Unit**	**Unit Cost**	**Total Cost**	**Present Worth**
2028	**15**	**Surface Course**	64-100	Poor-Good					
		Mill and Dispose of Surface Course			7000	m^2	$12.00	$84,000.00	
		50mm Surface Course			892.5	t	$135.00	$120,487.50	
								$204,487.50	**$141,191.58**
2051	**23**	**Full Reconstruction**	10-100	Serious-Good					
		Remove Asphalt Full Depth			7000	m^2	$15.00	$105,000.00	
		Add and Compact Corrective Aggregate/Correct Crossfall (25mm avg.)			420	t	$35.00	$14,700.00	
		40mm Base Course			686	t	$125.00	$85,750.00	
		50mm Surface Course			892.5	t	$135.00	$120,487.50	
								$325,937.50	**$127,534.43**
2067	**15**	**Surface Course**	64-100	Poor-Good					
		Mill and Dispose of Surface Course			7000	m^2	$12.00	$84,000.00	
		50mm Surface Course			892.5	t	$135.00	$120,487.50	
								$204,487.50	**$53,898.67**
		Final PCI in 2063:	**66**	**Good**				**Net:**	**$322,624.67**
								Residiual Value:	**$62,587.12**
								Total Cost:	**$260,037.55**

It may be easy to see upfront cost savings by understanding that as long as any costs associated with maintaining the pavement are deferred as long as possible, money will be saved. The reality is that extending a pavements service life prorates the total cost of the pavement over a longer period of time and ultimately becomes more economical in the long run. If preventive maintenance measures are strategically planned and carried out then the service life of the pavement can be maximized and substantial reconstruction costs can be deferred for longer periods of time. In a time when economy and efficiency are becoming more and more important, this type of proactive management is essential in the management of infrastructure.
Preservation Management Approach

4.1.1 Gravel Roads

The Township currently maintains approximately 24 km of gravel road. The proposed preservation management approach for this class of road is outlined in the following **Table 5** and **Table 6.**

Table 5 - Preservation Management Approach- Gravel Surface

Action	Frequency
Regrade surfaces to maintain smooth / safe driving surface and proper crossfall.	As needed, generally 2-3 times per year for higher volume gravel, or more frequently as necessary; 1-2 for lower volume.
Add calcium to tighten surface, retain aggregate and reduce dust.	Each spring on all roads of higher volume and as needed during summer months.
Ditching and brushing of right-of-ways to improve roadbed drainage and safety.	Complete road network every 10 years.

Table 6 - Capital Activities – Gravel Roads

Action	Frequency
Add layer (75 mm) of granular material to road surface.	Every 3 years for gravel roads.
Base and sub-base improvements.	As needed or as dictated by traffic volumes.
Reconstruct / convert to hard top.	As dictated by traffic volumes.

4.1.2 Surface Treated Roads

Surface treated roads have a hard wearing surface that must be preserved in order to be effective. The Township currently maintains 153 km of surface treated roads. Unlike gravel roads, a significant investment has been made in the surface and consequently these roads must be managed properly to obtain the longest possible service life from the surface.

Table 7 - Preservation Management Approach – Surface Treated Roads

Activity	Age (Years)	Ride Condition Rating	Estimated Service Life Extension (Years)
Slurry Seal	3	8	4
Single Surface Treatment	6	7	3
Double Surface Treatment	10	6	5
Pulverize and DST	14	<4	8

In addition to the noted preservation approach in **Table 7**, the following best management practices may be employed to preserve the surface, extend the service life and reduce life cycle costs of surface treated roads:

1. Surface treatment shall be applied to the entire road platform, from "grass to grass", including any shoulders. This will eliminate grading on surface treated roads, which has a tendency to damage the edge of the surface treatment and cause premature failure of the surface.
2. Suitable new technologies will be utilized where they can be demonstrated to reduce life cycle costs, such as fibre-reinforced surface treatment. This technology can be used to mitigate reflective cracking (if cracks are narrow and inactive) when a single or double surface treatment is applied over an aging surface. It can eliminate the need for pulverizing the underlying surface in certain situations and can reduce overall costs.
3. Assess drainage and culvert needs prior to any significant renewal or rehabilitation strategy and complete any improvements concurrently. This will eliminate the need to cut / excavate a relatively new surface to replace a culvert.
4. Ditching and clearing (brushing) of the right-of-ways (ROW) to improve roadbed drainage and safety.

4.1.3 Asphalt Roads

Asphalt surfaces are the smoothest and most durable hard top surface used by the Township however; they are also the most expensive. The Township currently maintains 122lo km of asphalt surface roads. Asphalt provides a constant, acceptable condition for the initial portion of its service life but then begins to deteriorate rapidly as it ages. Surface defects such as cracking and raveling are the first signs of the deterioration. If left untreated, the pavement will rapidly deteriorate to the point where reconstruction is the only option. A preservation management strategy can mitigate this by applying renewal treatments earlier in the pavements life before the conditions begin to deteriorate too far. **Table 8** below summarizes preservation management activities to be considered for asphalt roads:

Table 8 - Preservation Management Approach – Rural Asphalt Roads

Activity	Age (Years)	Ride Condition Rating	Estimated Service Life Extension (years)
Crack seal	2-6	9	2
Slurry Seal / Microsurface	4-8	8	4-6
Overlay	12-15	6-7	10
Pulverize and Pave	20-25	< 5	20
Reconstruct	30	< 4	30

Note: Slurry seal can be used on lower volume paved roads (less than 1000 vehicles per day). For roads with volumes in excess of 1000 AADT, microsurfacing should be considered.

In addition to the above noted preservation approach, the following best management practices may be employed to extend the service life and reduce life cycle costs of asphalt roads:

1. Review the condition of other infrastructure, particularly underground infrastructure prior to implementing any major renewal or rehabilitation of the pavement. Any repairs or capital upgrades to other infrastructure should be coordinated. This should reduce utility cuts in newer asphalt.
2. Repair potholes in the surface in a timely fashion to prevent saturation and weakening of road base.
3. Undertake regular shouldering program of rural paved roads to promote proper drainage. Poorly maintained shoulders allow surface water to pond and saturate the road base, which weakens the base and leads to cracking at the edge of pavements.
4. Undertake a ditching program to ensure there is adequate drainage for road base on rural roads. This will reduce the likelihood of structural distresses caused by softening of the road base due to poor drainage.
5. Specify the appropriate type of performance graded asphalt cement for the location.
6. Undertake a clearing program to reduce shading of the roadbed and remove roots / vegetation from the road base.

4.2 Application of Preservation Management Approach

The preservation management activities detailed in each of the tables above are not necessarily intended or required to be completed on each and every road. Road deterioration rates and the type of deterioration will dictate when action should be taken and what kind of treatment is most appropriate. The intention of the above is to outline the series of techniques to be considered in an effort to realize and extend the useful service life of the road asset for the lowest overall lifecycle cost while maintaining the highest overall condition. As detailed in the life cycle costs analysis presented above, the preservation management approach to roads is proven to yield the lowest overall life-cycle costs.

Each of the preservation management activities for gravel, surface treatment and asphalt roads identified above (including route and seal, slurry seal, resurfacing etc.), shall be considered as part of the regular Road Needs Study Report every five (5) years. Recommendations on the specific treatments required shall be documented and prioritized in this Report.

5.0 Road Needs Study Summary Table

5.1 Types of Improvements

All roads were examined to appraise the extent and type of improvement necessary.

"Order of Magnitude" construction costs were developed for each of the below options on a per kilometre basis. An estimated cost for isolated frost heave repairs was also considered.

The below alternative rehabilitation strategies are considered preliminary in nature and are intended to assist in providing an order of magnitude cost estimate to rehabilitate the road. Further field investigations and engineering design is required to confirm and develop the rehabilitation strategies for each road.

5.1.1 Asphalt

High Class Bituminous roads (HCB) or hot mix asphalt roads have rehabilitation alternatives ranging from a simple overlay to complete reconstruction. The following is a listing of standard road rehabilitation techniques that were considered for HCB or hot mix asphalt roads.

RO1 Resurfacing, Single-Lift Overlay

RO2 Resurfacing, Double-Lift Overlay

RMP1 Resurfacing, Mill and Pave 1-Lift

RMP2 Resurfacing, Mill and Pave 2-Lifts

PP1 Pulverize and Pave 1-Lift

PP2 Pulverize and Pave 2-Lifts

Recon 1R Excavate and Reconstruct Road and Pave 1-Lift – Rural

Recon 1S Excavate and Reconstruct Road and Pave 1-Lift – Semi-Urban

Recon 2S Excavate and Reconstruct Road and Pave 2-Lifts – Semi-Urban

Recon 2U Excavate and Reconstruct Urban Road and Pave 2-Lifts – Urban

SS Slurry Seal (Preventative Maintenance)

MS Microsurfacing (Preventative Maintenance)

RS Route and Seal (Preventative Maintenance)

5.1.2 Surface Treatment

Surface treated roads are generally able to be rehabilitated with either a single or double Low Class Bituminous (LCB) overlay treatment. They may also be upgraded to HCB pavement or downgraded to gravel. In some cases, previous resurfacing of LCB roads has occurred or the LCB surface or road structure has deteriorated to a state where a simple overlay surface treatment is not feasible. In these cases consideration can be given to removal or pulverizing of the existing surface treatment and placement of a new application. In some cases, where it is necessary to improve the overall roadbed structure, the addition of Granular A to build up the road and the reapplication of a surface treatment is recommended. The following is a listing of standard road rehabilitation techniques that were considered for LCB (surface treated) roads:

ST1 Single Surface Treatment

ST2 Double Surface Treatment

ST2R Double Surface Treatment, with Removal of Existing

ST2A Double Surface Treatment, over New Granular A

ST2PA Double Surface Treatment, over Pulverized Existing and New Granular A.

ST2PAW Double Surface Treatment, over Pulverized Existing and New Granular A with 1 m Widening

SS Slurry Seal (Preventative Maintenance)

5.1.3 Gravel

Gravel roads can likewise be upgraded with the reapplication of Gravel (G) or surface treatments (ST1).

5.2 Benchmark Construction Costs

The Unit Price Form found in **Appendix A** is based on average prices for the local area. The unit prices were used to prepare an array of benchmark construction costs.

The design standards in **Table 9** were utilized for development of the benchmark cost estimates for reconstruction. It should be noted that these are suggested standards and therefore should not necessarily be used as standards for detail design of roadway improvements.

Table 9 - Design Standards for Construction Cost Estimates

Functional Classification	Surface Width (m)	Shoulder Width (m)	Granular A Depth (mm)	Granular B Depth (mm)	Hot Mix Depth (mm)*
Rural R200 (50 to 199 vpd)	6.0	1.5	150	450	-
Rural R300 (200 to 399 vpd)	6.0	1.5	150	450	16*
Rural R400 (400 to 999 vpd)	6.5	1.5	150	450	50
Semi - Urban Local Residential	6	1.5	150	450	50
Semi - Urban Local Industrial	6.5	1.5	150	450	50
Urban Local Residential	8.5	-	150	600	100
Urban Local Industrial	9.0	-	150	600	100

**Note - Prime and Double Surface Treatment is based on 16 mm of Hot Mix.*

6.0 Improvement Plan

In the following tables you will find three columns being used to describe the condition of the road; Surface Condition, Structural Adequacy, and Condition Rating. To better understand the prioritization of the lists, descriptions of these ratings can be found below.

Surface Condition: Surface conditions relate to driving ease, comfort and safety. Inadequacies for paved surface include excessive or uneven crowns, washboarding, raveling and bumpiness because of cracking, sealing, and rough patching. Inadequacies on loose top surfaces do not include situations that can be readily corrected by maintenance blading. They do include unconsolidated surfaces due to poorly graded or clean aggregate and permanent roughness due to insufficient depth of aggregate or weak subgrade. The effects of surface inadequacies in ascending order of seriousness are noise, vibration, sway, excessive steering effort and reduced speed. *Rated on a scale of 1 to 10*.

Structural Adequacy: The Structural Adequacy point rating relates to the capability of the surface and base courses to support a load and to resist deformation or rupture. Soft spots and frost boils are structural adequacy distress signs for loose top roads. For paved surfaces, distress signs may be cracking, rutting, heaving, pot-holing, roughness, alligatoring, dishing, breakup, distortion, frost boils, etc. *Rated on a scale of 1 to 20*.

Condition Rating: A holistic rating that sums point ratings from alignment, surface condition, surface width, level of service, structural adequacy, drainage and maintenance demands. The condition rating is one of the major factors used to calculate the Priority Rating. *Rated on a scale of 1 to 100.*

6.1 Road Needs

The Township of Hamilton's Capital Improvement Plan is included on the next page, **Table 10.** This table notes the recommended capital improvements based on priorities throughout the Township. **All costs are based on 2024 dollars and should be adjusted for inflation based on program year, for budgeting purposes.** The capital improvements are listed in descending priority based on traffic volumes and Condition Rating, as described previously. All costs in the table below capture the cost to improve both lanes of the road.

Table 10 – Township of Hamilton Capital Improvement Plan

Sect. No.	Road Name	From - To	Length (km)	AADT	Preliminary Improvement Type Recommendation	Cost (x1000)	Surface Condition (/10)	Structural Adequacy (/20)	Condition Rating (/100)
NOW Needs									
455	Van Luven Road	From Nagle Road to Hutsell Road	1.04	797	*Recon 1S - Full Reconstruction + 1 Lift*	*$634*	5	7	51
1605	Front Street, Harwood	From 18 - Rice Lake Scenic Drive to Queen Street	0.41	550	*Recon 1S - Full Reconstruction + 1 Lift*	*$250*	5	7	52
1610	Front Street, Harwood	From Lakeshore Drive to Railway Road	0.22	335	*Recon 1S - Full Reconstruction + 1 Lift*	*$134*	5	7	48
370	Skye Valley Drive	From Division Street to Division Street	2.15	538	*Recon 1S - Full Reconstruction + 1 Lift*	*$1,310*	6	7	54
1560	Young Street	From 18 - Rice Lake Scenic Drive to North End	0.37	372	*Recon 1S - Full Reconstruction + 1 Lift*	*$225*	5	7	51
525	Baltibrook Road, Baltimore	From 45 - County Road 45 to North End	0.29	54	*ST2A - Double Surface Treatment with Granular A*	*$29*	5	7	30
1660	Sidey Drive, Bewdley	From Main Street to Boulton Street	0.28	215	*Recon 1S - Full Reconstruction + 1 Lift*	*$171*	4	4	46
780	Majestic Hills Drive	From 18 - Burnham Street North to South End Turnaround	1.39	310	*Recon 1S - Full Reconstruction + 1 Lift*	*$847*	5	7	52
Je230	Lorraine Street	From Ontario Street to 74 - Dale Road	0.43	251	*Recon 1S - Full Reconstruction + 1 Lift*	*$262*	5	7	50
1715	Oak Street, Bewdley	From Lake Street to North End	0.28	162	*Recon 1S - Full Reconstruction + 1 Lift*	*$171*	5	6	46
405	Hircock Road	From Nagle Road to Pine Tree Court	0.64	65	*ST2A - Double Surface Treatment with Granular A*	*$63*	5	6	37
1351	Cavan Road	From Sackville Bridge Road to 9 - Oak Ridges Drive	0.82	660	*Recon 1R - Full Reconstruction + 1 Lift*	*$500*	6	7	63
1665	Sidey Drive, Bewdley	From Boulton Street to East End	0.27	119	*Recon 1S - Full Reconstruction + 1 Lift*	*$165*	4	5	47
850	Albert Court, Camborne	From 18 - Burnham Street North to West End	0.22	162	*Recon 1S - Full Reconstruction + 1 Lift*	*$134*	5	7	52
1685	Mill Street, Bewdley	From Oak Street to Rice Lake Road North	0.09	54	*Recon 1S - Full Reconstruction + 1 Lift*	*$55*	4	5	43

Sect. No.	Road Name	From - To	Length (km)	AADT	Preliminary Improvement Type Recommendation	Cost (x1000)	Surface Condition (/10)	Structural Adequacy (/20)	Condition Rating (/100)
460	Van Luven Road	From Hutsell Road to End of HCB	0.77	269	*Recon 1R - Full Reconstruction + 1 Lift*	*$469*	5	7	58
1450	Snelgrove Road, Gores Landing	From 18 - Burnham Street North to Kelly Road	0.17	137	*Recon 1R - Full Reconstruction + 1 Lift*	*$104*	5	6	52
1485	Lewis Court	From Lew Harris Road to East End Turnaround	0.18	108	*Recon 1S - Full Reconstruction + 1 Lift*	*$110*	5	6	51
1595	Shortt Street, Harwood	From Highland Drive to East End	0.22	86	*Recon 1S - Full Reconstruction + 1 Lift*	*$134*	6	7	49
1710	Oak Street, Bewdley	From Boulton Street to Lake Street	0.11	54	*Recon 1S - Full Reconstruction + 1 Lift*	*$67*	5	6	46
1460	Churchill Road, Gores Landing	From Kelly Road to West End	0.18	65	*Recon 1S - Full Reconstruction + 1 Lift*	*$110*	5	7	49
95	Bob Carr Road	From 2 - Highway 2 to South End	0.32	48	*Recon 1R - Full Reconstruction + 1 Lift*	*$195*	5	5	47
1465	Lampman Lane, Gores Landing	From Plank Road to West End	0.1	54	*ST2A - Double Surface Treatment with Granular A*	*$10*	5	7	48
865	Doyle Road, Camborne	From Alberts Alley to South End	0.16	22	*ST2A - Double Surface Treatment with Granular A*	*$16*	4	5	43
165	Dalewood Court	From Theatre Road to North End Cul-de-Sac	0.21	97	*Recon 1S - Full Reconstruction + 1 Lift*	*$128*	6	7	54
335	Forest Glen Crescent	From Division Street to West End Turnaround	0.34	86	*Recon 1S - Full Reconstruction + 1 Lift*	*$207*	6	7	54
365	Carlton Boulevard	From Danforth Road West to North End	0.11	54	*Recon 1S - Full Reconstruction + 1 Lift*	*$67*	5	7	51
835	Taylor Road, Camborne	From Kennedy Road to East End	0.15	22	*ST2A - Double Surface Treatment with Granular A*	*$15*	5	7	46
1160	Spring Road	From Vimy-Ridge Road 6th Line to North End	0.23	32	*ST2A - Double Surface Treatment with Granular A*	*$23*	4	5	48
1725	Boulton Street, Bewdley	From Poplar Drive to Sidey Drive	0.13	48	*Recon 1S - Full Reconstruction + 1 Lift*	*$79*	5	6	51

Sect. No.	Road Name	From - To	Length (km)	AADT	Preliminary Improvement Type Recommendation	Cost (x1000)	Surface Condition (/10)	Structural Adequacy (/20)	Condition Rating (/100)
195	Howard Baker Road	From 74 - Dale Road to 90m Southerly	0.09	48	*ST2A - Double Surface Treatment with Granular A*	*$9*	5	6	51
1680	Mill Street, Bewdley	From Main Street to Oak Street	0.21	54	*Recon 1S - Full Reconstruction + 1 Lift*	*$128*	6	7	52
300	Trotters Lane West	From Ontario Street to West End	0.13	43	*Recon 1S - Full Reconstruction + 1 Lift*	*$79*	5	7	52
1600	Sherwin Street, Harwood	From Shortt Street to Lakeshore Drive	0.1	22	*Recon 1S - Full Reconstruction + 1 Lift*	*$61*	6	7	50
1500	Traill Road North	From 18 - Rice Lake Scenic Drive to South End	0.23	22	*ST2A - Double Surface Treatment with Granular A*	*$23*	4	7	50
305	Trotter's Lane East	From Ontario Street to East End Turnaround	0.23	32	*Recon 1S - Full Reconstruction + 1 Lift*	*$140*	5	7	52
950	Birch Haven Drive	From Dines Road to East End	0.05	11	*ST2A - Double Surface Treatment with Granular A*	*$5*	5	7	48
945	Dines Road	From Ough's Road to Birch Haven Drive	0.29	11	*ST2A - Double Surface Treatment with Granular A*	*$29*	5	6	51
1220	Robson Road	From 15 - Harwood Road to South End	0.93	43	*ST2A - Double Surface Treatment with Granular A*	*$92*	5	7	60
1250	Reyns Road	From 9 - Oak Ridges Drive to South End	0.44	11	*ST2A - Double Surface Treatment with Granular A*	*$43*	4	5	61
330	Halle Road	From Castle Hill Drive to East End	0.14	22	*ST2A - Double Surface Treatment with Granular A*	*$14*	5	7	67
1730	Boulton Street, Bewdley	From Sidney Drive to Rice Lake Drive	0.24	143	*Recon 2U - Full Reconstruction + 2 Lifts*	*$322*	5	6	75
1-5 Year Needs									
453	Van Luven Road	From 45 - County Road 45 to Nagle Road	0.19	2756	*PP1 - Pulverize and Pave 1 Lift*	*$38*	6	9	54
340	Division Street North	From 45 - County Road 45 to Lot 16/17	0.72	1495	*Recon 1R - Full Reconstruction + 1 Lift*	*$439*	5	8	51
345	Division Street North	From Lot 16/17 to Olivers Lane	0.47	783	*ST2A - Double Surface Treatment with Granular A*	*$46*	5	8	48

Sect. No.	Road Name	From - To	Length (km)	AADT	Preliminary Improvement Type Recommendation	Cost (x1000)	Surface Condition (/10)	Structural Adequacy (/20)	Condition Rating (/100)
515	Maple Crescent, Baltimore	From Elm Avenue to Community Centre Road	0.53	335	*PP1 - Pulverize and Pave 1 Lift*	*$105*	5	8	51
105	Theatre Road South	From 2 - Highway 2 to Telephone Road	2.06	1483	*PP1 - Pulverize and Pave 1 Lift*	*$410*	6	11	66
1670	Lake Street, Bewdley	From Boundary Road to Main Street	0.44	478	*PP1 - Pulverize and Pave 1 Lift*	*$88*	6	11	59
360	Carlton Boulevard	From 45 - County Road 45 to Danforth Road West	0.42	263	*PP1 - Pulverize and Pave 1 Lift*	*$84*	6	10	55
1760	Dieppe Road, Bewdley	From 28 - County Road 28 to Rice Lake Drive North	0.22	257	*PP1 - Pulverize and Pave 1 Lift*	*$44*	6	10	55
520	Elm Avenue, Baltimore	From Community Centre Road to Maple Crescent	0.34	191	*PP1 - Pulverize and Pave 1 Lift*	*$68*	6	8	53
395	Nagle Road	From Highway 401 to Hircock Road	1.98	800	*PP1 - Pulverize and Pave 1 Lift*	*$394*	6	9	66
1380	Shore Road	From Cook Road to Taits Beach Road	0.34	383	*ST2A - Double Surface Treatment with Granular A*	*$34*	6	8	60
665	Racetrack Road	From Ferguson Road to Crossen Road	1.89	383	*PP1 - Pulverize and Pave 1 Lift*	*$376*	6	10	61
785	Smylie Road	From 18 - Burnham Street North to Baker Road North	1.53	520	*Recon 1R - Full Reconstruction + 1 Lift*	*$932*	6	8	64
1650	Waverly Street, Bewdley	From Main Street to Boundary Road	0.44	215	*Recon 2U - Full Reconstruction + 2 Lifts*	*$590*	6	11	57
1632	Boundary Road, Bewdley	From Lake Street to North End	0.7	205	*PP1 - Pulverize and Pave 1 Lift*	*$139*	6	10	57
745	Theresa Street, Precious Corners	From Behan Road to Jean Davey Road	0.39	203	*PP1 - Pulverize and Pave 1 Lift*	*$78*	6	10	57
740	Francis Street, Precious Corners	From Behan Road to Jean Davey Road	0.37	191	*PP1 - Pulverize and Pave 1 Lift*	*$74*	6	10	57

Sect. No.	Road Name	From - To	Length (km)	AADT	Preliminary Improvement Type Recommendation	Cost (x1000)	Surface Condition (/10)	Structural Adequacy (/20)	Condition Rating (/100)
1590	Highland Drive, Harwood	From Queen Street to Lakeshore Drive	0.13	167	*PP1 - Pulverize and Pave 1 Lift*	*$26*	7	10	56
377	Slater Street	From End of CC&CG to East End Turnaround	0.33	119	*PP1 - Pulverize and Pave 1 Lift*	*$66*	6	11	55
1705	Pine Street, Bewdley	From Lake Street to Mill Street	0.18	54	*PP1 - Pulverize and Pave 1 Lift*	*$36*	5	8	49
1150	Little Road	From Vimy-Ridge Road 6th Line to Cavan Road	3.2	526	*ST2A - Double Surface Treatment with Granular A*	*$316*	6	11	68
565	Lime Kiln Trail	From 45 - County Road 45 to East End	0.2	43	*ST2A - Double Surface Treatment with Granular A*	*$20*	5	8	49
1350	Cavan Road	From Rice Lake Drive North to Sackville Bridge Road	1	650	*Recon 1R - Full Reconstruction + 1 Lift*	*$609*	6	8	70
1329	Harmony Road	From Byers North (10th Line) to South End	0.06	38	*ST2A - Double Surface Treatment with Granular A*	*$6*	5	8	49
1510	Burrison Road	From 18 - Rice Lake Scenic Drive to 18 - Rice Lake Scenic Drive	0.22	72	*ST2A - Double Surface Treatment with Granular A*	*$22*	6	9	54
545	Atanasoff Road	From Community Centre Road to North End	0.39	22	*ST2A - Double Surface Treatment with Granular A*	*$38*	6	10	47
1015	Percy Rose Road	From Bethel Grove Road 5th Line to North End	0.46	32	*ST2A - Double Surface Treatment with Granular A*	*$45*	5	10	49
575	Cedar Hill Court	From 45 - County Road 45 to North End Turnaround	0.1	54	*PP1 - Pulverize and Pave 1 Lift*	*$20*	5	8	53
1553	Hillview Drive	From Corkery Road to Rice Lake Scenic Dr	1.4	412	*PP1 - Pulverize and Pave 1 Lift*	*$279*	6	10	69
100	Apple Orchard Road	From 2 - Highway 2 to North End	0.8	32	*Recon 1R - Full Reconstruction + 1 Lift*	*$487*	6	8	52
1080	Roy Herron Road, Cold Springs	From Minifie Road 6th Line to North End	0.19	32	*ST2A - Double Surface Treatment with Granular A*	*$19*	5	8	52
1435	Glen Lynden Road	From Harris Beatworks Road to West End	0.14	43	*ST2A - Double Surface Treatment with Granular A*	*$14*	6	10	54
1290	Cavan Road	From 9 - Oak Ridges Drive to Little Road N	0.93	622	*PP1 - Pulverize and Pave 1 Lift*	*$185*	6	11	73

Sect. No.	Road Name	From - To	Length (km)	AADT	Preliminary Improvement Type Recommendation	Cost (x1000)	Surface Condition (/10)	Structural Adequacy (/20)	Condition Rating (/100)
1410	Oriole Beach Road	From Lander Road to North End	1.03	32	*ST2A - Double Surface Treatment with Granular A*	*$102*	6	10	53
1375	Tower Manor Road	From 9 - Oak Ridges Drive to Shore Road	1.64	383	*ST2A - Double Surface Treatment with Granular A*	*$162*	6	11	71
1195	Beaver Meadow Road East	From 15 - Harwood Road to Johnstone Road South	2.49	311	*PP1 - Pulverize and Pave 1 Lift*	*$496*	7	11	70
1185	Donaldson Road East 7th Line	From Canning Road to 18 - Burnham Street North	2.05	185	*ST2A - Double Surface Treatment with Granular A*	*$202*	6	11	67
1255	Buttar-Blezzard Road	From Cavan Road to North End	0.25	22	*ST2A - Double Surface Treatment with Granular A*	*$25*	6	11	55
1285	Cavan Road	From Canning Road to Morton Road	1.69	317	*PP1 - Pulverize and Pave 1 Lift*	*$336*	6	9	71
1280	Cavan Road	From 18 - Burnham Street North to Canning Road	2.1	305	*PP1 - Pulverize and Pave 1 Lift*	*$418*	6	9	71
860	Alberts Alley, Camborne	From Doyle Road, Camborne to Jibb Road	0.34	38	*ST2A - Double Surface Treatment with Granular A*	*$34*	6	11	58
1288	Cavan Road	From Little Road N to Morton Road	1.68	317	*PP1 - Pulverize and Pave 1 Lift*	*$334*	6	11	73
1555	Goose Creek Road	From 18 - Rice Lake Scenic Drive to North End	0.57	22	*ST2A - Double Surface Treatment with Granular A*	*$56*	6	10	59
1550	Hillview Drive	From 9 - Oak Ridges Drive to Corkery Road	0.9	197	*PP1 - Pulverize and Pave 1 Lift*	*$179*	6	9	71
1200	Beaver Meadow Road East	From Johnstone Road South to 0.2 km East of Johnstone Road South	0.16	11	*ST2A - Double Surface Treatment with Granular A*	*$16*	5	8	58
20	Moore Orchard Road	From 2 - Highway 2 to South End	0.31	48	*ST2A - Double Surface Treatment with Granular A*	*$31*	6	11	64
1085	Cherry Lane	From 15 - Harwood Road to East End	0.89	90	*Recon 1R - Full Reconstruction + 1 Lift*	*$542*	5	8	68
1385	Taits Beach Road	From Shore Road to East End Turnaround	0.46	140	*ST2A - Double Surface Treatment with Granular A*	*$45*	6	10	71

Sect. No.	Road Name	From - To	Length (km)	AADT	Preliminary Improvement Type Recommendation	Cost (x1000)	Surface Condition (/10)	Structural Adequacy (/20)	Condition Rating (/100)
1490	McFarland Road	From 18 - Rice Lake Scenic Drive to North End	0.19	81	*PP1 - Pulverize and Pave 1 Lift*	*$38*	6	10	68
1535	White Road South	From 9 - Oak Ridges Drive to Corkery Road	0.91	120	*ST2A - Double Surface Treatment with Granular A*	*$90*	6	10	71
1035	Vimy-Ridge Road 6th Line	From Kennedy Road to 0.2 km East of Kennedy Road	0.24	22	*ST2A - Double Surface Treatment with Granular A*	*$24*	6	11	64
1580	Queen Street, Harwood	From Highland Drive to Front Street	0.19	137	*Recon 2U - Full Reconstruction + 2 Lifts*	*$255*	5	8	73
570	McDougall Road	From 15 - Harwood Road to East End Turnaround	0.58	108	*PP1 - Pulverize and Pave 1 Lift*	*$115*	6	11	74
645	Pollock Road	From 15 - Harwood Road to South End Turnaround	0.29	32	*ST2A - Double Surface Treatment with Granular A*	*$29*	6	11	73

Notes:

1. *Rehabilitation strategy to be confirmed by geotechnical investigations at detail design.*

2. *Timing of storm sewer/culvert work should be considered in conjunction with road reconstruction and vice versa, where applicable.*

6.2 Annual Resurfacing Program

Based on typical degradation rates for gravel roads, surface treatment, and hot mix, a resurfacing program / budget is recommended, in addition to the noted capital construction works, as follows:

Hot Mix Paved Roads:

- 122.1 km of paved roads (HCB).
- Degradation rate 0.25 / year (rating drops from 10 to 5, over a 20-year period).
- Annual resurfacing 6.1 km / year.
- **Annual budget $2,061,800**: (6.1 km / year x $169,000 / ln **RMP1** x 2 lanes).

Surface Treated Roads:

- 153.4 km of surface treated roads (LCB & ICB).
- Degradation rate 0.625 / year (rating drops from 10 to 5, over a 7-year period).
- Annual resurfacing 21.9 km / year.
- **Annual budget $613,200** (21.9 km / year x $28,000 / km **ST1**).

Gravel roads require regular maintenance. Maintenance includes regular grading and reapplication of new gravel. Conventional Granular A is typically placed every 3-5 years.

Gravel Roads:

- 23.8 km of earth / gravel roads.
- 75 mm gravel every 3 years.
- Annual gravelling of 7.9 km.
- Granular A ($23,000 / km).
- **Annual budget $181,700** (7.9 km / year x $23,000 / km **G**) **.

** *Cost based on supply of Gravel only with application of gravel by internal forces.*

The total resurfacing program, (hot mix, surface treatment and gravel) is estimated at $2,856,700 per year.

Candidates for preservation / resurfacing include all roads with a 6-10 year structural need or are rated as structurally adequate. Although some of these roads will invariably become capital needs, most can have their service lives extended at significantly less cost than reconstruction (i.e. keeping the good roads good). Roads that are candidates for preservation / resurfacing are listed in **Table 11**, Township of Hamilton Resurfacing Plan.

Table 11 - Township of Hamilton Resurfacing Priorities

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Condition (/10)	Structural Adequacy (/20)	Condition Rating (/100)
6-10 Year Needs								
180	Telephone Road	From Theatre Road South to 18 - Burnham Street North	3.3	1066	HCB	6	12	67
160	Theatre Road South	From Telephone Road to 74 - Dale Road	2.02	1400	HCB	7	13	70
155	Telephone Road	From Hamilton Road to Theatre Road South	2.91	1235	HCB	6	12	70
1190	Beaver Meadow Road West	From 18 - Burnham Street North to Eagleson Road	2.07	819	HCB	6	14	68
185	Danforth Road West	From 74 - Dale Road to 18 - Burnham Street North	2.03	693	LCB	7	12	68
825	Kennedy Road	From Jamieson Road to Vimy-Ridge Road 6th Line	2.12	747	HCB	7	14	69
1655	Beech Street, Bewdley	From Boundary Road to Main Street	0.44	167	HCB	6	12	59
445	Oriole Crescent	From Van Luven Road to Van Luven Road	0.64	251	HCB	7	14	63
736	Behan Road, Precious Corners	From Jean Davey Road to Cornish Hollow Road	0.42	245	HCB	7	14	63
1345	Rice Lake Drive North	From 9 - Oak Ridges Drive to S Limits of Bewdley (Start of West C&G)	0.95	537	HCB	7	14	69
855	Alberts Alley, Camborne	From 18 - Burnham Street North to 0.4 km West of 18 - Burnham Street	0.29	120	HCB	7	12	58
750	Jean Davey Road, Precious Corners	From Cornish Hollow Road to 60 metres west of Francis Street	0.29	173	HCB	7	12	61
480	Hutsell Road	From Van Luven Road to East End Turnaround	0.67	183	HCB	7	14	63
55	Workman Road	From 2 - Highway 2 to Stanton Road South	0.27	1536	LCB	7	14	78
50	Cunningham Road	From Danforth Road East to North End Turnaround	0.82	54	LCB	7	13	57
560	Ellis Road	From Meyers Road South to 0.4 km Easterly	0.41	108	HCB	7	14	62
805	Charbrook Crescent	From Smylie Road to South End Turnaround	0.35	86	HCB	7	12	61
610	Hickerson Road	From County Road 45 to N of Clapperton Road	1.33	269	LCB	7	13	69
1505	Close Point Road	From 18 - Rice Lake Scenic Drive to North End	0.16	70	LCB	7	12	60

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Condition (/10)	Structural Adequacy (/20)	Condition Rating (/100)
580	Staples Road	From 45 - County Road 45 to North End Turnaround	0.2	54	HCB	7	13	60
1370	Halstead Beach Road	From 9 - Oak Ridges Drive to North End	1.55	340	LCB	7	13	72
1735	Brisbin Road, Bewdley	From Main Street to West End	0.23	48	HCB	7	14	61
1425	William Road	From King Road to East End	0.6	92	LCB	7	12	65
510	Mouncey Road	From 45 - County Road 45 to North End	0.27	43	HCB	7	14	61
1030	Vimy-Ridge Road 6th Line	From Little Road to Kennedy Road	1.93	646	LCB	8	14	77
965	Bell Hill Road	From McClelland Road South to East End	0.4	22	LCB	7	14	60
1075	Parker Lane, Cold Springs	From McIntosh Street to South End	0.16	32	LCB	7	13	62
660	Racetrack Road	From 74 - Dale Road to Ferguson Road	1.46	598	HCB	7	14	78
1330	Evertsen Road	From Byers Road to Hannah Road	1.05	108	LCB	7	14	70
1430	Harris Boatworks Road	From Lander Road to North End	1.26	280	LCB	7	14	76
700	Ferguson Road	From Rose Road to Honeywell Hill Road	1.4	132	LCB	7	14	72
1040	McBride Road 6th Line	From Jamieson Road to 18 - Burnham Street North	2.45	155	LCB	7	13	73
715	Dejong Road	From Honeywell Hill Road to Minifie Road 6th Line	2.15	155	LCB	7	14	74
30	Grimshaw Road	From Danforth Road East to North End	0.28	11	LCB	7	14	64
65	Ash Road	From Workman Road to South End	0.08	43	LCB	7	14	69
1025	Vimy-Ridge Road 6th Line	From 28 - County Road 28 to Little Road	2.92	251	LCB	8	14	78
1170	Donaldson Road West 7th Line	From 28 - County Road 28 to Rice Lake Drive South	0.34	215	LCB	7	14	78
875	Jibb Road	From Alberts Alley to Harding Road	0.94	233	HCB	7	14	79
495	Comunity Centre Road	From 45 - County Road 45 to Burwash Road	0.86	1988	HCB	7	14	88
125	Hunco Road	From Moore Service Road to North End	0.26	54	HCB	7	13	75
690	Rose Road	From Ferguson Road to Leach Road	1.3	84	LCB	7	13	77
265	Oliver's Lane	From Ontario Street to 0.4 km East of Ontario Street	0.42	520	HCB	7	12	85
1245	Clarke McKinlay Road	From McKinlay Road to East End	0.33	11	LCB	8	14	73

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Condition (/10)	Structural Adequacy (/20)	Condition Rating (/100)
1355	Sackville Bridge Road	From 9 - Oak Ridges Drive to Cavan Road	0.2	54	HCB	7	14	77
115	Moore Service Road	From 2 - Highway 2 to Hunco Farm Road	0.32	120	HCB	8	14	80
770	Cornish Hollow Road	From Smylie Road to North End	0.49	32	LCB	7	14	78
1675	Lake Street, Bewdley	From Main Street to Rice Lake Drive	0.41	723	HCB	7	14	88
375	Slater Street	From 45 - County Road 45 to End of CC&CG	0.1	191	HCB	7	14	88
Structurally Adequate Roads								
1750	Rice Lake Drive North, Bewdley	From S Limits of Bewdley (Start of West C&G) to 70m North of Mill Street	0.82	1650	HCB	8	16	67
270	Oliver's Lane	From 0.4 km East of Ontario Street to Division Street North	0.62	687	HCB	10	19	61
400	Nagle Road	From Hircock Road to Van Luven Road	0.52	1199	HCB	9	17	70
357	Division Street North	From 1.2 km North of Danforth Road West to 74 - Dale Road	1.1	1273	HCB	9	18	71
500	Community Centre Road	From Burwash Road to 0.2 km West of Payne Road	1.37	1046	HCB	8	16	71
380	Cap Wilson Drive	From 45 - County Road 45 to Deerfield Drive	0.19	466	HCB	8	15	65
240	June Avenue	From Ontario Street to Haymur Street	0.22	843	HCB	9	18	71
1065	Timlin Road, Cold Springs	From Minifie Road 6th Line to South End	0.14	22	G	6	12	46
385	Deerfield Drive	From Cap Wilson Drive to Lynden Court	0.6	430	HCB	8	16	68
1300	McAllister Road	From 9 - Oak Ridges Drive to South End	0.51	43	G	6	12	51
80	Normar Road	From 2 - Highway 2 to South End	1.66	1853	LCB	8	16	78
430	Meadowland Drive	From Nagle Road to Van Luven Road	0.94	526	HCB	9	17	70
755	Cornish Hollow Road	From 74 - Dale Road to 1.4km North of 74 - Dale Road	1.42	927	HCB	10	19	74
1455	Plank Road, Gores Landing	From 18 - Rice Lake Scenic Drive to North End	0.35	380	HCB	8	16	68
1640	Hunter Street, Bewdley	From Boundary Road to Main Street	0.44	287	HCB	8	16	66
585	Meyers Road North	From 45 - County Road 45 to North End	0.27	11	G	5	10	46
640	Daignault Road	From 15 - Harwood Road to North End	0.75	54	G	8	16	54
505	Community Centre Road	From 0.2 km West of Payne Road to Les Davey Road	1.11	783	HCB	8	16	74

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Condition (/10)	Structural Adequacy (/20)	Condition Rating (/100)
250	Lenore Avenue	From Haymur Street (N) to Olivers Lane	0.2	520	HCB	9	18	71
260	Lenore Avenue	From Catherine Street to Haymur Street (S)	0.15	520	HCB	9	18	71
735	Behan Court, Precious Corners	From 74 - Dale Road to northerly	0.27	490	HCB	9	18	71
245	June Avenue	From Haymur Street to Lenore Avenue	0.36	484	HCB	9	18	71
1695	Main Street, Bewdley	From Lake Street to Rice Lake Road North, Bewdley	0.51	418	HCB	9	18	71
1325	Byers Road (10th Line)	From 28 - County Road 28 to Arrowhead Road	1.83	359	LCB	8	15	70
1518	Sully Road North	From 18-Rice Lake Scenic Drive to 0.2 km North	0.19	54	G	6	12	57
1310	Main Street	From 9 - Oak Ridges Drive to Hunter Street	0.81	676	HCB	9	18	75
823	Kennedy Road	From End of CC&CG to Jamieson Road	0.71	1178	HCB	10	19	78
870	Jibb Road	From Kennedy Road to Alberts Alley	0.42	568	HCB	10	19	74
650	Peter Street	From 74 - Dale Road to North End	0.2	194	LCB	8	16	67
170	Bill Lang Road	From Telephone Road to North End	0.27	11	G	5	10	52
140	Dr Johnson Road	From Hamilton Road to East End	1.08	11	G	8	16	52
720	Cochrane Road South	From 74 - Dale Road to North End	0.99	97	LCB	10	19	63
895	Williamson Road	From Bickle Hill Road to Jibb Road	1.3	472	LCB	10	19	74
1420	King Road	From William Road to North End	0.51	48	HCB	8	15	59
820	Kennedy Road	From 18 - Burnham Street North to End of CC&CG	1.04	1178	HCB	10	19	79
145	Hamilton Road	From Telephone Road to 74 - Dale Road	2.03	1315	LCB	10	19	80
625	Kraumanis Road	From Hickerson Road to South End	0.36	22	G	8	15	56
920	Rowe Road	From Bethel Grove Road 5th Line to South End	0.45	11	G	7	15	54
425	Cardinal Court	From Nagle Road to West End Turnaround	0.31	280	HCB	9	18	71
1630	Boundary Road, Bewdley	From 28 - County Road 28 to Lake Street	0.42	539	HCB	10	20	75
120	Moore Service Road	From Hunco Farm Road to North End	0.6	48	G	7	16	60
110	Augustine Road	From 2 - Highway 2 to North End	1.94	43	LCB	9	18	61
410	Hircock Road	From Pine Tree Court to Nagle Road	0.41	227	HCB	9	18	71
655	Glendale Drive	From Peter Street to East End Turnaround	0.33	119	LCB	8	16	67

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Condition (/10)	Structural Adequacy (/20)	Condition Rating (/100)
1575	Queen Street, Harwood	From Lakeshore Drive to Highland Drive	0.23	137	HCB	8	16	68
840	Burgess Crescent, Camborne	From Jibb Road to Jibb Road	0.55	359	HCB	10	19	74
935	Hamilton Road	From 74 - Dale Road to 0.4 km North of 74 - Dale Road	0.4	11	G	8	15	57
1070	McIntosh Street, Cold Springs	From 18 - Burnham Street North to Minifie Road 6th Line	0.34	167	HCB	9	17	70
1752	Rice Lake Drive North, Bewdley	From 70m North of Mill Street to Valleyview Crescent South, Bewdley	0.35	1506	HCB	8	16	82
310	Stoneridge Road	From Forest Hills Drive to Danforth Road West	0.64	371	HCB	10	20	75
705	Ken May Road	From Ferguson Road to North End	0.84	11	G	7	14	58
130	Hamilton Road	From Canadian Pacific Railway to Peacock Boulevard	0.49	5422	HCB	9	18	87
290	Forest Hills Drive	From Ontario Street to Danforth Road West	1.11	353	HCB	10	20	75
235	Catherine Street	From June Avenue to Olivers Lane	0.34	173	HCB	9	18	71
752	Jean Davey Road, Precious Corners	From 60 metres west of Francis Street to Behan Road	0.65	173	HCB	9	18	71
1755	Rice Lake Drive North, Bewdley	From Valleyview Crescent South, Bewdley to 28 - County Road 28	1.02	1390	HCB	8	16	82
1607	Front Street, Harwood	From Queen Street to Lakeshore Drive	0.15	412	HCB	10	20	76
613	Hickerson Road	From N of Clapperton Road to 1.9km North of 45 - County Road 45	0.6	155	LCB	9	18	70
450	Gordon Street	From Van Luven Road to North End	0.35	86	HCB	8	16	67
390	Lynden Court	From Deerfield Drive to West End Turnaround	0.14	86	HCB	8	15	67
320	Castle Hill Drive	From Danforth Road West to Halle Road	0.7	490	HCB	9	18	77
85	Danforth Road East	From Jarvis Road to Ron Harnden Road	3.4	1338	HCB	9	18	82
1225	Barrett Road	From 9 - Oak Ridges Drive to South End	0.07	11	G	6	12	59
1202	Beaver Meadow Road East	From 0.2 km East of Johnstone Road South to Boundary Road	0.67	11	G	7	14	59
1745	Valleyview Crescent, Bewdley	From Rice Lake Drive to Rice Lake Drive	0.57	275	HCB	10	20	74
1740	Ainley Road, Bewdley	From Brisbin Road to South End	0.11	22	G	7	14	61

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Condition (/10)	Structural Adequacy (/20)	Condition Rating (/100)
1140	Art Lang Road	From Vimy Ridge 6th Line to North End	0.4	22	G	7	14	61
10	Carruthers Road	From 2 - Highway 2 to North End	1.31	22	G	8	15	61
1135	Frank Ritchie Road	From McBride Road 6th Line to North End	0.36	22	G	7	14	61
275	Sunset Drive	From Olivers Lane to Forest Hills Drive	0.52	263	HCB	10	19	74
420	Ravine Drive	From Hircock Road to Cardinal Court	0.42	155	HCB	9	18	71
1645	Poplar Drive, Bewdley	From Main Street to East End	0.44	215	HCB	10	19	73
600	Clapperton Road	From 15 - Harwood Road to Hickerson Road	1.04	299	LCB	9	17	75
1204	Boundary Road	From Beaver Meadow Road East to 0.3 km South of Beaver Meadow Road East	0.29	11	G	7	14	60
730	Precious Road	From Cornish Hollow Road to South End	0.07	11	G	7	14	60
1115	Turner Road	From Beaver Meadow Road 7th Line to South End	0.33	11	G	7	14	60
1125	Bowman Road	From McBride Road 6th Line to North End	0.54	22	G	7	14	62
885	Lacey Road	From Jibb Road to South End	0.45	22	G	7	14	62
70	Stanton Road North	From Elgin Street to South End	0.72	162	LCB	7	16	72
225	Ontario Street	From Danforth Road West to 74 - Dale Road	1.53	2400	HCB	9	17	85
630	Alnwick Hill Road	From 0.9 km North of 15 - Harwood Road to Pollard Road	0.78	108	LCB	8	16	70
795	Baker Road South	From Cornish Hollow Road to North End	0.18	11	G	7	14	61
45	Hill 60	From Danforth Road East to South End	0.6	11	G	8	16	61
955	Joe Bunting Road	From McClelland Road South to West End	0.66	11	G	7	14	61
1320	Seeney Road	From 28 - County Road 28 to South End	0.14	11	G	7	14	62
1635	Allan Road, Bewdley	From Boundary Road to East End	0.08	22	G	8	15	64
1495	Traill Road South	From 9 - Oak Ridges Drive to North End	1.81	86	LCB	9	18	70
760	Cornish Hollow Road	From 1.4km North of 74 - Dale Road to Ball Road	2.38	323	LCB	8	16	77
985	Bethel Grove Road 5th Line	From 830m East of 28 - County Road 28 to Irwing Goheen Road	1.87	389	LCB	9	18	78
685	Leach Road	From Racetrack Road to North End	1.34	92	LCB	9	18	71
440	Crestview Court	From Meadowland Drive to South End Turnaround	0.13	54	HCB	8	16	68
815	Willis Road	From 18 - Burnham Street North to West End	0.8	54	LCB	8	16	68
40	Joe Oliver Road	From 2 - Highway 2 to North End	1.36	43	G	8	16	67

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Condition (/10)	Structural Adequacy (/20)	Condition Rating (/100)
435	Prairieglen Circle	From Meadowland Drive to West End Turnaround	0.08	43	HCB	8	16	67
1520	Stevenson Road	From Sully Road to East End	0.36	65	LCB	9	18	69
392	Deerfield Drive	From Lynden Court to North End	0.25	97	HCB	9	18	71
150	Don Lang Road	From Telephone Road to North End	1.01	11	G	8	15	63
1620	Earl Joice Road	From 9 - Oak Ridges Drive to North End	0.24	11	G	7	14	63
995	Mulder Road	From Jibb Road to Kennedy Road	1.37	137	LCB	7	15	73
5	Heritage Road	From 2 - Highway 2 to South End	0.08	22	G	8	16	65
845	Ford Street, Camborne	From Jibb Road to South End Turnaround	0.22	162	HCB	10	19	74
1095	Edgar Benson Road	From Eagleson Road to End of LCB	0.42	54	G	9	18	69
1215	Jasper Martin Road	From 9 - Oak Ridges Drive to South End	0.36	11	G	8	16	64
147	Nelson Road	From 74 - Dale Road to South End	0.37	11	G	7	14	64
595	Cedar Creek Trail	From 15 - Harwood Road to East End	0.12	32	LCB	8	16	67
1045	Minifie Road 6th Line	From 18 - Burnham Street North to Dejong Road	1.1	532	HCB	10	19	80
540	Overlook Heights	From Burwash Road to North End	0.17	97	HCB	10	19	72
175	Birch Road	From Telephone Road to South End	0.48	16	G	8	15	65
255	Haymur Street	From June Avenue to Lenore Avenue	0.2	143	HCB	10	19	74
1120	Jack Gordon Road	From McBride Road 6th Line to North End	0.49	22	G	8	17	66
1315	Lakeview Lane	From 28 - County Road 28 to North End	0.57	22	G	8	16	66
1265	West Road	From Cavan Road to South End	0.9	22	G	8	16	66
615	Hickerson Road	From 1.9 km North of County Road 45 to Kraumanis Road	1.03	108	LCB	8	15	73
1585	Lakeshore Drive, Harwood	From Queen Street to Front Street	0.61	197	HCB	10	20	76
1470	Waldon Road, Gores Landing	From 18 - Rice Lake Scenic Drive to South End	0.51	97	HCB	8	15	73
1102	Fisher Road South	From Minifie Road 6th Line to North End	0.22	11	G	8	15	65
210	Danforth Road West	From Division Street North to 45 - County Road 45	1.02	1457	HCB	9	17	85
672	Smith Settlement Road	From 15 - Harwood Road to North End	1.2	65	LCB	9	18	71
970	Bickle Hill Road	From Theatre Road North to Williamson Road	1.78	275	LCB	9	18	78

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Condition (/10)	Structural Adequacy (/20)	Condition Rating (/100)
890	Harding Road	From Jibb Road to North End	0.36	22	G	8	16	67
135	Hamilton Road	From Peacock Boulevard to Telephone Road	1.17	2427	HCB	9	18	87
35	Pentecostal Road	From 2 - Highway 2 to South End	0.72	431	HCB	9	17	80
220	Ontario Street	From Oliver's Lane to Danforth Road West	1.15	2383	HCB	9	18	87
830	Jamieson Road	From Kennedy Road to McBridge Road 6th Line	1.28	167	LCB	9	17	76
1395	L. Westington Road	From 9 - Oak Ridges Drive to North End	0.21	11	G	8	16	66
1570	Ardagh Crescent, Harwood	From Old Schoolhouse Road to South End Cul-de-Sac	0.26	108	HCB	10	19	74
280	Sunrise Court	From Sunrise Drive to East End Turnaround	0.24	108	HCB	10	19	74
930	McClelland Road North	From Bell Hill Road to Bethel Grove Road 5th Line	2.04	239	LCB	8	16	78
1335	Hannah Road	From 28 - County Road 28 to 0.5 km East of Evertsen Road	1.26	191	LCB	9	18	77
1000	Whitney Howard Road	From Bethel Grove Road 5th Line to North End	1.26	65	LCB	8	15	72
1055	Turk Road	From 15 - Harwood Road to East End	2.51	347	LCB	8	16	80
207	Danforth Road West	From Castle Hill Drive to Division Street North	0.31	1548	HCB	9	18	86
1625	Hilton Harris Road	From 9 - Oak Ridges Drive to North End	0.5	11	G	8	16	67
1581	Lakeshore Drive, Harwood	From 18 - Rice Lake Scenic Drive to Queen Street	0.06	137	HCB	10	20	76
555	McMann Road	From Meyers Road to Boundary Line	0.26	43	LCB	10	20	71
415	Pine Tree Court	From Hircock Road to West End Turnaround	0.07	43	HCB	9	18	71
200	Danforth Road West	From 18 - Burnham Street North to Ontario Street	0.89	1483	HCB	9	18	86
1110	Fisher Road	From Start of LCB to Beaver Meadow Road West	0.35	54	G	9	18	72
1155	Glen Gavel Road	From Vimy-Ridge Road 6th Line to North End	0.64	11	G	8	16	68
394	Fawn Hill Court	From Deerfield Drive to East End	0.21	32	HCB	9	18	71
1020	Winifred Goheen	From Vimy Ridge Road 6th Line to South End	0.62	32	G	9	18	71
355	Division Street North	From Danforth Road West to 1.2 km North of Danforth Road West	1.15	1273	HCB	9	18	86
725	Cochrane Road North	From Cornish Hollow Road to South End	0.22	22	LCB	9	18	70

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Condition (/10)	Structural Adequacy (/20)	Condition Rating (/100)
1765	Kidd Street, Bewdley	From Lake Street to North End	0.08	22	HCB	10	19	70
605	Roebuck Road	From Clapperton Road to North End	0.33	22	G	9	18	70
1720	Chapel Street, Bewdley	From Boulton Street to Lake Street	0.13	54	HCB	10	20	73
90	Lovshin Road	From 2 - Highway 2 to North End	1.48	48	LCB	10	19	73
910	Garland Road	From 74 - Dale Road to 290m North of 74 - Dale Road	0.29	59	LCB	10	20	74
980	Bethel Grove Road 5th Line	From 28 - County Road 28 to 830m East of 28 - County Road 28	0.83	389	LCB	9	18	82
1400	Lander Road	From 9 - Oak Ridges Drive to King Road	1.9	634	LCB	10	19	84
1187	Beaver Meadow Road West	From Eagleson Road to 15 - Harwood Road	0.84	819	HCB	9	17	85
152	Garland Road	From 74 - Dale Road to South End	0.41	11	G	8	16	70
925	McClelland Road South	From 74 - Dale Road to Bell Hill Road	1.97	275	LCB	8	16	81
315	Stone Court	From Stoneridge Road to North End Turnaround	0.11	65	HCB	10	20	75
800	Baker Road North	From Smylie Road to South End	0.16	22	ICB	7	15	72
285	Paige Court	From Sunrise Drive to East End	0.22	43	HCB	10	19	74
1440	Kelly Road, Gores Landing	From 18 - Burnham Street North to Snelgrove Road	0.46	317	HCB	8	15	82
1210	Johnstone Road North	From 9 - Oak Ridges Drive to South End	0.7	11	G	9	18	71
1390	Cook Road	From Shore Road to North End	0.17	183	LCB	8	15	80
1180	Donaldson Road West 7th Line	From Benson Road to Little Road	1.67	179	LCB	9	17	80
1565	Old Schoolhouse Road	From 15 - Harwood Road to 30 m South of Ardagh Crescent	0.29	179	HCB	10	19	80
590	Pioneer Road	From 45 - County Road 45 to North End	1.05	140	LCB	9	17	79
990	Bethel Grove Road 5th Line	From Irwing Goheen Road to Jibb Road	1.86	287	LCB	9	17	82
673	Noble Road	From Racetrack Road to West End	0.12	32	HCB	10	20	74
1700	Ridge Road, Bewdley	From Mill Street to Cemetary	0.1	32	HCB	10	20	74

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Condition (/10)	Structural Adequacy (/20)	Condition Rating (/100)
295	Grand View Court	From Forest Hills Drive to South End Turnaround	0.19	43	HCB	10	20	75
215	Ontario Street	From Cobourg North Limits to Oliver's Lane	0.62	3200	HCB	8	15	90
695	Ferguson Road	From Racetrack Road to Rose Road	1.34	251	LCB	8	16	82
25	McEwen Road	From 2 - Highway 2 to Danforth Road East	2.13	251	LCB	10	19	82
675	Crossen Road	From Racetrack Road to Road Between Lot 8/9, Conc IV	1.91	143	LCB	10	20	80
1010	Vic Lightle Road	From Bethel Grove Road 5th Line to Vimy-Ridge Road 6th Line	2.08	132	LCB	9	17	80
1615	Railway Road	From Lakeshore Drive to Front Street	0.12	22	HCB	10	20	74
1270	West Road	From Cavan Road to 9 - Oak Ridges Drive	0.77	54	LCB	8	15	77
1090	Eagleson Road	From Minifie Road 6th Line to Beaver Meadow Road	2.09	72	LCB	8	15	78
628	Alnwick Hill Road	From 15 - Harwood Road to 0.9 km North of 15 - Harwood Road	0.89	203	LCB	8	16	82
1405	Lander Road	From King Road to 18 - Burnham Street North	1.26	807	LCB	10	19	87
620	Hickerson Road	From Kraumanis Road to 670m Northerly	0.67	32	LCB	8	16	76
475	Payne Road	From Start of LCB to Community Centre Road	1.21	108	LCB	9	18	80
550	Meyers Road South	From Community Centre Road to 45 - County Road 45	2.29	299	LCB	9	18	84
350	Division Street North	From Olivers Lane to Danforth Road West	0.57	520	HCB	9	18	86
710	Honeywell Hill Road	From Ferguson Road to Dejong Road	0.32	155	LCB	8	16	82
1415	King Road	From Lander Road to William Road	0.42	155	LCB	8	16	82
325	Castle Hill Drive	From Halle Road to 74 - Dale Road	1.15	490	HCB	9	18	86
960	Bell Hill Road East	From Garland Road to East End	0.16	11	LCB	10	20	75
915	Garland Road	From 290m North of 74 - Dale Road to Bell Hill Road	1.67	11	LCB	10	20	75
1340	Hannah Road	From 0.5 km East of Evertsen Road to Scriven Road	2.07	191	LCB	9	18	83
1545	White Road North	From Corkery Road to 15 - Harwood Road	1.2	149	HCB	9	17	82
1100	Edgar Benson Road	From End of LCB to Fisher Road	0.41	54	G	9	18	79
1105	Fisher Road	From Edgar Benson Road to Start of LCB	0.66	54	G	9	18	79
1530	Corkery Road	From 15 - Harwood Road to 18 - Rice Lake Scenic Drive	2.36	317	LCB	9	17	85

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Condition (/10)	Structural Adequacy (/20)	Condition Rating (/100)
1483	Lew Harris Road	From 300m S of 18-Rice Lake Scenic Dr to 18 - Rick Lake Scenic Drive	0.3	311	HCB	9	17	85
465	Van Luven Road	From End of HCB to Highway 401	0.99	90	LCB	10	20	81
765	Cornish Hollow Road	From Ball Road to Smylie Road	0.46	108	LCB	8	16	82
1275	Cole Road	From Cavan Road to 9 - Oak Ridges Drive	0.84	102	LCB	8	16	82
1005	Irving Goheen Road	From Bethel Grove Road 5th Line to Vimy-Ridge Road 6th Line	2.09	96	LCB	8	15	82
1360	Oak Hills Road	From 9 - Oak Ridges Drive to Bamsey Drive	1.97	448	LCB	10	19	87
635	Pollard Road	From South to North End	0.06	43	LCB	8	16	80
1260	Canning Road	From Donaldson Road 7th Line to Cavan Road	1.08	108	LCB	9	18	83
1050	Minifie Road 6th Line	From Dejong Road to 15 - Harwood Road	1.75	377	HCB	10	19	87
1175	Donaldson Road West 7th Line	From Rick Lake Drive South to Benson Road	0.91	179	LCB	9	17	85
1230	Linton Road	From Beaver Meadow Road West to Tinney Road	0.79	126	LCB	10	19	84
205	Danforth Road West	From Ontario Street to Castle Hill Drive	0.88	1518	HCB	8	15	91
535	Burwash Road	From The Gully to Community Centre Road	0.38	652	HCB	7	15	89
1475	Lew Harris Road	From 9 - Oak Ridges Drive to 520m S of 18-Rice Lake Scenic Dr	1.83	311	LCB	10	19	87
892	Williamson Road	From 74 - Dale Road to Bickle Hill Road	1.93	568	LCB	10	19	89
1165	Rice Lake Drive South	From 28 - County Road 28 to 7 - Donaldson Road W	1.99	347	HCB	10	20	88
900	Stu Black Road	From 74 - Dale Road to North End Turnaround	1.53	226	LCB	9	18	87
490	Les Davey Road	From Community Centre Road to South End	0.89	75	LCB	9	17	84
1130	Canning Road	From McBride Road 6th Line to Donaldson Road E. 7th Line	2.02	108	LCB	9	18	85
1515	Sully Road	From 9 - Oak Ridges Drive to 18 - Rice Lake Scenic Drive	3.17	466	LCB	10	20	89
75	Jarvis Road	From Elgin Street to Danforth Road East	0.5	658	LCB	10	19	90
775	Ball Road	From Cornish Hollow Road to Ferguson Road	0.86	126	LCB	9	18	86

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Condition (/10)	Structural Adequacy (/20)	Condition Rating (/100)
670	Racetrack Road	From Crossen Road to 15 - Harwood Road	1.15	395	HCB	10	20	89
1167	Rice Lake Drive South	From 7 - Donaldson Road W to 9 - Oak Ridges Drive	2.17	383	HCB	10	20	89
905	Theatre Road North	From 74 - Dale Road to Bickle Hill Road	1.91	383	HCB	10	19	89
1365	Bamsey Drive	From Oak Hills Road to West End	1	242	LCB	10	19	88
470	Payne Road	From Van Luven Road to Start of LCB	2.6	108	LCB	10	20	86
1205	Johnstone Road South	From Beaver Meadow Road East to North End	0.44	11	HCB	8	15	82
60	Stanton Road South	From Workman Road to North End	0.15	22	LCB	9	18	83
1480	Lew Harris Road	From 520m S of 18-Rice Lake Scenic Dr to 300m S of 18-Rice Lake Scenic Dr	0.22	311	HCB	10	19	89
1145	Morton Road	From Vimy-Ridge Road 6th Line to Cavan Rd	3.69	197	LCB	10	20	88
1235	Tinney Road	From Linton Road to McKinlay Road	1.01	126	LCB	10	19	87
880	Jibb Road	From Harding Road to Bethel Grove Road 5th Line	1.73	269	LCB	10	19	89
1295	Gibbs Road	From Donaldson Road West 7th Line to North End	0.46	22	LCB	9	18	84
680	Crossen Road	From Conc IV, Lot 8/9 to 15 - Harwood Road	2.1	54	LCB	10	20	86
790	Smylie Road	From Baker Road North to Cornish Hollow Road	0.94	120	HCB	10	18	88
1567	Old Schoolhouse Road	From 30 m South of Ardagh Crescent to 18 - Rice Lake Scenic Drive	0.35	179	HCB	10	19	89
1525	Sutter Creek Drive	From Sully Road to North End	0.7	43	LCB	9	18	86
530	The Gully, Baltimore	From 45 - County Road 45 to Burwash Road	0.2	54	HCB	8	16	87
1240	McKinlay Road	From Tinney Road to 9 - Oak Ridges Drive	0.72	132	LCB	10	19	89
1445	Kelly Road, Gores Landing	From Snelgrove Road to Plank Road	0.54	317	HCB	8	15	91
1305	Benson Road	From Donaldson Road West 7th Line to 9 - Oak Ridges Drive	2.04	84	LCB	10	19	89
810	Wallace Jibb Road	From 18 - Burnham Street North to Dejong Road	1.7	65	LCB	10	19	89
15	Ron Harnden Road	From Danforth Road East to North End	0.72	48	LCB	10	19	89
485	Northumberland Heights Road	From Highway 401 to 0.6 km Northerly	0.6	22	LCB	10	20	91

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Condition (/10)	Structural Adequacy (/20)	Condition Rating (/100)
1690	Main Street, Bewdley	From Hunter Street to Lake Street	0.21	568	HCB	9	18	95
257	Haymur Street	From Lenore Avenue to Olivers Lane	0.12	54	HCB	10	19	98
1689	Mill Street, Bewdley	From Rice Lake Drive North, Bewdley to East End (Rice Lake Boat Launch)	0.05	54	HCB	10	19	98

Notes:

1. *Rehabilitation strategy to be confirmed by geotechnical investigations at detail design.*

2. *Timing of storm sewer/culvert work should be considered in conjunction with road reconstruction and vice versa, where applicable.*

6.3 Preservation Management

Preservation techniques seal the surface as to prevent water infiltration into the granular base. Route and Seal is used on HCB pavements to seal individual cracks. Slurry Seal / Microsurfacing is used on LCB and HCB pavements to seal large areas, although wide / active cracks will reflect through the treatment. An annual preservation management budget has been estimated as follows:

Cracksealing

- 122.1 km of paved roads (HCB).
- Assume that cracksealing will be applied, on average, once per resurfacing cycle.
- Annual cracksealing of 6.1 km / year.
- **Annual budget $30,500** (6.1 km x $5,000 / km **Cracksealing**).

Slurry Seal / Microsurfacing

- 122.1 km of paved roads (HCB).
- 153.4 km of surface treated roads (LCB).
- Assume that slurry seal / microsurfacing will be applied, on average, once per resurfacing cycle.
- 28.0 km of road to preserve per year (6.1 km HCB and 21.9 km of LCB).
- **Annual budget $765,500** (28.0 km x $26,000 / km **Slurry Sealing / Microsurfacing**).

The goal of preservation management programs is to extend the service lives of hard top surfaces lengthening the time between more expensive rehabilitation activities, reducing the long term costs of maintaining a pavement.

6.4 Roadside Maintenance

Preventative roadside maintenance is critical to prolonging the useful service life of a road and maximizing the capital investment. A continuous road and roadside maintenance program is recommended to reduce the road degradation rates. Ditch cleanout and clearing of vegetation from the right-of-way should be carried out on a regular basis. This can either be accomplished through dedicated internal Township forces or sub-contracting to private contractors. Consideration may be given to a dedicated capital program of ditch cleanout and clearing,

7.0 O. Reg. 588/17 Reporting Requirements

This study meets the reporting requirements under Table 4 of O. Reg. 588/17. For convenience, all items required under Table 4 are presented below, with the exception of mapping.

Table 12 – Road Class Density

Class	Lane-kilometres	Lane-kilometres / Municipal Area*
Arterial	0.00	0.00
Collector Roads	207.39	0.81
Local Roads	167.83	0.66
All	375.22	1.47

**Municipal area taken as 256.08 km²*

The average PCI for hard top surfaces in the Township is 80.4.

The average surface condition of unpaved roads is 8.0 as per the inventory Manual. This would broadly translate into a road with a "good" rating.

Descriptions that illustrate the different levels of road pavement condition are presented in the tables below:

Table 13 - Qualitative Descriptions of PCI for HCB Roads[2]

PCI Range	Qualitative Description
90 - 100	The pavement is in excellent condition with few cracks. The Ride Condition Rating is excellent with few areas of very slight to slight distortion.
75 - 90	The pavement is in good condition with frequent very slight or slight cracking. The Ride Condition Rating is good with a few slightly rough and uneven sections.
65 - 75	The pavement is in fairly good condition with slight cracking, slight or very slight distortion, and a few areas of slight alligatoring. The Ride Condition Rating is fairly good with intermittent rough and uneven sections.
50 - 65	The pavement is in fair condition with intermittent moderate and frequent slight cracking, and with intermittent slight or moderate alligatoring and distortion. The Ride Condition Rating is fair and the surface is slightly rough and uneven.
40 - 50	The pavement is in poor to fair condition with frequent moderate cracking and distortion, and intermittent moderate alligatoring. The Ride Condition Rating is poor to fair and the surface is moderately rough and uneven.
30 - 40	The pavement is in poor to fair condition with frequent moderate alligatoring and extensive moderate cracking and distortion. The Ride Condition Rating is poor to fair and the surface is moderately rough and uneven.
20 - 30	The pavement is in poor condition with moderate alligatoring and extensive severe cracking and distortion. The Ride Condition Rating is poor and the surface is very rough and uneven.
0 - 20	The pavement is in poor to very poor condition with extensive severe cracking, alligatoring and distortion. The Ride Condition Rating is very poor and the surface is very rough and uneven.

[2] Adapted from Table B-1 of the MTO's Manual for Condition Rating of Flexible Pavements, SP-024.

Table 14 - Qualitative Descriptions of PCI for LCB Roads[3]

PCI Range	Qualitative Description
80 - 100	Pavement is in excellent condition with just a few bumps or depressions from slight surface deformation. No surface defects such as streaking, potholes or cracking distresses. The Ride Condition Rating is very good.
60 - 79	Pavement is in good condition with just a few bumps or depressions from slight to moderate surface deformation. Intermittent slight to moderate surface defects and/or cracking distresses. The Ride Condition Rating is good.
40 - 59	Pavement is in fair condition with intermittent to frequent bumps or depressions from slight to moderate surface deformation. Intermittent to frequent moderate surface defects and/or cracking distresses. The Ride Condition Rating is fair.
20 - 39	Pavement is in poor condition with frequent bumps or depressions from moderate surface deformation. Frequent moderate to severe surface defects and/or cracking distresses. Localized slight to moderate alligatoring may be present indicating pavement structural failure. The Ride Condition Rating is poor.
0 - 19	Pavement is in very poor condition with extensive bumps or depressions from moderate to sever surface deformation. Extensive to severe surface defects and/or cracking distresses. Frequent slight to moderate alligatoring may be present, indicating pavement structural failure. The Ride Condition Rating is very poor.

Table 15 - Qualitative Descriptions of Surface Condition for Gravel Roads[4]

Surface Condition	Qualitative Description
10	If the section affords a fully adequate standard of service, with no annoyance or discomfort. Gravel roads rarely score a "10" rating due to their inherent roughness.
7 - 9	If it is possible to maintain the lesser of the Minimum Tolerable Average Operating Speed or the legal Speed Limit with only a noticeable amount of annoyance to the driver due to sway, vibration or steering effort, but with no noticeable feeling of hazard.
4 - 6	If maintaining even the lesser of the Minimum Tolerable Average Speed or the legal Speed Limit results in either a "tug-of-war" with a too-steep crown, or a feeling that the car is taking undue punishment.
1 - 3	If the surface irregularities are so severe that a driver will tend to reduce speed considerably, possibly even steering an irregular course, or if the crown is so steep as to be hazardous in winter.

[3] Adapted from Table B-1 of the MTO's Manual for Condition Rating of Surface-Treated Roads, SP-021.
[4] Adapted from Item 83 from the MTO's Ministry of Transportation's Inventory Manual for Municipal Roads (February 1991).

7.1 Replacement Cost

In conjunction with this Road Needs Study Report, a replacement cost for the road asset was calculated based strictly on roadbed materials i.e. sub-base, base and surface. Road design standards noted in **Table 9** were used to estimate the existing depth of road bed materials for the purpose of the replacement cost calculation.

The total replacement cost for the Township's road infrastructure is approximately $100.9 M.

Note this cost represents the theoretical road bed materials costs only and does not include items such as removal of the existing road bed, installation of signs, pavement markings, lighting, drainage infrastructure, property etc.

8.0 Summary

D.M. Wills Associates (Wills) undertook a review of the Township of Hamilton (Township) existing road network to assess its physical condition and confirm various road attributes. Data collected as a result of the field review was used to develop a prioritized listing of the road network needs based primarily on condition and traffic volumes.

Wills undertook the field study in September and October of 2024. A visual assessment of each road within the Township was undertaken to assess the current condition of the road**.**

Two primary indicators of the relative health of a road are the structural adequacy and surface condition ratings. The current average structural adequacy rating for the Township's road network is 15.3/20. The current average surface condition rating for the Township's road network is 8.0/10.

Preservation Management

In addition to addressing currently deficient roads (i.e. capital reconstruction), a dedicated preservation management approach is required, **and perhaps even more importantly**, to "keep the good roads good"; the fundamental principle being that it costs much less to maintain a good road than it does to let it fail and then reconstruct it, from a life cycle cost perspective. Ultimately, the goal of preservation management is to extend the useful life of a road and road network, maximizing the Township's investment over the road life-cycle.

Road resurfacing is an effective way of extending the overall life of the pavement structure and therefore a road resurfacing program is highly recommended. Roads with a structural adequacy of 12/20 or greater are included as candidates for potential resurfacing. Preliminary recommendations and prioritization for road resurfacing are based on condition rating and traffic demands on each road section, as per the Inventory Manual. A road with higher traffic volumes and fair structural adequacy is given priority over a road with moderate traffic and good structural adequacy score, in an attempt to intervene and extend the life of the road before it deteriorates to a level

that can no longer be resurfaced (i.e. more expensive reconstruction is required). Specific resurfacing treatment recommendations must be assessed through further field investigation and detail design effort, prior to selecting and implementing the resurfacing strategy.

Based on typical degradation rates for gravel roads, surface treatment, and hot mix, a total resurfacing program, (hot mix, surface treatment and gravel) is estimated at $2,856,700 per year.

Further to the recommendations above with respect to resurfacing, it is also recommended that regular maintenance in the form of roadside ditch cleanout and clearing be undertaken as a critical component to preservation management in order to extend the useful service life of the existing roads.

Capital Improvements

Preliminary recommendations and prioritization for planned capital improvements i.e. reconstruction, have been developed based on the condition rating and traffic demands on each road section, as per the Inventory Manual. Those roads identified as having a "NOW", or 1–5 year needs have been included in the capital improvement plan for reconstruction.

A total length of 57.1 km of roads were identified as having structural needs in the "NOW" or 1 – 5 year periods. The estimated cost to improve these roads is approximately $17.3 M.

An additional length of approximately 27.3 km of road is identified as having inadequate surface widths. Generally, provided no operational or safety concerns are identified, roads with surface width deficiencies are typically addressed/considered at the next full reconstruction cycle.

The time of inspection plays a significant role in assessing a road's condition. The field work for this study was carried out in September and October of 2024.

We trust the above and attached information will be of benefit to the Township and appreciate the opportunity to assist the Township in developing its road improvement plan.

Respectfully submitted,

Turner Kuhlmeyer
Transportation Engineering Intern

TK/vm

Statement of Limitations

This report has been prepared by D.M. Wills Associates on behalf of the Township of Hamilton. The conclusions and recommendations in this report are based on available background documentation and discussions with applicable Township staff at the time of preparation.

The report is intended to document the 2024 Roads Needs Study Report findings and assist the Township in developing budgetary plans for investment into their road network.

Any use which a third party makes of this report, other than as a Road Needs Study Report is the responsibility of such third parties. D.M. Wills Associates Limited accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or action taken based on using this report for purposes other than as a summary of the 2024 Road Needs Study Report findings.

Appendix A

Unit Price Form

ROAD IMPROVEMENT COSTS
Township of Hamilton

Unit Costs	Units	Unit Cost
Granular A	t	$ 20.00
Granular B	t	$ 18.00
Hot Mix	t	$ 175.00
Earth Excavation	m3	$ 18.00
Asphalt Removal	m2	$ 6.00
Asphalt Removal - Partial Depth	m2	$ 3.00
Removal of Concrete Curb & Gutter	m	$ 30.00
Concrete Curb & Gutter	m	$ 125.00
In-Place Full Depth Reclamation	m2	$ 4.00
Surface Treatment - Single	m2	$ 4.00
Surface Treatment - Double	m2	$ 7.50
Granular A Conversion	2.2	t/m3
Granular B Conversion	2	t/m3
Hot Mix Conversion	2.45	t/m3

Gravel (75mm)

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*		*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Granular A	7.0	75	2.2	t		1155	$20.00	$ 23	
							G	**23**	**(per Kilometre)**

Frost Heave Treatment

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*		*Quantity*	*Unit Cost*	*Cost/50m Digout (x 1000)*	
Earth Excavation	8.0	800		m3		320	$18.00	$ 6	
Granular A	7.0	150	2.2	t		115.5	$20.00	$ 2	
Granular B	8.0	650	2	t		520	$18.00	$ 9	
							FT	**17**	**(per Kilometre)**

Surface Treatment - Rural/Semi Urban - Single [ST1]

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*		*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Surface Treatment - Single (Overlay)	7.0			m2		7000	$4.00	$ 28	
							ST1	**28**	**(per Kilometre)**

Surface Treatment - Rural/Semi Urban - Double [ST2]

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*		*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Surface Treatment - Double (Overlay)	7.0			m2		7000	$7.50	$ 53	
							ST2	**53**	**(per Kilometre)**

Surface Treatment - Rural/Semi Urban - Double with Removal of Existing [ST2R]

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Surface Treatment - Double	7.0			m2		7000	$7.50	$ 53	
Removal Asphalt Pavement	7.0	16		m2		7000	$6.00	$ 42	
							ST2R	**95**	**(per Kilometre)**

Surface Treatment - Rural/Semi Urban - Double with Granular Base [ST2A]

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Surface Treatment - Double	7.0			m2		7000	$7.50	$ 53	
Granular A	7.0	150	2.2	t		2310	$20.00	$ 46	
							ST2A	**99**	**(per Kilometre)**

Surface Treatment - Rural/Semi Urban - Double with Pulverization and Granular Base [ST2PA]

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Surface Treatment - Double	7.0			m2		7000	$7.50	$ 53	
Granular A	7.0	150	2.2	t		2310	$20.00	$ 46	
Pulverizing	7.0			m2		7000.0	$4.00	$ 28	
Minor Items @ 25%								$ 7	
							ST2PA	**134**	**(per Kilometre)**

Surface Treatment - Rural/Semi Urban - Widening and Double with Pulverization and Granular Base [ST2PAW]

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Surface Treatment - Double	7.0			m2		7000	$7.50	$ 53	
Granular A	7.0	150	2.2	t		2310	$20.00	$ 46	
Pulverizing	7.0			m2		7000.0	$4.00	$ 28	
Earth Excavation	2	450		m3		900	$18.00	$ 16	
Granular B	1	450	2	t		900	$18.00	$ 16	
Minor Items @ 25%								$ 15	
							ST2PAW	**174**	**(per Kilometre)**

Resurfacing - Rural/Semi Urban Single Lift Overlay [RO1]

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction ** *	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Hot Mix	3	50	2.45	t	74	441	$175.00	$ 77	
Granular A	1.5	50	2.2	t		165	$20.00	$ 3	
Minor Items @ 15%								$ 12	
							RO1	**93**	**(per Lane Kilometre)**

Resurfacing - Rural/Semi Urban - Double Lift Overlay [RO2]

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction ** *	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Hot Mix	3	90	2.45	t	66	728	$175.00	$ 127	
Granular A	1.5	90	2.2	t		297	$20.00	$ 6	
Minor Items @ 15%								$ 20	
							RO2	**153**	**(per Lane Kilometre)**

Resurfacing - Urban - Single Lift Mill and Pave [RMP1]

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Hot Mix	4.25	50	2.45	t		521	$175.00	$ 91	
Remove Curb and Gutter				m		200	$30.00	$ 6.00	
Curb and Gutter - 20%				m		200	$125.00	$ 25.00	
Milling	4.25			m2		4250	$3.00	$ 12.75	
Minor Items @ 25%								$ 34	
							RMP1	**169**	**(per Lane Kilometre)**

Resurfacing - Urban - Double Lift Mill and Pave [RMP2]

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Hot Mix	4.25	90	2.45	t		937	$175.00	$ 164	
Remove Curb and Gutter				m		200	$30.00	$ 6.00	
Curb and Gutter - 20%				m		200	$125.00	$ 25.00	
Milling	4.25			m2		4250	$3.00	$ 12.75	
Minor Items @ 25%								$ 52	
							RMP2	**260**	**(per Lane Kilometre)**

Pulverize and Pave One Lift [PP1] Rural/Semi-Urban

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Hot Mix	3	50	2.45	t		367.5	$175.00	$ 64	
Granular A	1.5	50	2.2	t		165	$20.00	$ 3	
Pulverize	3			m2		3000	$4.00	$ 12.00	
Minor Items @ 25%								$ 20	
							PP1	**100**	**(per Lane Kilometre)**

Pulverize and Pave Two Lifts [PP2] Rural/Semi-Urban

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Hot Mix	3	90	2.45	t		661.5	$175.00	$ 116	
Granular A	1.5	90	2.2	t		297	$20.00	$ 6	
Pulverize	3			m2		3000	$4.00	$ 12	
Minor Items @ 25%								$ 33	
							PP2	**167**	**(per Lane Kilometre)**

Semi-Urban: Resurfacing and Widening - Residential (Single Lift Widening)

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction* **	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Earth Excavation	2	600		m3		1200	$18.00	$ 22	
Granular A	5	150	2.2	t		1650	$20.00	$ 33	
Granular B	5	450	2	t		4500	$18.00	$ 81	
Hot Mix	8	50	2.45	t	196	1176	$175.00	$ 206	
Milling	4			m2		4000	$3.00	$ 12	
Minor Items @ 25%								$ 88	
							RW1	**442**	**(widening one side)**

Commercial and Industrial (Double Lift Widening)

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Earth Excavation	2	600		m3		1200	$18.00	$ 22	
Granular A	5	150	2.2	t		1650	$20.00	$ 33	
Granular B	5	450	2	t		4500	$18.00	$ 81	
Hot Mix	8	90	2.45	t	353	2117	$175.00	$ 370	
Milling	4			m2		4000	$3.00	$ 12	
Minor Items @ 25%								$ 130	
							RW2	**648**	**(widening one side)**

Gravel Road Widening

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Earth Excavation	2	600		m3		1200	$18.00	$ 22	
Granular A	1	150	2.2	t		330	$20.00	$ 7	
Granular B	1	450	2	t		900	$18.00	$ 16	
Minor Items @ 25%								$ 11	
							GW	**56**	**(widening one side)**

Rural: Full Excavation and Reconstruction - Gravel (6 m surface width)

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Earth Excavation	5	600		m3		3000	$18.00	$ 54	
Granular A	3	150	2.2	t		990	$20.00	$ 20	
Granular B	5	450	2	t		4500	$18.00	$ 81	
Minor Items @ 25%								$ 39	
							Recon G	**194**	**(per Lane Kilometre)**

Rural: Full Excavation and Reconstruction - 1 Lift

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Asphalt Removal - Full Depth	3			m2		3000	$6.00	$ 18	
Earth Excavation	5	600		m3		3000	$18.00	$ 54	
Granular A	4	150	2.2	t		1320	$20.00	$ 26	
Granular B	5	450	2	t		4500	$18.00	$ 81	
Hot Mix	3	50	2.45	t		368	$175.00	$ 64	
Minor Items @ 25%								$ 61	
							Recon 1R	**305**	**(per Lane Kilometre)**

Semi-Urban: Full Excavation and Reconstruction - 1 Lift

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Asphalt Removal - Full Depth	3			m2		3000	$6.00	$ 18	
Earth Excavation	5	600		m3		3000	$18.00	$ 54	
Granular A	4	150	2.2	t		1320	$20.00	$ 26	
Granular B	5	450	2	t		4500	$18.00	$ 81	
Hot Mix	3	50	2.45	t		368	$175.00	$ 64	
Minor Items @ 25%								$ 61	
							Recon 1S	**305**	**(per Lane Kilometre)**

Semi-Urban: Full Excavation and Reconstruction - 2 Lift

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Asphalt Removal - Full Depth	3			m2		3000	$6.00	$ 18	
Earth Excavation	5	600		m3		3000	$18.00	$ 54	
Granular A	4	150	2.2	t		1320	$20.00	$ 26	
Granular B	5	450	2	t		4500	$18.00	$ 81	
Hot Mix	3	90	2.45	t		662	$175.00	$ 116	
Minor Items @ 25%								$ 74	
							Recon 2S	**369**	**(per Lane Kilometre)**

Urban: Full Excavation and Reconstruction - 2 Lift

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Asphalt Removal - Full Depth	4.25			m2		4250	$6.00	$ 26	
Earth Excavation	5.5	750		m3		4125	$18.00	$ 74	
Granular A	4.5	150	2.2	t		1485	$20.00	$ 30	
Granular B	5.5	600	2	t		6600	$18.00	$ 119	
Hot Mix	4.25	90	2.45	t		937	$175.00	$ 164	
Remove Curb and Gutter				m		1000	$30.00	$ 30.00	
Curb and Gutter				m		1000	$125.00	$ 125.00	
Minor Items @ 25%								$ 103	
							Recon 2U	**670**	**(per Lane Kilometre)**

Rout and Seal

Item				*Unit*		*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Rout and Seal				m		1000	$5.00	$ 5	
							RS	**5**	**(per Lane Kilometre)**

Slurry Seal

Item	*Width - m*			*Unit*		*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Slurry Seal	7			m2		7000	$3.75	$ 26	
							SS	**26**	**(per Lane Kilometre)**

Microsurfacing

Item	*Width - m*			*Unit*		*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Microsurfacing	7			m2		7000	$5.00	$ 35	
							MS	**35**	**(per Lane Kilometre)**

Semi-Urban: Upgrade to Urban - 2 Lift

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Asphalt Removal - Full Depth	4.25			m2		4250	$6.00	$ 26	
Earth Excavation	5.5	600		m3		3300	$18.00	$ 59	
Granular A	4.5	150	2.2	t		1485	$20.00	$ 30	
Granular B	5.5	450	2	t		4950	$18.00	$ 89	
Hot Mix	4.25	90	2.45	t		937	$175.00	$ 164	
Curb and Gutter				m		1000	$125.00	$ 125.00	
Minor Items @ 25%								$ 92	
							Recon 2U	**585**	**(per Lane Kilometre)**

Rural: Full Excavation and Reconstruction with 700mm grade raise - Gravel (6 m surface width)									
Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*	
Earth Excavation	5	450		m3		2250	$18.00	$ 41	
Granular A	4	150	2.2	t		1320	$20.00	$ 26	
Granular B	6	1000	2	t		12000	$18.00	$ 216	
Minor Items @ 25%								$ 71	
							Recon G	**354**	**(per Lane Kilometre)**